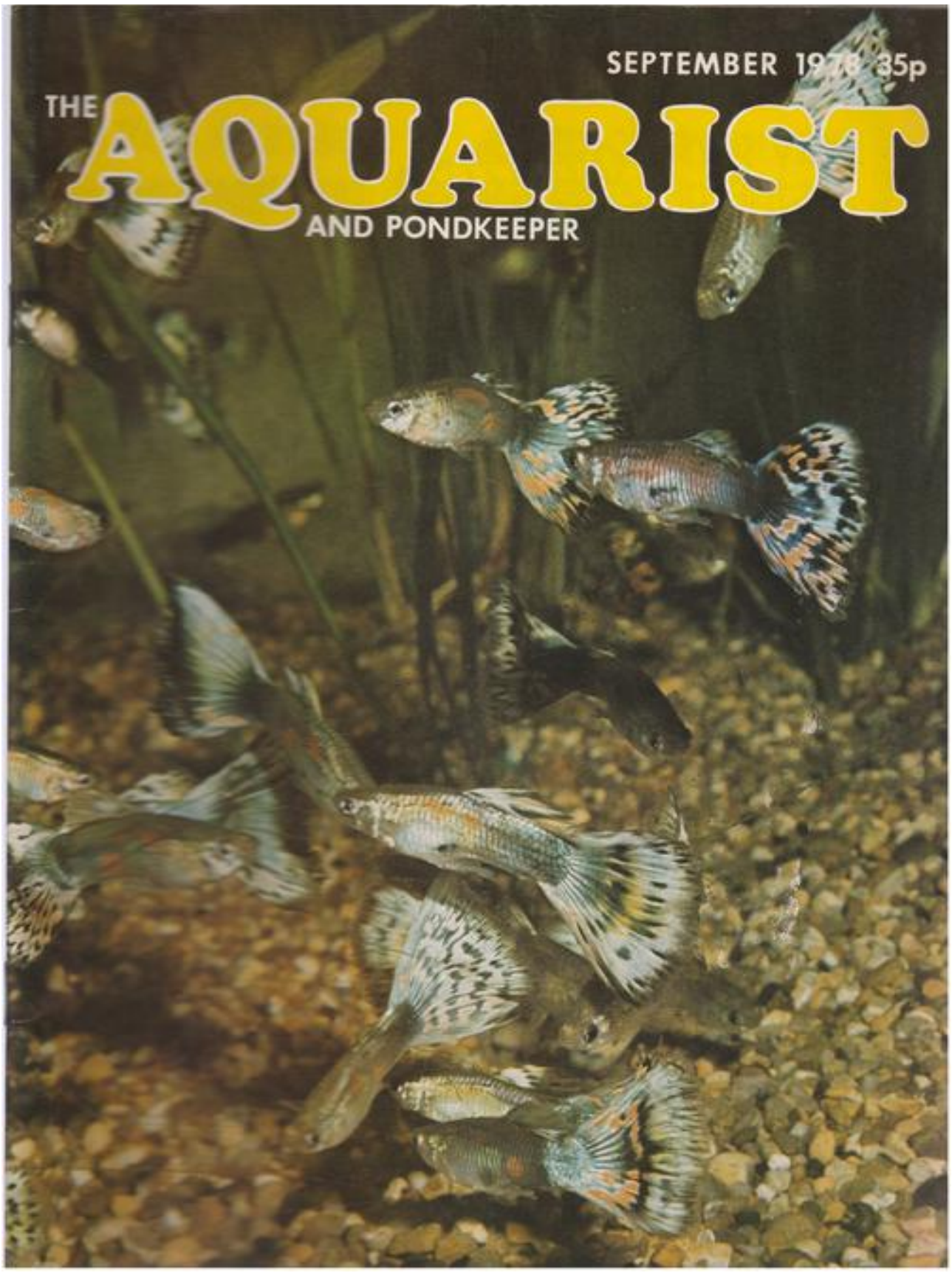
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THE
AQUARIST
AND PONDKEEPER

THE AQUARIST AND PONDKEEPER

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Our Cover:
Guppies (Courtesy of Waterlife Research Industries Ltd.).

OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE
All queries MUST be accompanied by a stamped addressed envelope.

Letters should be addressed to Readers' Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex, TW8 8BN.

TROPICAL QUERIES

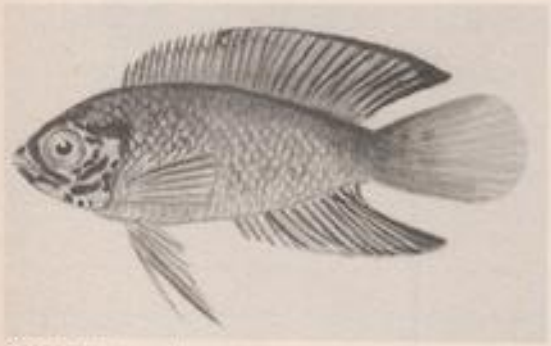
by Jack Hems

Is it wise to introduce a weatherfish into my decorative community tank?

If you mean *Misgurnus anguillicaudatus* or *M. fossilis* then the answer is no. Weatherfish are peaceable but as they increase in size they quickly spoil the appearance of a decorative tank by churning up sediment and uprooting the plants.

I have just bought a tyre track eel and cannot find any information about it in my books. Please can you help me?

The tyre track eel is known to science as *Mastacembelus armatus*. It grows to about a foot and must be fed on live food such as whiteworms, gnat larvae or tiny or chopped earthworms. A temperature of about 75°F (24°C) suits it well. The species, like others of its kind, hides away for longish periods of time in burrows it drives in the sand or among thickets of plants. It is peaceful and should live for years in a tank housing inoffensive fishes which do not rob it of too much of its food.



Nannacara anomala

I should appreciate some information about a small cichlid called *Nannacara anomala*.

N. anomala is one of the most desirable of the smaller cichlids. Its compressed body reflects beautiful shades of green, gold and blue on an olive-green ground. Every so often a dark horizontal stripe or two, and some vertical bars, show up on the sides. The fins are prettily coloured with orange to red on green. The male, the more gaudily coloured of the two, attains about 2½ in. The female tends to remain smaller. It is a well-behaved species except when courting and spawning, during which time the male becomes aggressive towards his mate and drives away any other fishes that approach the spawning site. Spawning takes place in a depression fanned in the sand or in a flower pot or cave of piled stones. The eggs are guarded by the female. The male should be removed from the tank. *N. anomala* accepts dried, flesh and live food and flourishes well at a temperature in the middle to upper seventies (°F). It is native to Guyana.

I am writing to you about a 9 in. fish which I purchased about a month ago. It is eel-like in shape and white in colour, with long-based dorsal and anal fins and antennae-like barbels. The dealer called it a walking catfish. What can you tell me about this species?

What you have bought is a young *Clarias batrachus* catfish from south-east Asia. This fish occurs in two forms: one a sort of muddy brown and the other pinkish white. It attains a length of about 18 in. and is too voracious—at this size—to be placed with regular community species of smaller size. Your 9 in. specimen can do little or no harm to fishes too bulky to be swallowed whole. *C. batrachus* will eat almost anything you offer it. It is very active at night and will almost always end up on the floor unless its tank is kept well-covered. It has a wide range of temperature from the middle sixties to the eighties (°F).

I have a metal frame 60 in. × 18 in. × 9 in. I intend to fix the five pieces of glass into the frame with a silicone rubber sealant. I would like to know whether I should paint the frame before glazing?

I recommend that you give the frame two thin coats of aluminium paint, followed by an enamel paint of a colour complementary to the furnishings of the room. Press the glasses onto a bed of ordinary glaziers' putty and then fill the tank with water to firm them home. After the tank has been emptied and dried, apply the silicone rubber sealant.

I should like to establish a community of anabantids in a tank measuring 36 in. × 15 in. × 12 in. What is your opinion of my plan?

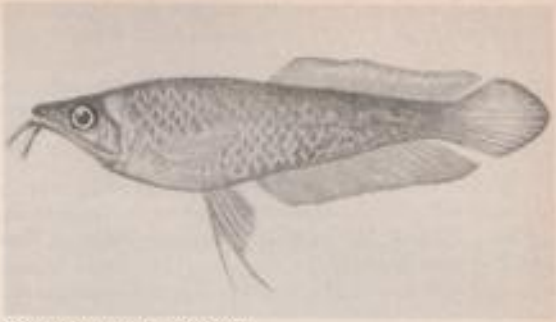
You must bear in mind that male anabantids bully and chastise—seemingly for no reason at all—their female partners—and sometimes so viciously and persistently, if they are given the chance, that they die of exhaustion or the battering they receive—when raising a family is uppermost in their minds. Therefore plenty of tall-growing plants must be rooted in the compost—along the rear half of the tank, and at both ends—to afford escape routes in the greenery. Even then a much-bullied female may have to be separated—for a short or protracted period of time—from a mean-tempered male. Secondly, some anabantids are less suited to living together than others. The male paradise fish (*Macropodus opercularis*) is well-known as a persecutor of fishes smaller or more timid than itself. Then again, a male opaline gourami, much given to spiteful moods, can make a most troublesome occupant of a shared tank. Of the medium-sized to larger anabantids more likely to hit it off together, I recommend Leer's gourami, the golden gourami, the moonlight gourami, the thick-lipped gourami and the kissing gourami. Among the small species the dwarf gourami, the honey gourami and the croaking gourami (*Ctenops vittatus*) make a good team.

Male guppies always die soon after I introduce them into my community tank. Please can you offer an explanation? The other fishes in the tank remain all right.

The more exalted types of male guppy are not ideally suited to a community tank. The fluttering fins invite adverse attention from other fishes and a good bit of chasing around. The place for a male guppy is with other male guppies or with a female or females of its own kind.

Please give me some information on *Osteoglossum bicirrhosum*.

This unusual looking fish is found in Brazil and the north-eastern corner of South America. It has the



Osteoglossum bicirrhosum

habit of cruising about in the upper levels of the water or staying in one position for irregular periods of time among surface vegetation. It feeds on such things as gnat larvae, small or baby fishes, *Daphnia*, and the like, and attains a length of about three feet. Young arowana—to give the fish its popular name—require plenty of growing space in soft and acid water maintained at a temperature of about 78°F (26°C). One more word. The aquarium should be kept well-covered; for all species of arowana are excellent jumpers.

I have introduced two small black sharks into my 4 ft. aquarium. What size will they reach before a year is out?

You did not mention the size of your black sharks at the time of writing. I can say, however, that the black shark can attain about 9 in. before eighteen months are out. In the natural state this species (*Morulius chrysophekadion*) can reach a length of about 2 ft.

Is there such a fish as an albino pristella?

There is, though I have not come across it at shows or in dealers' tanks for a long time. The fish has all the attributes that go to make a first class community fish: good looks, small size (1¼ in.), great activity in the middle and upper levels of the water, and non-faddy eating habits.

I should be grateful for anything you can tell me about *Aequidens rivulatus*.

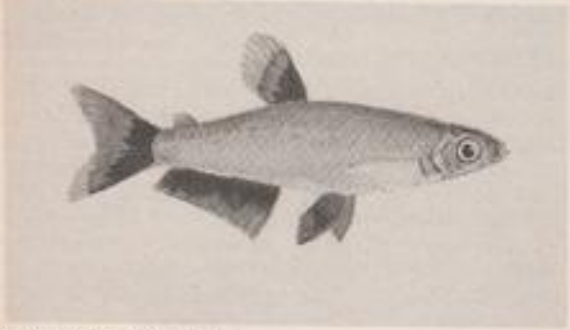
A. rivulatus differs from most other species of *Aequidens* in that it is overtly spiteful and belligerent. It attains a length of 10 in., is native to Peru and demands a diet of flesh and live food. Both sexes look much alike in colouration.

Could I keep the ordinary Australian rainbow fish outdoors for the summer?

Certainly you can if the receptacle used as an aquarium is sunk to ground level or is insulated on all four sides and has, in addition, a clear plastic or glass cover, to prevent rapid heat loss on sunless

days and during the hours of darkness. Again, the fish should not be placed outdoors until the temperature of the water in the container registers about 68°F (20°C) on the thermometer. Further, do not subject the fish to any abrupt change of temperature during the changeover.

Would you recommend the bloodfin for a community tank already stocked with platies, White Cloud Mountain minnows, enamel fins and lemon tetras?



Aphyocharax rubripinnis

The bloodfin (*Aphyocharax rubripinnis*) is well-suited to a community tank housing the smaller species of inoffensive fishes. It minds its own business and eats anything, alive or dried, small enough to be swallowed without difficulty. Furthermore, it is always on the go, is a shoaling fish and is not worried about temperature provided it is maintained within a range of about 68°F (20°C) to 77°F (25°C).

What sort of environment and food suits the black-banded sunfish?

In the natural state this North American centrarchid inhabits the cypress swamps of New Jersey south to Florida and therefore very clear and acid water maintained at about 68°F (20°C) to 72°F (22°C) suits it best. It shows little or no interest in dried foods and live foods such as brine shrimps, gnat larvae, whiteworms and well-washed tubifex should be placed on the menu. The black-banded sunfish is a shy species and hiding places for it should be contrived out of pieces of slate or waterlogged branches of some suitable tree (willow, alder, oak). Plants, too, should be included in the set up.

What can you tell me about the chess-board cichlid?

The chess-board cichlid is known to science as *Crenicara maculata*. It is a fish from the middle reaches of the Amazon and is marked with black blotches on a yellow ground: a pattern similar to that of a chess—or draughts-board. In addition the

Crenicara maculata

sides are adorned with red spots and there is plenty of red and blue in the major fins. The male reaches a length of 4 in, the female about half this size. It is not a trustworthy fish to keep in a community tank; for the male can be snappy. It flourishes best in peaty acid water and a temperature in the middle to upper seventies (°F). Living and flesh foods are necessary.

My great problem is algae. I added some salt to my aquarium for the benefit of mollies and the green growth just romped away. What can I do to stop it?

Mollies, if you have quite a few of them in your tank, should keep the soft green algal growths in check by cropping them day in and day out. For all that, try adding more underwater plants to rob the algae of nutrient salts in the water and, at the same time, tone down the light. Recommended plants include *Hygrophila polysperma*, *Ceratopteris thalictroides* and *Vallisneria spiralis*. Provided there is not more salt in the water than one teaspoonful to the gallon the plants should suffer no untoward effect.

What is the breeding behaviour of the small Egyptian mouthbrooder?

This species, which has undergone a few changes in nomenclature over the past decade or so and is now known as *Pseudocrenilabrus multicolor*, usually spawns in a shallow depression fanned in the planting medium. The eggs are then taken up by the female and incubated in her mouth. About ten days elapse between the time the eggs are laid until the time the free-swimming fry are released into the water. The fry look for small live food right away. Micro worms, small Grindal worms, freshly hatched mosquito larvae or brine shrimps are indicated. If frightening shadows or vibrations disturb the free-swimming fry they will rush for the safety of their mother's mouth.

