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Scatophagus argus

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The Editor accepts no responsibility for views expressed by
contributors.

Editor: Laurence E. Perkins

January, 1970

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Apistogramma corumbae

By Steve Forster

Having now a devotee of dwarf cichlids for some time I am always on the look-out for some of the less available species and so I was delighted, when on a visit to London, I obtained three specimens of *Apistogramma corumbae*, a fish which I had never seen before and for which reference details are few and far between.

The fish were rather small when purchased and were typical of other immature dwarf cichlids in that their colouring was very plain. After long discussions and numerous examinations of the fish in individual jars, it was thought (with some doubt still remaining) that the trio consisted of one male and two females.

On my return, the fish were placed in a 16 in. x 8 in. x 8 in. tank and fed on a diet of *daphnia*, whiteworm, fresh water shrimp and 'TetraMin.' Local (Central Scotland) water seems to be about right for most dwarf cichlids, as fish brought up from the South 'blossom' after a week. *Ramirezii*, particularly, develop colour intensity normally only seen on very few occasions. The water hardness is approximately 100 p.p.m. and is very slightly acid, 6.8 pH.

As the fish developed it became evident that the discussions in London had been worthwhile, as one of them was evidently a male with elongations to both anal and dorsal fins and a slimmer body shape. There was little change in their coloration at this time and as further searching for some previous published details had proved fruitless, I assumed that maturity was still some way off.

One of the females did not have the same growth-rate as her tank mates and she was removed and placed in a tank with some young *Kribia*.

A month passed and although the remaining pair grew slightly the increase in size was barely noticeable. The male at this time measured 2 in. and the female about 1½ in. in length. During routine morning feeding I noticed that the fins of the male were looking rather the worse for wear but due to the fact that I was already late for work (as usual) I didn't have time to remove him. That evening, however, I wished I had taken the time as his fins were now reduced to tatters and he was cowering behind the filter. Every time he stuck his snout from behind the filter, the female flew at him and worried him until he took the coward's way out and retreated. Due to these antics from the female, which was indicative of post-spawning behaviour of other dwarf cichlid females towards their partner, I removed the male to another tank and searched for signs of a spawning. No spawning was found and the female did not appear to be restless at my intrusions so I presumed that the trouble had been caused by the common cichlid trait of incompatibility.

The male, having fully recovered, was returned to his partner three weeks later. The tank furnishing at this time consisted of a 3 in. plastic flower pot, one flat stone, a slate arch and two clumps of Indian Fern planted in the gravel.

The following morning I checked the tank to see if the male had been the victim of any further attacks and on seeing the pair my immediate reaction was that somebody had placed two different fish in the tank. The male was a beautiful copper colour which shone with yellow undertones; the top edge of his dorsal fin shimmered with a blue/yellow tinge. The female, I was convinced, had turned into a small version of a female *Nannacara anomala* in breeding coloration. She kept flitting in and out of the flowerpot and examination showed about 40 reddish brown eggs laid on the inner wall of the flower pot.

The male was left in the tank and that evening and the next morning all was going well as he had assumed guard duties while the female mouthed and fanned the eggs. Later on that day the eggs had disappeared and as no fry could be seen wriggling about in the flower pot I feared that the spawning had been eaten. This proved to be the case as further examinations during the next few days produced nothing.

Dwarf Cichlids eating their first spawning does not now upset me as I have found through experience that this often happened with young pairs who proved to be excellent parents of subsequent spawnings.

Two weeks later no further signs of courtship made me decide to try the stimulus of separation and this was done for a period of two days. As this period did not improve the situation the pair was again separated, this time for a week.

I deliberately chose a Saturday morning to replace the male as I wanted to observe the proceedings, if any. After swimming round for a few minutes, familiarising himself with the tank, the male chased his partner behind the filter. On emerging a few minutes later they had again been transformed into the two "other fish" witnessed at the previous spawning.

Both fish had continued to grow slowly and the male now measured 2¼ in. while the female had reached the 1¾ in. mark and the copper sheen of the male was now much more resplendent. Fervent chasing ensued for 20 minutes and culminated in a typical cichlid jaw tugging. The female then proceeded to clean the same area of the flower pot as had been used for the previous spawning, and it was then noticed that her ovipositor was in evidence. No breeding tube could be seen in the male but he showed eagerness as his partner painstakingly carried on with her work.

This preparation carried on for most of the morning with

the male showing more and more impatience by entering the flower pot with increasing regularity and nudging the female. She, for her part, was determined to keep him at bay until the flower pot had been cleaned to her satisfaction.

At this time I took a quick break for lunch which I gulped down so quickly that indigestion seemed to be assured. My quick return was worthwhile, however, as I was just in time to see the first egg being deposited. As the female backed away the male then swam from outside the flower pot over the egg and fertilisation took place. Further deposits of 3, 4, 2 and 3 eggs were made but after this I could not determine the numbers laid as the eggs were closely packed together. Spawning lasted for about 35 minutes and looked to be about twice the size of the first spawning, i.e., about 80 eggs. The male was again left in the tank and again the spawning was eaten during the second day.

After liberal feedings of live food and 10 days' separation the pair spawned again. Whether or not I had disturbed them during spawning I do not know, but this time only 21 eggs were laid. The male was immediately removed and the female dutifully cared for the eggs. My hopes were again frustrated on the second day when once more the eggs had disappeared.

I departed that evening on a two-day trip to London convinced that the spawning had again served as a good meal. On my return I was surprised to see that the female still showed some of her spawning coloration and then "lo and behold" on top of the flower pot was a cluster of wriggling fry.

I screened off the tank using heavy wrapping paper to

ensure that the female would not be subjected to sudden frights which could result in the fry being eaten. Even with this precaution the following week was one of alternate soaring hopes and disappointing searches as the fry were in evidence one day, eluding the most prying of eyes the next, only to reappear when I had eventually given them up. The fry were about four days old before they became free swimming and as soon as this was apparent the female was removed.

Only seven fry survived to the age of two weeks but on reaching that age they progressed by leaps and bounds, eating everything that was offered to them including Tetra-Min fry food, powdered flake food, brine shrimp and sifted *daphnia*.

I should like to persevere with another two or three spawnings before resorting to artificial spawning methods as I prefer, where possible, to have the breeders care for their young.

In conclusion I would say that although *Corambes* are not difficult to spawn, rearing the young is not so easy. Four factors would seem to aid the possibilities of spawning and rearing:

1. Separation of the pair for at least a week.
2. Removal of the male after spawning.
3. As little disturbance as possible while the female is caring for eggs and young.
4. Removal of the female as soon as the fry are free swimming.

The pair spawned again as this account was being typed so once more, here we go again!

ALEXANDRA PALACE

Wood Green, London, N.22

10, 11, 12 JULY, 1970

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FURTHER NEWS IN OUR NEXT ISSUE

THE AQUARIST
& PONDKEEPER
FISHKEEPING
EXHIBITION

LIZARDS IN MALTA

□
By H. G. B. Gilpin, B.Sc.
□

MALTA, DURING MY stay there in July, was blessed with a temperature ranging from 85°-90°F., a state of affairs favourable for the existence of a considerable, very active, lizard population. We were staying in a bungalow near Mosta, almost in the centre of the island, which faced on to a sun-drenched garden enclosed by a hedge and two rough, dry stone walls. Geckos, mainly *Hemidactylus nericus*, but some *Tarentola mauritanica*, abounded on both the garden walls and the outside and inside walls of the bungalow.

It was interesting to see how firmly the geckos were bound to a regular pattern of life. Early in the morning when the sun was shining but the temperature, though high by English standards, well below the level it reached at mid-day, several were to be seen on the dry stone wall at the far end of the garden. For the most part they remained motionless for considerable periods but they were acutely conscious of any movement in their vicinity and disappeared with celerity into the nearest fissure the moment one approached within a distance of ten feet.

Towards mid-day and until about three o'clock, when the heat drove most humans indoors for a siesta, the geckos usually retired into the crevices between the boulders, coming out again as the first shadows fell across the wall. They were most active and most numerous in the evening and soon after dusk seven or eight were invariably to be seen on the exterior walls of the bungalow, remaining there until after ten o'clock at night. Most probably these were attracted by the night-flying insects drawn to the area by the light streaming from the windows. Switching on the light also brought out a number of geckos from their hiding places inside the bungalow.

During the day these remained hidden behind pictures, at the back of infrequently used shelves and wardrobes and in the less accessible reaches of kitchen furniture. Once out in the open they scampered over the walls and across the ceiling, clinging firmly to the slightly roughened surfaces with the aid of the innumerable microscopic hooks on the underside of the feet. Very occasionally a gecko would lose its grip and drop to the ground, in one instance breaking its fall by landing on a visitor's head. These involuntary

descents did not appear to damage the animals in any way and they scuttled off afterwards to the nearest cover.

These geckos proved uncommonly difficult to capture, with the single exception of one individual, who took refuge behind a curtain. It carelessly left its tail exposed and by gently grasping its body, through the material, the animal was secured with its tail intact. The only other gecko we caught at all easily was found in a stable where a number of them were waxing fat on the abundant spider population. In its haste to escape it ran head first into a particularly thick and resistant cobweb and was secured before it could extricate itself.

Each of the geckos living in and around the bungalow had its own, fairly limited, territory from which it rarely strayed. Once these areas had been discovered, one could rely on finding its inhabitant at almost any hour of the day. One big grey *mauritanica* was in permanent residence behind a crate standing against the back wall. If one approached quietly it could be seen clinging to the wall, basking in the morning sunshine, within a foot or so of its shelter, into which it darted the moment it detected the presence of an intruder. Another had taken up its quarters under the stairway leading to the flat roof and could be seen, any time one cared to look, during our entire stay at the bungalow.

The geckos living on the long wall at the bottom of the garden confined themselves each to a particular area. The space occupied by an individual was comparatively small, no more than a few feet across, but it was defended with considerable vigour by its established owner against intruders. Occasionally a gecko would stray into a neighbour's territory. When this happened the resulting battle was fast and furious. The actual damage done however was slight. In the various encounters I witnessed the invader was invariably driven off by the "rightful squatter" without either suffering any appreciable damage. The presence of several lizards bereft of their tails suggested though that the encounters sometimes ended less successfully for one than the other.

The garden appeared to provide ideal living accommodation for geckos, with few natural enemies to take toll of their numbers. The only predator I saw, offering a possible hazard to their safety, was a slim black snake, about two and a half feet long, which I glimpsed one morning as it disappeared expeditiously under a low growing vine, no doubt disturbed by my approach. Unfortunately, my view of this reptile was too fleeting for positive identification. Untoward casualties did sometimes occur, as in the case of a half grown *Hemidactylus nericus* which, in attempting to pass through a crack in the window frame, became jammed fast and died before its presence was discovered.

Although other species of lizards, particularly Lacertids, are commonly met with in Malta, none other than geckos were seen in the garden during my visit. Earlier in the year, before the ground had thoroughly dried out, a fair number of skinks—exclusively *Calcidiscus o. telligeris*—were to be seen, indeed this was the source of my present breeding pair of these handsome lizards. It appears that they require some degree of moisture in the soil and the arid condition of the ground in August had compelled them to burrow deeper than usual and none were visible on the surface during the time I was able to watch for them.

Continued on page 291

A Commercial Breeder's Notes on GUPPIES

By F. L. Vanderplank

ALL TOO OFTEN articles are written by people who have little experience in the subject; sometimes they have bred a fish not previously bred in captivity and then their limited experience is of value to all, but frequently articles are written by comparative beginners on breeding say guppies, angels and other fish that are bred in huge numbers commercially, and this is due to the indifference or refusal of commercial breeders to write about their livelihood; we have to be thankful to those who do write. I have been breeding fish here and in the tropics for the past 40 years, and still wonder whether I know enough about the subject to write with any certainty. At the moment I am concentrating on a few species of fish and guppies is one of them.

Last year I bred and sold over 15,000 exhibition quality males, and culled twice this number, so on this basis alone should know a little about guppies. As a qualified and professional (retired) Geneticist, I contend that a great deal of bunk is talked and written about the genetics and methods of breeding guppies. To give the detailed experiments I have carried out on this subject would be boring and I doubt whether it would be of any help, but my experiments and experience have proved to me as a commercial breeder that pure soft water is fatal to guppies, slightly acid water with a low salt content is also detrimental and that, in fact, guppies do best in hard water with a fair, or even high, calcium content and require all the essential trace elements; to ensure good growth and good colour, I regularly add trace elements to the water. My own guppies are in cement tanks from 300 to 1,000 gallons and the pH varies between 8.5 and sometimes rises as high as 11.0 without any trouble to the inmates. pH is regularly tested using an electric pH meter costing over £90 so is not a toy everyone

can afford, but as a commercial breeder and writer it is essential for me to be able to study changes in the pH without all the "palaver" of using indicators in test tubes, etc. Should the fish be overfed and the water start to become polluted, the pH drops and as the bacteria increase, the water becomes acid and this is when the trouble ensues. Normally my 6 to 10 thousand guppies are kept at 78-82°F, but the temperature is dropped every two or three days to 60°F when dirty water is syphoned off and clean tap water (pH 8.5 DH. 29°) is added. Fortunately guppies are not oversensitive to chlorine, as some fish are, in fact guppies can be adapted to live in sea water (pH 7.8-8.4). One very interesting point is the relationship between foods and their behaviour. If guppies are bred on dried foods containing three-quarters carbohydrates (starches, sugars, etc.) to one-quarter protein (dried shrimps, etc.) they do not generally eat their young, and are slow growing and are not aggressive, but when fed on raw liver, live foods such as daphnia, tubifex, micro and other worms, also mosquito larvae, they become very aggressive, grow quickly and eat their young, if they get the chance. Of course, in nature there are not hard and fixed codes of behaviour, starved or mineral short guppies fed on dried foods will still eat their young, and guppies which have masses of live food may not bother to eat their young. The slowness of growth and lack of aggressiveness in guppies fed on dried foods can be corrected to a large extent by addition of a single mineral (chemical) but this is one of my few trade secrets, and probably accounts for the reason why breeders are so unsuccessful here in producing first-class guppies by the thousand, instead these are imported from abroad where they are bred in very large ponds or amply supplied with plenty of running water of the right quality and temperature. Split caudal fins are a perpetual subject of correspondence within aquatic circles, naturally guppies with split tails are useless to a commercial breeder like myself and such unfortunates end up in the Oscar tanks (the quickest way I know of killing a guppy, therefore the least cruel). Aggressive guppies nip the tails of other inmates; live food such as tubifex although excellent for growth produces a lot of bacteria and with them split fins. Split tails occur most frequently in soft and acid water, with live and very high protein foods and with deficiencies of essential minerals, so to prevent split tails, which only occur with about 1 per cent of my guppies, I use a hard water (pH 8.4 up to 11.0), regular additions of trace elements and a well-balanced dried food, with a little fresh raw liver 4 or 5 times a week (the liver is less than one-twentieth of the weight of dried food supplied). Guppy genetics are a very complicated subject and if there is sufficient demand I could make a start with this large and complex subject in a later article.

Lizards in Malta—continued

The magnificent San Anton Gardens near Birkakara provided ample opportunities for watching lizards. Many Lacertids young and adults alike, including *Lacerta sicula cetti*, scampered across the sunny pathways and here and there geckos could be seen clinging to the rough bark of tree trunks. Most of the geckos congregated in the open fronted glass houses used for the propagation of plants. Here really large specimens of *Tarentola mauritanica* clung to the natural stone walls at the back of the buildings and to the wooden frame-work of the roof. Like those in the garden of the bungalow, they were nervous and although they remained motionless, staring with unblinking eyes at a visitor if he stayed a respectful distance away, any attempt to approach within arm's length sent them hurrying away.

THE ROACH (*Rutilus rutilus*)

By A. Boarder

IN THIS SERIES of British freshwater fishes I shall be writing about the fishes which are commonly found in these isles. I shall not deal with them in any family order but rather in either their popularity or commonness. This fish is rather variable and in some districts it may be rather slim more like the Dace (*Leuciscus leuciscus*), or in some cases deeper like the Rudd (*Scardinius erythrophthalmus*). The Roach is more likely to be confused with the Rudd than with the Dace, but there are differences in the teeth, the Roach having one row of pharyngeal teeth whereas the Rudd has two rows. Also the dorsal fin of the Roach begins almost above the base of the pelvic fins and that of the Rudd starts well behind the base of the pelvic fins.

The Roach is common in most parts of the British Isles, but it is not found in Ireland and not very frequently in the extreme west and parts of Wales. Its colour is a dark green on the back and silvery on the rest of the body. The fins are a reddish colour but not quite as red as those of the Rudd. When seen from above in its natural waters it is not very conspicuous as the silvery sides are not seen. Although it is found in rivers and still waters it does not seem to frequent rapid running waters as would the Trout (*Salmo trutta*).

The Roach can reach over 3½ lb., but it appears that it is only in special waters where they can reach this size. One of over 2 lb. would be considered a good catch by many anglers. It has been suggested that this fish might have crossed at times with the Rudd, which could account for the extra large specimens caught in some reservoirs. I remember fishing for the Roach in Star Tops End reservoir near Tring, Herts., many years ago, and if one of 1½ lb. was taken it was thought to be a very good catch. I do not remember many being caught there much larger than this. Yet in the same water a 12 lb. 14 oz. Bream was taken. I myself saw one of 11 lb. 9 oz. caught some years ago in this reservoir.

The food of the Roach consists of small live foods such as Tubifex, Daphnia, small water snails, caddis larvae and the larvae of many insects which live in the water. Small worms are taken and some of the larger specimens have been caught with this as bait. Anglers do very well with bread flakes, cheese cubes, boiled wheat and hemp seed, gentles and shelled shrimps. It appears that these fish will take a certain food in one water and ignore it in another. I remember catching Roach in the above named reservoir with boiled wheat but in the canal which it served, and not more than twenty yards away, one could never catch a Roach with wheat but only with cheese. On the other hand cheese would bring no success in the reservoir.

The Roach spawns in late April and May, and the driving is similar to that of the Goldfish. The eggs are laid in great numbers but singly, adhering to the water weeds in the shallows where the fish congregate in large

numbers to spawn. The eggs hatch from ten days to a fortnight according to the warmth of the water and the young fish shoal well for some time, and even when adult they will often be found in shoals. The flesh of the Roach is white but tastes extremely muddy when cooked. I could never tackle eating one myself as the bones were a nuisance apart from the strange taste.

As a fish for the garden pond it is not to be recommended as it has a bad habit of contracting Fungus disease. The Rudd is much to be preferred as this fish does not seem to contract the disease nearly as easily. It is probable that if very small Roach could be caught very carefully and placed in the garden pond they might thrive all right. The fish is heavily coated with mucus or slime, and it is almost impossible to catch one without removing much of this slime. As this gives protection against pests and diseases it can be seen readily that the removal of some of this protection leaves the fish open to infestations.

This fish is mostly a bottom feeder and so if in a garden pond it is not likely to be seen very well except in warm weather when it might bask near the surface. Also it can take flies from the surface occasionally when it makes a fine flash as it turns.

PRODUCT REVIEW

Aquarium Control Unit Review

"ELECTIDY" Aquarium Push-Button Electrical Control Unit, a product of 'Aqua-Service (Hayes), 237 Shakespeare Avenue, Hayes, Middlesex, price 22s. 6d.

When I received an "Electidy" aquarium control unit, I was surprised at how small it was. I had expected a much larger unit. It turned out to be a very compact and attractive little unit, about 3½ in. square, by 1½ in., made in white plastic. The front of the unit has two push-button switches, one for the aquarium light, and one for the air pump. The three core mains lead enters the unit from the bottom, and there are two openings at the top through which the wires for the pump, heater, thermostat and light leads enter and leave. The heater and thermostat are connected so that they are on permanently. The front of the unit is unscrewed so that the wire connections may be fitted to the screw-in connectors. The back of the unit, which is also of white plastic, is covered in foam plastic so that it can be glued on to the side glass, or back glass, of the aquarium making it easily accessible but inconspicuous.

This is a most attractive and efficient unit and should help put paid to the unaesthetic jumble of wires which often detract from the beauty of the aquarium situated in the living room or lounge at home. This unit should fill a long-standing need for the home aquarist.