COLDWATER QUERIES

by Arthur Boarder

Can you recommend some good oxygenating plants for my garden pond? I have tried Willow Moss but it masses up badly.

I know of no better oxygenating plant than *Lagarosiphon major*. This plant makes closely leaf-packed stems of over a yard long in one season. With this plant there is no need to use any other kind. Many pondkeepers go wrong in trying to grow too many different species together, when some may grow but others are choked out.

I am getting some fish called Pumpkinseed. Can I keep them all the year round in my garden pond and what do they eat?

I see no reason why you should not be able to keep the Pumpkinseed, *Lepomis gibbosus* in your pond as long as the water is kept in good condition and at least one part kept open during a severe freeze up. This fish is native to North America where there are very severe winters. It resembles our native Perch, *Perca fluvatilis*, as it is a carnivorous fish. Its usual form consists of fishes and any other live foods it can find. In captivity it may not take any dried foods at all but can be fed on earthworms, maggots, meal worms and strips of raw meat or ox heart. In tanks, these fish may be gradually encouraged to eat some flake food. The method is to mash up garden worms and add some flake food. The mixture is gradually altered so that it contains more flake food in a week or two. Sunfish like some soft sand on the bottom in which to lay their eggs and the male fish guards them and the fry, guarding them in shoals. You must not have any small fishes in the pond with the Sunfish or they could be eaten. Allow a square foot of surface for each inch of fish.

Can you tell me of an oxygenating plant which will grow in deep water surrounding a large water lily?

The best plant for your purpose is Hornwort, *Ceratophyllum demersum*. This plant will thrive in deep water and does not appear to mind semi-darkness. As it makes no roots it is a good idea to use a plastic net bag, as is used for packing oranges, etc. Place a large stone in the bag and then a bunch of plants. Throw into the water and the plant will soon send out shoots through the bag and grow well. This peculiar plant can extract its nourishment through the stems and has no need for roots.

I intend to make a garden pond and want to start right. Is there a small book on garden pond construction and stocking on the market please?

The book, "Coldwater Fishkeeping" as published by *The Aquarist* at £1·50, post free, gives all the necessary instructions for making, stocking and maintaining a garden pond.

I have some fancy goldfish and I recently purchased a small oranda and a Lionhead. Now both these fish show what appears to be blood streaks in their tails. Is this the start of fin-rot, and what can I do to cure the fish?

It is not certain that the trouble is the start of Fin-rot. It is probable that the fish you bought had been raised in warm water and when transferred to your cold tank, they got a chill. The blood streaks may soon disappear but if they do not you had better keep the fish in warmer water for a time. A temperature of 70°-75°F., should help the fish to recover.

I have had trouble with my pond fish through Ulcer disease. I have cleaned out the pond and disinfected all plants. Do you think that there could still be danger from the germs of the disease remaining in the pond?

If you have cleaned out the pond correctly I see no reason why you should have a recurrence of the disease. The rod-like bacteria which are reputed to be the cause of the disease are non-mobile and so all should be well.

I have a magnificent female Lionhead goldfish which has spawned twice during the winter in an indoor tank. My problem is that I just cannot get a male Lionhead to pair with this fish. I have tried many pet shops and have had no success. Can you help me please?

I am enclosing an address from which you should be able to obtain the fish you require. It is hardly likely that you would be able to get a very good specimen from a pet shop. One needs to go to a specialist breeder and dealer for such a fish. The average high street pet shop would hardly be expected to stock such a valuable fish in the meagre hope of a quick sale.

I am having no luck at breeding Bitterling. I have a mussel in the tank and there are other kinds of fish in the tank. Do you think that I would have success if I kept the Bitterling in a separate tank?

The Bitterling should certainly be in a separate tank away from other fishes. They do not like being disturbed and even if they bred in a community tank the fry could be eaten as soon as they left the mussel. See that you have plenty of very soft sand or mud on the bottom in which the mussel can move around and remain healthy.

What causes Fungus disease on goldfish and is there a cure?

The spores of Fungus infestation are usually present in most ponds, but any healthy fish is not likely to become infected. All healthy goldfish have a protective mucus covering and as long as this is undisturbed the fish will not be affected. Once a fish becomes unwell, either through bad conditions in the water or from any damage caused by a pest, it is open to attack. It is imperative that if any fish is seen with any wound, no matter how small, it should be segregated from other fishes and treated with a disinfectant. Only when the wound has completely healed should the fish be returned to the pond. Small wounds can be caused by fish lice, flukes, anchor worm and leeches. There is one time of the year when pondkeepers must watch their fishes for trouble and that is just after they have been spawning. This is often very vigorous and male fish may even jump out of the pond in their excitement. At such times some damage may be caused. The sea salt bath as often recommended is the best cure.

I have a tank, 64 × 12 × 18 inches and it is well stock with plants and has overhead lighting. I have used it for tropicals and now wonder if I can keep coldwater fishes and which kinds to have. The trouble may be that the temperature of the water remains at about 72 F., as the tank is in a centrally heated room. How many fishes and which kinds do you think I could keep?

Your tank could hold about 32 inches of body length of fish. This is the maximum and you can keep below this so that there is plenty of room for growth. If you have some fancy goldfish I am sure that they would not suffer in any way from the warmth of the water. Many fancy goldfish are bred and reared under such warm conditions and after all, many outdoor ponds will have this temperature during the summer. Also many indoor tanks in living rooms will certainly be as warm as yours especially with a lamp overhead. The kinds of fish I recommend are, Fantails, both scaled and calico, Veiltails, Orandas and Moors. These will give a good range of colour and should do well.

I have just moved house and in the garden is a corner which is rather dark and does not get much sun. It measures 19 ft. by 8 ft., and I wonder if it would be possible to make a pond there and if so which small fishes could I keep?

Because the site is not likely to get much sunlight it does not signify that it will not be possible to make a pond there. Many water plants would grow well there and the fish do not appear to mind whether sun gets to the pond or not. Many ponds are so overgrown with water plants that the sun never reaches the depths of the water. Water lilies may not succeed in the pond but you could try one. Any of the usual water oxygenating plants would be all right for you and goldfish would be quite suitable for the pond. There is one point to bear in mind and that is you would not be as likely to be bothered with green water as do some people who have their ponds in direct sunlight.

I have some smooth newts in my garden pond and as I intend to breed goldfish in there, I wonder if the newts will do any harm, and if so how can I catch them?

The newts are not likely to harm your fish but they could eat the fry. Also they could breed in the pond and their young ones could also eat the fry. If you are intending to remove the eggs from the fish on water plants it is almost certain that the plants will also contain some newts' eggs. The tadpoles will hatch out in your rearing tanks and can become a nuisance. You can catch the newts by watching for them to come to the surface to breathe and then netting them. A very good trap can be made very easily with a two pound preserving jar. Discard the glass top and make a funnel, or buy a small plastic one which will fit in the top and just allow the screw top to hold it in position. Tie a plastic string around the top so that it can be retrieved from the water. Place a garden worm inside and lower the jar in the water. You must inspect the jar regularly or the newts will drown inside, as they cannot get to the top to breathe. Remove the newts to a wild pond some distance away or they may return.

I have had one fish in a goldfish bowl for some time and have now added three more. Do you think I have overstocked the bowl?

I do not know the sizes of your fish, but I would say that you have definitely overstocked the bowl. These accursed bowls should never be used to keep goldfish in and if I had my way it would be made an offence to do so. After all, it is an offence to keep a bird in a small cage and so why not to keep a goldfish in such cramped, unsuitable quarters? Get a proper tank for your fish; if they are still alive!

KOI QUERIES

by Hilda Allen

I have a pond in which I keep 14 Koi up to 9 in. long, I also have an outside filtration tank. The fish are always ready for food and everything is eaten. Is it possible to overfeed Koi? My second problem is that the strainer on my pump needs changing every day as it becomes blocked with algae. Are you able to recommend a solution?

Koi are avid feeders in warm weather and it is surprising how much food they will eat. They have a rapid digestion and "little and often" is the best practice, no food being left at any time; this indicates that the quantity given is too great. Koi should never be satiated but constantly searching for anything they may have missed. If this rule is observed then there is little danger of over-feeding.

The problem with your pump-strainer is a very common one when under-gravel filtration is not used. I suggest that you dispense with the strainer altogether and fit a piece of hose directly on to your pump inlet. In turn, this hose should be fitted to a length of rigid, vinyl pipe which should be drilled through with many ¼ in. holes and the end capped. This pipe should be buried in a container of ¼ in. gravel not less than 6-9 in. deep. The small strainers, as fitted on many submersible pumps, have a high velocity and tend to collect everything in suspension in the water, and thread algae also. The gravel will act as a pre-filter and the larger area effectively reduces the flow and chance of blockage. The correct diameter hose for your pump can be easily fitted by immersing the end in hot water for a few moments to expand and soften it, likewise the other end to be fitted on to the vinyl pipe. When cooled, these make excellent joints requiring no clips. The gravel will need to be contained to prevent its being spread all over the pool floor and it must be well washed before going into your pool. The action of your pump and fitting will be indicated by the water going to your outside filtration tank.

A few weeks ago I bought 9 Koi costing between £1·50 and £3 each, 3 died within a week and were replaced free of charge by my supplier. He advised me to put these straight into my large pond, which I did, and since then I have lost another 5 making a total of 8 Koi dead. My pond has plants and a continously operated filter for some large comets, goldfish and another 3 Koi I have had for well over a year. All these fish are healthy and growing well although some of the Koi that died had tail-rot and open blisters on the body. Can you please explain why only Koi die in my pond?

You do not state the size of the Koi but obviously they were quite small from the price paid, or whether the Koi were British-bred or imported. In the case of imported fish, the high cost of air-freight may mean that they are over-crowded in the smallest amount of water and the resultant foul conditions create an ideal situation for an explosion of disease or irreparable damage, to otherwise healthy fish, from which many do not recover. Rapid changes of temperature and water between the country of origin and here coupled with the stress of transfer and netting several times are sufficient to seriously affect completely healthy Koi. Buying fish, particularly imported Koi, is a risky venture for anyone. Losses must be expected for a whole variety of reasons, including unsatisfactory conditions in which Koi may be kept by both suppliers and buyers. I firmly disagree with your supplier's advice to put newly-purchased Koi straight into your pond. Careful treatment, with rest, in good water is all part of the essential long period of quarantine to ensure that fish are free of disease before being mixed with existing healthy stock. Fish in quarantine can be observed and treated if necessary, an impossible task in a pool, especially if anti-biotics are required. The introduction of disease into a pond can be a shattering experience and by now your other fish could have been infected, it has happened before.

I believe you would be well advised to buy fewer but larger Koi if you intend to increase your stock. The Koi you bought were very cheap if they were imported and would only be regarded as poor quality in their home country.

After writing to you in April for advice on under-gravel filtration, water exchange system, etc., my pond was completed by early June. It is 16 ft. × 6 ft. and has no plants except water-lilies, but I have had two disappointments. Within two days my largest Koi (a Showa Sanke) had leapt out overnight. The water level in the pond was 9-10 in. below the coping, and I never imagined it would clear this height but perhaps the small width of my pond was a cause for my loss?

The pond water went green after about 10 days

EVOLUTION OF AN AQUARIST

by N. A. Newman

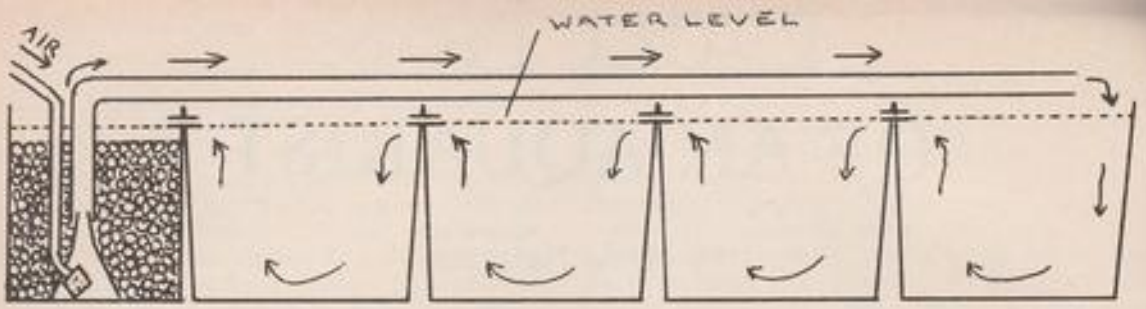
LIKE MOST small children I used to be fascinated by the animals I found in rock pools during the annual summer holiday at the seaside. I was seldom content to go away without taking some specimens, usually as many of the largest shore crabs as could be crammed into a tin bucket. This puts me in mind of a Victorian lady who, inspired by Gosse's *The Aquarium*, obtained a large bell-jar and set it up like a Swedish sandwich; a layer of pebbles, on top of which she put a layer of crabs, then a layer of sea-weed, then fish and so on until she had filled it to within an inch or two from the brim, topping up with a little sea-water. I used to secrete my specimens under my bed at the boarding house where they quickly died and, in the hot summers of those far off days, putrified. If my parents did not notice the landlady always did and many sharp words were exchanged on the subject. A little later I took to bringing shore crabs home and attaching a thread to their legs and staking the unfortunate animals out in the garden. This was a little more successful as they lived for several days. On one occasion I found the masked crab, *Corystes cassivelaunus*, in a rock pool This I placed in a bowl of tap water, and realising that sea-water was necessary for its well-being, I 'borrowed' a packet of salt from the larder and emptied it into the bowl. I admit to feeling some pangs of guilt about my early experiments and I do not think I would allow my son to repeat my mistakes, but was I not acting in the tradition of good empirical scientific investigation? "I am told and I forget, I am shown and I remember, I do and I understand" says the Chinese proverb.

Jam-jars

Wherever I have lived there has always been an assortment of jam jars and dishes of pond water standing about the house and at some time during my youth I stumbled on the most important of all aquarists' rules; that, unless one is using a mechanical aid to circulate the water, the greater the surface area of a body of water compared with its volume, the more successfully it will support animals living in it. Having established this I was able to bring home a rockling, blenny, starfish or prawn and keep them alive for several weeks in a dish, at first borrowed from my mother and later from my wife. Simple set-ups like this brought a great deal of pleasure and interest for many years but the turning point in my experiments with marine aquaria came in July 1973. One evening when there was a spring tide I waded out beyond the extreme low water mark. There had been several windless days previously and the water was perfectly clear. The sight was breathtakingly beautiful. As I waded I disturbed quite large flat-fish that had been hiding in the muddy sand and they scudded off in all directions. Tightly-packed shoals of fish, mainly sand smelt and young garfish, darted away in unison. Sand stars moved awkwardly over the sea bed and hermit crabs scuttled hither and thither. The rocks were covered with yellow and brilliant red sponges; green, orange and turquoise sea squirts and long-legged spider crabs. The beauty, strangeness and abundance of life was thrilling and I decided that I must become more familiar with it. That is when I became an aquarist proper as he might be defined in this magazine.