B.W.

Surgical Success with an Anemone

By David Tafler

ON A RECENT VISIT to a local marine fish stockist, I noted a very beautiful golden anemone with vivid purple tipped tentacles. On attempting to buy the animal, I was told that its condition was very poor and that it would most probably be dead within the next two days, due to a disease which was attacking the outer edges of its disk. Not having noticed the affliction, I asked to have it pointed out to me, and sure enough, a small part of the outer rim of the disk was very jelly-like and bits of flesh were decomposing. The rest of the body seemed in good condition so I decided at this point to try to save its life. The proprietor and I came to an amicable agreement regarding its purchase and with the anemone in hand, I set off for home.

I allowed a 5 hour period for the anemone to settle down in a 10 gallon tank of freshly mixed salt water which had been heavily aerated and filtered. After much deliberation, I decided to use surgery as the disease was spreading very rapidly around the outer rim of the disk. I transferred the anemone to a shallow bowl with enough sea water to cover the animal.

My surgical instruments consisted of one sharp scalpel, a pair of stainless steel forceps and a pair of cow's ear scissors. These were all sterilized in boiling water and then dipped in "Milton" antiseptic as a final precaution.

Cutting as carefully as possible, I removed the infected parts and scraped away all the loose and decayed flesh. Small holes that had appeared in the body were scraped out and a large lump of partly digested food was removed from the stomach using the forceps. The anemone, by this time, was beginning to look a little sorry for itself. It had not, as yet, curled up and this made the operation a great deal easier. Finally, I dried all those parts that had had surgery and applied swabs of cotton wool soaked in 30 volume peroxide. This was washed off in tepid, clean,

"fresh" water and the anemone was returned to the tank.

I replaced one airstone with two of the olive wood types which produced a fine mist of bubbles throughout the tank. I then looked at my watch—3 a.m.—and I was exhausted.

The following morning, I awoke with pangs of anxiety and rushed downstairs to see the result of my efforts—expecting to find the anemone in its last dying convulsions. To my amazement, it was quite the reverse. "Goldy," as he was now affectionately called, had moved on to a piece of organ-pipe coral close to one of the airstones and was bathing himself in the air flow.

A month has since passed and Goldy's recovery seems to be complete. Those parts which had been removed, have grown back in a remarkably short time. This week he has found a new home in my community tank, where I hoped he would be befriended by a homeless clown fish, but sadly, he has been shunned by the clowns. I have noticed that if clowns do not take an interest in an anemone within a few days, they seldom ever do.

All is not lost; Goldy has found a companion in the form of a rather portly Domino Damsel. I first noticed his interest one evening, when all the algae had been cleaned off the rocks were Goldy had taken up residence. The Domino was systematically cleaning the rocks, when he rose above Goldy and with his head held high, waved his fins vigorously causing Goldy's tentacles to part, whereupon, the Damsel sank slowly into the centre of the anemone's tentacles and then immediately out again to clean more rocks. At one point, the Damsel went round the outer tentacles, sucking them into its mouth and blowing them out until Goldy was completely spring-cleaned. Then the Damsel departed never to return again. However, with the introduction of another clown into the tank, Goldy has found a true friend and he hopes to live happily ever after.

CARE OF GOLDFISH—SIXTY YEARS AGO

By Alan P. Major

THE GOLDFISH has been successfully bred and kept as a pet for centuries and still maintains its popularity today among children and aquarist beginners. I have a very old household guide which gives advice on all kinds of subjects and among the hints on the care of pets is a reference to goldfish. "Great care must be taken of Gold Fish," warns the guide, "as they are very sensitive and hence a loud noise, strong smell, violent or even slight shaking of the vessel will sometimes destroy them. Small worms, which are common to the water, suffice for their food in general, but the Chinese, who bring Gold Fish to great

perfection, throw into the water small balls of paste of which they are very fond. They also give them lean pork, dried in the sun and reduced to a very fine and delicate powder. Fresh river water should be given them frequently, if possible. Gold Fish seldom deposit spawn when kept in glass vessels. In order to procure a supply they must be put into reservoirs of a considerable depth, in some part at least, well shaded at intervals with water lilies and constantly supplied with fresh water." Some of this advice is still reasonably sound, but I am not sure about the lean pork!

Easily bred Locusts as food for Fish and Reptiles

By F. L. Vanderplank,
B.Sc., Ph.D.



FEEDING REPTILES and some fish can be quite a problem, especially larger species and varieties with large appetites to match. Recently I have found that not only can locusts be easily and cheaply bred in large numbers, but also they are greedily gobbled up by many species of fish, amphibians and reptiles. Two species of locust are readily available in this country, the Desert locust and the Migratory locust. Both have similar requirements and habits and can be treated the same way. Locusts can be purchased as adults, generally 24/- to 27/- per dozen or as nymphs (young) from 9/- per dozen. Although I have not seen egg-pods offered for sale, this would be the best way of buying them as postage would be cheaper, etc. No doubt if the demand was sufficient breeders would offer such. Like all insects, and other cold-blooded animals, the growth rate of locusts depends on temperature. Locusts can tolerate low temperatures of 40°F for short periods, 60°F for long periods up to 2 weeks, but for rearing and breeding temperatures should be between 70° and 85°F. Locusts are now extensively reared and bred in schools where they are used for the study of chromosomes. In schools they are generally kept at room temperature with the addition of a tungsten electric lamp (or lamps) in their cages to give extra warmth and light during the daytime. Locusts require a rest period at night

and temperatures in many parts of Tropical Africa often fall below 60°F at night and in some places to as low as 40°F for 2 or 3 hours. I keep Desert locusts at an average temperature of 78°F because my fish house is controlled at that temperature, but I also give their cage which is 4 x 5 x 2 ft. high two 75 watt electric (tungsten) lamps, which are switched on from 8 or 9 a.m. till 5 or 6 p.m. At 78°F adult locust pair several times and the females start laying some ten days later. Females lay egg-pods containing 50 to 100 eggs and to do this they require 4 inches of damp sand or grit; they are stupid senseless creatures and seem to have difficulty in finding pots of sand put in for the purpose, so I use deep seed trays for this purpose and give them several so that they cannot fail to find them. Females will lay 2, 3, 4 even 5 egg-pods, in the wilds they lay many more, but 2 or 3 hundred young locust from each breeding pair is more than enough. The sand must be kept moist but not waterlogged and at a temperature of 78° to 85°F the eggs hatch in 10 to 14 days; the young emerge out of the sand like worms, then take in air and swell up and look like the small locusts or the grasshoppers they are. Food should be ready; the easiest way of feeding newly hatched locust is having trays of germinated and growing wheat or rye grass seed. One point to watch if you use grass seed is to make sure it hasn't been treated with any insecticides or other chemicals, as so much grass seed is treated these days. Besides growing wheat or grass the young locust should be given bran. They grow very quickly and in a few days they change skins; as they grow they want protein and a little dried shrimp or flaked fish food provides this needed protein and is one of the secrets of successful rearing of numerous locusts. Instead of giving them cultivated wheat or grass they can be fed on wild grasses, and seem to be very partial to couch and rye grasses. There are some grasses they don't like and these are soon discovered and should be avoided. Depending on temperature and providing plenty of food is provided regularly they take about a month to become adult. Newly hatched locusts are not much good for anything, but after feeding for 2 or 3 days they can be fed to fish such as all the Cichlids, Butterfly fish, in fact any fish that takes live food and is big enough to take small locusts. Obviously the larger the fish, the larger the locust should be—it is more economical to feed large locusts to large Oscars or other Cichlids.

I find that six inch Oscars can eat two adults a day, 8 and 9 inch Oscars eat 4 or 5 adults besides other food. Locusts are excellent food for frogs, toads, lizards, geckos and snakes, which are often difficult to find sufficient live food for, and locusts, as most of their food is bran or grass and it is so cheap and so many can be reared in a relative small space and short time, are most economical. At 78°F the life cycle takes 2 weeks for the eggs to hatch, 4 weeks to become adult, 3 weeks to mate and develop their eggs, a total of 9 weeks, at lower temperatures the cycle may take up to 26 weeks, death rates are very high at low temperatures.

Locust breeding cages can be aquaria or wooden frames covered with a polythene (netlon) or nylon netting (cotton is liable to be eaten). They should be protected from cold draughts and cleaned out regularly, they like twigs to climb about on, and this allows one to get many more inmates in a cage than one could normally expect. Care should be taken to see that the electric light bulb cannot set the cage or netting on fire, I burnt down a shed some 40 years ago, due to this type of thoughtlessness.

From a Naturalist's Notebook

By Eric Hardy

THE SCHELLY, a freshwater Coregonid or whitefish long known in Cumberland's Ullswater, Brotherswater, Loweswater, Haweswater and Red Tarn, and called *Coregonus stigmaticus* or a variety of the powan, *C. clupeoides*, or known as a geographical race of the vendace *C. vandesius*, sometimes enters the river-outfalls of these lakes. In the autumn of 1969, a "grayling" caught by a young angler in the upper Eden was proved to be a female schelly, ripe with eggs, and 13½ inches long. Another race, the larger-eyed Gwyniad of Llyn Tegid, the Welsh Lake Bala, which has 9-10 longitudinal rows of scales where schelly have 8-9, has been taken so far down the Dee as near Chester in 1951 and 1937 on maggot bait, as well as at Llandrillo. It does not normally enter the rivers, and it would be interesting to know if these were wandering in search of spawning grounds which are usually the hard bed of the lake, or were swept down by floods. The Eden fish was caught in a relatively dry period.

Sudden death among grey mullets kept in a marine aquarium coincided with brown water and the odour of iodine, states a report I received recently from the Israeli sea-fisheries research station at Haifa. R. S. Gozlan subsequently isolated iodine-producing bacteria, which catalyse the oxidation of iodide to iodine. The species hasn't yet been named.

Sixty-six fish of 33 families were observed recently in the Gulf of Aqaba, the north Red Sea, off Eilat, by Enrico Tortonese of Genoa Natural History Museum. He describes in Bulletin 51 of the Haifa station what he found by diving by day and by night. Thirty-four of them live among the coral-reefs and some are now—like the strange *Centricentrus scutatus*—in the aquarium, or the museum, at Eilat. He wonders if the Red Sea's lizard-fish (*Synodus variegatus*) is dimorphic, with red and green colour-forms, the latter living in shallow water, as has been observed with the Japanese and Hawaii species. It shares the sandy bottom with the related, brightly coloured *Trachinocephalus myops*, horizontally striped in blue and yellow. Brightly dotted with blue on a red body is *Cephalopholis minckleyi*, a coral-dwelling sea-perch. Shoals of bright blue Lutianids, or snappers, with black tips to their tails, called *Caesio lunaris*, haunt the reefs. Conspicuous red mullets on the sandy areas between coral reefs are *Parupeneus macronema*, well marked by a black lateral line and a black spot on their bright yellow tails.

Prettily marked Chaetodonts, like *chryserus* and *Cantabrigaster*, are common in pairs. The brilliant colours of many of these fish, like the clear blue, pink and yellow of the labrid *Hemipteronotus pentadactylus*, fade rapidly after death. Others like *Siganus rivulatus* (an immigrant through the Suez Canal into the eastern Mediterranean now abundant at Beirut) quickly change colour from dark to pale, or from spotted to almost plain. A Lagocephalid called *Amblyrhynchotes hypselogomion*, for want of a better name, produces a peculiar sound by moving its jaws when handled. The purpose of Tortonese's survey was to understand better the relation between Indo-Pacific and Mediterranean fishes.

It is better to preserve our interesting native fish than to stock waters with aliens that may endanger indigenous species? Because the Siamese walking catfish *Clarias batrachus* is drought-resistant, because of its abilities to estivate or spend summer in a torpid state, authorities have failed to control its spread in Florida's freshwaters where it competes so successfully with native fish for food and space that the Federal bureau of fisheries and wildlife is trying to restrict the importation, or acquisition, of any live fish or eggs of the family Clariidae after this year (1969). It can even migrate overland to find water. But many different fish share the name "catfish."

In Britain, the Danubian catfish, known also as wels and sheat-fish, has been introduced to Woburn Abbey, the Thames at Molesey and the Clayden Lakes near Winslow, Bucks., as well as Marsworth Reservoir, Tring (1909).

Large-mouthed American black bass, introduced from Hazlemere trout farm, are in Send Gravel Pond, Woking. In 1878 earlier experiments tried them at Scotland's Dunrobin Castle and at Eynshill Hall, Oxfordshire, when fry were also introduced to White Water Lake at Nurligh House near Stamford, lakes at Rushden and Sandringham, as well as the rivers Welland and Nene. In 1884 the National Fish Culture Association reported the Stamford offspring voraciously eating up all small fish.

Golden orfe were established at Woburn Abbey lake, London's St James's Park, Hillfield Reservoir (Elstree), and ponds in Essex, etc. Continental pike-perch (*Stizostedion lucioperca*) were also introduced into Woburn Abbey lake, the River Deiph at Welney in Cambridgeshire, Firbanks Pit, Leighton Buzzard, Claydon lakes waters between Tamworth and Burton, and in Northants. Eggs of American pike-perch or wall-eyed pike were introduced into the Ouse in mistake for black bass at Earith Bridge before the war. Continental bitterling, from anglers' discarded livebait, established themselves in canals and "dams" in south Lancashire, west Cheshire, south Yorkshire and the London area. The Nene and Welland Fishery Board caused some concern in 1948 by proposing to introduce India labios carp, while the Central Electricity Authority hasn't achieved much success in its experiment to establish similar giant Indian grass-carp, and the Ministry even suggested using them for aquatic weed-control.

Young Danubian huchen-salmon from Denham Hatchery, near Uxbridge, introduced to the Thames at Taplow and Hedsor in 1906, only just survived to modern times; but not the Canadian ouananiche (land-locked) salmon put into Loch Tay in 1895. "Rainbow trout" introduced widely into lakes and some rivers, compete strongly with native brown trout but are really American steelhead (*Salmo irideus*) not true American rainbows (*S. gairdneri*). American "brook trout" introduced to the Cumberland Eden, Westmorland Kent, and other rivers are a char, *Salvelinus fontinalis*. Of course our carp and grayling are widely established aliens in British waters. Grayling are burned on the banks of the Eden in "skelly-fuddling" as they compete for the food of trout and salmon—but so do native dace there and in the Wye!

OUR READERS WRITE



The *Barbus* Question

Some years ago a story circulated about an American Presidential candidate, who had a reputation for being somewhat behind the times, to what that, when asked what he would do in case of nuclear attack replied: "Well, first I would draw all the wagons together in a circle . . ." It would appear that Herbert R. Axelrod (see *The Aquarist*, October 1969, pp. 212-213) is also drawing his wagons together in a circle, and his reasoning as well.

To bring Mr. Axelrod up to date, and to calm his ruffled feathers concerning "qualifications" and "authorities," I would like to add to his education. Writing in the prestigious *Stanford Ichthyological Bulletin* (not to be confused with any aquarium magazine), Vol. 7, No. 4, Dr. George S. Myers, Curator of Zoological Collections, Professor of Biology, and a renowned teacher of American ichthyologists, at Stanford University, stated: "Recently there has appeared in a popular aquarium magazine an article by L. P. Schultz (1957) which seems to have been published principally to uphold its author's ideas on aquarium fish nomenclature. He claims to have worked on the *Barbus* of Europe, Asia and Africa, states that *Barbus* is not found in tropical Africa or southern Asia, and refers several African species to the Asiatic genus *Puntius*, mostly on the superficial characteristic of the number of barbels. Where he would place numerous African and Asian species that are obviously not *Puntius*, *Capoeta*, *Barbodes* or *Barbus* (in his restricted sense) he does not say. Nor does he give a reference to any scientific paper in which his presumably extensive tri-continental revisional studies or evaluations of characters are published. It would seem as if the author were unaware of the extent of the evolutionary problems involved, especially in regard to the numerous and confusing phyletic lines that must be patiently untangled before anyone can assert that he has a key to generic differentiation within what has been called *Barbus*. For the present, the writer believes that Schultz' conclusions are, to say the least, premature, and require the support of much more extensive and prolonged anatomical and phylogenetic research before they can be accepted. It remains to be pointed out only that his nomenclatural findings are not always trustworthy. Without carefully reading the International Rules, he has (with others) assumed that *Cyprinus puntio* is the type of *Puntius* by the rule of absolute tautonymy. *Puntius* and *puntio* are spelled differently and the cited rule does not apply."

In the *Bulletin of Zoological Nomenclature*, Vol. 18, Pt. 3, June 1961, J. J. Hoedeman of the Zoological Museum, Amsterdam, The Netherlands, said this of the Schultz'

article: "Schultz' statement (1957, *Tropical Fish Hobbyist* 5(4):15 that 'Day, 1870 (*Proc. Zool. Soc., London*, p. 100) redescribed *Barbus puntio*' and that 'Hora & Mukerji . . . also recognize this species as *Barbus puntio*, which definitely gives it taxonomic status,' is not true and is wrongly interpreted." (Italics mine.)

After my own summary of the situation in the pages of *The Aquarist*, Dr. Stanley H. Weitzman, Curator and Supervisor, Division of Fishes, Smithsonian Institution, wrote to this magazine (Our Readers Write, June 1969, p. 86). Unfortunately the printer omitted Dr. Weitzman's title and institutional affiliation: "I have just read your reprint of Mr. Klee's article on the nomenclature of barbs in the February 1969 issue, p. 693. I wish to add my endorsement to Klee's article."

Furthermore, Mr. Anthony R. Coles (see Our Readers Write, May 1969, p. 58) telephoned Dr. K. Banister of the British Museum to find out if Dr. L. P. Schultz' classification was still used by professional ichthyologists. Mr. Coles wrote: "His answer was the same as that of Mr. A. J. Klee." Continuing, Mr. Coles stated: "Later I went to see Dr. E. Trewavas of the British Museum (Natural History). She explained to me the classification of the genus *Barbus* and pointed out examples of where Dr. L. Schultz' classification was incorrect." (Italics mine.)

How now, Mr. Axelrod? Qualifications sufficient? I amend my previous statement that "the vast majority of American ichthyologists" agree with my position on *Barbus*, to include eminent British ichthyologists as well!

ALBERT J. KLEE,
Editor, *The Aquarist*

What occasions this letter is the reprinting, in your October issue, of Dr. Schultz's 1957 paper from "The *Tropical Fish Hobbyist*" on the generic names *Barbus* and *Puntius*, together with a quotation from the editor of that magazine to the effect that Mr. Klee is unqualified to criticize Dr. Schultz. Whether or not Mr. Klee has that competence is immaterial, for he was only using some parts of my own criticism of Dr. Schultz's paper, which I published in the "Stanford Ichthyological Bulletin" in 1960. I suggest that I was, and am, qualified to criticize Dr. Schultz's paper.

What is more, although the taxonomy of *Barbus*, in the broadest sense, is still in confusion and thus mere opinion still enters the case, Dr. Schultz did make one important nomenclatural error. That was the acceptance of *Barbus puntio* as the nomenclatural type species of the generic name *Puntius*. *B. puntio* is not *B. sophore* is, under the International Code of Zoological Nomenclature. Thus, even if

Schultz were right about separating the Indo-African species into genera on the basis of barbel number (which I suggested is probably an artificial arrangement), his application of the names is wrong. Because *B. saphora* has four barbels, the generic name *Puntius* would go with the four-barbelled group, replacing the much later name *Barbodes* in Schultz's list.

Inasmuch as Dr. Schultz has apparently published nothing on the subject since my paper came out in 1960, it is to be presumed that he accepts the above nomenclatural criticism, even if he still persists in overlooking the basic evolutionary, taxonomic and practical objections to his generic arrangement that I brought forward. As I said, it would seem, at first sight, that the European species of *Barbus* (to which the generic name *Barbus* must apply under any circumstances) are not very similar to most African and Indo-Oriental species, but no published study known to me has dealt in depth, and from the necessary evolutionary viewpoint, with the main problems involved. Schultz did so only superficially, and in small part. Until somebody does make such a profound and far reaching study, my 1960 criticism needs no change.

I suggest that you perhaps owe your readers the full critique of Schultz's 1957 classification that was published nearly a decade ago, and I enclose a copy of my 1960 paper. I give you permission to publish it *in toto* in *The Aquarist* if you care to do so, with the proper credit.

GEORGE S. MYERS,
Professor of Biology,
Editor, "Stanford"
Ichthyological Bulletin."

See preceding letter from A. J. Klee who quotes from above-mentioned paper. (Ed.)

A "Standard" Terrapin for all Temperatures

Because of my experimental work with hardy fresh water turtles I become now and then the unwilling owner of small tropical and subtropicals—which are left to die on me.

The owners, more often children, have purchased the creatures from local shops. Neither the child nor the salesman has any idea what conditions suit these turtles. It seems immoral to me that the importation and sale to all and sundry of these turtles is permitted.

There are always those who come to the defence of "Pet" shop salesmen when I complain of their crass ignorance but a case in point occurred here last autumn.

A neighbour bought what she was told was a tropical

terrappin so she stood the tank and water on top of a boiler in the kitchen. The terrapin escaped and was presumed dead. The lady then sent a child to the same dealer to buy a hardy terrapin. This the dealer was pleased to supply. In the meantime the tropical was found behind the boiler.

The perplexed neighbour called me in to view both creatures. Both were of the same species—a species quite unknown to me. I could but suggest that warm conditions should be tried and I am pleased to hear that both are feeding well.

BRIAN FURNER, F.L.S.,
38 Northend Road,
Erith, Kent.

Brine Shrimps Galore

In the *Tropical Queries* column of October issue the raising of brine shrimps was mentioned. I have successfully done this and found it interesting as well as useful: plastic boxes of the kitchen variety (3½ in. deep, 10½ in. long with flat lids) were set up and stocked with hatchings over several days, fed alternately on Liquifry (green variety) and yeast infusion. No aeration at all. Within three weeks shrimps were ½ in. long and large enough for fishes' snacks. But curiosity got the better of me and lots were left to grow on.

And on: they reached maturity, females bright red/brown, males a sandy brown colour and with a sort of loop on their heads; bodies of all a good ½ in. long, plus tails (females' tails longer), eyes bright black and prominent, and lots of feathery legs busily churning. The loop on males' heads is for attaching them to females, I have seen as many as three so attached to one female which swam gaily on apparently unperturbed, and they stay there for as long as two days.

Then females appeared to have flat creamy-coloured "panniers" on their backs, which gradually turned red-brown, then dark brown. Presumably these discharge the eggs and are immediately replenished, as I never saw a mature female without her "pannier" at some stage of its development.

The eggs duly hatched and I had constant supplies of shrimps of all sizes which were harvested once a week for young or small fishes. The only drawback here is that you cannot avoid including a goodly number of unhatched eggs, not recommended for very young fry.

I did intend to establish the full life cycle of a shrimp; at the end of two months I found one or two turning grey and slowing up considerably which may have been caused by old age as the rest were still lively and healthy and bright-coloured. Because of the floating unhatched egg problem I have disposed of the entire breeding stock (Angel fishes thought it was Christmas!) and, having satisfied my curiosity, in future will use the shrimps at the point of maturity; the value of these through the winter will be readily appreciated, and it is possible to stack up several boxes of the type I have, on the kitchen windowsill and harvest in rotation.

MRS. DAPHNE HUTCHINSON,
Northumberland.

The Good Earth

John Lowndes, the author of "Is Your Tank Safe?" in your November edition, may have left many aquarists and their fishes in an even more dangerous situation than that

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in which his advice found them. He does conclude his article with the recommendation that one should switch off the mains supply before handling a tank. This excellent advice may well go unheeded by anybody who has followed the preceding instructions and, he thinks, rendered his installation "safe." It will, almost certainly, be ignored by young children in the home!

It is essential, when earthing for safety's sake, to earth everything. If this is not possible, it is far safer to earth nothing. As an example of what can happen to Mr. Lowndes, it is possible to achieve a high degree of insulation resistance between the metal frame of an aquarium and the water which it contains, especially with the increasing use of silicon-rubber sealants. The occurrence of a heater or thermostat fault in a well glazed tank would make the water "live" until it was earthed by some unsuspecting person, a child, perhaps, putting one hand into the water and resting the other on the earthed frame. The result is absolutely shocking!

If an aquarium frame is earthed, the water, stand, lighting reflector and any other part of the installation which can but would not normally conduct electricity should be connected to earth. Water is best earthed by using a stainless steel screw, which is long enough to reach into the water, as the earth terminal for the frame. Other components are easily earthed by drilling them to take a screw and nut terminal.

It is not necessary to lead earth connectors across one's room, bore holes in the window frame, and drive spikes into the flower bed beneath the living room window. The Electricity Board's earth, available at the large pin of the same power socket which supplies the tank, is adequate. It is rarely at more than a fraction of one ohm above "true earth," a state impossible to achieve otherwise without laying extensive earth mats in one's garden and watering the ground regularly!

Fishes, if their opinion were sought, would doubtless elect to occupy a tank which is isolated from earth. They can live in water which is "live" at any potential, without their even being aware that it is so. When a fault develops in an earthed tank, electrical current flows, which results in the electrocution of the inmates or the blowing of the supply fuse, or both. A blown fuse can prove particularly expensive on a cold night where more than one tank is supplied from the same fused plug.

A "floating" installation should never be used unless it is certain that only responsible adults have access to it. It is even more important, in such a case, to ensure that the mains supply is disconnected before the equipment is handled.

Since I do not wish to endanger the lives of other readers' young children, I will conclude by saying that whereas I prefer to earth nothing in my own set-up, I would recommend that anybody in the slightest doubt should earth EVERYTHING in theirs. Above all, never half and half!

R. S. HOLMES,
Peterborough.

Import of Marines

I feel that some comment is required on the feature headed "The Rigours of Importing Marines" written by Trevor Wild for the November issue of *The Aquarist*.

The final sentence: "So next time you grumble over the high cost of marines, remember, many fish have died so that you can keep the remainder in your homes" is a most incorrect summing up of the situation which exists today, as far as the trade is concerned. If Mr. Wild's experience was typical of the normal commercial importation then indeed the concluding sentence of the feature would be valid. However, it must be realised that we importers not only require to receive our shipments with the barest minimum mortality in order to make the consignment a profitable prospect, but we also require the fish to be received in good condition so that they will not suffer undue mortality after their arrival. Marine fish which arrive in a poor state of health will require a long period of quarantine and conditioning before they can be resold, and the longer they have to be so accommodated the less profitable they will be.

Let me hurriedly admit that in the past I have suffered the anguish of receiving some shipments of marine fish which might have been in a pitiable state on arrival, but shippers who send out consignments which might be received in such a bad condition have been quickly dispensed with! I also admit that at one period I ceased to deal in marine fish because I was unable to find a supplier who was willing to condition the fish properly in the face of a rapidly growing demand. Such action is necessary when high mortality is experienced, and I do not accept that a situation where an importer is willing to accept continued series of shipments with high mortality being a regular feature of such shipments, and the consequent necessity to price the survivors high enough to make a profit on the deal, would exist in Britain today.

I would assure the hobbyist that the prices asked by the established trader who is known to charge reasonable prices for his stock, both freshwater and marine, will be based on fair margins. There are, of course, some traders who charge high prices for most of the stock they handle and it is not possible to quote "normal" retail prices because of this but, by and large, I feel sure that those importers who are importing marine fish regularly, are charging reasonable and competitive prices for their stock.

The difficulty of obtaining the services of a really good supplier is a very real one. Following the period already mentioned when I did not import more than the odd box of marine fish, I was fortunate enough to have the opportunity to call on my present supplier, Mr. Earl Kennedy of Manila, The Philippines, and I saw breathtaking Indo-Pacific marine fish accommodated in his compound which were being held in pools and aquaria undergoing a process of acclimatisation to captivity. The fish were obviously excellent. The main snag I then had to consider was the length of time it would take to ship the fish from these remote islands to London . . . fully twice as long as from my previous suppliers in Ceylon and East Africa. Past experience of hauls almost as long as this was restricted to some unhappy results experienced with Singapore shipments. However, having ascertained that Mr. Kennedy would supply me I went ahead and arranged for a favourable freight rate to be introduced for the consignment of live fish from Manila to London, and made my first attempt

with fingers tightly crossed. The result was excellent, and in January too!

Since then, many shipments have been made and the results have been outstandingly good. A recent shipment was held up by fog and when the fish were finally unpacked they had been in their boxes for more than 48 hours, yet out of more than 600 fish only five damselfish were found to be dead, and three other fish were suffering from exhaustion to an excessive degree. The main difference between the fish of mine, which were delayed for the same length of time as Mr. Wild's, and those he received was that the shipper of my fish is an experienced professional at the job and knows how to apply the techniques he has learnt through experience to every shipment. I imagine that the shipper of Mr. Wild's fish has far less experience and probably less adequate facilities for the conditioning of the fish before shipping them.

Although many marine fish are captured some time before they are assembled for shipment, they are often held in cages anchored in the sea, and rarely held in aquaria and subjected to any degree of acclimatisation before shipment. Therefore, even the survivors of shipments consisting of fish taken from these cages, or actually caught from the reef to order, will need to be taught to feed and accept such strange surroundings as aquaria, electric lighting, bleached corals and other unfamiliar furnishings all in one go. The shocks and stresses so inflicted must be overwhelming. I am sure that you will find the regular importers of marine fish are being supplied from better managed sources.

No, Mr. Wild, you are paying the high price you do for your marine fish, for many better reasons than that of making up for high mortality suffered in transit. In the case of my own firm the price factor is purely controlled by the fact that I am willing to pay a higher price for the best available supplies, and I am willing to haul these fish very much farther than most other importers and pay twice as much freight as a result. Also, of course, duty has to be paid on fish from The Philippines. Apart from these obvious high costs I have to place my orders by International telephone calls as the postal service in Manila is not so good. In fact, I pay twelve times as much for a Copperband Butterfly Fish (*Chelmon Rostratus*) from the Philippines as I would have to pay for the same specie in Singapore, but the fish are received without mortality, and they are feeding the day after they have been unpacked. In view of this result I consider them a bargain at the price. A typical result from any one of three shippers I have had Chelmons from in Singapore would be one to three fish alive out of twelve received, and the probable loss of one more within 24 hours of being unpacked. Any survivors will prove difficult to acclimatise and start feeding successfully. Occasional Singapore shipments would, admittedly, prove the exception and better results might be experienced.

Obviously, any importer dealing regularly with Singapore marine fish shippers must be enjoying better results than I have had, otherwise their business together would have been terminated long ago, and I believe that it is largely a question of how capable and conscientious one's supplier is that controls the success of individual shipments, whether marine or freshwater.

No longer are marines being imported solely as a side line by importers of freshwater fish, but we are now seeing the emergence of marine specialists, notably Seaquariums of Croydon in this country, and these people have to establish

contacts with good shippers and enjoy good results in order to remain in business. Perhaps the lesson to be learnt from Mr. Wild's experience is that importing is an activity for the professionals.

MAX GIBBS,
The Goldfish Bowl, Oxford.

Re. Is your tank safe November Issue

I feel that I must write and correct a statement made by John Lowndes in the above article.

His method of driving a piece of conduit pipe into the ground for earthing is very dangerous and most unsatisfactory because:

1. After a time the conduit will rust and become ineffective.
2. In some areas because of the nature of the soil this method will not provide satisfactory protection.

There is only two satisfactory ways of dealing with this problem.

1. To run an earth wire from the tank to the existing installation earth (usually connected to the sheath of the supply cable if underground type) or if earthing is non-existent, the fitting of an earth leakage circuit breaker is essential.

2. To test if the resultant installation is entirely safe an earth loop impedance tester is required. This is an instrument usually owned only by qualified electricians. Whilst writing I would be glad if you would include the following in "What's your opinion," column.

First tip that may be useful to readers, when I have had a good harvest of Daphnia I place some in small plastic containers and put them in the deep freeze compartment of the fridge I can then drop these cubes into the aquarium and as they melt they release a trickle of food which the fish seem to enjoy. I think this would also kill any unwanted pests. Second, could anyone using fan storage heaters for fish house heating let us know the results.

P. J. SHEPHERD,
Penn, Bucks.

Firemouth Convict Hybrids

I write to your magazine as I think an unusual event has taken place.

I have had a Convict and Firemouth spawn and the fry are now about ten days old, although only about thirty surviving.

We first noticed the interest between these two fish in June when they paired off and killed a male Firemouth (the Convict is the male) and then set about spawning in a tank housing about six other Cichlids which were herded to one end and kept there by the vigilant Convict whilst the Firemouth watched over her eggs in the usual manner, fanning and eating any that went bad.

The eggs hatched and the fry were just starting to swim when we moved house and in the move we lost the fry.

Almost as soon as the tanks were set up at the new house C and F were off again, and again they were in a tank with other fish. This venture cost them their fry and me a couple of fish that tasted them.

My next step was to get rid of the rest of the fish out of the tank so that my pets, as they now were, could have the tank to themselves. The result are the fry I mentioned earlier which are now in a small nursery tank.

P. DAWSON,
Edmonton, N.S.

Breeding Goldfish:

Preparing for the Breeding Season

By A. Boarder

THE PREPARATIONS for the next breeding season can be going forward during the rest of the winter months. There are many tasks which may be done now to save time later on. Also one does not want to be caught up at the beginning of the season by tasks which could have been done earlier. The preparations will be affected by the type of fish which are required to be bred. If common goldfish are to be bred, then there is no need to take any special precautions. In most garden ponds goldfish will breed without the owner taking any special precautions but when the question of breeding any type of fancy goldfish is concerned then it is a very different problem.

Most fancy goldfish require a different technique if one wishes to breed a number of good-quality fish. Any of the double-tailed types such as Fantails, Veiltails, Moors, Orandas, Lionheads, Celestials and Bubble-eyes will require to be bred under more controlled conditions than would be necessary for ordinary goldfish. In a garden pond it is probable that if any of these fish were bred many of the fry could be eaten and as the double-tailed fish can only swim more slowly than the single tails, then it is obvious that if any were to be eaten it would be the best types which could not escape from the larger fish.

By controlled conditions I mean that the eggs will have to be taken from the pond soon after spawning or the breeding fish will have to be removed to a separate tank in which they can spawn and then be returned to the pond when eggs have been obtained.

It is quite possible to keep the spawners in the pond as long as they are not Veiltail types, as these fishes have such flowing finnage that trouble often occurs from fungus and fin-rot, or fin congestion. Such fish as Fantails, Fantail Moors and Lionheads can remain in the pond and then be caught up if required for breeding. Although it is possible to breed a few good-quality fish in the pond I am certain that for fancy goldfish breeding some form of control must be used to ensure success.

To have much chance of success with a really good type of fish, one must make the necessary preparations early enough in the year. The main thing is to have special hatching and rearing tanks in readiness. If the parent fish are in the pond for the winter and it is intended to take the eggs when laid to safety, then a number of hatching tanks must be prepared. I have described in earlier articles how I made my concrete hatching tanks, and after many years these tanks function well. If one cannot make these then there are several alternatives. It is not necessary to purchase expensive tanks, as most of these would be too deep, and although the water level could be reduced there is

no sense in paying out for what is not required. A very good type for hatching is the plastic baby bath which can be bought quite cheaply at a large store. As long as they are soaked well and washed out they are quite safe and deep enough for hatching tanks.

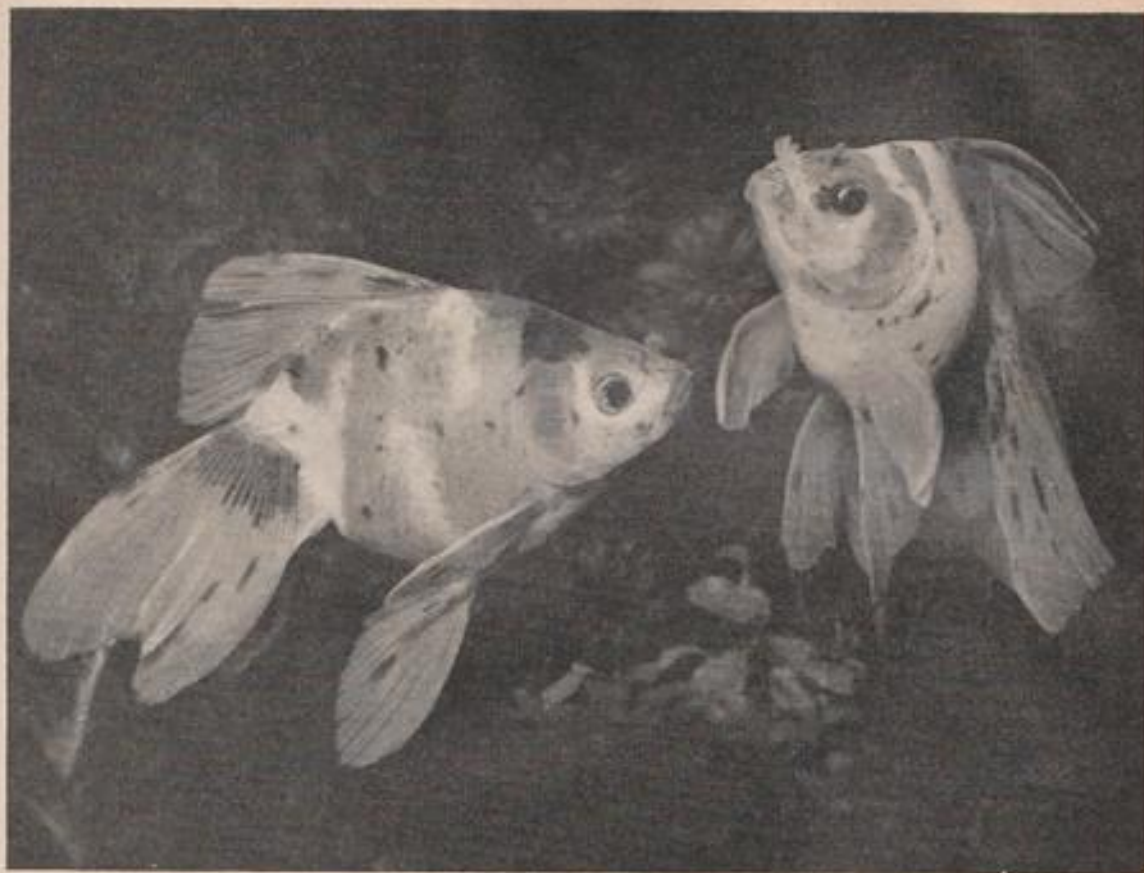
The water in such tanks need not be more than six inches deep. Remember that the deeper the water the less oxygen is likely to be near the bottom. Also when fry first hatch they should be able to reach the surface of the water without any undue exertion. It is also a good plan to keep some of these containers filled with water before spawning time so that the water can become cleared of chlorine. This can be fatal to fry if the water is used straight from the tap. Never use such water for the hatching tank or for fry whilst they are under two months old.

The next question is whether one intends to use some form of artificial heating for hatching and rearing. This will have to be decided in good time to enable one to get the necessary equipment. If one has a fish house with heating provided then there will be little trouble in getting the ideal conditions. If this is not available then tanks can be kept in a garage or garden frame where it is possible to use electric heating. My own set-up is to have a number of concrete tanks in a garden frame. Each hatching tank is provided with a 100-watt immersion heater and two thermostats in series to control them. My tanks are 24 x 12 x 9 in. outside measurements. A temperature of 70°F. is aimed at as I find that this is a very good one for my purpose. One must not think that this is so very unnatural for rearing coldwater fishes, as in most ponds the water temperature near the side, where most fishes spawn, is often in the region of 70°F. during the summer months.

When some form of heating is provided it is easy to get a hatching in three and a half to four days. This is a help if there is the possibility that there may be some pests in amongst the water plants on which the eggs have been laid. The quicker the hatch, within reason, the more fry are likely to be hatched. Once they hatch, the time taken to consume the egg yolk will also be reduced and so one must be ready with food once the fry are free swimming. This should take just under two days.

In addition to the heating of the tanks I use some aeration. This I find is very useful as eggs must have a well-oxygenated water in which to develop. It must not be thought that the eggs can develop properly without this oxygen, and there is no doubt in my mind that many eggs fail to hatch if the oxygen content of the water is poor.