Filter

Anticipating the difficulties of setting up a community tank, I bought four plastic aquaria, 33 cm. × 22 cm. × 22 cm., a Rena 100 airpump, air-line, a plastic funnel and a length of plastic tubing as used by wine makers. I drilled holes near the tops of the tanks so as to be able to connect them. I cut down a plastic sweet jar to the same height as the aquaria, fixed a length of the tubing to the spout of the funnel, in the side of which I made a small hole to take the air-line. The funnel was placed in the bottom of the sweet jar and the jar was filled with fine gravel. I covered the bottom of each tank with a mixture of broken cockle shell and sand to a depth of about two centimetres and made a few caves in each using flat stones collected from the shore. I brought sea-water from the beach after a few days of calm when it was reasonably clear. When the pump was switched on the water in the sweet jar was air-lifted and conveyed through plastic tubing to the last tank in the series. It then ran back through each tank to the filter. The rate of flow was



sufficient to keep the water in each tank slowly circulating. The system stood on a window sill facing north-east.

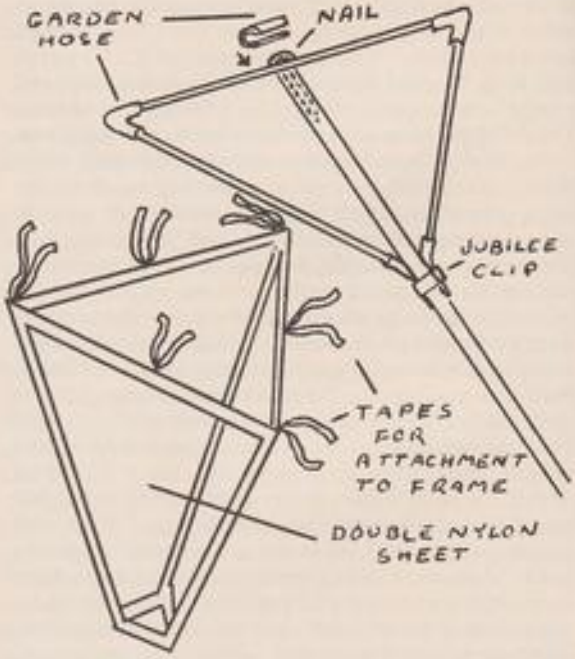
It should be emphasised that, at this stage, I had not understood the importance of biological filtration and was only concerned to filter the water mechanically. I have given a detailed description of this system, which proved to be very successful, to show how cheaply—the total cost was not more than about £6 at the time—one can create an environment in which most marine organisms will live for several months.

Local Specimens

I am fortunate in that I live in a seaside town and it takes me about twenty minutes to walk from my house to the extreme low water mark of spring tides. Thus there was no problem with the transportation of specimens. The greater part of the shore consists of firm, muddy sand but at low water mark and beyond there are areas of boulder clay. The fauna is therefore dominated by worms and bivalve molluscs and the animals that feed on them, rock-loving species being rather scarce or absent. The methods of collecting were searching around and beneath the boulders, digging with a trowel and netting in the water below the low tide mark with a specially designed net. It may be useful to describe this in some detail. Over much of the shore a push net like those used by shrimpers is suitable but the most rewarding areas were covered by fairly small, barnacle and weed covered rocks. These offered too much resistence to the conventional push net. A smaller net, offering less resistence and with smaller mesh was required.

Robust Net

The only small mesh net I could find was nylon curtain material but I knew this would soon be ripped to pieces by the barnacle covered rocks. I constructed a triangular frame with 50 cm. aluminium rods joined with lengths of garden hose. The handle was a stout length of cane attached at the apex of the triangle and at the centre of the leading edge as shown in the drawing. The net itself consisted of three triangular panels, that attached to the leading edge being made of a double thickness of nylon sheet and those at the sides being curtain netting. The free ends of the triangles were truncated and nylon sheet was used to fill in the triangular bottom of the net formed when the sides were joined. The joins were reinforced with



tape. The net was attached by tapes tied to the frame making it possible to dismantle it after use so that it could be rinsed in tap water and dried thoroughly. This net stood up to three years very frequent use. It was pushed along the sea bed for not more than twenty paces. This picked up a manageable amount of weed for sorting and specimens were placed in a plastic bucket of water suspended from a stout leather belt at my waist. Collecting from the boulder areas was simple. It was just a matter of turning a boulder over, searching thoroughly the underside and the ground on which it stood and putting specimens in a plastic bucket of water standing close by. Rocks *must*

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The *Xiphophorus* Genus
(6) Platy Colour Variations

Written & Illustrated by Barry Durham

LIKE THE Swordtails, the Platies also appear in many different colours brought about by crosses between wild fish, accidental mutations and further crosses between established strains of Swordtails and Platies.

Xiphophorus maculatas appears now in about a dozen different colours, plus three additional "overlay" markings, and various fin variations. You can combine colours, body marks, fin variations and the caudal peduncle markings in almost any way and a bit of mathematics tells us that this must produce thousands of different Platies.

Having dealt with the possible tail markings in the previous article we shall concern ourselves here with the basic body colours currently available. Many of them appear in Wagtail, Salt and Pepper (spotting of varying degrees) and Tuxedo forms as well as Hi-fins and Topsails. There seems to be some argument at present as to whether a Hi-fin is just an underdeveloped Topsail, but there is evidence to show that these are two distinct fin varieties.

A Hi-fin Platy tends to hold its dorsal more erect more often than a Topsail. The front ray is extended and when the fin is folded it lays flat along the back just barely reaching the tail. The Topsail on the other hand is bigger and broader. The front ray does not extend beyond the rest of the fin and when the fin is closed it drapes scarflike over one side of the caudal peduncle. When fully spread out it is more fan-like and triangular shaped than the Hi-fin which is longer and narrower.

It seems that in the future even more exotic colour and fin developments will come to the fore. Already in America there are veiltail swordtails which seem to have been developed from a further mutation of the lyretail swordtail and from photographs it looks to be a really beautiful fish.

The Pintail Platy is a British development but these fishes have not caught on as fast as one would have thought. This is possibly due to the fact that they might not breed true as yet. However, the strain, like the veiltails, is still young and with more work may still become popular in the near future.

Basic colour and fin variations of the maculatus Platy currently available are:

Red.—The body is an even matt red including the throat and belly. On the best specimens the colour spreads well into the fins leaving only the edges pearly white. On most fish, however, the red colour invades the fins only a short way leaving a pale band before the white edging is reached.

Pearl Albino.—A true albino with a pinkish-white body and pink eyes. A pearly irridescence suffuses the whole body making it one of the most attractive of all albino mutations.

Gold Albino.—A slight variation on the Pearl Albino. The body here has a warm golden glow instead of the pearly sheen. Both types of albino were developed in Hungary and imported into America by Dr. Herbert R. Axelrod who passed some of them on to Joanne Norton. Dr. Norton established a permanent breeding stock of both colours and then passed them on to commercial breeders. Both types breed true and are hardier than most albinos. Having no black pigment they do not bear tail marks. Regrettably they don't seem to have found their way into Britain in any numbers yet.

Gold.—The body is a golden yellow colour above the lateral line, paling to lemon yellow and then silver on the belly and throat. The tail is a pale yellow as are the other fins except for the dorsal which is bright red. The red colour should be present only in the fin; however, in many fish it "bleeds" into the body producing a red "saddle". Perhaps selective breeding of these latter fish may produce a further

variation with a broad red band in the middle of the body.

Bleeding Heart.—The background colour of the body is pinkish white and on the forepart and belly region is a large red area which fades towards the back of the fish and towards the tail. The best specimens have three to six intense red streaks in the red area giving the impression of blood flowing from wounds—hence the name. The dorsal fin is red at the base but the colour fades towards the extremity. The pectoral fins are red but the tail and other fins are colourless.

Sunset.—This name applies to two very different fish—the English and the American. The Platy known as "Sunset" in this country has a dark orange back, head, dorsal and tail and a pale yellow belly. On the lower half of the sides is a black tuxedo marking which is overlaid with irridescent green above the lateral line. The closer one gets to the dorsal the more the green replaces the black. On many fish this green colour also spreads into the fins and along the nose, but this does not happen on the best specimens where the transition is stark.

The American Sunset Platy is simpler but not as interesting. The body colour is red with varying degrees of black spotting. The dorsal and caudal fins are bright yellow.

Marigold.—The marigold Platy has the head and forepart of the fish (including the dorsal fin) an intense chrome yellow. The tail and caudal peduncle are red and the red colour runs along the underside of the body as far as the pelvic fins. Between the two colours is a transition zone which begins just behind the dorsal fin. The red zone is therefore roughly triangular in shape. The tail is also deep red throughout in the best specimens.

Blue Mirror.—Basic body colour is olive grey or deep gold with the sides, from just behind the head, overlaid with a patch of metallic blue scales. The blue colour spreads well into the caudal peduncle on the best fish. The metallic scales are outlined in dark blue and they fade under the belly to leave it silvery or pale gold depending on the background colour.

Fin colours are variable. Some specimens carry burnt orange ones; some have a bright red dorsal with the other fins a pale orange; other have all red fins; a red dorsal and yellow tail or completely colourless fins. The lower edge of the tail, anal and pelvic fins are edged in a brilliant bluish white. The top edge of the dorsal and the rear edge of the anal fin have a thin black stripe and many fish carry the "Mickey Mouse" marking on the caudal peduncle.

Green Mirror.—Very similar to the Blue Mirror in all respects except that the metallic scales reflect a brilliant bright green to turquoise colour instead of blue. The fish with red dorsals and little colour in the other fins show the most intense green.

Spangled.—An orange Platy with a scattering of black spots which reflect irridescent green or blue. Fins orange.

Black.—A very variable fish. The body should be an even matt black all over like the black molly and this should extend well into the fins. Such specimens are few and far between, however. Most fish of this strain show pale grey on the belly, round the head and on the back so that the black coloration is really just a very large black patch on the sides. Some also have pale orange fins and tail whereas in others the fins are colourless.

Salt and Pepper.—A term used to describe spotted fish. The spots vary in size and intensity all over the body which is usually red, orange or gold.

Wagtail.—Wagtails, that is fish with black fins, were produced as the result of a cross between a wild Platy with the "Comet" marking (upper and lower black stripes on the tail) and a domesticated Platy without the "Comet" mark. Interaction of genes reinforced the black pigment cells in the fins and the result was a fish with its fins coloured black. Selective breeding then brought the wagtail element into many other types of Platies and the Swordtails as well until now all wagtails breed true. Just occasionally a wagtail will throw a couple of "Comets" in a brood just to let everyone know what they were developed from.

The best Wagtails show black in both the fin membranes and the fin rays but in many fish only the rays are coloured with the membranes varying from transparent to grey. The most popular colours are red and gold but the Wagtail now appears in many of the various colour forms mentioned. Perhaps the most attractive are the Bleeding Heart and Blue or Green Mirror Wags.

Tuxedo.—Usually a red or gold fish with a dark patch on the lower half of the body extending from the caudal peduncle and fading to finish just behind the operculum. Above the lateral line the black patch fades quite quickly leaving the back of the fish either red or gold depending on type. Occasionally there is some spotting in this area. The black colour also extends a short way into the tail and there is now a Wagtail form as well.

Hi-fin.—A development from the Simpson Hi-Fin Swordtail. The leading ray of the dorsal fin is

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Aplocheilus (E) singa

Boulenger 1899

Habitat

Reportedly from Boma, lower Congo and from the Lindi River near Stanleyville. The samples which came into the BKA, which were collected by friends of Geoff Wood, were caught by the roadside on the road Matida to Boma. Exact water conditions unknown.

Photo: Allan Brown

Description of the male

Dorsally the male is a light brown. The flanks, caudal and anal fins are irredescent grey/green. Along the body there are 5 rows of red dots which are not always complete. The rows of dots become lines in the top part of the caudal but appear as dots in the lower part. The small dorsal fin is set well back towards the caudal, it has many small red spots which are repeated in the anal fin in the lower half. The caudal fin has slightly extended centre rays and also a small extension from the lower edge of the fin. The pectorals are clear with a pale blue edge. The sides of the head have an irredescent cast of grey/green, the eyes are bright gold. The chin and throat are clear of any colour or dark pigmentation.

Description of the female

The female is dark grey with a few black spots on the lower half of the body with several small spots in the dorsal fin. All other fins are clear. The caudal is rounded. Eyes bright gold.

Size attained in the aquarium

Male to 2¼ inches. Female to 1¾ inches.

Maintenance and breeding

The fish seem very happy in a tank which has some top cover and a small amount of peat at the bottom with java moss (Vesicularia dubyana) in which most of the eggs are laid. Water conditions for both breeding and maintenance are as follows, pH 6·5 DH 2. Water temperature 24°C. Given these conditions the species is easily maintained and bred. As the fish are quite peaceful several pairs can be kept together in the same tank, kept in this way they seem to become less shy and show themselves quite often. They will readily consume most live foods but dislike dry foods. The eggs which measure 1 mm. are laid close to the water surface on plants or floating mops and require ten to fourteen days incubation. As the eggs are difficult to handle because of their size it is easier to leave the eggs on the mops or plants and allow them to hatch out in the breeding tank and then to remove the fry after a few weeks to another tank to be grown on. It is quite possible to leave the fry with the parents until they mature. As the fry reach the ½ to ¾ inch size they have a very attractive herringbone pattern on their sides which slowly disappears as the fish mature.

Summary

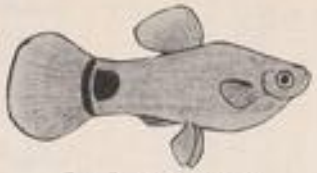
Quite an attractive species that is both peaceful and easy to keep and breed. Not prone to disease. Because the species is an *Aplocheilus* (Sub-genus *Epiplatys*) it will be quite rare in the BKA as most members tend to neglect this genera.

Allan Brown BKA 313

From Leaflet issued by The British Killifish Association.