I use a small pump which was not expensive and this is capable of serving nine of my concrete tanks quite adequately.



ly. One must realise that with water no deeper than about eight inches the pump is able to function very well with a number of tanks. The aeration is only necessary, of course, when there are a number of fish in the tanks. Unless one had an unlimited range of tanks it is almost inevitable that the fry are likely to be crowded when good spawnings have been obtained. Although this overcrowding may tend to keep the youngsters from growing at the fastest rate, it is quite easy to sort out the better fish and so give them more swimming space, when they can grow on better.

Because I have described the warm water method for rearing fancy goldfish, it must not be thought that it is not quite easy to breed such fish with the normal coldwater treatment. For about thirty years I never used either artificial heat or aeration when breeding my fantails. It was only a very late spawning one year which gave me the idea of trying the heating method as there seemed little chance of success without it, the time of the year being so late. Even if no form of warmth is used it is still almost certain that more success will be obtained when the controlled method of rearing is carried out. All that is necessary is to have plenty of hatching tanks ready and then the spawners can

remain in the pond and eggs removed for hatching elsewhere.

There is one important feature of the warm water rearing. If the temperature is about 70°F., then the young fish will need feeding much more frequently than when the water is colder. In the warmer water the fish swim about very actively and so use up more energy. This has to be replaced if the fish are to grow at the maximum rate. In such a temperature it will be necessary to feed the fry about every two hours during daylight. This can become quite a chore, but unless such fish are fed well and often they will not grow very quickly but will no doubt change colour very soon. The warm water causes a quicker colour change in the scaled varieties, and the amount of sunshine does not matter very much, it is the warmth which is important.

Once the youngsters are over two months of age the temperature of the water can be gradually reduced if it is required to bring the fish down to a more normal temperature.

In my next article on breeding goldfish I shall deal with the different varieties which are available and any special treatment or conditions which they require.

OUR EXPERTS' ANSWERS TO YOUR QUERIES

COLDWATER QUERIES

By A. Boarder

Please note: Tropical and coldwater queries will not be answered by our experts unless a stamped addressed envelope is enclosed with your letter.

I have kept goldfish for six years in an outdoor pool and they have bred well. Now I find that many are attacked by the Fungus disease. I think I have cured them but have emptied the pond and would like to know how to sterilise the plants before returning them to the pond?

The plants can be immersed in a fairly strong solution of permanganate of potash. The spores of the Fungus disease may be anywhere in the pond as, in fact, they may be in many waters in the open. The fish are able to withstand the attacks of this disease by their mucus covering. Once they become off colour this is upset and the fish are then prey to the disease. The health of the fish could be adversely affected by being overcrowded or that the water has become foul over the years. It might be as well to check up on the numbers of fish you have in the pond as fewer fish would be more likely to thrive than if the pond held too many.

The water in my pond is very murky and I cannot see the fish. What can I do and what is the cause of this?

There may be several reasons why the water in your pond has turned murky. If the water is green in colour without a bad smell it is due to the presence of thousands of free-floating single-celled plants known as Algae. These can only thrive when plenty of light reaches the water and so the cure is to shade out much of it. This can be done by increasing the cover with water lily leaves or by adding plenty of duck weed (*Lemma*) so that it can spread over much of the surface. This green water often clears when the sun loses its power and the weather turns colder. If the water is a brown colour it is probably due to the presence of infusoria. These tiny creatures multiply rapidly and their growth can be encouraged by uneaten food decaying in the pond. If the water smells badly and is a muddy colour that is usually caused by the presence of too much decaying matter such as dead lily leaves or decaying food. This state is more dangerous than the former causes as the water will lose much of the oxygen and contain foul gases which could kill the fish. The pond should be cleaned out if the latter is the case and no doubt as long as too much dried food is not given the water should remain clear throughout the winter.



Is there anything I can put in my pool, an old bath, to clear out the slimy green stuff without harming the fish?

There is nothing you can put in the water to kill the Algae which would not harm the fish and also the water plants. It is possible to clear such a small pool by dragging out most of the Algae. A small stiff brush, as used for cleaning flower pots, can be pushed into the weed and twisted. It will be found that the pest can be removed quite simply by this method.

The water in my fish pond is very brown and if it is cleaned out and refilled the water soon returns to this brown colour. I have some goldfish and Ampullaria snails in the pond and the water temperature is about 72°F. How can I clear the water?

It is quite probable that your trouble is mainly caused by the Ampullaria snails. These are usually the ones that aquarists breed to cultivate infusoria for fry feeding. The conditions which you have in Spain, such as a warm climate reproduce almost the same water conditions used over here by tropical aquarists. The snails eat water plants and fish food and their copious droppings soon encourage the infusoria to form. I recommend that you get rid of the snails, go easy with the dried food for a time and conditions should improve.

I have come across a stretch of water which is heated by water from a nearby factory. In it are many various coloured goldfish. I would like to catch some for sale. How can I catch them, how do I transport them and would there be a market for them?

Goldfish will breed well in water warmed by such a cause. As to your proposal, I suggest that you tread carefully. The owner of the water will probably have initial rights to the goldfish, and in fact may be quite aware of their presence. In such a case you would be stealing the fish if you took any. To catch fish in your district you may have to have a licence from the local authority. If all was in order you could trap the fish with a large net which is lowered into the water and food placed therein. After a time for the fish to gather, the net could be raised. There is certainly a market for British bred healthy goldfish and you might do well to contact a dealer near you. On the other hand if you make it too public, you may find too many others after the fish. Goldfish and most other types are transported in plastic bags packed in cardboard cartons.

In a recent copy of "The Aquarist", a contributor mentioned a book on coldwater fishkeeping. I cannot see it advertised anywhere and would like to know

how to get it? Also how many goldfish can I keep in a 24 x 12 x 12 in. tank?

The book, "Coldwater Fishkeeping" by A. Boarder, has been advertised recently in "The Aquarist", and if you send 5/6 to their address you will get the book you require. Your tank will hold a maximum of 12 in. of fish, ignoring the tail when measuring.

I am 11 years old and have two goldfish. Can you tell how to tell which is female and which is male?

The female fish is usually fatter in the body than the male and in the breeding season, April to August, the male shows small, raised, white pimples on the gill plates.

I have five goldfish in an outside pond and they are three to five inches long. Will they be safe during the winter and is it wise to cover the pond with a plastic sheet during frost and snow?

The fish should be safe in your pond providing it is at least eighteen inches deep and that the water remains pure and oxygenated. The plastic sheet might be a good idea but if heavy snow rested on it no doubt it would break or sink down in the water.

My pond is 16 feet by 8 feet and 2 feet deep. I have 6 water lilies and plenty of oxygenating plants. I have 12 Koi carp about 12 in. long and 6 golden orfe 6 in. long. I am cleaning out the pond and realise that I may be overstocking with fish. What do you suggest?

I think that you would do well to cut down on the water lilies instead of the fishes. Too many water lilies can be a nuisance and can restrict the swimming space for the fishes. If you still feel that you should part with some of the fishes then I suggest that you get rid of four of the Koi.

Will you recommend a safe method of sterilising water plants and fishes before putting them into a tank?

You will find that a fairly strong solution of permanganate of potash will do for the plants quite well but not for the fish. I still have an old-fashioned belief in the advantages of salt as a fish cleanser. Over many years of fishkeeping I have rarely used any other as a disinfective and curative for my fish. Do not use table salt as this has an additive to prevent it caking. Sea salt, such as Tidman's, will do very well. About a tablespoon to a gallon of water is a good dosage, but never stir the salt when put in the water with the fish, let it dissolve gradually.

I have a pond, 12 ft. by 8 ft., with two large lilies, and thirty fishes. I now find some type of scum or oily matter on the surface of the water and the fish appear to have a fine white film on their bodies. What is the trouble?

There is little doubt but that the oil and scum on the surface of the water is mainly caused by the decaying water lily leaves. You will find that if you push a decaying one under the water you will see some oily substance coming from it. There may be other dying water plants in the pond and also some uneaten fish food. These will also pollute the water. When such a condition arises you will almost certainly find that the fishes soon get out of condition. They then lose some of their slimy protective covering and

become prone to such skin diseases as fungus or velvet disease. You had better clean out the pond as soon as possible and give the fishes a salt bath for a few days. Most small and medium sized ponds can benefit greatly from a thorough cleaning out every early winter or late autumn when the leaves have died down and fallen from surrounding trees and shrubs.

We have a large pond with lots of goldfish. Some now appear to have some fungus on them. Can this be cured without catching the fish?

It is rather doubtful if you could add any chemical to the pond which would clear the fish of fungus. If they were not badly attacked then the addition of a quantity of sea salt might help. Also if you could estimate correctly the amount of water you might try adding a 5 per cent solution of mercurochrome at the rate of eight drops per gallon. The difficulty is with any attempt at dosing a pond that any water plants could have the effect of reducing the strength of the solution. It is probable that the pond may need cleaning out and the numbers of fishes reduced.

I sometimes find that after feeding my fantail goldfish with flake food that some of them seem unable to swim properly. They look as though they had swim bladder trouble but after a time they recover and swim normally. Why is this?

Fancy goldfish with short bodies are rather prone to troubles of this kind. Their intestines are constricted somewhat and so if they eat a quantity of dried food rather quickly they may find that they have difficulty in keeping on an even keel due to the constriction of the swim bladder. When the food soaks the fish are once again able to swim properly. Try soaking the food before feeding it to the fish. Some types of food have cod liver oil in and this may cause the fish to float near the surface for a time. Try a change of food or else give much less at a time. Some fish will go for any food they like and may swallow too much before it has had a chance to become wet.

I intend to breed goldfish next season and want to increase the numbers of fish bred by artificial stripping. Have you any advice to offer on the subject?

You are only likely to be successful at stripping goldfish when they are in spawning condition. Any attempt to force eggs out of a fish when it is not ready will be very dangerous as it could bruise the fish internally. If fish are caught when they are actually spawning it is not difficult to strip them. It was reported many years ago that I was probably the first to successfully hand-strip fantail goldfish. My method was to wait until the fish were chasing vigorously and then to have a bowl of clean water nearby. I caught a male fish first and holding it belly up in my left hand, gradually applied pressure from the front part of the belly to the vent. Some sperm was obtained. Immediately after, I repeated the process with a female and many eggs were obtained which proved fertile and hatched eventually. This method is I believe the reverse to the one used for stripping trout. In such cases the female is stripped first. The water is then swilled round the eggs, which will adhere to the container and after an hour or so is replaced with fresh clean water.

COLDWATER QUERIES

continued

What are the best water plants to put in the pond for the fish to spawn on?

If you intend to remove the plants once eggs have been laid, I consider that Hornwort (*Ceratophyllum demersum*) is one of the best. It never makes roots and so when removed to a clean hatching tank, it does not require any base compost in which to grow and so remains healthy. It is also very finely leaved and makes an excellent receptacle for eggs.

Can I use peat as a base medium for a tank?

Too much peat in the water will encourage an acid condition which does not suit all kinds of fishes.

We have constructed a fairly large pond and wonder if it would be an advantage to install a fountain and a waterfall when breeding golden orfe is anticipated?

You will have much more chance of success with breeding golden orfe with a fountain and waterfall than you would have had without either. Orfe require a well oxygenated water before they are likely to breed. They must also be of a good size, say about a foot long.

We wonder if it would be a good idea to have a pair each of mandarin and carolina ducks in a breeding pond. Do you think they might damage the marginal plants?

These ducks are very handsome but they are not for the breeding pond. Unfortunately ducks of any kind will soon foul the water. They are constantly chewing at the water plants and so would eat or destroy any eggs thereon. Also such ducks would have to be penned to prevent them flying away. If you particularly wish to keep the ducks I suggest that you make a small separate pond with surrounding netting for them. You may then be able to get plenty of *Daphnia* for your fish as these usually breed well in a duck-polluted pond.

TROPICAL QUERIES

By Jack Hems

A few days ago I introduced a 6 in. *Mastacembela armatus* into a community tank, but it will not eat any of the dried foods, raw meat or live *Daphnia* that the other fishes accept. What can I give this fasting fish.

Generally speaking the mastacembelids are faddy feeders. Offer your spiny eel white worms or tubifex or tiny or halved earthworms. Worms of one sort or another will almost always tempt a spiny eel to eat.

I have a Madagascar lace plant that has outgrown its pot. Would it be possible to split this plant up without killing it?

A large rhizome of *Aponogeton fenestratus* may be divided successfully. Cut the rhizome into three or four 'eyed'

portions to make a fresh start. Set these cuttings in a compost of peat, grit and potting charcoal and keep them in shallow water for a few weeks to encourage good rooting.

I have a piece of seasoned cork bark that I want to stick to the back glass of my aquarium. How can I do this?

Reduce the level of the water and rub the back glass clean and dry. Now secure the cork bark to the glass with a dab or two of Araldite adhesive. Alternatively, tie the bark to a flat piece of slate and suspend it from the back of the aquarium on two lengths of nylon fishing line or stout nylon thread.

Is it possible to grow water plants from different parts of the world in the same aquarium with equal success?

Provided the cultural requirements, that is light, temperature, and so forth are about the same, then most plant from different parts of the world will flourish in the same aquarium.

Would a trio of golden medakas live at peace with inoffensive fishes such as guppies and their fry in a well-planted decorative tank?

The golden medaka keeps itself to itself and seldom casts a hungry eye on its own or other fishes' fry. But make certain that the medakas, if you buy them, are kept well-fed, for even the best behaved fishes will sometimes turn cannibal if they are not given sufficient to eat.

Now that the winter is here and I cannot collect the wide range of small livefood which ordinarily I obtain from my long-established garden pond, how can I bridge the gap between freshly-hatched brine shrimps and whiteworms to feed barb fry? Chopped tubifex is too large, and powdered dried food does not grow them on fast or shapely enough for my liking.

I think your best plan would be to set up a box of Grindal worms. These worms are smaller than the ordinary whiteworm (*Enchytraeus albidus*) and do very well indeed if they are properly fed and kept in a warm place.

Can you give me the scientific name of a cichlid called the red devil?

Red devils cichlids come in more than one species. All are largish fishes with quarrelsome ways. All are well-marked with bright orange to fiery red. *Cichlasoma erythraeum* and *C. labiatum* are the red devils most likely to turn up in a dealer's tank.

I have a tank placed in an alcove in my lounge. Because I have been unsuccessful with plants I have furnished it with slivers of red granite alone. The tank houses two pairs of scaras and a trio of large blue gouramis. It is illuminated by a 60 watt striplight. My problem is that although I scrape the sides every nine days or so I cannot stop them growing a brownish mould or flu. Please tell me what is causing this mould to grow in my aquarium?

The reason can be given in four words. There is not enough light. Lack of light prevented your growing green plants; lack of light is the cause of the brown growth, which is a form of algae. If you clean up the tank and allow 40

watts ordinary electric lighting for every foot length of the tank the brown growth will not reappear. Better still, fit a 40 watt warm white fluorescent lamp over your tank. A 40 watt fluorescent lamp will provide sufficient light, if kept switched on for about eight hours a day, for a 3 to 4 ft. aquarium planted with a variety of water plants.

How does one sex the neon tetra?

In well-grown fish kept under good conditions, the female may be told apart from the male by her body shape. Her abdominal region, especially when in spawn, is fuller than that of the male. For all that, sexing this species is far from easy.

Is it true that algae is fit for human consumption?

We have not heard of anyone eating freshwater algae as a greenfood, but we imagine a few dedicated vegetarians might make it palatable. In Japan a soup is made from a marine algae.

Normally my tropical aquarium is kept at a temperature of about 75°F (24°C), but when morning sunlight falls on the front glass the temperature registered on the external fitting thermometer

shoots up to about 86°F (30°C) in next to no time. Will this rapid rise and equally rapid fall in temperature (as the sunlight moves away) have a harmful effect on my fish?

If the temperature of the whole body of water in your aquarium shot up and down as rapidly as the readings show on your thermometer, then your fishes would soon be in trouble. But I feel certain that the temperature of your aquarium remains fairly even whatever the sun is doing outside. The sun, when it shines, is merely warming the front glass and the external fitting thermometer, and this accounts for the temporary rise in temperature as shown on the dial. The water behind the glass is, I feel certain, hardly affected.

What is a lesser angel fish?

The true angel fish is known to science as *Pterophyllum scalare*. This species can attain a length of about 5 in. and a height of nearly a foot, that is from tip of the dorsal fin to the tip of the anal fin. *P. eimekei*, the angel fish most commonly seen in captivity, seldom exceed 4 in. in body length and above 8 in. in height. Hence because of its smaller size, it is known in some quarters as the lesser angel fish.

AQUARIUM REMEDIES REVIEW

"ACUREL F" is produced by the Bioquatic Laboratories, Rustlings Road, Sheffield, and each costs 8s. 6d. for a 28 ml. plastic, dropper bottle.

This new product, a brownish liquid, is used for clearing cloudy aquarium water. It appears to work by a coagulating action, or a flocculating action. The fluid clears aquarium water of suspended particles of organic matter, including free algae. The removed particles soon settle to the bottom of the aquarium and can be removed by siphoning, or the filter will soon remove them. They may, of course, be left on the bottom. I shook up some garden soil in a jar, and added some of the resulting dirty liquid, to two empty bottles. Each contained the same amount. One sample was treated with "Acruel F", and both bottles were shaken equally and left to settle. The water in the treated bottle was clear in about half an hour; the other bottle was still slightly cloudy next day, when it was thrown out.

"Acruel F" will clear cloudy aquarium water, settle fine dirt stirred up by fish, help coagulate detritus so that siphoning is easier, etc. One drop of the fluid, per gallon, will treat the above conditions. A drop of the liquid added, per gallon of water, to the filter medium, helps improve the efficiency of the filter media, by over 500 per cent. Addition to the filter media will also help improve the water flow through the filter. The action of undergravel filters is also improved if the substance is added to the aquarium water. 4-5 drops of the liquid added to one stone of new aquarium gravel, will enable the washing process of the gravel to be cut down to about one quarter of the time.

"Acruel F" does not contain, as do other similar products, potassium permanganate, and is effective over a p.H.

range of 4.0-9.0. A similar product, for outside ponds, "Acruel E", should also be available soon.

It's always interesting to see new brands of items on the aquarium market, but it's even better when an original new product appears. This is quite an exciting introduction and should be useful, especially to the beginner who is sometimes too easily put off by a cloudiness in his aquarium water, at the start. Even the more experienced aquarist can sometimes add more food to an aquarium than he intended. This product should be useful to help clear the resulting cloudiness on such occasions.

B. WHITESIDE.



Filtration in the Marine Aquarium

□
By Graham F. Cox
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WHAT FOLLOWS originally began as an attempt to enable private aquarists and any interested parties professionally engaged in the Aquatic Trade, to make for themselves the particular type of high turnover undergravel filter which has now come to be known as the SeAquariums Undergravel Filter. This I felt to be necessary owing to our inability to produce these units at a fast enough rate to satisfy the existing demand. For better or worse it has developed into a more lengthy article on the special filtration requirements of the marine aquarist. I wish to make clear the fact that I have no connection with any manufacturers whose products are mentioned below.