For further information, send s.a.e. to:

A. BROWN,
173, Parr Lane,
Unsworth,
Bury BL9 8JN



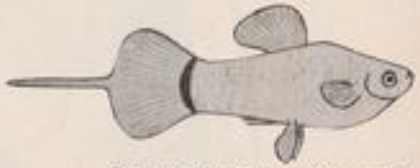
Red Platy (Crescent)

Spangled Platy (Twin Spot)

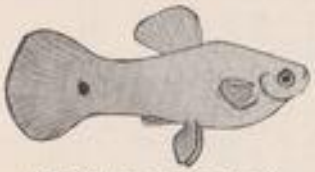
Tuxedo Platy

Bleeding Heart Platy

Black Platy



Pintail Platy (Simple Crescent)



Marigold Platy (One Spot)

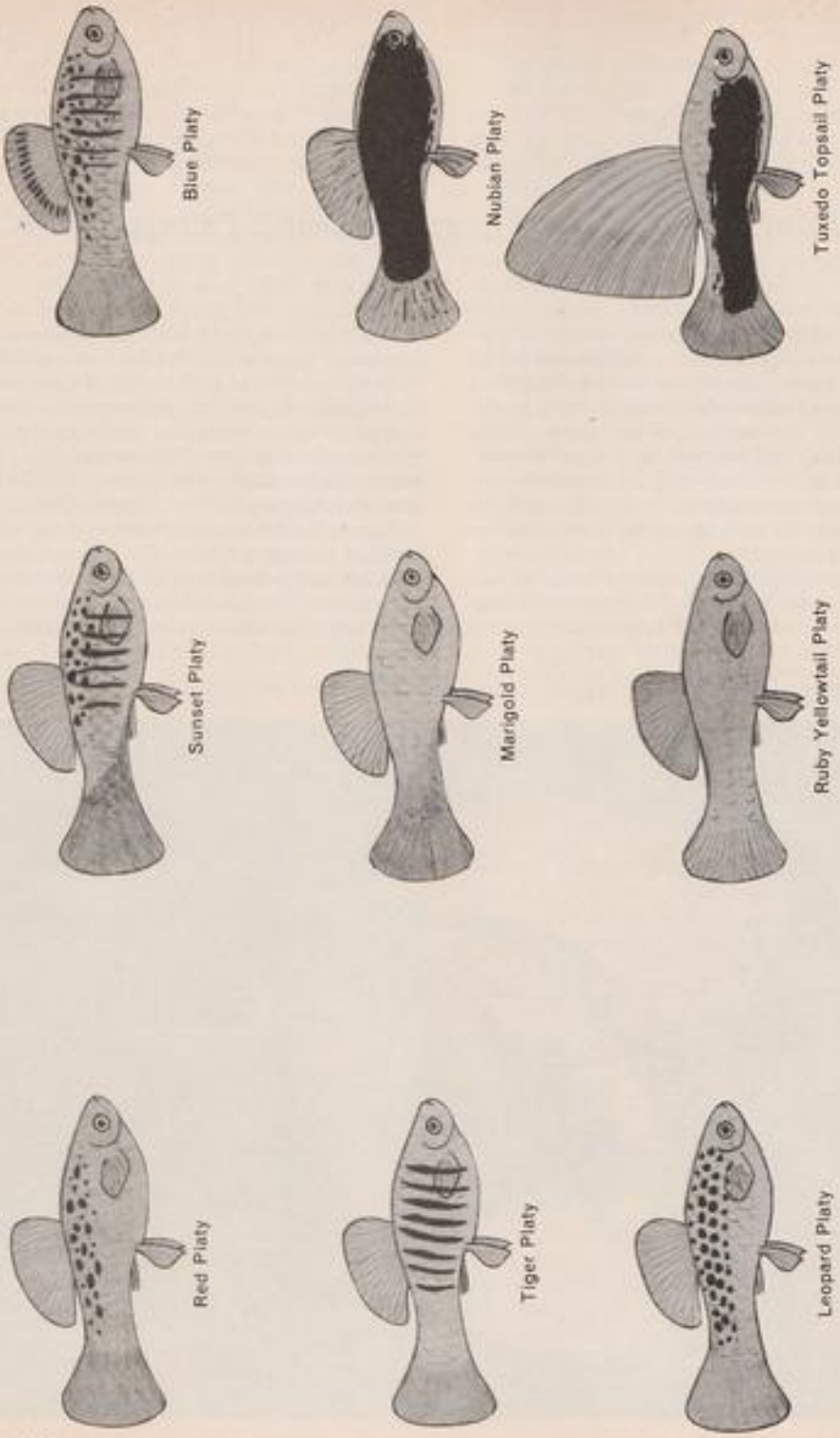
Gold Salt and Pepper Platy
(Comet)

English Sunset Hi-Fin Platy

Blue or Green Mirror Platy
(Mickey Mouse)

Red Wagtail Platy

American Sunset Topsail Platy



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LAND HERMIT CRABS

Written & Illustrated by Jørgen Hansen & Pamela Stewart

It is not every day that one discovers something new and interesting because one makes a mistake and thinks that one knows better than anyone else. It happened one Sunday while reading the advertisements in the morning paper: it was announced that a pet shop a good distance away had just got in a stock of land-living hermit crabs. Thinking that the advertiser had confused the names and really meant fiddler crabs, for which we had been on the look-out for some time, we rang him up and ordered ten.

Of course he was right, so on the trip home we had ten lively hermit crabs in a small closed cardboard box. No sooner had we sat down in the train than they began to scuffle around in the box. An elderly lady who sat just across from us shuffled her feet uneasily and cast us anxious looks, and when this did not help, moved demonstratively into the next carriage. Later a young couple sat opposite us and smilingly inquired as to whether the box contained white mice, and when informed that they were in fact land hermit crabs, admitted that they had not known of their existence.

At long last we reached home with our trophies and installed them in a 170 × 40 × 35 cm. all-glass tank, built up with a land area of rough gravel and stones at each end, and a pool (30 cm. radius) of 5 cm. deep fresh water in the middle. The whole family sat

Small claw delivering piece of banana to the maxillipeds which then pass on the food to the mouth

enthralled in front of the tank for the rest of the evening.

Land hermit crabs are to be found in tropical areas around the world (we have not been able to find more precise information on this count) and belong to the section *Anomura* of the suborder *Reptantia*. Our species does not seem to be particular with regard to type of snail shell, as four different types of shell are represented amongst the ten shells borne by our crabs.

The largest of our crabs measures about 10 cm. in height, when in motion, and 10 cm. in width The stalked eyes seek eagerly around. The crab's own thoracic shell is reddish in young specimens, growing whitish-yellow with age. Stiff hairs of about 1 cm. in length are visible on the claws and walking legs after a change of thoracic shell but these are worn away with age until new are produced at the next change of shell.

When the hermit crab outgrows its snail shell, it changes to a larger; it is not unusual for the crab to try all the various shells available until it finds the one which fits best. The crab first investigates the shell by crawling on top of it, and if this primary inspection proves satisfactory, it will turn the shell so that the opening points upwards, and in the course of less than five seconds will have changed abode. The large pale abdomen emerges from the old shell and is sunk down into the new. In nature the hermit crab is at this point extremely vulnerable which explains its apparently desperate hurry when shifting abode.

The crab limits itself to choosing amongst empty shells and never attempts to interfere with snail-inhabited shells.

The abdomen, which has a right-hand spiral, contains the large digestive gland, the sexual glands, and a large part of the urinary bladder, which in other decapods are present in the fore-part of the body. The limbs on the right side of the abdomen are undeveloped with the exception of the outer, which forms part of a converted tail fan protruding to the side at the end of the abdomen. Each branch of the tail fan bears special non-skid surfaces bearing in turn tiny spines which can be pressed against the inner side of the shell.

One should never attempt to remove a hermit crab from its shell as it would rather be severed in two than be forced out of its stronghold.

The hermit crab has two functional pairs of walking legs. When moving forward, the anterior pair pulls while the posterior pair pushes. With the practically exclusive use of these two pairs of legs the crab can ascend an almost perpendicular stone surface. If difficulties should occur, the two front claws can help out. These are differently developed such that the left is by far the larger and is used to cover the shell opening in times of danger after the crab has withdrawn into its shell; the large claw has moreover a threatening effect.

The two posterior pairs of walking legs are reduced and converted for use as supporting pillars against the inner wall of the shell; they, moreover, help bear the shell.

The gills of the land hermit crab are reduced, which means that less water is lost by evaporation. They are, however, constantly kept damp. A widely-spread net of blood vessels beneath the thin covering layer of the abdomen compensates for the reduction of the gills by taking over a part of their function.

Hermit crabs belonging to the genus *Coenobita* spend most of their lives on dry land and wander far from the sea; they have been found climbing on bushes in search of food. *Coenobita* returns to the sea however to lay its eggs, which hatch as planktonic larvae, which develop into small crabs and thereafter go ashore an seek empty shells.

The hermit crab goes through the process of ecdysis every 12-18 months: the old shell cracks and falls off revealing beneath the new spacious soft shell. Ecdysis has the purpose of enabling the crab to go through a period of growth. For a couple of days until the shell hardens, the crab is even more vulnerable than when it changes snail shell and therefore buries itself in the sand during this period.

The land hermit crab is said to live to an age of more than fifty years. In nature it lives in large flocks of from about 50 up to several hundred and will as a rule keep each other company in the vivarium. This fact may seem to belie the appellation "hermit" which, however, probably refers to the crab's living in a shell as human hermits were reputed to live in caves. It should apparently be possible to hear the crabs communicate with each other but we have not heard this so far.

Hermit crabs generally live on detritus, carrion, fruit, vegetables, grain, seeds, leaves and bark. They can reputedly withstand hunger and thirst for several months by burying themselves in the sand and going into a sort of hibernation. During these periods the crab lives on stored body reserves.

It eats very slowly and only a little at a time. Both claws are used to transfer small portions of food to the maxillipeds, which transport the food to the mouth. The large claw, and sometimes the legs, are frequently used to hold the food, while the small claw picks off small portions.

The bottom of the vivarium can be covered with a 10 cm. deep layer of gravel or sand, and hide-outs can be formed by means of large stones; one should, however, avoid building too high, in order to lessen the danger of the crabs' falling and coming to harm. Plants may be planted here and there as desired. The temperature should be between 20 and 30°C., and the air should be moist; the latter can be achieved by providing a small water hole with a water level of about 5 cm. in one of the corners. Water should in any case always be provided, such that the crabs are able to crawl down into it. If one wishes to attempt to breed these crabs salt water is, of course, essential.

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elongated into quite a pronounced point and works well in holding the fin erect. It is a tall narrowish fin with a rounded edge after the leading spike. When folded it lies flat on the fishes back just about reaching the start of the caudal fin.

Topsail.—The dorsal fin on these fishes is very large and triangular in shape when held erect. When folded it falls like a scarf over the fishes back and well beyond the base of the tail.

In both Hi-Fin and Topsail Platies the dorsal is less well developed on female fish.

Pintail.—A fairly recent innovation that has not yet become fully established. The middle three rays of the caudal fin extend for ½ in. to ¾ in. beyond the tail in a narrow spike. Like some of the fancy Swordtail strains there seems to be some problem about it not breeding completely true, nor will every fish from each brood carry a good tail extension. So far the colours seem to be limited to red and gold, although others will no doubt appear as the teething troubles of the strain are sorted out.

As with the maculatus Platy, *Xiphophorus variatus* also now appears in many colour forms and fin variations, though not quite as many as the foregoing. For one thing the caudal peduncle marks do not appear nor has the Wagtail trait been bred into the species. However, new varieties of Swordtails and Platies are always appearing so it is quite possible that the list will have at least doubled in the next few years.

In the maculatus strains the females are as highly coloured as their mates, but this is not so with the variatus Platies. The female has much more subdued colouring and almost always has very little or no colour at all in the fins. Because she is so much paler the reticulated pattern of the scales is usually much clearer than on the more intensely coloured males.

In the Topsail varieties the dorsal is far less developed in the female fish than in the male.

Variatus Platies appear in the following varieties at present:

Red.—A bright orangey-red fish with a yellow dorsal and deep red tail. Some fish have black spots of varying size and intensity on the top half of the body. The females are uniformly orange with only a trace of yellow in the dorsal and a pale orange tail. The amount of spotting is much reduced and is missing altogether on some specimens.

Albino.—Rare among variatus Platies but occasional ones pop up now and again. Body is a pinkish-white and the fins are colourless. Pink eyes.

Gold.—The body is an even golden yellow paling under the belly and throat. Dorsal is lemon yellow and the tail more orangey. Females are pale gold with colourless fins. Scale pattern is enhanced, however, and some show a black lateral stripe.

Tiger.—This fish has a yellow body with black bars evenly spaced along its sides. The dorsal fin is yellow and the caudal red. Females are simply pale olive-yellow with colourless fins. The belly is usually silvery and the lateral stripe may be present.

Leopard.—Again this variety has a yellow body with a yellow dorsal and redtail. The red colour spreads into the caudal peduncle, however, and there are evenly spaced spots on the upper half of the body. The females are similar to those of the Tiger variety but the caudal peduncle is more orange than yellow.

Sunset.—The body is orange with a green sheen. The tail is red and the colour spreads along the bottom of the caudal peduncle forming a triangular shape. The dorsal fin is yellow. There are three to six bluish bars on the forepart of the body and some spotting. The female has far less orange in her make-up. Above the lateral line the body colour is greenish as is the dorsal. The reticulated pattern on the scales is prominent usually forming a stripe along the lateral line. The belly is silvery and the tail pale red with some of the red colour extending along the bottom of the caudal peduncle as far as the anal fin.

Marigold.—Same colour as the Marigold maculatus, i.e., forepart of the body chrome yellow shading to orange and then red on the caudal peduncle. Red colour more intense on the lower half. Tail red, dorsal yellow. There are, of course, no caudal marks as in the maculatus. Females are similarly coloured though paler.

Ruby Yellowtail. The opposite of Marigold. Head is red shading through orange to yellow on the hindpart of the body. Dorsal fin is red and tail yellow. Once again the females are similarly coloured, even in the fins, though paler.

Blue.—This is one of the most popular of all the variatus Platies with an even metallic blue body with three to six darker blue bars on the sides and dark spotting of varying size and degree. The dorsal is yellow sometimes with short black streaks between the rays towards the outer edge. The tail is red. The scales are edged in darker blue giving a more intense reticulated pattern than on most males. The female is a uniform metallic blue with the dark edging to the scales, possible a lateral line stripe but no colour in the fins.

Nubian.—Also known as the Black Variatus. The body is almost all black apart from the head and belly which are gold, orange or white. The fins are coloured according to which additional colour is prominent with a small amount of black spotting or streaking. Females are coloured similarly to the males although the fin colour is much plater.

Tuxedo.—The same marking as the Tuxedo Swordtail and maculatus Platies. A dark patch overlaying the rear lower half of the body. It appears on many of the colour forms and the female also bears it.

Topsail.—Once again the same as the maculatus Platy. A large triangular shaped dorsal fin which is spectacular when held erect and drapes over the rear of the fish and caudal peduncle when closed. Female fish show some extension of the dorsal fin but it is nowhere near as marked as in the males. There is no Hi-Fin strain as in the Swordtails and Maculatus Platies.

Further Reading

There are, in fact, very few books dealing exclusively with Swordtails and Platies and their related species, or indeed livebearing fishes alone. The books mentioned do not comprise a complete bibliography of all those that mention these fishes therefore, rather a list of books which have been consulted during the writing of this series of articles and to whose authors the writer wishes to make his acknowledgements.

The date with some of the books is that of the edition consulted.

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INNES, W. T.—"Exotic Aquarium Fishes" (19th edition), Aquariums Incorporated, Maywood, New Jersey, 1966.

JACOBS, K.—"Livebearing Aquarium Fishes" (2nd edition), T.F.H. Publications Inc., Hong Kong, 1973.

KALLMAN, K.—"Enjoy Your Platys and Swordtails," The Pet Library Ltd.

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Acknowledgements are also due to many members of the Longridge and District Aquarist Society for allowing the writer to study their fish, especially Mr. R. S. Holden; and numerous other aquarists, far too many to mention individually, who have shown their fish to, and discussed the subjects of these articles with, the writer at many Open Shows.

BOOK REVIEW

Water Analysis *by F. J. H. Mackereth, J. Heron and J. F. Talling.* Scientific Publication 36; 120 pages, illustrated. Freshwater Biological Association, £2·50.

Water, the cradle of life and evolution, plays a prominent part in the life of aquarist and angler, water-bailiff and water engineer. All need to know its contents, chemical and biological. Yet how many have the skill or the equipment to assess its quality? Assuming its readers have access to a spectrophotometer or a colorimeter for colour-matching and to observe light-absorption, to piston burettes for titration, pumps for large samples and measurers to close for required water depth samples, this new scientific paper back from the Freshwater Biological Association must be the most practical laboratory handbook in this subject.

A polythene container is still the most practical, but the concentration of phosphates in it may alter in a few hours. Freezing is still among the best ways of keeping samples. This is a rewritten and largely up-dated new edition of Mackereth's earlier work on the subject and is essential for anyone analysing water-samples for a wide range of requirements, from dissolved oxygen or alkalinity to its electrolytic conductivity or its metal content. There is useful advice on pitfalls to avoid, like contamination from glassware, contaminating water-samplers or storage-containers, the faults of measurers opening at the wrong depth or leaking, and the need to keep samples in darkness to avoid the growth of algae.

It will be an above-average fish-keeper, however, who will be able to use this publication; but those with its technical standard, the limnologist in fact, will welcome its guidance for the accuracy and precision necessary in the chemical analysis of lake, river or tank water.

ERIC HARDY.

Aphyosemion puerzli

Radda & Scheel 1974

Biotope. A small tributary stream of the Wuri River, Cameroons. Water conditions hardness 1° German, pH 6·4, temperature 25·8°C.

Photo: R. A. Heap

Aphyosemion puerzli is a very recent introduction to the aquarium hobby and has, because of its striking colouration, proven a most popular species. In colouration it rather resembles that of *Aphyosemion louessense* Pellegrin 1931, which inhabits small streams in the Brazzaville area of Zaire. Basically, the flank colouration of *A. puerzli* is of a greenish-blue, dorsally olive and the belly region of pale green to white. Overlaid along the flanks are vertical, slightly oblique, splashes of vermillion red. The eye is bold and has a vermillion streak from the edge which extends to the gill covers. Other red markings are present around the gill covers. All fins are basically of a pale green hue, the unpaired fins having a series of large red spots some of which merge to form stripes in the direction of the fin rays, particularly in the caudal fin. The dorsal and caudal have an inner red margin and a final outer margin of bluish-white. The caudal is slightly trilobate with the upper edge extended to form a filament which takes on a dark red or black colouration.

Maintenance and breeding.

A species which does not appear too difficult to keep in the aquarium, seemingly to be happy in a variety of water conditions. A dimly illuminated tank having water of 24°C and conditions of hardness between 2° and 5° German with a pH of 6·8, seems to suit well for general maintenance and for breeding attempts. Feeding presents few problems as all usual types of live foods are accepted and greedily eaten, some dry commercial foods are also accepted.

For breeding a suitable sized tank of 3 to 5 gallons should be provided and furnished with either peat moss, peat fibres or sphagnum moss. *A. puerzli* is very much a bottom spawning species and appears to revel in a large area of bottom space in order to chase and to lay eggs. Consequently a good supply of a suitable bottom spawning media is essential. Eggs are laid frequently and may be left with the parent fish for two weeks before removal for either water incubation or drying as with the more annual Killie forms. Eggs which are water incubated, take some 30 to 32 days to hatch at a temperature of 22°C. Eggs which are dry stored should be incubated for seven to eight weeks at 22°C. Although the water incubation method can give results it would seem that fry are much stronger if dry incubated as outlined. The fry are of medium size when newly hatched and able to consume fine Artemia and, within a few days, small or grated Grindal worm. Growth is rapid and would suggest that *A. puerzli* is, in the wild, an annual form.

Summary

This very striking and obliging species in regards to degree of ease of handling in the aquarium, grows to some 2¾ to 3 inches in captivity and in its adult size is a breathtaking spectacle. The females also have a charm and quite beautiful colour pattern and are unlike other females of the *Aphyosemion* genus. In the wild this species is sympatric with *Aphyosemion riggenbachi* Ahl 1924 and *Epiplatys sexfasciatus* Gill 1862.

Fred Wright T/E BKA

From Leaflet issued by The British Killifish Association.

For further information send s.a.e. to:

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BUBBLE CORAL

by Collin Grist

For many tropical marine aquarists taking the numerous risks of stocking their tanks with fish, invertebrates such as crabs, shrimps and the anemones, and various types of worms etc., are one thing, but when it comes to living coral, well that is another matter. Coral is expensive, and you appear to get very little for your money, but it is very beautiful and equally as fascinating. So is it worth the expense? That, of course, depends on the individual. However, there are other considerations to take into account, such as, it is unwise to put living coral into a tank that already houses butterfly fish, triggers or any other coral-eating creatures. Then there is the problem of deciding whether to have a natural system or a semi-natural system and most important of all, will there be enough minute food available for the coral colonies? All in all there are many risks to be taken. But here is one species of coral that has few problems with maintaining it.

Bubble Coral in appearance is not very coral-like and it has unusual feeding habits, at least by the normal way of thinking. A specimen of Bubble Coral looks like a mass of miniature balloons with a number of tentacles of different lengths which are not always obvious at first glance. This is how it looks in the daytime, but during the hours of darkness it looks totally different

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SHORELIFE IN TENERIFE

Written & Illustrated by H. G. B. Gilpin

DURING a fortnight spent in Tenerife last November I had ample opportunities to examine the aquatic life of the coastal regions. Often the shore lines were composed of massive black rocks and boulders, interspersed with pools and inlets from the open sea. Many of the sandy areas between the rocks were dark, greyish black in colour but some resembled our own beaches and in one place I visited, designed to attract tourists, imported yellow sand replaced the drab local variety.

Needless to say it was the deserted parts of the coast which attracted my attention. One such spot, a quarter of an hour's walk from our base at Los Gigantas, completely covered at high tide, revealed huge, water worn rocks as the sea went out. The rocks themselves were smooth and, apart from scurrying shore crabs, bare of animal and plant life, but the numerous pools well repaid attention. Small or large, almost every one contained minute crabs and blennies, alert, long sighted little fish, which darted for shelter whilst one was still a yard or so away.

It was here I saw my first free-living example of *Octopus vulgaris*. The animal, some six inches in overall length, was lurking in a hole under an overhanging rock in a small pool connected by a narrow channel to the open sea. When a stick was gently inserted into the hole, the octopus grabbed it with its tentacles, exerting an astonishingly strong pull for so small an animal. Evidently disapproving of the intrusion, the octopus, closely followed by another slightly smaller specimen, its presence hitherto unsuspected, suddenly emerged, shot across the pool and escaped beyond reach.

My favourite part of the coast was at Caleta where the small, yellowish, sandy beaches forming two arms of the bay led to the familiar smooth rocks, and pools. Exploring one side of the bay yielded much of interest. The pools contained a great many snakelock anemones, *Anemonia sulcata*, beautiful anemones with mauve-tipped, green tentacles, which I have kept successfully in aquaria, and vast numbers of hermit crabs. Most of the hermit crabs were in periwinkle shells but some occupied cowries. These latter shells, up to one and a half inches in length, were cream coloured, heavily barred with brown and made most attractive residences. On the side of one boulder, constantly washed by the sea, was a colony of over 120 hermit crabs, huddled together, but continually moving over an area no larger than one square foot. These creatures make interesting aquarium inmates but discretion must be used if they are to be kept under community conditions. I have known the larger ones to be disastrously destructive to fish.

One pool revealed a fine sea hare, *Aplysia depilans*, three and a half to five inches long as it stretched fully and three inches across at its widest part. It was dark

Sea Hare (*Aplysia depilans*)

Running Crab
(Pachygrapsus marmoratus)

brown in colour with even darker brown veining. Its body, firm and solid to the touch, was low and broad with a rounded tail and the lateral folds of the mantle fused towards the posterior end.

A nearby pool held two starfish, *Coscinasterias tenuispina*. One was one and a half inches across with eight rays, the other five to six inches across. Both were banded blue and light brown dorsally and yellow ventrally. In water their overall appearance was bright blue but this colour faded immediately when they were exposed to the air. This gregarious species inhabits shallows where it lies in wait for topshells. Variation in the number and size of its arms is common, due to the readiness with which it fractures and regenerates lost parts. It is said to live well in aquaria.

Several pools, usually about eight inches deep, contained sea urchins, *Paracentrotus lividus*, in clear water on sandy patches, surrounded by seaweed, blennies and shrimps. These urchins were covered with rufous red, uniform, shortish spines. Some had small stones and shell debris adhering to their spines. This is characteristic of the species, possibly as a protection against strong light. They were fascinating creatures and have been recommended for inclusion in aquaria.

Perhaps my most interesting experience, this time on the other side of the bay in a knee-deep inlet amongst massive rocks, was the discovery of an octopus, over two feet in length. Several attempts to capture it were unsuccessful as its yielding, slippery body made it impossible to hold. Each time it was grasped it slithered through the hands and retreated under a boulder. This manoeuvre was repeated every time it was disturbed. Finally, no doubt provoked beyond endurance, it emitted an "ink screen," clouding the water so much it was able to escape further irritation. Curiously enough this octopus made no attempt to fasten its sucker covered tentacles around an invading hand.

Within a yard or so of the "octopus inlet" a deep reddish coloured sea cucumber, *Holothuria tubulosa*, was seen. The sluggish, sausage shaped creature was easily caught. When attacked, sea cucumbers can discharge a slimy substance which solidifies in sea water and becomes drawn out into long, clinging threads. Further provocation may result in expulsion of the whole of its internal organs from the cloacal opening. In this case gentle handling prevented any demonstration of resentment and the animal was returned to the pool none the worse for its temporary removal.

The rocks in this part of the coast supported a large population of running crabs, *Pachygrapsus marmoratus*. Their one and a half inch long square shaped carapaces were flat and smooth in texture, yellowish green in colour with dark lines and irregular patches. These extremely active denizens of the splash zone are ever on the alert for danger. Their uncommonly keen vision enables them to detect the presence of an intruder whilst he is still several yards distant and they scamper away into rock crevices long before one can approach within catching distance. They are far less pugnacious than shore crabs and for this reason more easily kept in an aquarium.

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taking on a form where the "Bubbles" seem to deflate and the tentacles become more prominent. The colour of the "Bubbles" and tentacles is a light fawn, but the hard calcareous base is white. The base is usually well hidden during daytime.

The Bubble Coral is not a colonial species like many other types of corals, and it is not a reef builder. In many ways it is very like an anemone, in both anatomy and feeding habits. However, unlike the anemones it has the hard base and lacks a pedal disc or "foot", so it cannot move about.

As mentioned earlier this species is fairly undemanding, but there are a couple of important points worth taking note of. One is the amount of light provided Plenty of light is vital for the reproduction of symbiotic algae, Zooxanthellae, which live within the coral's tissues. These algae are so beneficial to the health of the coral by producing oxygen, and absorbing carbon dioxide (CO_2), and also providing nutrients. The counts of Zooplankton and Phytoplankton can be increased in the aquarium by introducing regular supplies of a liquid vitamin complex of a kind that can now be bought from your dealer, and it appears that such a vitamin supplement aids growth in algae, so I think it would be safe to assume that Zooxanthellae will likewise benefit. The other point is to beware of any fish or invertebrates in the same tank that may do damage to the delicate looking "Bubbles", although in my experience they seem to be fairly resistant to the proddings of relatively large shrimps and crabs and to the various clown fish, dragonetts and wrasse, sharing the same tank as my specimens and which continually peck at tit-bits lying in the coral's folds.

Feeding Bubble Coral is probably the easiest thing of all with their maintainance. This is where they are most similar to anemones as they feed on flesh such as that of mussels, fish, shrimps and even small chunks of beef heart (but very sparingly). It would be wise to use irradiated foods as supplied by your dealer, and there is a wide variety of foods available, including whole Lance Fish which can be used as the fish flesh part of the coral's diet. The food, again like anemones, is placed on top of the specimen and the "Bubbles" then engulf the morsel, drawing it down to the large central mouth. Bubble Coral will also feed at night using its tentacles to draw the food down to the mouth as the "Bubbles" have been withdrawn at this time. Although it is not a good idea to practise this, it is known that these corals can go for a very long time without being fed. Under such conditions they will gradually diminish in size but will readily accept food again as soon as it is offered and will then quite rapidly grow to a good size if feeding is continued. I find that feeding them two or three times a week is sufficient to promote satisfactory growth, but the amount of food given each time depends on the size of the specimen, so a little experimentation is needed here to find out how much can be comfortably devoured.

Another point in the Bubble Coral's favour is that it can be long lived in the aquarium. One prominent European aquarist has kept them for four years, and the two specimens that I keep have been in their present tank for two years and they are still growing.

So, for the marine aquarist who fancies keeping corals in an aquarium but does not really fancy the risks involved, here is a coral that with a little care you cannot go far wrong, and is recommended for the sensible beginner.

WHAT IS YOUR OPINION?

by B. Whiteside, B.A., A.C.P.

Photographs by the Author

REQUESTS FOR samples of plants today—3rd July—reached the forty-five mark; unfortunately I have no more excess plants available at the moment. When more are available I shall let readers know. I've decided that the unidentified plant that I called 'hornwort' is almost certainly a species of *Nitella*—possibly *Nitella capillaris*, an alga. I'm hoping that Mr. Ken Burras, Director of the Botanic Gardens at Oxford University, will be able to identify the plant.