G. F. Cox, September 1969.

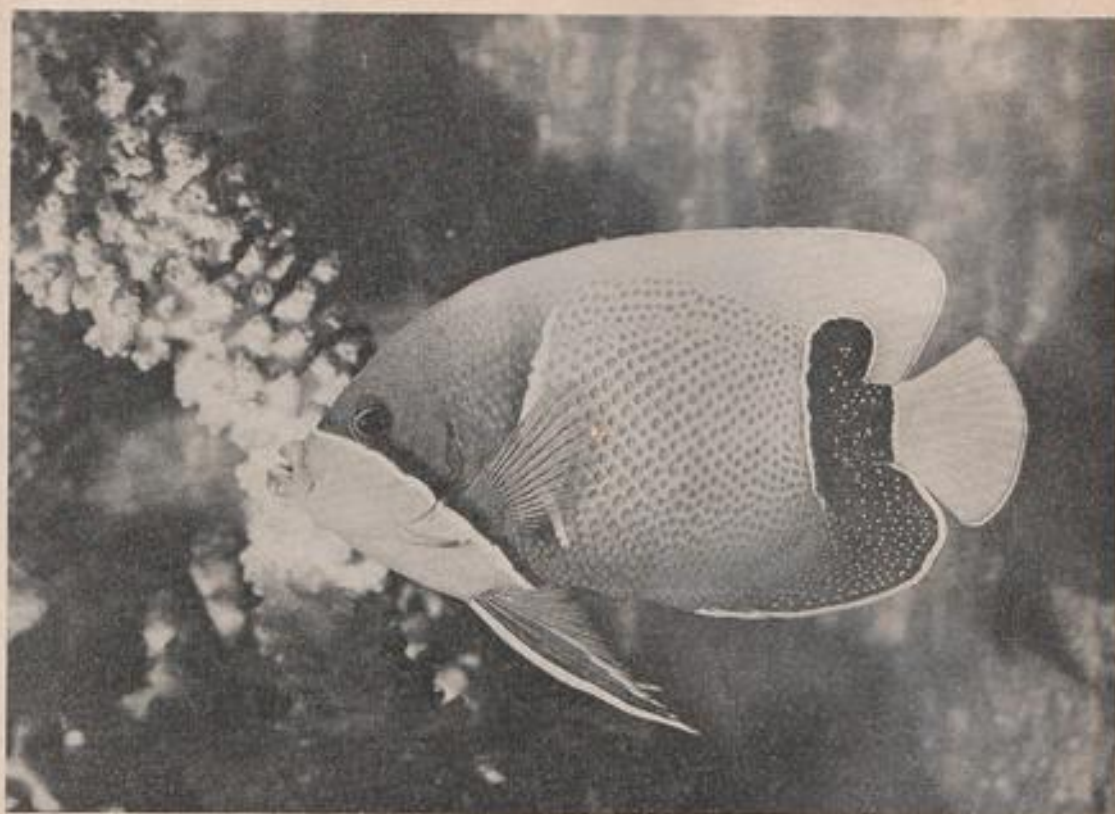
IT WOULD BE folly or deceit to pretend that the problems facing the tropical marine aquarist are any less troublesome than those afflicting the freshwater enthusiast. The main arenas of difficulty in which the marine hobbyist or researcher engages in battle against nature are as follows:

- (1) WATER MANAGEMENT—a superficially innocent expression which, on closer examination, covers a wide range of topics such as salinity, pH control, toxins in solution, redox potential, temperature, mechanical filtration, biochemical filtration, etc.
- (2) FEEDING—not just to keep the animal alive, but to so perpetuate the condition in which it was collected from the reef, that it may even reward its owner by reproducing in captivity.
- (3) DISEASE CONTROL—and more important, Disease Prevention.
- (4) STOCKING—having particular regard to the psycho-territorial requirements of the animals under culture which are just as important as their spatial requirements.
- (5) LIGHTING—not only to secure the best display of one's prized collection of reef-life, but to ensure an adequate level of photo-synthetic activity amongst the algal growths within the aquarium.

In this article, we are concerned essentially with only two small sub-divisions of the heading Water Management, but because of the involved interrelationships between all the above major headings (other less important headings have been omitted here), we shall inevitably find ourselves considering the overall complex from time to time.

It would appear to be self-evident that if we are to be successful in the long term culture, and even breeding of coral reef life-forms, then we should attempt to duplicate as closely as possible in our tanks those conditions obtaining on the reef under which our fishes, invertebrates and plants have been evolving for the last several hundred million years. Fortunately for us, it is not necessary to duplicate reef conditions exactly, since the mere fact that an animal exists on the reef today, i.e., it has not become extinct, means that the species to which it belongs is sufficiently adaptable to survive *gradually* changing conditions—a basic precept of the Neo-Darwinist evolutionary theory. Of equal importance, it should be realised that in the case of fishes, most of which are collected for the aquarium at the young adult stage, the very fact of their survival to this young adult stage under the terribly competitive conditions of the reef, indicates that they were endowed at conception with an abnormally-high survival value—that they in fact were "Smarter than the Average Bear." Stated more scientifically, their particular selection of genes made them more cunning, more courageous, better cryptically-coloured, physically stronger and physiologically more adaptable than their long-dead siblings.

It is this same ability on the part of aquarium subjects to adapt in the face of rapidly changing physical, chemical and biological parameters which is the saving grace of all marine aquarists, with the possible exception of those fortunates responsible for the maintenance of multi-thousand gallon tanks in the public aquariums. Very few well-experienced freshwater aquarists seem able to appreciate that, although they can work wonders with Characins, *Anabantids* and smaller *Poecilius* sps. in 10-gallon tanks they quickly come unstuck when they first venture into the marine field using the same tank. Personally, I would



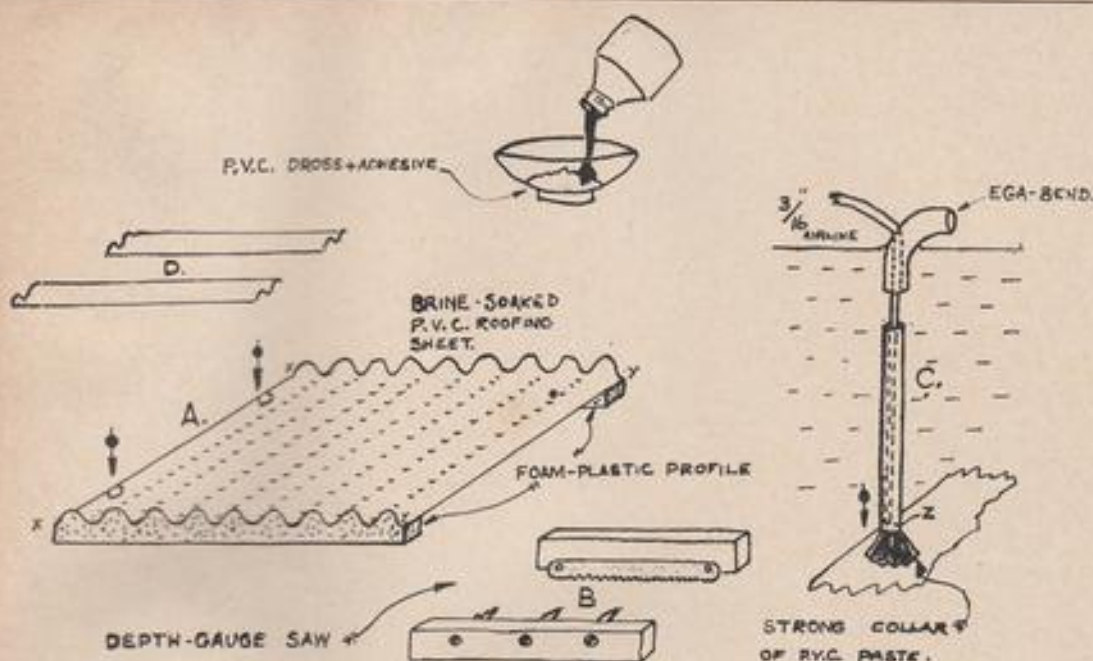
This fish, the most difficult and most beautiful of the angel fishes the majestic angel fish is widely held by collectors in the Philippines to be "unfeedable" in captivity. The fish in this photograph lives in one of our units containing a filter as described and eats dried foods.

never attempt to keep more than two $\frac{1}{2}$ in. *Amphiprion* sps. fishes in a tank of such small size. To understand why this relative intolerance of cramped quarters exists amongst marine animals, it is necessary to realise that most of our freshwater tropical fishes come from streams, rivers, ponds, dambos, swamps, etc., i.e., bodies of water which, as a result of their shallow depth, the changing climatical conditions (i.e. dry season, rainy season) and the varying chemical nature of the rock formations through which the water flows, produce an aqueous life-support medium whose chemical and physical nature changes drastically and rapidly. pH fluctuations, varying water hardness, diurnal variations in temperature, periodic high organic pollution (owing to seasonal declines in vegetation) and all the common time-to-time experience of freshwater fishes. Consequently, their ability to adapt to the varying parameters referred to above, dwarfs that of even the hardest tropical marine animals. The oceans and to a lesser extent the coral reef, are probably the most stable environments on this planet. Here, biochemical and physical changes are minute and very gradual.

Salinity in any given animal's territory changes only very slightly even during the rainy season, and even then, the

amount of rainfall, in proportion to the gallonage of seawater covering the reef is small and the resulting fall in specific gravity is slight and slow.

In view of the above, and to return to our theme, the whole design of a marine life-support system, and in particular the filtration provisions of that system, must aim towards the creation of as stable an environment as is possible. This means a large tank, since in a large body of water, changes in the chemical and physical quality of the water occur comparatively slowly. It also means a highly efficient filtration system. The reader may be concerned as to why or how his filtration system can possibly have any effect on the stabilisation of the micro-habitat which he calls his marine aquarium. It will be remembered that we discussed earlier the fact that, from time to time, large bodies of fish-bearing freshwater in the tropics are subjected to massive organic pollution, and that, as a consequence, almost all freshwater tropical fishes have evolved metabolic processes which enable them to cope with large quantities of toxic matter in solution. I have recorded ammonia levels in freshwater tropical tanks as high as 28 ppm and nitrite levels almost 5 times that amount, yet the same aquarium housed a large number of Pacu,



CA.

Piranha, and Cichlids which were in excellent health. On the other hand, I know of no tropical marine fish which can long tolerate ammonia levels in excess of 0.1 ppm or nitrite levels in excess of 10 ppm. It is obvious then that since a relatively high proportion of the excreta of marine fishes is ammonium and nitrite salts, and these two toxins are also the interim products of aerobic decomposition of uneaten food, it is imperative that a successful filtration system for the marine aquarium should make ample provision for the swift nitrification of waste nitrogenous matter.

The design of the following filter has more than shown itself capable of achieving these results over the last few years.

Materials Needed

(1) 1 in. P.V.C. roofing sheet; (2) EGA P.V.C. $\frac{3}{8}$ in. tubing and bends; (3) EGA-WELD P.V.C. adhesive; (4) 12 in. hack-saw blade; (5) 2 pieces of 2 in. \times 1 in. wood, each to be 13 in. long; (6) Foam-plastic profile to match corrugated sheet; (7) Tank-cutting tool to be $\frac{1}{8}$ in. smaller in external diameter than the P.V.C. tube; (8) $\frac{1}{8}$ in. bit 9) hand drill.

Method of Construction

Some cheap P.V.C. roofing sheet has a rather high lead-content and we have always felt it necessary to soak both the P.V.C. corrugated sheet and the EGA tube in a 1.040 specific gravity solution of sodium chloride (cooking salt is adequate) for 7-14 days prior to use. The cured sheet is then cut to *fully* cover the entire base of the aquarium (as shown in diagram A) to ensure that the total surface

area of the base of the tank is subject to filtration.

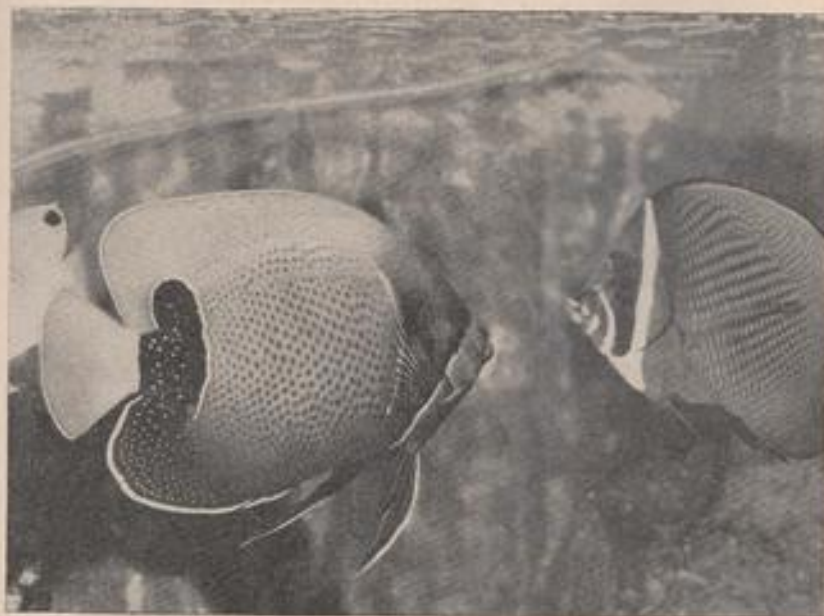
Ideally, one should attempt to cut the sheet in such a way that, when fitted in place, the edges of the sheet xx and yy are forced by the weight of the gravel to make contact with the glass base of the tank. In this way, gravel cannot be sucked under the base plate when the filter is in operation, since the two ends are sealed as shown by gluing foam plastic profile in position.

A simple tool should be made for cutting the slots in the corrugated base-plate, in the manner shown in diagram B. If this tool is correctly made it not only affords a speedy means of slotting the sheet, but the dimension of each saw cut is pre-determined by the depth of blade exposed. Should too deep an amount of blade protrude, the slots will so weaken the finished filter plate that it may collapse under the weight of gravel. It is suggested that the blade protrudes by $\frac{1}{8}$ in. and that the saw-cuts be made at 1 in. intervals along the corrugations.

Ideally, the slots will be made in the bottom of the corrugations, i.e., in the "valleys" rather than on the "mountain-tops," since cuts in the latter would leave troughs of unfiltered gravel where pockets of toxic gases may build up under anaerobic conditions.

Next, the circular holes are cut in the top edge of the rear-most corrugation and placed as near the ends of the sheet as is convenient, bearing in mind that a 1 in. width of foam profile is to be glued at the very edge immediately after drilling these holes.

Whilst cutting the slots in the base-plate, it will have been seen that a large amount of P.V.C. dross has been formed.



A confrontation between east and west? A majestic angel fish from the Philippines looks at a *Chaetodon collar* from Ceylon and seems to say, "Fancy meeting you here".

This should now be collected together, and after mixing with the appropriate amount of EGA-WELD adhesive, a stiff paste will be produced which should be used to bond the correct-sized lengths of EGA-TUBE into position. The nearly finished filter is now stood against a wall and the air-lift tubes held firmly back against the wall with adhesive tape for several hours whilst the adhesive sets rock hard. Also during this "setting-period" the ends of the base-plate should be weighted down into intimate contact with the foam profile strips to effect a good bond.

Next, a $\frac{1}{8}$ in. hole should be neatly drilled in the back of the EGA-BENDS so that a piece of normal $\frac{1}{8}$ in. diameter polythene air-tubing is a tight fit when threaded through. This tube should be pulled through so that when installed down the centre of the EGA-Tube it is within 1 in. of the bottom as shown in diagram C. Finally the base-plate and stand-pipes are lowered into the aquarium and stood on narrow off-cuts of corrugated sheeting (diagram D) placed at right angles to the plane of corrugations of the base-plate itself. These should be used at 4 in.—6 in. intervals, particular care being used to support the air-lift openings well-clear of the glass bottom of the tank.

The opening of the EGA-BEND, when mounted on top of the EGA-TUBE, may be below or above water when the aquarium is filled, but the gallonage-turnover efficiency of this type of air-lift decreases markedly as the height to which the water has to be pumped increases.

I personally prefer to have the lower lip of the EGA-

BEND opening just at water level, as shown in diagram C, since a considerable measure of water aeration is provided as a bonus.

Some results obtained with filters of this type

Tank Size Final dimensions— vertical depth ins.	No. and dia. of air lifts	Motive power	Gallonage turn- over
36 × 12 × 15	2 airlift at $\frac{1}{4}$ in. diameter	1 only RENA "Super" or 1 only "Happy" Twin.	80-100 gallons per hour
36 × 15 × 18	2 airlift at $\frac{1}{4}$ in. diameter	2 only RENA "100"	120-150
48 × 15 × 24	2 airlifts at 1 in. diameter	2 only RENA "SUPER" or 2 only "Happy" Twin or 1 ESHA/PERMA	200-400
72 × 24 × 24	2 airlifts at 2 in. diameter	2 only ESHA 400 or 2 only PERMA	500-600

The gallonages per hour turnover rates quoted above do,

The Filtration system described in this article is also particularly suitable for filter feeding invertebrates, e.g. Sponges, living corals, "feather dusters" (tube-worms) etc., since unlike the power-filter, it doesn't remove marine planktonic organisms from solution.



I admit, seem preposterously high for such a relatively simple device. There is beauty and efficiency in simplicity. The hobbyist or trader who goes to the trouble to make one of these units must satisfy himself as to the veracity of the above claims by *actually calibrating his output* (only a stop-watch and a 2 gallon bucket are required).

It is, of course, this colossal turnover rate coupled with *TOTAL* filtration of the basal area of the tank, which accounts for the amazing nitrification potential of a life-support system based on one of these filter units. Once the gravel filter medium has "matured" (10-60 days) the number of nitrifying bacteria coating each particle of gravel is so huge, that it is almost impossible to foul the water so filtered. It is my sincere view that the small band of marine aquarists who have been unsuccessful in their attempts to duplicate our results, have been unsuccessful in their attempts owing to the use of either the commercially available platform U/G filters or the pin-holed plastic tube types.

Both these filters are, from a marine aquarist's point of view unsatisfactory because of their low-turnover rate. No commercial U/G filter manufacturer yet appears to have appreciated that the basic factor determining the turn-over rate of an air-lift is *NOT* the shape or number of air bubbles used (e.g. "bubble-up" type air-lifts) *NOR* even particularly how much air is used (one can actually *decrease* the efficiency of an air-lift by supplying too much air!), but is simply the internal diameter of the air-lift tube itself. Furthermore, the very factors which makes the pin-holed plastic-tube type suitable for a freshwater aquarium

(i.e., low turn-over rate so that plant roots don't suffer and relatively large areas of unfiltered or lowly-filtered gravel exist between the plastic pipes where plants can take root), are possible sources of extreme danger for the marine aquarist. It is in these areas where anaerobic bacterial decomposition of faeces and unester foods may occur, producing highly toxic pockets of hydrogen sulphide and methane gases which are lethal in minute traces to marine life but are tolerated relatively well by freshwater animals.

The following is a list of observations arising from several year's experience with this filter unit.

- (1) The filter-gravel should be $\frac{1}{2}$ in. — $\frac{1}{4}$ in. mean diameter, with possibly an admixture of washed and cured calcareous matter for pH buffering, e.g., crushed oyster shell, crushed limestone gravel, crushed coral, etc., etc.
- (2) The depth of the filter-bed should be 2 in. minimum, and where conditions will allow (i.e. to the rear of the tank) even 6 in. deep.
- (3) The air-supply to the air-lift(s) may be mildly ozonised, when the air-lift tubes will act as miniature sterilization chambers, and some nitrites present may be oxidized to nitrates (harmless). If this is done the air-lift should open *BELOW* water, otherwise minute, ozone-filled bubbles may be carried into the gravel and destroy nitrifying bacteria. Because of the high insolubility of ozone in salt-water at 75°F—80°F, it is advantageous to insert a short length of wicker cane in the end of the air-line at point Z in the diagram. At the expense of a slight decrease in turnover rate,



A very beautiful Butterfly which is rarely seen is *Chaetodon larvatus*

the ozonised-air is thus brought into a greater superficial contact with the water.

- (4) If a power-filter is available, it is possible to "back-wash" the gravel-bed of the filter after 1-2 years use by inserting the *OUTLET* tube from the power-filter down the airlift for a few days. The *INLET* tube to the power-filter is, of course, placed in the aquarium being "back-washed" in the normal way.
- (5) The **bio-chemical filtration* provided by a U/G filter of this type is vastly superior to any other method I know of, and whilst, with normal stocking-ratios and careful feeding during the 10-60-day maturation period, the degree of **mechanical filtration* is second to none, the *rate of mechanical filtration* is not up to the standards one would expect from a good power-filter. By this I mean that, if dirty water were to be deliberately poured into two separate tanks, one filtered by a good power-filter and one filtered by a U/G filter such as that described above, the water would probably clear in the former before it did in the latter.
- (6) Very highly activated charcoal, a vital medium for de-colourising and revitalising "tired" sea-water cannot easily be used with a U/G filter. For this reason, a very useful auxiliary apparatus is an external filter packed

with such charcoal. I was thrilled recently to see Inter-Pet's new Airstream Twin Filter in operation. How these fantastic little units can be made to retail at only 29s. 6d., I don't know, but I do know that when many marine aquarists see one, it will soon become a part of their "armoury."