Andrew Young is 14 years old and his home is at 43 Lawn Drive, Swinton, Lancs. Andrew thinks that many readers' plants fail to grow because they are disturbed too frequently. He says: ". . . I bought a few *Cryptocoryne willisii* a number of months ago and they would not grow, so I kept moving them around the tr ; but still no new leaves. Then I decided to leave the plants—and to my amazement a number of new leaves popped up. Remember that *Cryptocoryne* species need a few months to establish themselves. Also, I have some Java moss which I will swop for *Cryptocoryne* or floating plants of any kind." (Anyone interested in effecting a swop should write directly to Andrew.)

I received the following letter from Mr. A. J. Hewitt, of 174 Salisbury Road, Liverpool. ". . . I have a small collection of large cichlids, all housed for the moment in a 24 in. × 12 in. × 15 in. tank. This collection includes a large gold angelfish, a large festivum that is a truly magnificent fish, four blue acaras, five *Herotilapia multispinosa* and a true pair of jewel cichlids—*Hemichromis bimaculatus*. It is truly amazing how this collection thrives together despite the fact that the jewel cichlids spawn at least once a fortnight and avidly defend their eggs and young—some of which have since been given away.

"All the fish are fed on flake food, earthworms and meal worms which, I think, are the chief cause of the jewels' frequent spawning. These fishes seldom quarrel and do little or no damage to one another. I note that the June issue of *The Aquarist* contains an article on that most beautiful of fishes, the festivum; and I was extremely pleased to read the information therein.

"I seek the help of some generous aquarist in my area who could tell me where I could purchase a male and two female festivums to accompany my lone male. The fish I seek would need to be at least 3 in. long so as to avoid being bullied by the other inmates. For such fish I should be willing to pay a reasonable price because I paid £2·00 for my festivum and would not part with him now for any amount of money."

Near Disaster

Home Farm, Ansty, Coventry, heads the following watery tale written by Mrs. G. M. Payne. "I thought you might be interesting to hear of an almost disastrous experience I had with a recently-set-up 48 in. tank. I had the tank working last summer as a coldwater tank but discontinued it when I transferred the fish into the pond. I was going to sell the tank and stand when some young men arrived and offered to purchase a large oak table which was standing in the hall—and which I hated. (It had been left to me by my mother-in-law after an advertisement in the local paper, some years before, had failed to produce a buyer.) The table took up a lot of space but had been strong enough to support a 36 in. community tank.

"With the table out of the way I could now re-plan the hall and use my 48 in. tank and stand in place of the 36 in. one. After a couple of weeks the tank was ready, a few of the fish were introduced and it looked a picture. At one end there is an island of rocks surrounded by plants—the names of which I do not know, but they look a little like fir trees. I also have some bog wood; it is about a foot long with a 2 in. hole about 4 in. from one end. This looks very attractive surrounded by various 'grasses' and *Vallisneria*. The rest of the tank is planted with *Cabomba*, *Elodea* and *Bacopa*.

"The evening before disaster struck I had been admiring my handiwork and was pleased with the way the fish seemed to like their new quarters and were enjoying the extra swimming space. I went to bed well pleased.

"'Get up fast!' were the urgent words from my husband the following morning. 'Your tank's empty and the fish are flopping about on the gravel.' I've never jumped out of bed so fast. The first thing I did was unplug the heater—which I was able to do from the bedroom. What a mess! The carpet was sopping—with not a drop of water left in the tank. The poor fish were barely alive—and I have had some

of them for over three years. Anyway, my husband and I picked them up and threw them into a 30 in. community tank, in the living-room, which is already fairly well stocked. Fortunately I have had only one direct loss—but I guess there could be more in a week or two due to the stress.

"What had happened? I couldn't make it out. I always stand large tanks on a strong board; the board was completely dry! I started to refill the tank, checking for the leak. Nothing! I have U/G filtration in my tanks but I never switch it on for at least two weeks after the tank is working. Normally I make sure that the air line is tied up above the tank; why I didn't this time I'll never know—but that was the answer. There was a particularly long line on one of the air lift tubes; this hung to the floor where the cat likes to play with the end of it. A refill of the tank and a tap on the air line soon showed me how to start the water flowing out of the tank. That was a lesson I shall not easily forget—I hope!"

Siamese Fighters

"No one could argue that the Siamese fighting fish (*Betta splendens*) is (not) one of the most stunning and beautiful fish—and one of the easiest to breed," says Master Ian Boreham, a fifteen-and-a-half years old reader whose interesting account of the spawning activities of fighting fish crossed the Irish Sea, to my home, from 15 Trelawney Road, Newquay, Cornwall. (I'm pleased to note that Ian makes occasional use of the semi-colon which, like the colon, is a very useful punctuation mark in danger of dropping out of our limited repertoire because it's used so infrequently—possibly because few teachers of English instruct their pupils in its use.) The tank in which Ian spawned his fighters was 18 in. × 12 in. × 12 in., bow-fronted, and divided into three 6 in. × 12 in. compartments; the temperature was 80°F. The water depth was approximately 6 in., excluding 2 in. of gravel. The only plant was a few pieces of *Azolla;* on the gravel were two stones, one leaning against the other to form a tunnel. The water had a pH of 7·0.

Red and Turqoise

Ian continues: "The male, a beautiful red and turquoise, was introduced one morning to get accustomed to his new surroundings. Immediately he got accustomed, a bubble-nest was built incorporating *Azolla*. It was amazing to watch him build the nest as it took only a few hours before, I thought, it was complete. After a while the female was introduced into the compartment next to the male's. An immediate transformation took place: the female's transversal (?) lines appeared and her fins clamped up; whereas the male spread out his fins and gills. She started to tremble and pivot as the male became more aggressive and slapped his body and fins at the partition. This pattern was interrupted at times so that the male could get back to his nest. He started to make headlong lunges at the female; but she was pretty adept at escaping these lunges even though she was in another compartment.

"Her beautiful, steel-blue body darkened as the pale bars stood out from the dark background. As time passed his tactics changed and he appeared to become gentler; also, she showed interest and seemed to be eager to join him. By that time it was evening and I switched the lights off, hoping to breed them the following morning.

"Next morning the nest appeared to have deteriorated—except for a small clump of bubbles in the corner. It was not until lunch time that he had completed the nest; and that was when I introduced the female into the male's compartment. Immediately he swam around her trying to entice her under the nest to spawn; but she resisted and was battered viciously by the male. With fins torn apart and scales missing she took advantage of the two stones and hid beneath them. He continued to give chase and she eventually lay on the gravel, wounded and exhausted. As he returned to build the nest, she swam towards him, head down, with fins clamped, and started to nip him on the body. They started to circle each other, nosing each other's sides. The female was turned upside down and the vents were in proximity when the male curved his body over her.

Embraces

"Their very first embraces were eggless, and they kept slipping out of position. It seemed as if they started to experiment to complete embraces. Eventually eggs began to drop and the male swam down to collect them, leaving the female paralysed at the surface. After a few moments she, too, swam down to collect eggs and force them into the nest. The eggs seemed to number from three to thirty at a time. It took two hours for them to complete spawning—during which approximately two hundred eggs were laid. It was at this point that the female began to lose interest and the male's patience decreased. He attacked her savagely and so I removed her before much more harm was done.

"Over the next day he mouthed the eggs and continued to build the nest. After 24 hours the eggs began to hatch and the fry, all of which were 2-3 mm. long, began to drop from the nest. The male continuously blew the babies up into the nest until he could not cope much longer. I removed him, leaving the babies sticking to the side of the tank. Over the next few days I fed them on Liquifry, making sure I did not over feed them.

"Two weeks later the fry, between 2-4 mm. long, swam about the tank. They were a pale orange colour—but the black eyes were dominant. This

was when I made my first mistake. A fish book said that it was advisable to have a water change and increase the water level by an inch or two. This I did—and all but twenty fry survived. As I needed the tank for further breeding I placed the fish in a breeding trap and moved them to a community tank in which they swam about unaffected by other fish outside the trap. Over the next week all but three died. All the fry were different sizes, for unknown reasons, and appeared to be healthy. During the next few weeks they died one by one, the last one dying at the age of seven weeks. I only hope that I'll have better luck in future."

Photograph 1 shows a pair of golden gouramies. Have you bred this attractive fish? If so, please send me details.

"In reply to Mr. D. Mills: where he gets the idea that Sterba's *Freshwater Fishes* is a Bible for showing aquarists, I do not know. I am a breeder of tropical freshwater fish and I like to think I have had reasonable success over the years. As for showing, I have not entered more than six shows in the last fifteen years; not that I have anything against showing fish; fish shows are, after all, the hobby's shop window and attract many new addicts to our ranks.

"To get back to breeding: I find the information in *Freshwater Fishes* helpful and accurate—which is more than can be said for much aquarium literature. One drawback, of course, is that it is gradually going out of date; I refer of course to name changes and new discoveries; and as I stated in my original letter I cannot speak for the most recent edition of the book. I have had my copy for a number of years.

"I have found neons and cardinals respond to soft, acid water and shade; also cleanliness; but in both cases I have not had regular successes. *Cryptocoryne affinis* grows best for me as it seems able to endure my regular water changes better than most of the *Cryptocoryne* group.

"A tank made of angle iron, wrought in the shape of a gas light, has given me fifteen-plus years of service and is still going strong. As a member of the B.K.A. I have had reasonable results from posted killifish eggs; but a lot depends upon the sender and the prevailing weather conditions. I think a 50% hatch is quite a fair return.

"I have one 4 ft. 6 in. tank and one 6 ft. tank on either side of the fireplace, and the above-mentioned gas light tank standing in a dark corner of the lounge. The rest of my tanks are in a converted walk-in pantry." This letter was written by Mr. D. E. Green, of 26 Lord Derby Road, Gee Cross, Hyde, Cheshire.

Pretty Tank

Mr. J. E. Bradburn lives at 15 Stamford Close, Hooe, Plymouth, Devon. He has kept fish for about four years and has two 36 in. tanks. He writes: "One, which my wife calls a 'pretty tank', contains angels, *Corydoras*, a variety of characins, kissing and dwarf gouramies and young brown acaras. The other tank houses breeding pairs of brown acaras and Mozambique mouth-brooders, and a large, brown, bull-head catfish. This tank my wife calls 'rogues' gallery'. I feed the fish on a well-known and popular flake food, which I've used over the years, and the fish have grown to full size and are quite healthy and active. However, I use boiled cabbage and scalded lettuce to avoid constipation. There's nothing worse than seeing fish swimming around with long trailers hanging from them; and none of my fish has suffered from constipation.

"The cichlids and catfish are fed flake food and raw, fresh meat cut into strips of about ¾ in.; and again, boiled cabbage and scalded lettuce. When I want to condition them for breeding, the only live food I ever use is ordinary garden worms—and ragworms when I go digging for bait for angling. These are taken very readily and the fish spawn soon afterwords. I think flake foods contain enough vitamins for the requirements of fish—and live food fed every day can work out very costly. . . ."

Crested Newts

No. 18 Grosvenor Road, Manchester, heads a long, interesting letter I received from Miss S. Andrews. ". . . My first introduction to fish was a present of a large carp when very young; then, of course, tiddler catching; and my father explaining fungus and white spot. During the 1939-45 war I was a child and at that time I had an illness that often kept me away from school. . . . My father brought home some beautiful, crested newts and I used to be able to play with these when well enough to sit up. The last one died when I was about twelve and so had lived six years in a goldfish bowl! I still think they are beautiful creatures—if gently handled, not mangled.

"When I managed to go to school every day a class mate often came round in the holidays. Her father had some carp to get rid of so they came into a bath in our back garden. Most people we knew had only a goldfish bowl; the only ones we knew with one or two aquariums we regarded as well off or better off.

"When the service men were demobbed, or came home in 1946-47, many wanted the tropicals they had seen in Germany; and although we all know the hobby had been here a long time, most people, like me, saw more aquarium shops suddenly open—some soon to close. It was a man we knew who started me on tropicals. Before I left school at sixteen I had managed to save up and buy a few tanks; and after leaving school I did buy a couple of fish from Mr. Boarder. My parents, though, were not fish-minded like me—so, when I went into dog-owning it was approved of and I ceased going to Clapham Aquarist

Society and took up showing and breeding a few dogs. I did this only as a hobby.

"I have kept all animals possible in a normal dwelling—from alligator to mice; but I was always taught a pedigree or pure strain is one that is either natural or after a hybrid is standardised by line-breeding it is pure. Remember, even a dog pure-bred as the greyhound or pekingese (it can be spelt either way) for one or three thousand years may not, in some cases, throw true—and, of course, atavism may occur." (My well-thumbed dictionary is having a bonanza: atavism—resemblance more to distant ancestors than to parents.) Miss Andrews goes on to distinguish between cross breeds, mongrels, pedigrees and hybrids—particularly in the dog world. She now keeps coldwater and tropical fish again—mainly anabantids and cichlids. She says: ". . . I agree that perhaps fishkeeping is an expensive hobby; but I was brought up to believe any hobby is expensive because one does not expect a monetary reward; the reward is in any achievement or reward of satisfaction and interest. Once one has a cash income or is balancing equally income to expenditure, then it is a business—not a hobby. I try to keep my costs down—for instance, by not using an air pump at all; and most certainly by keeping coldwater fish as *coldwater* fish and not by heating them to 75 or 78 degrees for 365 days a year. . . ."

Photograph 2 shows a danio and several cardinals among Java moss and Java fern. Can you identify the unknown fern behind the cardinal on the left?

I was particularly pleased to receive the following letter because although I receive occasional letters from boys, girls don't often put pen to paper. Do fewer girls than boys keep fishes? Miss Helen Rose is 12 years old and she lives at 99 Hazelton Way, Cowplain, Hants. One day, after Helen had finished cleaning her 3 ft. tank, she went away to make some fudge. She says: "An hour or so later I returned to the lounge, where my tank is sited, and sat down. Funny; I could hear quick dripping. Automatically I stared at the aquarium—and did I get a surprise. All my fish were trying to swim in 2 in. of water and the siphon tube was still in the tank. I didn't really want to tell my mum there were twenty gallons of water on the carpet—but I thought I'd better. That night all my family were up late filling up my tank and using cups to scrape water from our carpet. I wonder if this has happened to many other aquarists." (On more than one occasion I must admit to having had a tank leak or siphon on to a carpet; the worst occasion resulted in water dripping from a bedroom tank down through the dining-room ceiling. Both my fish and I were unpopular when that happened! B.W.)