I realise that for the average private aquarist, unless he is prepared to set up several marine tanks with these U/G filters, the cost of making *one unit only* would be rather high, because of the excessively large quantities of materials he would have to buy in order to get the best prices. May I therefore make the following suggestions:

- (a) Several members of an Aquarist Society "club" together and bulk-buy their materials, or,
- (b) A co-operative trader be approached with a view to his making them in quantity for customers. Even though the Trader would obviously have to charge for materials, labour and include a profit, I think the unit price of a filter so produced would be cheaper than an individual could make one for.

When I coined the terms Clinical System and Natural System in two articles on Marine Fishkeeping written for this magazine some few years ago, I meant by the first term

an aquarium typified by permanently bleached coral, ozone as the sole means of oxidation of nitrogenous toxins, ultra-violet sterilization for pathogen control (together, of course, with the bacteriacidal bonus which comes with the usage of ozone), protein-skimmers, power-filters and the all-too-frequent accompanying collection of plastic anemones, technicolour gravel, sunken galleons, busy mermaids and dyspeptic hippopotami and oysters. By Natural System I meant an aquarium simply filtered by a powerful U/G filter of the type we have just examined. At that time I knew perhaps thirty "Clinicists" and two or three "Naturalists." Now I know several hundred "Naturalists" and only two or three "Clinicists." This article will only serve to increase that imbalance, and I confidently predict that when the provincial trader discovers the supreme ease (and enormous reduction in costs), of keeping marines with the help of the unit described above, the rapidly gathering momentum of the Marine Hobby in Great Britain (and the world), may get out of hand.

I don't think it is too ambitious to look forward to the not-so-distant time when we shall have Marine Aquarium Societies, firstly perhaps on a county basis with bi- or tri-monthly meetings, but soon after on a well-organised city basis with weekly or fortnightly meetings. In the meantime, I implore all marine aquarists, whether of Clinical or Natural persuasion, to support the Marine Class competitions in the various National Aquatic Exhibitions. At one very well-organised National Exhibition held in London the Marine Class attracted TWO entries. Also I know that many of you share my ambitions to see the birth of an all-British Marine Aquarium Magazine, but how can one approach a publisher with a proposal like this when

out of every hundred articles published in current hobbyist magazines, we're lucky if two or three of them concern our particular branch of the hobby?

***BIOCHEMICAL FILTRATION:** The removal from solution of nitrogenous poisons, (i.e. toxins), such as nitrites and ionised and un-ionised ammonia, as effected by massive populations of nitrifying bacteria, (i.e. non-pathogenic bacteria, capable of oxidising ammonia to nitrites and nitrites to harmless nitrates), which coat the surface of each particle of gravel (— my definition). Although I haven't yet succeeded in verifying this hypothesis experimentally, there may also exist in an aquarium established on the system outlined above, (when the water is well-aged), a considerable population of DE-NITRIFYING bacteria, since I have nearly always found it difficult in an old-established sea aquarium to maintain the level of nitrate salts above 100-150 p.p.m. This is contrary to the experience of Wickler, ("The Marine Aquarium," price—10/6, Studio Vista), but, in view of that worker's apparent distaste of high-turnover rate under-gravel filters, his experience may not be surprising. Incidentally, may I strongly recommend any person interested in marine aquariology to read this excellent little book as soon as possible.

***MECHANICAL FILTRATION:** The removal from water of all individually-visible or collectively-visible matter, e.g. food particles, detritus, faeces, bacteria, protozoans, and marine planktonic life-forms of all types. (— my definition).

Why not make a New Year's Resolution?

Good Fishkeeping.

(Marines, of course).

Hypessobrycon herbertaxelrodi

By Jack Hems

THIS LITTLE characin or tetra is one of the best species for a tropical aquarium; for, apart from its colourful appearance and gentle disposition, it is never, or hardly ever, still, does not tear at the plants, and flourishes well at a temperature of 72°F (22°C) to 75°F (24°C), though it is hardy enough to stand a range of from about 68°F (20°C) to 85°F (29°C) without ill effect. It is native to "the vast shadowy twilight" (to borrow a phrase from that great, but too seldom read, English writer and naturalist, W. H. Hudson) of the Mato Grosso, Brazil.

The black neon, to give this fish its popular name, was described for science (as a newly discovered species) by Dr. Jacques Géry, the French ichthyologist, about ten years ago. It seems hardly necessary to add that its scientific name is after Dr. Herbert R. Axelrod, the American writer and publisher of a wide variety of pet books.

Hypessobrycon herbertaxelrodi is of about the same size and build as the better known neon tetra (*H. imnei* = *Paracheirodon imnei*) and, like its congener, spends most of its time swimming to and fro in the middle to upper levels of the water. This, to suit it best, should be medium hard to soft and give a neutral to acid reaction. The black neon has a small mouth and it follows that all food given must be of swallowable size. *Daphnia*, Grindal worms, gnat larvae, brine shrimps, and the rest, as well as any dried food, are

readily accepted. In the absence of live food, tiny pieces of raw white fish or red meat will do. By nature it is a shoaling species, and a dozen or more seen swimming in close formation makes a splendid sight.

What does the black neon look like? This is a question that the aquarist desirous of obtaining worthwhile tropicals for his decorative tank is likely to ask. Well, let me hasten to say that the black neon is greenish brown to greyish brown on the back and silvery white to ivory-grey on the underparts. A broad black band extends from the gill-covers to the bifurcation of the tail-fin. It is accompanied above by a stripe of shining green to bluish gold, which terminates in a glittering gold spot in the upper half of the caudal base. The fins are translucent grey that lightens to milky white at the points. The pupil of the eye is black. The upper half of the iris is red, and the lower half is green to greeny blue.

The black neon is not backward in spawning in captivity, provided the conditions are right. The chief essentials are clear, acid water, as free from bacteria as possible, with no dissolved lime. A bright light should be avoided. The plants—plants with finely divided or feathery foliage—should be well-washed and anchored to a scattering of scrupulously clean grit or sand. The eggs, which are laid in the plants, hatch in two days at a temperature of 78°F (26°C).

With regard to sexing, it is best to compare size and contours; for in most smaller tetras, and *H. herbertaxelrodi* is no exception, a female in good condition is invariably the rounder and more heavily built of the two.

PATIENCE REWARDED

By A. C. Wells

IT IS NOW two years since I fulfilled a long-standing ambition and established a small rock and water garden. The project had been started some time before and had been abandoned for lack of time to finish it. The hole I had dug had become an overgrown, muddy, swamp; the haunt of countless frogs and a standing reproach to my laziness. Until, at last, I made a start at clearing up the mess. The hole was cleared and lined with two thicknesses of polythene; rocks were placed and a few alpines planted; the pool was filled with water and a selection of underwater plants, set in plastic baskets, placed on the bottom. A washing machine pump, driven by a small electric motor, provided the necessary head of water for a small waterfall and after a few strenuous days I settled back to wait for the water plants to become established before introducing the fish which were the main reason for it all.

Stocking the pool was started with a few small goldfish and these were soon joined by some golden orfe. A dozen snails were added to act as scavengers and since all the books I had read stressed the usefulness of green tench in clearing up the debris at the bottom of the pool, a couple of these joined the other inmates. Green tench are bottom feeders and I was told that, as they shun the light, I should probably never see them again. There were times in the following months when I wondered if I would ever see the other fish either. The water turned a thick green and the fish were evident only as gaping mouths at feeding time. The greenness was expected of course and I had been warned that it might take some months for the water to clear, so efforts were concentrated on making the area surrounding the pool as attractive as possible. Small stone slabs covered the edges of the plastic lining and the few alpines were augmented with summer bedding plants which soon became a blaze of colour. No doubt the rock garden purist would have been shocked by my efforts but the overall effect was pleasing enough. But the water stayed green. A friend gave me a water lily which was soon in bloom; water lettuce and duckweed were used in profusion to provide the shade that all the books recommended but winter came and I had but rarely seen my fish.

In the spring two goldfish died from fungus infection. It is believed that frogs, in their mating season, can cause this trouble by clasping the fish—and I certainly had plenty of frogs.

Through the summer of last year the underwater plants thrived, the water lily bloomed and I sometimes saw the fish; not often for, though the water had now cleared considerably, the plants formed a thick tangled growth that effectively obscured one's view. Other matters kept me busy and the rock garden, neglected, was but a poor reflection of its previous summer's glory.

Early this year I decided to forestall trouble from frogs by removing them from the pool before the mating season. In several sessions over sixty were caught and, together with some spawn, they were taken to a nearby stream. With the coming of the warmer weather the water plants again broke into vigorous life and threatened to swamp all else in the pool so some drastic thinning was carried out. Of the two water lilies now well established, one is much too rampant for a small pool and many of the leaves were removed. It didn't seem to mind—at least it continued to flower very happily. And now I could really enjoy my pool. The fish had become much less wary and would gather at the side of the pool, waiting to be fed. And then one day I thought I saw something large and dark glide off the plant shelf, down to the bottom. A few days later I saw it again and this time there was no doubt; one of the green tench was nosing about on the shelf. It was large; larger than any of the other fish, and it was difficult to believe that this was one of the tiddlers put into the pool two years before.

Since then I've seen both of them often. Once they were together cruising quietly at the edge of the deeper water. One of them even came to the surface to take some food before the greedy orfe could reach it. The goldfish are quite tame now; they will nibble at my fingers if I trail them in the water and though the orfe are more cautious they have learned to ignore the presence of people around the pool. But to see the green tench one has to be very still. The slightest movement will send them darting to the bottom, there to hide till the coast is clear. But the intervals before their reappearance got shorter and I am getting quite attached to my elusive, giant, green tench.

And so, to those who have just started a pool, I would say, be patient and in time your water will clear and your fish will become tame. You will even, if you learn to be quiet and still, find that your shy green tench will often disport themselves in your view.



from AQUARISTS' SOCIETIES

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

THE entertainment at Swillington A.S. first November meeting was a short talk on furnished aquaria, and was in preparation for Swillington's fourth annual Home Furnished Aquarium competition. This was judged by J. Skinner, and won by D. Dickson. C. Barry came second. D. Dickson being third. He received the Jeff and Marjorie Skinner Trophy for Home Furnished Aquaria.

The second November meeting was given to the fourth Members show, and was also judged by Mr. Skinner. Results were as follows: Furnished jars: 1, Mr. & Mrs. Stringer; 2 and 3, P. Reynolds. Livebearers Pairs: 1, H. Wimbles; 2, Paul Reynolds; 3, M. Crowther. Egglayers Pairs: 1 and 2, A. Crowther; 3, L. Longfellow. Carps and Minnows: 1, L. Longfellow; 2, H. Wimbles; 3, Mr. & Mrs. Stringer. A.O.V.: 1, P. Reynolds; 2 and 3, Paul Reynolds. The awards were: Mr. and Mrs. Stringer, Leeds Trophy for furnished jars; H. Wimbles, Swillington Trophy for livebearers pairs; A. Crowther, the Swillington Trophy for egglayers pairs; P. Reynolds, S. A. Pullan Trophy for A.O.V.; and L. Longfellow, the G. and M. Binks Trophy for Carps and Minnows. Mr. Longfellow also won the Best in Show with his Red-tailed Shark.

THE Annual General Meeting of the Northwich and District A.S. was held in November, when the following persons were elected to serve on the Committee for the coming year: Chairman: F. Hyland; Vice-Chairman/Treasurer: B. Pearson; Show Chairmen: L. Thorne; Show Secretary: C. Davies; P.R.O.: H. Backley; Table Show Secretary: R. Antonio; Ladies Chairman: Dorothy Thorne; Librarian: M. Palin; Secretary: L. Bradley, 4, Ash Road, Sandiway.

The committee agreed about the success of the open show last year, and the date for this year's open show will be on 28th June, the venue to be announced later. It was also agreed that the Society would be entering the Northern British Aquarist Festival held annually at Belle Vue, Manchester. An auction of surplus Fish, Plants and Accessories was held and the winner of the monthly table show A.O.V. was M. Palin (Kulfa Fish), second being P. Anton and third W. Dickens.

A RECORD number of aquarists attended the annual Inter-Club Fish Show of the Mid-Sussex A.S. which was held in November. Participating in a five-cornered show were Brighton and Southern, Redhill and Reigate, Crawley, Littlehampton, and the home team Mid-Sussex. After judging the four classes of fish in which each club entered three exhibits in each class, Mr. Cannon congratulated all Societies for an extremely fine exhibition of fish,

saying that many of the fish were well up to International Standard. The results were as follows: Rasboras, Danios and Minnows: 1, Brighton and Southern (Giant Danio); 2, Redhill and Reigate (Harlequin); 3, Brighton and Southern (Giant Danio); 4, Mid-Sussex (Harlequin). Barb: 1, Brighton and Southern (Clown Barb); 2, Littlehampton (Chola Barb); 3, Mid-Sussex (Checker Barb); 4, Redhill and Reigate (Half-Banded Barb). Livebearers: 1, Littlehampton (Green Swordtail); 2, Mid-Sussex (Male Guppy); 3, Littlehampton (Lima Vintatus); 4, Brighton and Southern (Red-eyed Red Swordtail). Characins: 1, Mid-Sussex (Mynnis); 2, Mid-Sussex (Anostomus Anostomus); 3, Mid-Sussex (Mookhauser); 4, Redhill and Reigate (Black Neon).

The final pointings resulted in a win for the home team, Mid-Sussex Aquarist Society winning the contest with 939 points, second were Brighton and Southern A.S. with 929 points, third Littlehampton A.S. with 915 points, fourth Redhill and Reigate A.S. with 904 points and fifth Crawley College A.S. with 825 points. The fish of the show was won by D. Soper of Mid-Sussex with his Mynnis in the Characin Class, and he received the club shield presented by the Society Chairman R. Johnson.

Anyone interested in joining the Society, please contact the Secretary, Mr. John Reeve, 36 Rumbold Lane, Haywards Heath, Sussex.

Mr. R. Johnson (Chairman) gave out the results of the Home Aquarium Competition and out of 24 entries J. Walker won first place, second A. Prior, third D. Soper, fourth J. Reeves and fifth place was given to E. Johnson and R. M. Ross who tied. In the Junior section of the Home Aquarium first place went to Andrew Kwasiński, second S. Casiderbank, third D. Ranson and fourth S. Prior.

Results of the Exhibitor of the Year were also given out by the Chairman and the following awards were presented: Senior Section: 1, D. J. Soper; 2, J. Walker; 3, C. West; 4, A. Jackson; 5, H. Speck. Junior Section: 1, A. Kwasiński; 2, S. Casiderbank; 3, D. Ranson.

Further results were those of the Table Show held at the club's monthly meeting in October in which the results were: Fish of the Year: 1, G. Slade (Harlequin); 2, D. Soper (Checker Barb); 3, G. Slade (Harlequin); 4, J. Walker (Jack Dempsey); 5, A. Jackson (Anostomus Anostomus). Novices Class: 1, H. Speck (Red Tailed Black Shark); 2, E. Speck (Scissor Tail); 3, A. Prior (Male Guppy); 4, A. Prior (Male Guppy). Breeders Egglayers: 1, J. Walker (team of Thick Lip Gouramies); 2, J. Walker (team of Zebra Danios); 3, D. Soper (team of Vintatus Barbs); 4, D. Soper (team of Vintatus Barbs). Breeders Livebearers: 1, J. Walker (team of Mosquito Fish); 2, C. West (team of Mosquito Fish); 3, J. Walker (team of Platies); 4, J. Reeves (team of Platies).

A TOTAL of 496 entries were benched at the annual open of the Aireborough and District A.S. Results: Intersociety Furnished Aquaria: 1, Halifax A.S., set up by D. Fryer, 2, Nelson A.S., set up by Mr. and Mrs. B. Tate; 3, Aireborough and District A.S., set up by J. A. Whiteley. Novice classes: A.V. Livebearers: 1, I. Hepinstall (Castleford); 2, K. Marshall (A.D.A.S.); 3, Mrs. Brothwood (Merseyside);

A.V. Barb: 1, I. Hepinstall (Castleford); 2, R. Hepinstall (Castleford); 3, A. Baldwin (Nelson). A.V. Characin: 1, M. Dwyer (A.D.A.S.); 2, F. Chorley (Bradford); 3, Mr. and Mrs. Barmen (Castleford). A.V. Cichlid: 1, R. Whitaker (Privateers); 2, Mrs. A. Carey (York); 3, C. Thompson (A.D.A.S.). A.V. Anabantid: 1, Mrs. Brothwood (Merseyside); 2, C. Mallaby (Mount Pleasant); 3, J. Christopher (Rotherham). A.V. Carps and Minnows: 1, R. Hepinstall (Castleford); 2, M. Colley (Independent); 3, B. Conlon (Selby). A.V. Catfish and Loach: 1, E. Wells (Doncaster); 2, G. E. Cuff (Lincoln); 3, A. Baldwin (Nelson). Any other variety: 1 and 3, J. Moorhouse (Bradford); 2, Mrs. E. Asquith (Castleford). Breeders classes: Livebearer classes: Six Guppies: 1, Mr. and Mrs. P. Buxton (Barnsley); 2, H. Gardner (A.D.A.S.); 3, R. V. Brothwood (Merseyside). Six Platies: 1, Mr. and Mrs. Hogarth (Salford); 2, H. Gardner (A.D.A.S.). Six Swordtails: 1 and 2, P. Reynolds (Swillington); 3, H. Gardner (A.D.A.S.). Six A.O.V. Livebearers: 1, L. Kaye (Top Ten); 2, E. F. Hunt (A.D.A.S.); 3, H. Gardner (A.D.A.S.). Egglayer classes: Six Barbs: 1 and 3, Mr. and Mrs. Cohen (Castleford); 2, Mr. and Mrs. Buxton (Barnsley). Six Characins: 1, Mr. and Mrs. Cohen (Castleford); 2, Mr. and Mrs. F. Buxton (Barnsley); 3, Mr. and Mrs. Healey (Barnsley). Six Cichlids: 1, J. A. Whiteley (A.D.A.S.); 2, G. Monk (A.D.A.S.); 3, Mr. and Mrs. Webb (Salford). Six Anabantids: 1, J. Wright (Alfreton); 2, Mr. and Mrs. Cohen (Castleford); 3, G. Tate (Nelson). Six Carps and Minnows: 1 and 2, Mr. and Mrs. Hogarth (Salford). Six Catfish, Loach and A.O.V.: 1, G. E. Cuff (Lincoln); 2, P. Reynolds (Swillington). Advanced Classes: Guppies: 1 and 3, R. V. Brothwood (Merseyside); 2, R. Taylor (A.D.A.S.). Platies: 1 and 2, D. Sewell (Rainsworth). Siamese Fighters: 1 and 3, R. V. Brothwood (Merseyside); 2, Mr. and Mrs. Cohen (Castleford). A.O.V. Anabantid: 1, W. Selby (Notts. & Dist.); 2, L. Kaye (Top Ten); 3, D. Sewell (Rainsworth). Dwarf Cichlids: 1, J. Hooking (Wakefield); 2, J. A. Whiteley (A.D.A.S.); 3, P. Carey (York). Angel Fish: 1, J. A. Whiteley (A.D.A.S.); 2, J. A. Stretton (A.D.A.S.); 3, M. Allsop (Alfreton). A.O.V. Cichlid: 1, Mr. and Mrs. Howard (Barnsley); 2, R. Taylor (A.D.A.S.); 3, D. Sewell (Rainsworth). Small Barbs: 1 and 3, J. A. Whiteley (A.D.A.S.); 2, Mrs. J. Tonge (Oldham). A.O.V. Barb: 1, J. A. Whiteley (A.D.A.S.); 2, C. Britten (Ashton); 3, P. Carey (York). Small Characins: 1, Mr. and Mrs. Buxton (Barnsley); 2, B. Dawson (Oldham); 3, J. Wright (Alfreton). A.O.V. Catfish: 1, F. Pullman (Stockton); 2, P. Carey (York); 3, Mr. and Mrs. F. Gates (Castleford). A.V. Loach: 1, Mr. and Mrs. Zamiteus (Bradford); 2, Mr. and Mrs. J. Robinson (A.D.A.S.); 3, N. and V. Fearn (Stockbridge). Any other variety: 1, D. Kennedy (Bradford); 2, C. Britten (Ashton); 3, I. Hepinstall (Castleford). Pairs (Livebearer): 1, Mr. and Mrs. Webb (Salford); 2, G. Monk (A.D.A.S.); 3, Mr. and Mrs. Hogarth (Salford). Pairs (Egglayer): 1, M. Tonge (Oldham); 2, Mr. and Mrs. Webb (Salford); 3, Mr. and Mrs. Healey (Barnsley). Common Goldfish: 1, R. Lister (A.D.A.S.). Fancy Goldfish: 1, P. Moorhouse (Bradford); 2, G. Thickbroom (Castleford); 3, M. Cole (Swillington). A.O.V. Coldwater Fish: 1 and 2, J. Hooper (Bradford); 3, J. Kay (A.D.A.S.). Furnished Mini-jars: 1, J. Greenwood (Halifax); 2, B. Megson (A.D.A.S.); 3, I. Kovacevic (Halifax). Aquarium Plants: 1, J. Groop (A.D.A.S.); 2, J. Kay (A.D.A.S.); 3, Mr. and Mrs. Webb (Salford). A.O.V. Characin: 1, G. Monk (A.D.A.S.); 2, B. Eyre (Workop); 3, J. A.