Mr. Kevin Appleton, who ably edits Thorpe and District Aquarist Society's Magazine, kindly sent me a copy of the club's fourth edition. It contains a very good photograph of a seahorse and some tube worms—taken by Kevin—and a variety of interesting news and articles. Kevin, whose home is at 46 Oak Lane, Old Calton, Norwich, Norfolk, passed on the following story. "I work as an estate agent and in the course of my travels see tanks and ponds of all shapes and sizes. Recently I went into a house and saw a small, plastic tank containing plastic plants and shells. The water was crystal-clear despite there being no pump or filter—and there was no heater. The tank was full of guppies—which had bred—and zebras; but the proud owner insisted that they were not tropical fish but members of the goldfish family.

"The water was changed once a week for water direct from the cold tap; and the fish put straight back in. I think we could all save pounds by following this person's example and removing heaters and pumps, etc. Why worry about white spot! Who knows one day we may be throwing ping pong balls into jam jars at the fun fair and winning a shoal of zebras. I wonder if anybody else has had a similar experience."

The more requests for plants have reached me: one from Dyfed and the other from Margate. I've almost lost count but I think the total now stands at 47.

Mr. R. G. Farrow's address is 9 Wyndham Close, Birch Glen, Colchester, Essex. He says: "Thank you very much for the Java moss which was received on 29th June at 11.00 a.m. The postmark was 7.30 p.m. on 28th—so the Post Office certainly pulled out all the stops. The moss seems to be settling down and I hope to distribute some to friends. Once again, thank you for taking the time to send me the moss. . . ." (If other recipients will distribute samples of moss when the original piece has reproduced, numbers of countries should eventually have flourishing colonies. B.W.) Mr. Farrow continues: "Of all the tropical fish available, my first love is the barbs. I keep *Barbus nigrofasciatus*, *B. semifasciatus* and *B. oligipes*. After keeping these for about a year I made my first attempt to breed them.

"I read as many books as possible and gleaned all the information I could. Obviously the information I gathered was tried, tested and correct; however, as I progressed I learnt that considerable variations occur and I wish to pass on my experience of these. I started with *B. nigrofasciatus* and set up a tank as various books had recommended. The conditions, plants, etc. were as most books suggest and, therefore, I shall not waste space with detail which is available at most public libraries. I put the fish, which were well conditioned, into the breeding tank in the late afternoon and waited until the next morning. Nothing! I waited another week and then gave up.

"I then tried with the *B. semifasciolatus* in the same set up and after a week, to my delight, they spawned and I managed to raise a number of fry. Going by the book these fish should have spawned the morning after being put into the tank. I have since spawned these fish again with the same result. The eggs took about 80 hours to hatch instead of the 36 hours that most books state. This was with the water temperature at 82°F. Also, I saw no fry hanging on the plants or glass sides of the tanks. So, I would say to all who have little or no experience of breeding fish: gather all the information you can from any source available. Be patient and prepared for the unexpected. Above all, enjoy your failures as well as your successes. Now, I must go because I have a tank full of fry to feed. . . ."

Mr. K. R. Jaggar resides at 18 Holtdale Way, Holtpark, Leeds, and he tells me that his tortoise was doing so well after hibernation that last July he acquired an additional tortoise. It laid three eggs which were put into a biscuit tin placed in the airing cupboard. Twelve weeks later one of the eggs hatched and a baby tortoise, about the size of a 10p piece, emerged. It was kept awake all winter and fed on chopped lettuce; but sadly, while Mr. Jaggar and his family were away for a day in May, the baby tortoise drowned in about

½ in of water. The Jaggar's are hoping that their female tortoise will lay some more eggs this year.

777 Sgt. Garner, 1 Squadron, 3 Armd. Div., H.Q. & Sig. Regt., BFPO 106 writes: "Having just read June's *W.Y.O.*? Ife lt compelled to write to you in respect of your request for information about foreign aquarium shops. I, along with 50,000 other British servicemen, live here in Germany and quite a number of us are avid aquarists. The reason for this is, I assume, that the conventional pets, dogs, cats and the like, are not too popular due to the quarantine costs one would face on eventual return to England—although a minority do keep them. Fish, however, are quite easily disposed of—and cause less heartbreak when one has to part with them.

Costly

"The one great failing of aquarium keeping over here is the cost. For a 36 in. × 24 in. × 12 in. (*sic*) all-glass tank one could expect to pay a minimum of £50; whereas, I read in June's *Aquarist* that an identical tank is offered at £8·50. Fish also command a fairly high price—the common guppy is approximately 75p; a small molly the same. Male fighting fish are never less than £1·50; females £1·00. Neons compare favourably at 25p each. I use these common fish as examples because I find very few dealers sell tropicals which are in any way out of the ordinary. It was a great achievement, several weeks ago, to find a dealer who actually stocked pencilfish. The cost of plants is also ridiculous; it is four times cheaper to send to England for one's requirements.

"Not only do we suffer because of the cost, but there is also the language barrier. Illnesses, medicines, accessories, foods, etc. all use names not found in the average Anglo/Deutsch dictionary. This problem alone is preventing me from starting a marine tank—which I would dearly love to do. Imagine also living in an environment where you cannot ask your local dealer's advice!

"Readers may be interested to learn that the last time I visited the U.K. I bought some 20 or so fish which survived the 30 hour car journey; each species was in its own bag, contained in a large polystyrene box. There were no problems—other than my wife being annoyed. Bearing in mind these problems, do readers know of any dealers who will send fish abroad by post? If so, there is a ready market waiting for them."

Today is 10th July and the postman has brought me requests for plants from Sychdyn, Lyneham and Tamworth. I think that brings the total to *fifty*—and forty-nine of those who wrote got either one plant or both plants. My tanks are almost bare now—but if the single reader who did not get a sample of Java moss will write again, I'll send him (or her) one of my few remaining strands. Please don't send me any more requests at the moment because my plant stocks are very low—and I cannot afford a secretary. I feel I've done rather well; there's quite a bit of work in supplying, packing and posting fifty free samples of plants!

Few Letters

Unfortunately I've received very few letters in the past weeks but I hope that, when you return from your summer holidays, you'll pen me a few lines. I'll conclude this month's feature while I watch the summer mists and drizzle swirl around my garden making it look like a wilderness in late autumn. The concluding letter was written by 15-year-old David Allford, whose letter is headed 69 Sheppard Road, Basingstoke, Hants. David comments: ". . . I am writing about the recent improvement in the quality of imported coldwater fish. Although I have not purchased any recently I have noticed that they appear to be much healthier. I wonder if any of your readers have noticed this; of course, it might be that my local supplier is getting his fish from another source. Fungus and fin-rot seem a thing of the past and all the fish have the correct number of fins. The number of fins was a big fault in my supplier's stock. Goldfish with tri-tails and fins missing were very common. However, now there are shoals of fish swimming happily around in the tanks, looking in the peak of condition. At least, healthy imported goldfish?

"Why is it that tropical fish food is made up of such large flakes? Many firms give the excuse that it allows selective feeding. This is rubbish as the fish either have to choke on massive chunks of food or I have to grind it up for them—a long and tedious job. What ghastly creatures could possibly manage inch-square pieces of food? I should think even oscars and piranhas would have a little trouble!"

Although I accept no responsibility for the views expressed by contributors to this feature, I should be pleased to receive your opinions on any of the following topics—and any others you may wish to choose for yourself. (a) If you have visited a commercial fish farm, please send me a short account of what you observed. (b) If you have made any attempts to make a colour movie of fishes in aquariums, please send me details of your successes and failures. (c) Mr. P. Sharpe, of 73 Oxford Street, Barrow-in-Furness, Cumbria, sent me an attractive colour print that shows his four aquariums set into the wall of his living-room. Where and how are your tanks displayed? (d) Have you used peat as a plant-growing medium under the gravel in any of your tanks? (e) Please send me details of your experiences with the breeding of: zebras, large cichlids, and small tetras. (f) How many varieties of flake food do you feed to your fishes? (g) Under what conditions do you cultivate *Cabomba*, *Ludwigia*, and Amazon swords? I look forward to receiving your letter. Good-bye until next month.

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be replaced carefully. I cannot stress this enough. We are always horrified by the results of failing to do this. They are easily recognised because their upper surface, which was once resting close to the sea bed, is quite bare unlike the undisturbed rocks around it which are weed covered. This bareness is the result of several hundred hydroids, sponges and sea squirts dying in the exposed conditions. The once algae-covered upper surface which is now facing the sea bed is a black, smelly mess, the algae having died from lack of light. I am sure that, if people realised the carnage that follows when rocks are not returned to their original position, they too would be horrified and it is imperative that they become aware. People are usually relaxed and receptive when exploring the shore and are interested to be shown things by an 'expert.' There is hardly ever any difficulty in getting the message over and there may be time yet to save our littoral fauna and flora. While on the subject of conservation, I am sure that taking one or two examples of each species can do no harm, especially if they are returned after two or three months study. I am sure that any beach can accomodate the activities of a few aquarists exercising common-sense and moderation.

In the first month of collecting I felt I had more than my share of beginner's luck. My notes show that I had found:—

Pipefish: *Syngnathus acus.*
Plaice: *Pleuronectes platessa.*
Gunnel: *Centronotus gunnellus.*
Blenny: *Blennius pholis.*
Gobies: *Gobius minutus; G. paganellus; G. ruthensparri.*
Sole: *Solea solea.*
Eel: *Anguilla anguilla.*
Rockling: *Onos mustelus.*
Eel pout: *Zoarces viviparus.*
Anemones: *Actinia equina; Sagartia elegans; Diadumine cincta; Tealia felina; Metridium senile.*
Starfish: *Asterias rubens; Amphipholis squamata; Ophiothrix fragilis.*
Sea squirts: *Botryllus schlosseri; Botrylloides leachi; Dendrodoa grossularia.*
Crustacea: *Idotea linearis; Hippolyte varians; Athanas nitescens; Crangon vulgaris; Leander squilla; L. serratus; Homarus vulgaris; Galathea squamifera; Eupagurus bernhardus; Porcellana longicornis; Cancer pagurus; Macropodia rostrata; Inachus dorhynchus; Hyas araneus; Carcinus maenas; Portunus puber; Pilumnus hirtellus.*
Worms: *Pomatoceros triqueter: Amphitrite johnstoni; Lanice conchilega.*
Sponge: *Halichondria panicea.*

For convenience the nomenclature follows Barrett and Yonge which, in some cases, is out of date.

Variety

Visitors to the house who have lived here all their lives were amazed that such an unpromising shore could yield such a variety of life and I was sure that it represented only a small fraction of the organisms living there. I chose small specimens for the aquarium. Most of the fish were five or six centimetres long. They were sorted into groups that I thought might live together amicably and put into the aquaria with a little of the algae *Ulva* and *Chondrus* attached to rocks and chosen for their hardiness. All except the suspension feeders did well. The sponge and the sea squirts died within a fortnight. The lobster which was about five centimetres long when I caught it had to be isolated because it was so aggressive. The only creature that was able to avoid its attentions was an *Athanas nitescens*, a shrimp that is often mistaken for a very small lobster and is a beautiful port wine colour with a broad white stripe down its back. It took up residence in an empty whelk shell, making occasional sorties to nibble pieces of mussel left by the lobster. I should say that, at this time, I was unaware that keeping lobsters is illegal. This is a great pity since it was one of the most interesting and amusing animals I have ever kept. 'House-proud' describes it best. It would spend hours walking about the tank and adjusting the position of every moveable object. If a shell or stone was moved during cleaning the lobster would promptly appear with chelae waving threateningly and adjust them until satisfied that all was as before the intrusion.

Feeding

Feeding the animals was simple. I kept a week's supply of mussels—about a dozen—in the top of the filter tank where they may have assisted with cleaning the water as they are suspension feeders. They were interesting specimens in themselves. They are able to protrude a foot and move about until they find a suitable resting place where they will attach themselves with their byssus. When I opened them I would often find parasitic pea-crabs and the strangely modified copepod, Mytilicola. If for some reason I was unable to collect mussels I fed the animals on small earthworms which were accepted by all except the pipefish which I fed on mature brine-shrimps.

Notebook

I believe writers about aquaria generally make one serious omission. Rarely do they suggest the keeping of a note-book and thereby much of the real fascination of the hobby is overlooked. I had a hard bound exercise book on a shelf by the aquaria and made a practice of opening it as soon as I settled down to a session of observation. By noting every event one builds up an understanding of the ways in which life-forms exploit every conceivable niche in their environ-

ment and the ways in which the anatomy of the class to which they belong has been adapted by species to make this possible and to avoid competition. Another 'tool' that is often overlooked is a magnifying glass with a magnification of X10 or X15. This has a short focal length and I made a point of placing the animals that were likely to have interesting small structures close to the front of the aquaria. It was possible to watch the worm *Amphitrite johnstoni* spreading its long tentacles over the gravel, picking up organic particles and transporting them along a groove by means of cilia (small 'hairs') to its mouth; or another worm *Lanice conchilega* collecting grains of sand to build its tube. The pigmentation of fish and shrimps seen at this magnification is very beautiful and it is fascinating to watch the distention and contraction of the pigment cells of cuttlefish. The eyes of many fish are exquisite.

It is not possible to write about all these animals in detail although each deserves a full account. I will just draw attention to a few so that a beginner may know what to look out for. Pipefish suck crustaceans into their small mouths which are situated at the end of a long snout. They seem to have great difficulty in assessing the distance of their prey, which is not surprising since this is often a copepod half the size of a pin-head. They will peer at it from all angles before striking and quite often invert their heads and take their prey from beneath. The males have a pouch formed by two flaps of skin running the length of the belly and these may be taken in early summer and kept until the tiny offspring are released. They can be fed on newly hatched brine-shrimps. I have found blennies to be a nuisance on account of their bullying but small ones make interesting specimens. Mine used to come out of the water and lie on the ends of the connecting tubes at the top of the aquarium. Mature specimens become very excited during the breeding season and when they encounter one another they instantly become almost black. The most attractive of the gobies is *Chaparudo flavescens*, often recommended for the aquarium, but the most interesting is the little mentioned *Aphia minuta*. It is transparent so that one can watch the heart beat or the stomach fill as it feeds. It grows to about five centimetres long and is our only "annual" fish. It lays its eggs on bivalve shells in the summer. The parent fish then die and the offspring are mature by the following summer. It would be interesting to rear this species but I have only caught the occasional specimen although they are said to be common in my area. The sole does not really come to life until after dark. Then it scuttles over the bottom of the tank and up the sides where it will often rest by applying the fins to the surface and using the water pressure to hold it in position. If the tank is not covered sole will sometimes race up the sides and drop over the top. Their eyes are small and badly placed for hunting and they seem to recognise their food by touch or taste. In my experience they are the hardiest of flatfish.