 **A TABLET A DAY, SENDS WHITE SPOT AWAY**
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Whiteley (A.D.A.S.). Toothcarps: 1, W. Batley (B.K.A.); 2, M. Tonge (Oldham); 3, M. M. and A. Crowther (Swillington). A.V. Marine Fish: 1, V. Fletcher (Workop).

MR. G. VINICOMBE presided at the November meeting of the **Llanrwst Major A.S.**, when Mr. and Mrs. L. Baker and son Andrew and Mr. S. Jenkins were welcomed as new members. R. S. Wieg judged the show which resulted as follows: A.V. Baylayers: 1, Helen Jones; 2, Mr. Ireland; 3, J. Thompson; 4, D. Edwards. A.V. Livebearers: 1 and 3, Helen Jones; 2, D. Archer; 4, Mrs. L. Baker. Best Fish: Helen Jones. This was followed by three films in colour—Between the Tides, A Letter to Wales and Next Stop Scotland. They all proved interesting and lasted ninety minutes. Only Between the Tides was of interest to the hobby but all three were hired from the British Transport. Meetings are held on the second Tuesday of the month and new members are always welcome.

THE Annual General Meeting of the **Thurrock A.S.** was held in November when the following officers were elected: President: R. Nicholls; Chairman: M. Martin; Vice-Chairman: P. Hinchley; Secretary: John Appinall, 48 York Road, Coringham, Essex. Treasurer: J. L. Juson; Show Secretary: D. Durrant, 22 Kingsman Road, Stanford-Le-Hope, Essex; Assistant Show Secretary: J. Purber; Librarian: R. Stradwick; Recorder: J. Hatton; Publicity Officer: Miss A. Sutton; Special Duties: K. Appleyard.

THE **Hendon and District A.S.** held their Annual General Meeting recently, when the following officers were elected: Chairman: H. White. After six years R. Purbeck stated that he did not wish to be nominated as Secretary, so rather than lose his valuable services he was elected Vice-Chairman. Secretary: R. Maynard, 90 Cotswold Gardens, London, N.W.2. Treasurer: P. O'Connell; Assistant Secretary: R. Deacon; Show Secretary: R. Sherwin; Assistant Show Secretary: D. Allison; other Committee Members: H. Mould, T. Glass, D. Finch.

THE first meeting in November of the **Basingstoke A.S.** consisted of an illustrated lecture by A. Feeder on Aquarium Plant Propagation. The talk was of practical value to all present and the proceedings concluded with an auction of plants donated by Mr. Feeder. Results of the Table Show were as follows: Any variety plant: 1, G. Payne; 2 and 3, H. Gough. Any variety Novice: 1, T. Sweeney; 2, R. Iley; 3, D. Pun. Any variety (Tropical): 1, A. Clarke; 2, T. Sweeney; 3, H. Gough.

At the second November meeting a talk was given by a member on Live Foods and Cultures. The Society were also very pleased to hear that they had won the "Three Counties Quiz Cup" in a very tight contest. The results of the Table Show were as follows: Any Variety Labyrinth: 1, 2 and 3, A. Blake. Any Variety Novice: 1, R. Weston; 2, D. Puet; 3, M. Strange. Any Variety Tropical: 1, R. Weston; 2, A. Marshall; 3, A. Blake.

A TALK on live breeding of goldfish was given at the **Goldfish Society of Great Britain** November meeting, by a member of the Society. Then a discussion took place on the reprint of the Standards Book. The awards to the winners of the breeders competition were presented by the President of the Society, and were: Singletails: 1, D. Meieris; 2, R. Whittington; 3, L. Imery. Twintails: 1 and 2, J. Linsale; 3, D. Meieris. Globe-Eyes: 1 and 3, J. Leaver; 2, H. Jago. Mixed Class: 1, R. Whittington (Brambleheads); 2, D. Woodley (Pearlscodes). Breeders Cup: J. Linsale (Twintails). Intermediate Breeders Cup: R. Whittington (Brambleheads).

January, 1970

THE November meeting of the **Bishops Cleeve A.S.** was given over to a formal discussion between the members. Table Show was for Australian Rainbows: 1, D. Stevens; 2, P. Tredgold; 3, F. Scrivim. Furnished Jars: 1, N. Doolley; 2, D. Stevens; 3, C. Surgeoner. During the month the Society was challenged to an inter-show with I.C.I. Gloucester Aquarist Section, the result being a win for Bishops Cleeve with 623 points against I.C.I. 604 points.

THE monthly meeting of the **New Forest A.S.** commenced with the award of Prize Cards to members who had had successes at two recent inter-club shows. One of these was with Winchester and the other was the second leg of the triangular match with Salisbury and Bourne-mouth clubs. Cards were received by Messrs. R. Moseley, A. Williamson and D. Harding.

The meeting continued with a Quiz arranged by R. Moseley. This proved to be a real treat, but was informative. Members realised how much more there was to learn. The results of the Table Show were as follows: A.D.V. Coldwater: 1, M. Lee; 2 and 3, R. Travers; 4, A. Williamson. Barbs: 1, J. Jeffrey; 2 and 4, D. Hare; 3, D. Lane.

THE **Bristol Tropical Fish Club** held their Annual General Meeting at the end of an extremely successful season, the highlight of which was undoubtedly the 1969 Open Show. This attracted a record number of high standard entries and a committee has been formed to formulate details for next year. The Show Secretary is E. Newman, 71 Somerdale Avenue, Knowle, Bristol, 4, and further details will be announced as soon as possible.

The following members were elected as officers for the coming year: Chairman: L. Littleton; Vice-Chairman: A. Kimber; Hon. Secretary: W. Holland; Assistant Hon. Secretary: C. McGrath; Hon. Treasurer: R. Toope; Reporting Secretary: R. Chapman; Programme Officer: R. Gale; Librarian: Mrs. J. Chapman; Auditor: Messrs. G. Purber and B. Clarke. Award winners for the 1969 Table Shows were Open Section: P. Brown; Novice Section: J. Smith.

During this season some extremely capable speakers kindly visited the club. In addition, considerable emphasis has been laid upon showing a varied selection of films selected by the programme officer. An invitation is extended to visitors and prospective new members who are assured of a warm welcome at the monthly meetings held on the third Tuesday of each month at the Swan Hotel, Stokes Croft, Bristol, 1, at 7.30 p.m.

THERE was almost a complete turn-out at the November meeting of the **Tombridge and District A.S.** to hear Ken Nutt of Tottenham give a talk on keeping cichlids.

In the course of his fascinating talk, he covered every aspect from buying stock to breeding compatible pairs and rearing their young. In the second part he dealt with the needs of some of the more difficult cichlids. Almost the only problem he didn't help with was the disposal of excess stock. K. Nutt also judged the Table Shows for Cichlids with the following results: F.R.A.S.—Class D: J. Bellingham (Zebra Cichlid); Class Da: R. Taylor (Angel); Class Db: D. Allin (P. Kribensia).

THE **Gorton and Openshaw A.S.** is in the process of reorganisation with a view to ensuring maximum progress in the Society. The reformed committee is as follows: Chairman: R. Thomson; Secretary: Glyn Mills, 73 Ashdale Crescent, Droylsden, Manchester; Treasurer: A. Newsome; Minute Secretary: A. Seabright; Public Relations: E. Price. The Society meet on the first and third Wednesday evenings at 8 p.m. at the Midland Hotel, Hyde Road, Gorton, Manchester, 16 (near Belle Vue Lake entrance).

Federation of British Aquatic Societies

SPECIAL SHOW MEETING

The Conway Hall, Red Lion Square, Holborn, W.C.1.

Saturday the 17th January, 1970
at 2.30 p.m.

Societies are invited to send representatives to put forward suggestions and discuss the Major Aquatic Shows which are to be held this year.

THE West London Section of the **Fancy Guppy Association's** Autumn Show had 197 entries with visitors from Bournemouth, Radlett and Edmonston Sections. The best Male in show was a Fan—C. W. Parker; Best Female: Cofer—W. M. Holmes; Best Breeders: Females—Mr. and Mrs. Fillmore. The West London Section meets every third Sunday in the month at the Community Centre, Clifton Road, Isleworth, at 3 p.m. and visitors and new members are welcome.

AT the Annual General Meeting of the **Didcot and District A.S.**, A. Wilkinson was elected chairman, on the departure of F. Hall. The Secretary as before is D. C. Whiting, 28 Blenheim Close, Didcot, Berks. and Show Secretary J. Trinder, 6 St. Rumbold Road, Wallingford. The new Treasurer and Librarian is P. Lay. The fifth Annual Club Show was held in October with the fish were ably judged by M. Carter from Becknell A.S. Any prospective new members and visitors will be welcomed on the first and third Fridays at 8 p.m. in the Social Club, Esso Research Centre, Abingdon, Berks. or please contact the Secretary.

THE principal event of the evening at the meeting of the **Bristol A.S.** was a talk by Les Dodge of Birmingham, his theme being "How to keep Fish in Winter." He was referring to Coldwater Fish and his own methods were described in great detail. The point which emerged and was greatly stressed was that preparation of winter quarters, especially the cleanliness of them, together with the fish being left strictly to their own devices in well planted accommodation, was all that was necessary to bring them through the coldest of seasons. Mr. Dodge went on to bring to bear the dangers of supplying too much dried foods to the fish, for although there is no such thing as over-feeding, the problem lies with uneaten foods and the pollution which will probably set in. There followed a questions and answers period, with Mr. Dodge in the Chair, during which all members were able to put forward theories and quote facts on this very interesting and necessary subject.

The monthly Table Show programme was brought to a grand finale with the two classes having thirty-four exhibits. In the tropical class for Characins, Master Ian Milford was awarded the three cards given for the six exhibits on display. The Coldwater class for

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Shubunkina bred 1969 was a large affair, giving the judge, N. Grimston, a difficult task to assess the twenty-eight fish. The fish were of high standard and seven cards were awarded in this order: 1, 2, 4 and V.I.C., J. Savage; 3, R. Pincock; H.C., E. Wilson; C. C. G. Bell.

THE Privatoers A.S. were entertained by Colin Wilson at their November meeting. He gave an informative and interesting talk on his experiences keeping various forms of livebearer. The Table Show of the month was for Killifish and the results were as follows: 1 and 2, R. Whinaker; 3, W. Burton.

IN October, the British Aquarist Study Society (BASS) held its Annual General Meeting and Convention. The new President for the following year is Dr. G. Gust, who has been chosen for the tremendous work he has put into the Society in the last few years. Unfortunately, owing to bad weather he was unable to fly down from Scotland to receive this honour. The other officers of the Society were duly re-elected for a further term of office.

In the afternoon, Mr. Winston Taylor of Belle Vue Aquarium gave a highly informative talk on Tropical Marine Coral Fishes. This very interesting talk was illustrated by an excellent film taken by the lecturer at the Belle Vue Aquarium. Shots were seen of Marine Fish actually spawning, and this provided many questions and discussions. After tea a Brain Trust was held, and many searching queries from the floor were answered by the "Panel of Experts."

THE Halifax A.S. Show attracted 373 entries from twenty-three societies. Results: Livebearers—Guppies: 1, J. Brook; 2, A. Mason; 3, J. and B. Dawson. Swordtails: 1, Mr. Burnap; 2, R. Robinson; 3, B. Kirkton. Mollies: 1, J. Brown; 2, N. Turner; 3, D. Holmes. Platies: 1, B. Kirkton; 2, J. Untley; 3, J. Whiteley. Characins—Small: 1 and 2, R. Wilkinson; 3, R. Middleton. Medium: 1, N. Turner; 2, A. Whyte; 3, R. Wilkinson. Large: 1, J. Whiteley; 2, Mr. Hepinstall; 3, L. Thompson. Barbs—Up to Nigger: 1, J. Whiteley; 2, P. Suxton; 3, Master Winner. Over Nigger: 1, J. Whiteley; 2, Mr. Webb; 3, Mr. and Mrs. Cohen. Rasbora—Rasbora, Danio, Minnow: 1, S. Harrop; 2, Mrs. Diver; 3, Mr. Burton. Sharks, Flying Fox: 1, V. M. Fearn; 2, D. Kennedy; 3, H. Naylor. Anabantids—Fighters: 1, Mr. and Mrs. Cohen; 2, A. Mason; 3, Mr. Whitehead. A.O.V.: 1, Mr. Corns; 2, V. M. Fearn; 3, Miss Helms. Catfish and Loach—Corydoras: 1, R. Wilkinson; 2, Mrs. Diver; 3, P. Booth. A.O.V. Catfish: 1, Mr. and Mrs. Gates; 2, Mr. Fryer; 3, V. Poole. Loaches: 1, J. Brown; 2, Mr. Webb; 3, Mr. and Mrs. Hogarth. Cichlids—Dwarf: 1, R. Taylor; 2, N. R. Gibson; 3, J. Whiteley. A.O.V. Cichlids: 1, Mr. and Mrs. Heward; 2 and 3, E. Ormesher. Toothcaips: 1 and 2, Mr. Bartley; 3, R. Taylor. A.O.V. Tropical: 1, D. Kennedy; 2, Mr. Whitehead; 3, H. Naylor. Breeders—Egglayers: 1, F. Burton; 2, Mr. and Mrs. Healey; 3, J. Whiteley. Livebearers: 1, Mr. Gardner; 2, N. Turner; 3, N. R. Gibson. Pairs—Egglayers: 1, R. Robinson; 2, Mr. Webb; 3, J. Whiteley. Livebearers: 1, R. Wilkinson; 2, Mr. and Mrs. Hogarth; 3, A. Hubbard. Coldwater—Goldfish: 1 and 2, L. Eadon. Fancy Goldfish: 1, J. Hooper; 2 and 3, L. Eadon. A.O.V. Coldwater: 1 and 3, L. Eadon; 2, J. Hooper. Furnished Jars: 1, 2 and 3, D. Shields. Best in Show: D. Kennedy.

THE following officers were elected for 1969-1970 at the Annual General Meeting of the Yate and District A.S. Chairlady: Mrs. P. Wright; Secretary: P. Wright; Assistant Secretaries: Mr. and Mrs. R. Bennett. Treasurer: A. Snell.

This was a lively meeting far above the usual Annual General Meeting dullness, with an above-average attendance. At this meeting also a shield was presented to the Society for winning the inter-club shows between Yate, Bath and Stroud.

The Society holds its meetings on the first Monday of every month at the Hesteshoe Inn, Downend, Bristol. Visitors, guests and new members are always welcome.

AT the recent Annual General Meeting of the Bethnal Green A.S., the following officers were elected: Chairman: J. Gower; General Secretary: P. Arnold; Treasurer: J. Hayes; Show Secretary: A. Davis; Assistant Show Secretary: J. Coombs; P.R.O.: A. W. Collings; Committee: P. Williams, T. Newman, J. Adams, P. Brindley.

The meeting was told by the Secretary that the accent next year would be on a drive to recruit more members now that the Society has the services as Resident Lecturer of Frank Tomkins, who came to the Society at the early part of last year and has since done a magnificent job. The Society meets every Tuesday evening from 7.45 p.m. to 10 p.m. at The Strouditch Institute, 229 Bethnal Green Road, E.2. Further information may be had from the Secretary, P. Arnold, 128 Amhurst Road, Hackney, E.8.

A SUCCESSFUL year has been enjoyed by the Selby and District A.S., which was re-formed last year. The membership has steadily increased to the present total of about forty active members.

At the last meeting, Mr. Winterburn of Bradford gave a very interesting talk on plants, and a series of inter-club shows have been arranged between Selby, Hull and Thorne, the first of these to be held on 16th March.

Club meetings are held on the first and third Mondays in each month, school holidays excepted, in the Technical School, New Lane, Selby at 7.30 p.m. Prospective members, both novice and experienced aquarists, are most welcome to attend. The Annual General Meeting will be held on the 2nd February, the venue to be arranged at a later date.

RECENTLY the Bournemouth Aquarists Club were hosts to the Salisbury and District A.S. and the New Forest A.S. for the second round of the three-way Inter-Club Competition. The classes, chosen by the hosts, were: Platies, Mollies, Guppies and Fancy Goldfish, and were judged by a panel of judges from the three clubs. The results of this round were: 1, New Forest A.S.; 2, Bournemouth A.C.; 3, Salisbury and District A.S.; Bournemouth A.C. retaining its lead over New Forest A.S. on aggregate.

The meeting was attended by over sixty people, who heard Ron Matley give an illustrated talk. During the interval, the Club's Table Show of the Month was very ably judged by Dennis Harding, with the following results: Breeders (Egglayers): 1, Mr. Merrifield; 2, Mr. Ryan; 3, Mr. Watkins. At the Christmas meeting a good attendance of members and guests took part in a special Christmas Quiz, and many prizes were won. The Table Show results were: Any Variety Single Fish: 1, Mr. Ryan; 2, Mr. Morris; 3, Mr. Watkins.

A MEETING of the Gloucester A.S. was held on 6th November, 1969, at the new premises at St. James Parish Hall, Upton Street, Gloucester. After Club business was discussed, the members were given an extremely interesting and informative talk by Peter Treadgold of the Bishop's Cleeve A.S., who took as his subjects "Fish Photography" and "Water Analysis." Prospective members are invited to attend meetings at the above venue on the first Thursday in the month, commencing at 8 p.m.

TALKS were given at the November meeting of the Brampton A.S., by R. Hayter (Chair-

man), A. Hunt, D. Robinson and C. Hind, on various aspects of Tropical Fish keeping. The Jar Show results were as follows: Loaches: 1 and 3, B. Hodgson; 2, A. Hunt; 4, D. Robinson. Plants: 1, B. Hodgson; 2, J. Moses; 3, T. Harbour. Breeders Class: 1, E. Bell; 2, R. W. Bell; 3, C. Hind.

THE Hinckley and District A.S. held their first Annual General Meeting in October. The following officials were elected: Chairman: C. Watkin; Secretary: D. Sparrow; Treasurer: N. Pywell; Committee: P. Morris, M. Bishop. At this meeting it was decided that the club would try to obtain permission to donate an aquarium to the Hinckley Hospital, to be maintained by the Society. For further information please write to D. Sparrow (H.D.A.S. Secretary), 172 Brookside, Burbage, near Hinckley, Leics. All new members are welcome.

THE following officers of the Brent A.S. were elected for the coming year: President: T. Denis Smith, A.A.I.B.; Vice-Presidents: Laurie Pavin, M.P., Bernard Ellison, L.L.B.; Chairman: T. Butler; Vice-Chairman: D. Howe; Secretary: R. Fox; Treasurer: P. Shrimpton; Show Secretary: J. Raymond; Assistant Show Secretary: D. Thomas; Committee Members: B. Fellous, K. Lee, R. Howe; F.B.A.S. Delegate: T. D. Smith.

The Chairman, T. Butler, congratulated all members for their tremendous efforts in the past year, which has contributed so much to the overall success of the Club and took part in the very successful West London show held at Brent Club, resulting in the Society taking no less than eight awards at the Aquarium Show. For the ever-increasing membership, the programme for 1970 is adventurous, and all aspects of the hobby will be given the fullest possible consideration. Anyone wishing to join the Society would be assured of a very warm welcome. Details may be obtained from R. Fox, 22 Harvist Road, N.W.6.

THERE was a record entry for the Hartsfield Aquarist Association Annual Show and the results were as follows: Guppies: 1, Mr. Taylor (Aireborough); 2 and 3, J. Thickbroom (Castleford); Mollies: 1, H. Williams (Independent); 2, E. Turnbull (Has.); 3, J. Whiteley (Aireborough). Swordtails: 1, Mrs. Gibson (Huddersfield); 2, Mr. Duncanson (Priory); 3, Mr. and Mrs. Robinson (Privatier Shipley). Platies: 1, J. Tate (Peterlee); 2, J. Whiteley (Aireborough); 3, Mr. and Mrs. Roberts (Peterlee). Small Characins: 1, J. Tate (Pas.); 2, Mr. Mellis (Newton Aycliffe); 3, L. Wirtwood (Peterlee). Large Characins: 1, J. Tate (Peterlee); 2, J. Whiteley (Aireborough); 3, Mr. and Mrs. Robinson (Privatier Shipley). Small Cichlids: 1, J. Whiteley (Aireborough); 2, Mr. Chamberlain (Haswell); 3, Mr. Gibson (Huddersfield). Large Cichlids: 1, J. Watson (Haswell); 2, Mr. James (Priory); 3, Mr. Bonman (Stas.). Small Barbs: 1 and 2, J. Whiteley (Aireborough); 3, J. Robson (Peterlee). Large Barbs: 1 and 3, Mr. Wilkinson (Independent); 2, J. Whiteley (Aireborough). E.L.T.C.: 1, Mr. and Mrs. Robinson (Privatier Shipley); 2, Mr. Catmull (Tad.); 3, R. Curle (Independent). Anabantids: 1, A. Rowbotham (Haswell); 2, J. Tate (Pas.); 3, Mr. Gibson (Huddersfield). Fighters: 1, Mr. and Mrs. Conan (Castleford); 2, L. Willis (Haswell); 3, C. Asquith (Castleford). Catfish and Loach: Mr. Rowbotham (Haswell); 2, Mr. and Mrs. Atwell (Pas.); 3, Mr. Rhodes (York). Rasbora, Danio, Minnow: 1, C. Simpson (Pas.); 2, J. Tate (Pas.); 3, B. Kirkpatrick (Independent). A.O.V.: 1, A. Rowbotham (Haswell); 2, F. Sonley (Independent); 3, Mr. Taylor (Aireborough). Sharks and Lobers: 1, A. Stephens (Stas.); 2, Mr. Frank (Haswell); 3, Mrs. Gibson (Huddersfield). Coldwater: 1, J. Thickbroom (Castleford); 2, Mrs. Hunt (Houghton); 3, J. Peat (Haswell). Furnished Jars: 1 and 3, P. Reynolds (Swillington). Breeders—Egglayers: 1, Mr. and Mrs. Cowan (Castleford); 2, J. Williamson (Haswell); 3, Mr. and Mrs. Atwell (Pas.). Livebearers: 1, Mr. Gibson (Huddersfield); 2, P. Reynolds (Swillington). Breeders Pairs—Egglayers: 1, M. Curle (Independent); 2, S. Hay (Haswell); 3, J. Tate

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Hillside Aquatics London N12

(Pas.). Livebearers: 1, Mr. and Mrs. Robinson (Shipley); 2, Mr. Southern (Pas.); 3, E. Turnbull (Haswell). Best Fish in Show: J. Wason with a silver Chromide.

HOST SOCIETY was Thurrock A.S. at the final meeting between East London and Southend in the Inter-Club Competition. The four classes were judged by C. Creed and Ted Jessop of the F.B.A.S. with the following results: **Mollies:** 1, A. Sutton (Thurrock); 2, S. Hendle (Thurrock); 3, B. Walling (Southend); 4, M. Upton (Southend). **A.O.V. Tropical:** 1, A. Sutton (Thurrock); 2, D. Durrant (Thurrock); 3, G. Eaton (Thurrock); 4, T. Clark (Southend). **A.V. Coldwater:** 1, P. Croot (Thurrock); 2 and 4, T. Clark (Southend); 3, R. Studwick (Thurrock). **Characins:** 1, J. Ross (Best Fish) (East London); 2 and 4, D. Edwards (Southend); 3, T. Clark (Southend).

Whilst judging was in progress members were entertained by C. A. T. Brown, F.B.A.S., with a "Slide Show on Killies", with pointers on keeping and breeding. This was a really impressive and enjoyable lecture which was extremely well received by those present. Southend A.S. were good winners and so hold the Inter-Club Block and Gavel for the year.

AT the Annual Dinner of the Llanrwst Major A.S. G. Vinicombe presided and welcomed forty members and guests. John Wheeler and his wife Joyce of Bradford-on-Avon were made honorary members for services to the Society. The President, Alderman P. G. Smith, C.B.E., presented a table lamp to Joyce and an inscribed plaque to John. The Secretary, R. Wigg, spoke of John's long journey to judge at the Society's Annual Shows since 1960, and said how much this was appreciated by the members. The President presented the W/Comdr. Smith, Miles Thomas and J. Holmes memorial cups to A. Ibbotson, the Stamps Cup to Miss Helen Jones and the President's Cup to Richard Wigg. He also presented plaques to last year's winners, Messrs. A. Ibbotson, S. Yelson, A. Rogers and R. Wigg.

Eight members joined the Bridgend members in a visit to the British Aquarist's Festival at Manchester and on the following evening they attended the Bridgend Society, for the annual Inter-Club Table Show. This proved a very close contest with Llanrwst winning by 22 points.

THE Eastern Counties Section of the Federation of Guppy Breeders Societies have changed their meeting to the third Friday of each month. There has also been a change of Secretary. Visitors are very welcome.

Any enquiries regarding the activities of this Section should be addressed to: Mrs. L. Myers (Secretary), 40 Charford Road, Canning Town, London, E.16.

NOVEMBER was quite an eventful month for the Bethnal Green A.S. It began with the Annual General Meeting, the following officers and Committee were elected: Chairman: J. Ower; Show Secretary: A. Davis; Assistant Show Secretary: J. Coombs; Secretary: P. Arnold; Treasurer: J. Hayes; P.R.O.: A. Collins. Committee: Messrs. T. Newman, W. Williams, P. Brindley, J. Adams. Then came the first Annual Dinner and Dance of the Society which proved a great success and it looks as though this will become part of the Society's annual programme. During the evening the presentation of trophies won by members throughout the year was made the task being ably performed by the Society's resident Lecturer, Frank Tomkin.

To round off the month the Society visited the Independent A.S. for a return Inter-Club Table Show. There were four classes of three fish per class from each Society, making a total of 24 fish benches. The judge for the evening was Mr. Baker and while the judging was in progress the two societies joined in a "Criss Cross Quiz" competition, the questions being given by P. Tomkin. The evening was extremely successful for Bethnal Green, for not only were they the Quiz victors but they also won the Table Show with a twenty-five to fifteen points win.

THE Annual General Meeting of the Lincoln and District A.S. brought a most successful year to a close, a year in which their first open show met with such a good response that its future appearance is assured.

The Society met at 7.30 p.m. the third Monday of each month in the Liberal Club, St. Swithin's Square, Lincoln.

THE Three Counties Group entertained the Association of Southern Aquarist Societies in October at Basingstoke.

The Show Bench classes were 15 in number and each group supplied six fish per class, a total of 180. Cyril Locke of the Reading Club gave a varied and interesting talk on Prehistoric Fish and Mammals, illustrated with slides which was very well received. A. Coombes, President of the A.S.A.S. presented the awards to the Three Counties members and L. Jordan, the Vice-President, presented the awards to the A.S.A.S. members.

Results were as follows: **Barbs:** 1 and 3, C. Pike (High Wycombe); 2, A. Cox (Weymouth); 4, M. Carter (Bracknell). **Characins:** 1, A. Cox (Weymouth); 2, I. Goddard (Salisbury); 3, P. Merritt (Reading); 4, C. Pike (High Wycombe). **A.O.V. Cichlids:** 1, M. Davies (Reading); 2, A. Marshall (Basingstoke); 3, L. Jordan (Bracknell); 4, S. Cook (Salisbury). **Apistogramma, Pelmatochromis, Nannacara:** 1 and 3, T. Henton (Weymouth); 2, R. Bight (Basingstoke); 4, Mr. Bridgen (Gosport). **A.V. Labyrinth:** 1, H. Gough (Basingstoke); 2, Mr. Barker (Portsmouth); 3, Mr. Blanchard (Salisbury); 4, A. Blake (Basingstoke). **E.L. Toothcarps:** 1, H. Gough (Basingstoke); 2, Mr. Bridgen (Gosport); 3, Mr. Davies (Salisbury); 4, J. Vincent (Southampton). **Corydoras Catfish:** 1, A. Blanchard (Salisbury); 2, Mr. Carter (Weymouth); 3 and 4, R. Cox (High Wycombe). **Danio, Rasbora and Minnow:** 1, D. Jones (Southampton); 2, P. Merritt (Reading); 3 and 4, A. Blake (Basingstoke). **Loaches:** 1, M. Carter (Bracknell); 2, G. Carter (Bracknell); 3, I. Little (Bracknell); 4, P. Merritt (Reading). **A.O.V. Egglayer:** 1, J. Frost (Reading); 2, T. Duffy (Bracknell); 3, A. Blake (Basingstoke); 4, D. Walls (Basingstoke). **Platies and Swordtails:** 1, L. Little (Bracknell); 2, R. Cox (High Wycombe); 3, T. Duffy (Bracknell); 4, C. Boets (Portsmouth). **A.O.V. Livebearer:** 1 and 2, M. Carter (Bracknell); 3, L. Little (Bracknell); 4, A. Marshall (Basingstoke). **Common Goldfish:** 1 and 4, V. Voysey (Salisbury); 2, R. Ridley (Basingstoke); 3, A. Coombes (Bournemouth). **A.V. Fancy Goldfish:** 1, 2 and 3, A. Seed (High Wycombe); 4, A. Coombes (Bournemouth). **A.V. Pond or River:** 1, J. Stillwell (Portsmouth); 2, L. Jordan (Bracknell); 3, V. Voysey (Salisbury); 4, M. Davis (Reading). **Best Tropical Fish:** C. Pike (High Wycombe); **Best Coldwater Fish:** Mrs. A. Seed (High Wycombe); **Best Fish in Show:** C. Pike (High Wycombe). **Match result:** Three Counties Group 641 points, Association of Southern Aquarist Society's Group 542 points.

DURING November the Leamington and District A.S. were visited by Mr. Jarvis, who comes from Kings Norton, Birmingham, and who gave a talk on Apogonids, their availability and also some instructions on their propagation. The second meeting featured three members: P. Taggart, G. Muddiman and R. Woodward, who gave a talk on Reptiles and also exhibited a number of live exhibits.

THE members of the Merseyside A.S.'s recent meetings have included talks from Barry Penningley and Eddie Pillinger.

As always Mr. Penningley illustrated his talk with excellent colour slides. He chose for his subject on this occasion, the Anabantid family and the audience saw a very good representation of the various species of gouramies, including the three spot, the honey, the dwarf, the thicklip, the pearl and kissing gouramies. He also showed slides of other anabantids and accompanied each slide with information on the fishes' care and breeding.

Fellow member Eddie Pillinger, proprietor of Water World Ltd., came to talk on the subject of Aquatic Plants—their care and propagation. To illustrate his talk he had prepared specimens

of plants, each of which was carefully arranged in a polythene bag, labelled with the scientific and common name and stating the country of origin.

Taking the various plant families to which these specimens belonged (and there were quite a few plants which many of the members had never seen before)—the speaker proceeded to enlighten his listeners on the needs of the various species in respect of water conditions, lighting and planting mediums.

WE understand that the Grantham and District A.S. which for some years had remained dormant, became extremely active last year and is now getting much stronger under a new Committee. New members are, however, urgently required and for those interested in any aspect of the hobby, including old members, they will receive a warm welcome if they contact the Secretary, Mr. S. Paver, 59 Alexander Avenue, Newark, Notts, or come along to the meetings on the second and last Fridays in each month, which are held at Victoria Hotel, Commercial Road, Grantham, at 7.30 p.m. There is an eight class Table Show at each meeting and in addition a Special Class.

THE members of the Nottingham and District A.S. were recently entertained with a film "Water in Biology" which was very colourful, instructive and entertaining. Mr. Lynn also made a surprise visit to the October meeting and related some stories of the early days of the Society. The result of the Table Show for Catfish and Loaches was as follows: 1, Mrs. I. Bullyment; 2, I. Husk; 3, N. Kenney.

THE December issue of the Bradford and District A.S., in addition to the usual features, contains a review of the Society activities during the year, which makes quite interesting reading. It is surprising how many speakers, shows, entertainments and the wealth of information which is available to members throughout the year for a modest outlay.

EARLY in November the members of the North Kent A.S. had a very interesting lecture on Cichlids by Mr. Senior. The Table Show was Characins and the results were as follows: 1 and 3, J. Stephens; 2, H. Hull; 4, R. Birch. On 10th November the members accepted an invitation from Catford A.S. to go to one of their club meetings, which included a small show. North Kent chose the classes and when they invite Catford back in the New Year they have the choice of classes. The results were: **Livebearers:** 1, Catford; 2, 3 and 4, N.K.A.S. **Swordtails:** 1 and 3, N.K.A.S.; 2 and 4, Catford. **Killies:** 1 and 3, Catford; 2 and 4, N.K.A.S. **Angels:** 1 and 2, N.K.A.S.; 3 and 4, Catford. **Catfish:** 1 and 2, Catford; 3 and 4, N.K.A.S. **Barbs:** 1 and 2, N.K.A.S.; 3 and 4, N.K.A.S.

At the second November meeting a Quiz was given by T. Flint, a member. The Table Show was for breeders, the results being: 1 and 4, C. Wood; 2, J. Stephens; 3, R. Birch. For further information please contact R. Bloss, 11 Lanes Avenue, Greenhithe, Kent.

NEW SOCIETIES

A NEW aquarist society has been formed in Bechill. At the Inaugural Meeting held in November some twenty prospective members were welcomed and a committee was elected as follows: Chairman: P. Martin; Vice-Chairman: D. Spencer; Hon. Secretary: D. Joffe; Treasurer: Mrs. J. Shrad; Committee members: Messrs. Bates, Moynv and Brett-Smith.

Mr. Martin, speaking to the Society, said that he hoped that the future activities would be wide and include Film Shows, Slide Shows, Lectures, Table Shows, etc. The evening was concluded by a Slide Show given by that well-known local aquarist, Barry Funnell of Hastings, who showed slides of the smaller Marine species which may be kept in aquaria and who also gave an excellent commentary on these colourful additions to the aquarists' world.

THE Lakeland A.S. was formed in November last at the Plough Inn, Seaside, Kendal. Details of the Society for new members will be despatched by return of post, as these are urgently needed. Already film and slide shows have been planned with trips out to other societies. The Secretary is I. Ward, 38 Peat Lane, Kendal, Westmoreland.

THE inaugural meeting of the Fakenham and District A.S. was held on Friday, 3rd October, 1969, and the first full meeting was held on Friday, 7th November. Future meetings will be held on the first Friday of every month.

Particulars of any club, society or individual who may be able to lend or hire any films or slides for future club meetings would be greatly appreciated. The Secretary is Allan D. Murray, 17 Fisher Road, Fakenham, Norfolk.

AT an inaugural meeting on 6th November, it was decided to form a society to be called the Buxton and District A.S. The following were elected: Chairman: T. Bloom; Secretary: J. Snadden, "Rosedale", 29 Dale Road, Dove Holes, Buxton.

GRANTHAM and District A.S. See paragraph in Club Notes for news concerning this Society.

THE Hemslow and District A.S. recently held their Annual General Meeting, at which the following officers were elected: Chairman: B. Abbott; Secretary: D. Woodward; Treasurer: H. Woodward; Show Secretary: A. Pratt; Press Secretary: J. White; Librarian: H. Sheppard; Public Relations Officer: Mrs. Rona Brewer; Entertainments Officer: R. Nelham; Floor Members: D. Brooks and E. Dorrell.

At the last meeting of the Society, a talk on "Keeping Terrapins" was given by the new chairman, B. Abbott, which proved extremely

interesting to those members toying with the idea of keeping these fascinating creatures. The Table Show for the class of Labyrinths was well supported. Results: 1, A. Pratt; 2, J. Basham; 3, Mrs. R. Brewer; 4, Miss R. Brewer.

THE election for officers at the Annual General Meeting of the Wellingborough and District A.S. resulted in the following appointments: Chairman: D. Lawrence; Vice-Chairman: A. Tupman; Secretary: Phyl Flint; Treasurer: P. Flint; Committee members: Joyce Atkins, Hilarie Lawrence, Ada Tupman, M. Barker, R. Bentley, J. Phillips and P. Skerrett. Table Show: the class was Any Variety Losers Best. There were nineteen entries and it was judged by A. Tupman. The results were: 1, R. Barker; 2, R. Bentley, Sr.; 3, A. Love.

SECRETARY CHANGE

EASTERN Counties Section of F.G.B.S. Mrs. L. Myers, 40 Charford Road, Canning Town, London, E.16.

AQUARIST CALENDAR

22nd February: Rotherham and District A.S. Open Show at Drill Hall, Firwilliam Road, Rotherham. Schedules are obtainable from C. Raybould, 52, Dovercourt Road, Rotherham, Yorks.

1st March: Keighley A.S. Open Show.

8th March: Huddersfield T.F.S. Open Show to be held at Cambridge Road Baths, Huddersfield.

29th March: Nelson A.S. Open, Nelson Civic Centre, Stanley Street, Nelson. Schedules from B. Tate, 12, Priory Close, Bingley, Yorks.

18th April: Thrusrock A.S. Third Open Show. New Venue: Arthur Street School, opposite the Society headquarters.

24th-26th April: Stockton-on-Tees A.S., Fifth Annual Show at St. Peter's and Paul's School, Durham Road, (A.177) Stockton-on-Tees. Schedules available shortly.

3rd May: Derby Regent A.S. Open Show Sherwood Foresters Recreation Centre (Normanton Barracks) Ormiston Park Road, Derby. (Follow R.A.C. Signs).

3rd May: Bury and District A.S. Open Show.

10th May: Association of Yorkshire Aquarist Societies Annual Open Show. Full details later.

10th May: Accrington and District A.S. Open Show at St. John Ambulance Hall, Bull Bridge, Accrington. Details from C. H. Whitley, Hon. Secretary, 47 Lynwood Road, Blackburn.

16th May: Southend, Leigh and District A.S. Provisional date only.

31st May: Coventry Pool and Aquarium Society. Open Show. Foleshill Road Community Centre. Show schedules (S.A.E.) from Show Secretary, S. Woodbridge, 32, Ridgeway Avenue, Coventry, CV3 5BP.

12th June: Llanrwit Major A.S. Open Show, Town Hall, Llanrwit Major.

14th June: Bournemouth Aquarists Club Annual Open Show. Further details to follow.

28th June: Northwich and District A.S. Open Show. Particulars of venue will be announced later.

21st June: Swillington A.S. Fifth Annual Open Table Show.

5th July: High Wycombe A.S. Open Show, West Wycombe Hall, West Wycombe, Bucks.

5th July: Lytham A.S. Open Show at Lowther Pavilion, Lowther Gardens, Lytham, Lancs.

7th July: Lincoln and District A.S. Venue details later.

11th July: Basingstoke and District A.S. Open Show. Details from A. Blake, 50 Bounty Road, Basingstoke.

12th July: Grantham and District A.S. First Open Show, Guildhall, St. Peter's Hill, Grantham. Schedules available mid-February from Show Secretary, S. Paver, 59 Alexander Avenue, Newark, Notts.

19th July: Barnsley Tropical Fish Society. Open Show. Venue to follow.

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