Plenty of Oxygen

The very large sea-anemone *Tealia felina* makes a beautiful exhibit but it requires a plentiful supply of oxygen. Marine aquarists, before the invention of the air pump, had great difficulty in keeping it. The same is true of the most beautiful of our native prawns, *Pandalus montagui*, the 'pink shrimp' of the fishmongers. It is translucent like other prawns but has a 'zebra-pattern' of red stripes. Unlike its relatives it is not aggressive and cannot fend for itself in a community tank. However, they are such attractive and interesting creatures that it is worth giving them a small tank to themselves. The anomurans are a group of crustacea that bridge the prawn and lobster group and the crabs. The best known, of course, is the hermit crab. If one is lucky enough to be by the aquarium when they have outgrown their molluscan home and change shells, it is a very amusing performance to watch. The other members of the group are the squat lobsters and the porcelain crabs. These do well provided one is not scrupulous in cleaning their aquarium as they feed by sifting through the organic matter that collects at the bottom of the tank. If a porcelain crab is feeding at the front of the aquarium look at it through the magnifying glass and see the net-like maxillipeds sweeping the water for food. To observe the life-style of spider crabs they need to be given algae in which to climb. They will take up a position over a clear space in the algae, their long walking legs forming an arch and the pincers or chelipeds hanging down into the space below. They are normally very slow moving animals but if a small fish or prawn attempts to swim beneath them it is seized and devoured instantly. This method of catching prey is reminiscent of the freshwater scorpion, *Nepa cinerea*, and it is interesting to watch for these examples of parallel adaptation. One evening we were amazed to see a spider crab, *Macropodia rostrata*, swimming by waving its legs up and down. Since then I have seen them do this in the open sea. Much of their time is spent in tearing off pieces of algae, chewing them and then methodically placing the fragments all over their legs and bodies. Some species such as *Hyas araneus* are often completely covered and hardly identifiable as crabs. *Sepiola atlantica* is a small relative of the common cuttlefish that grows to about five centimetres. I caught a few specimens in a shrimp net and spent many hours watching them. During the day time they lie in hollows in the gravel which they make by forcing water out of the mantle cavity and peering about with their highly developed and knowing eyes. The rusty brown pattern on their backs is constantly changing, waves of intense colour passing over their off-white bodies. When it begins to get dark the little cuttles leave the bottom of the aquarium and hover in mid-

water, heads hanging down. They remain almost stationary until a small shrimp comes into sight. Immediately a cuttle will jet-propel itself through the water, throw out a long pair of tentacles armed with suction pads and seize the shrimp, pulling it onto the parrot-like beak. The black grape-like eggs of the common cuttle, *Sepia officionalis*, turn up frequently on the shore in summer and are worth taking home and keeping until they hatch. So far I have been unable to get young sepias to feed and I would be interested to hear from a reader who has been successful with this species.

I have described the setting up of a simple marine system, my methods of collecting and some of the more striking forms of behaviour of the animals I have kept. I used this set-up for about two years until I bought a four foot tank, returned my specimens to the sea (by which time the lobster had grown from five centimetres to sixteen), and completely altered the system. If I repeated the experiment I would use coarser gravel mixed with cockle shells as I believe this would improve the biological function of the filter. I would connect the aquaria with glass 'U' tubes as sold for children's chemistry sets and connect the filter to the furthest tank with opaque plastic tubing because the clear plastic that I used became clogged with a growth of algae and needed to be cleaned periodically. I would not use the scraper supplied with the plastic aquaria as this scratches the surface but always use a soft cloth. No doubt there are other improvements that could be made and it is half the fun of aquarium keeping to devise these. However I think I have presented convincing evidence that lack of space and money need bar no one from enjoying the study of some of our smaller littoral animals. Finally, I would like to recommend two excellent books, one to assist in the naming of animals you are likely to find and the other a general account of shore life. They are Collin's Pocket Guide to the Sea Shore by Barrett and Yonge and the other The Sea Shore by C. M. Yonge, published in the Collin's New Naturalist series. They are invaluable.

BOOK REVIEW

The Complete Aquarium Encyclopedia of Tropical Freshwater Fish, *Edited by Dr. J. D. Van Ramshorst.* Illustrated by A. Van Den Nieuwenhuizen. Published by Phaidon Press Ltd., £9.95.

Books on aquaria and aquarium fishes continue to get bigger and the one under review measures 11 in. × 8½ in. × 1½ in., which makes for quite a large volume. The majority of the very many illustrations are colour photographs with a high standard of reproduction.

The first 80 pages comprise seven most informative chapters on aquarium establishment and maintenance, general introduction to plants, introduction to fishes, layout of the aquarium, disease of fishes in freshwater aquaria, feeding, breeding. These fully illustrated chapters form a solid prelude to the systematic lists of plants, and then, fishes which follow under their family names with each species carrying notes on its size, habitat, general care and breeding.

Most of the popular species are illustrated in colour but with a large family, for example Callichthydae (the armoured catfishes) detailed drawings of 26 species are given as well as the ten species depicted in colour photographs.

The chapter on identification and treatment of diseases in fishes will be of special value to aquarists for its authority stemming from the pen of Dr. R. Bootsma, of University of Utrecht.

Reference was made initially to the large proportions of this book, but let it not be thought that disparagement was intended for the large page area affords scope—fully exploited—for a most attractive, clear and colourful layout. The book is a pleasure to handle and of inestimable value as a work of reference as well as a fund of practical information.

Identification Guide to Plants and Fish for your Garden Pond. Published by Godfrey Cave Associates, £3.95.

This is a useful guide for the enthusiatic would-be pond owner and will help him from the moment he selects the pond site. Step by step guides to pond construction (other than utilising concrete) are followed by notes on planting the pool, with a gallery of colour drawings illustrating the wide range of submerged, floating and marginal plants available for water garden decoration as well as other plant species suitable for forming a "backdrop."

Native fish, goldfish varieties and koi are dealt with succinctly in the final section with colour drawings for identification of varieties and guide lines for the care and maintenance of fish in ponds.

PRODUCT REVIEW

The Pixie Aquarium Air Pump. *Manufactured in Great Britain by Singleton Bros. (Electronics) Ltd., Penryn, Cornwall. A member of the Armitage Group of Companies. £3·79 retail, including VAT.*

There is no doubt that this superb little vibrating magnet air pump—the first of British manufacture and, at the time of writing, the smallest in the world (about 1¼ in. by 3 in. by 1¾ in. and no more than 6 oz. in weight) is set to enjoy run-away sales among discerning and wide-awake aquarium keepers.

It has so much to recommend it as, for example, faultless and durable moulding, plenty of power to supply two or three tanks with air, low noise level, a give-away price and, of supreme importance in these inflationary times, negligible current consumption: a mere 3 watts on 240 volt mains.

The mechanical parts of the Pixie are housed between tough polypropylene take-apart cover and base well-secured at each bottom corner with a Phillips' screw sunk well below rubbery shock-absorber feet. It is a matter of a moment to open up the interior for inspection and servicing. Moreover, as all parts can be lifted out and put back again without difficulty it stands to reason that a diaphragm past proper service can be replaced with a new one in a jiffy.

The output of air is above average for a pump of the Pixie's size. The manufacturer's claim '1·5 litres of air per minute at 75 p.s.i.' However, this is not all. 'It will build up a back pressure of 2 p.s.i. which is enough to supply air through a diffuser stone at a depth of 36 in.'

I am deeply grateful to Singleton Bros. (Electronics) Ltd. for giving me the opportunity to try out a Pixie pump in my home. There was, I found, no lack of power to operate an internal bottom filter in a regular 24 in. by 12 in. by 12 in. tank housing a couple of fancy goldfish. While air was bubbling into the goldfish tank, I connected additional air lines to two lift tubes inserted into an undergravel filter under 15 in. of water and, as extra, fitted another line to one of the highly efficient Surge Filters used in a small tank given over to some platies. Everything went well. Even then, with some clever manipulation of pinch-cocks, I believe there was still some air to spare.

It is interesting to note that the Pixie pump is not a copy of the imported pumps available. It is, in fact, based on a completely new concept of construction, with a cleverly cranked and pivotted vibrator arm set in a special soft plastic bearing. If the Pixie pump be run continuously the diaphragm flexes forward and back 3,000 times a minute or 30,250,000 times a week. Ordinarily a diaphragm will give from about seven to twelve months perfect wear. Yes, the Pixie pump is a very good investment indeed. JACK HEMS.

AN ARABIAN KILLIFISH

by W. Ross

A. dispar with male fish on right

photo P. W. Stroud

Aphanius dispar (Rüppel) is a cyprinodontid found throughout the Arabian peninsula. It is extremely tolerant with respect to salinity and temperature. Found in the cooler seas around Arabia, Bahrain and the very hot fresh water sulphur springs of the interior

Marine specimens are drab in comparison to their freshwater bretheren. This is possibly brought about by the warmer spring water bringing the fish into spawning condition and therefore enhancing their colours. No apparent difference in size was observed in fish from marine or freshwater environment.

Sexing the Arabian Killi is fairly simple. The males grow to to 3-3½ in.; females tend to be slightly larger. Males are more colourful, have larger flowing fins and develop vertical stripes on their tails when mature.

The fish spawning in the photograph were caught by the author with the assistance of Reg Hartley. These specimens were obtained from fresh water irrigation ditches at Qatif in the Eastern Province of Saudi Arabia. *Aphanius dispar* has also been found in one of the largest irrigation systems in the world at Al-Hassa, approximately 50 miles inland from Qatif.

The males and females were separated and conditioned on a varied diet for six days. The selected pairs were then transferred to aquariums containing fresh tap water at a temperature of 80 F. In this area the tap water is very hard and contains some salt. The fish were spawning within thirty minutes of being placed together. The male drives the female down onto the gravel. Wrapping his dorsal fin over the female they commence spawning as can observed from the photographs. When spawning is completed the adult fish must be removed as they eat their eggs and subsequent youngsters.

News from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists societies for inclusion on this page should reach the Editor by 3rd of the month preceding the month of publication.

TOTAL entries were 520 for the **Sudbury A.S.** open show. Best in show, Doris Winder of E. Dulwich. Results: Class B: 1, B. Johnson (Uxbridge); 2, M. Strange (Basingstoke); 3, C. and J. Richards (Sudbury); 4, D. McKay (Kingston). Class C: 1, J. Miles (Basingstoke); 2, T. Wooley (Saracens); 3, Mr. Doee (Reading); 4, M. West (Kingston). Class Ca: 1, Mr. Farmer (Roehampton); 2, P. Moye (Sudbury); 3, I. Lecky (Basingstoke); 4, C. Osborne (Selas). Class Cb: 1, Mr. Doee (Reading); 2, C. and D. Finnis (Strood); 3, B. Barford (Saracens); 4, G. Stallwood (Newbury). Class D: 1, C. Osborne (Selas); 2 and 4, W. Knight (Gosport); 3, M. Nethersell (Riverside). Class Da: 1, C. and D. Finnis (Strood); 2, J. Jackson (Basingstoke); 3, D. Lambert (Kingston); 4, J. Miles (Basingstoke). Class Db: 1, Doris Winder (E. Dul); 2, C. and J. Richards (Sudbury); 3, Mr. and Mrs. Brook (Selas); 4, A. Fuller (Kingston). Class E: 1, C. and D. Finnis (Strood); 2, T. Liston (Selas); 3, P. Moye (Sudbury); 4, L. J. Brazier (Sudbury). Class Ea: 1, C. and D. Finnis (Strood); 2, B. Barford (Saracens); 3, A. P. Taylor (Sudbury); 4, C. and J. Richards (Sudbury). Class F: 1 and 3, C. Cheswright (Sladas); 2, B. Witteridge (Sudbury); 4, J. Miles (Basingstoke). Class G: 1, T. Wooley (Saracens); 2, G. Laster (Saracens); 3, C. and J. Richards (Sudbury); 4, P. Moye (Sudbury). Class H: 1 and 2, J. Mann (Sudbury); 3, P. Moye (Sudbury); 4, J. Carpenter (Hounslow). Class J: 1 and 4, Doris Winder (E. Dulwich); 3, B. Hall (Sudbury); 2, David Winder (E. Dulwich). Class K: 1, D. McKay (Kingston); 2, C. McKay; 3, S. Webb (Ellapa); 4, T. Fraser (Basingstoke). Class L: 1, D. Winder (E. Dulwich); 2, C. and D. Finnis (Strood); 3, P. Coyle (Walthamstow); 4, C. and J. Richards (Sudbury). Class M: 1, R. Moye (Sudbury); 2, M. Nethersell (Riverside); 3, C. and D. Finnis (Strood); 4, J. Miles (Basingstoke). Class Nbm: 1, A. Campion (Reading); 2, C. and J. Richards (Sudbury); 3, P. Moye (Sudbury); 4, C. and D. Finnis (Strood). Class Not: 1, B. Bow (Selective); 2, B. Barford (Saracens); 3, A. P. Taylor (Sudbury); 4, D. Cheswright (Sladas). Class O: 1 and 2, C. and D. Finnis (Strood); 3 and 4, F. J. Holding (Walthamstow). Class P: 1, J. Randell; 2 and 3, C. and D. Finnis (Strood); 4, B. Witteridge (Sudbury). Class Q: 1, R. Walsh (Sudbury); 2, 3 and 4, C. and D. Finnis (Strood). Class R: 1 and 2, N. Wallage (Selective); 3, T. Wooley (Saracens); 4, C. and D. Finnis (Strood). Class S: 1, I. Lecky (Basingstoke); 2, N. Wallage (Selective); 3, P. Edwards (Thanet); 4, C. and D. Finnis (Strood). Class T: 1, B. Bow (Select); 2, B. Barford (Saracens); 3, M. Davies (Select); 4, D. Cheswright (Sladas). Class Xbm: 1, J. Jackson (Basingstoke); 2, 3 and 4, S. Webb. Class Yoc: 1, M. Davies (Select); 2, D. Cheswright (Sladas); 3, Mr. and Mrs. Andrews (Strood); 4, C. and D. Finnis (Strood). H.P. Society (Strood).

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MEMBERS meeting of the **Norwich & District A.S.**, enjoyed a lecture with slides by Ian C. Sellick of the British Cichlid Association. Mr. Sellick lectured on the behaviour and evolution of Cichlid fishes and concentrated mainly on South American species.

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THE open show results of the **South Park Aquatic (Study) Society** were as follow: Veiltail: 1, W. G. Cook; 2, T. Longstaff; 3, B. Cook; 4, T. Longstaff. Bristol Type Shubunkin: 1, G. King; 2, R. M. Whittington; 3, W. G. Cook; 4, B. Cook. Bramble Head: 1, S. Herman; 2, J. Pollard. Bubble Eye: 1 and 3, H. Berger; 2, S. Herman; 4, E. Binstead. Celestial: 1 and 2, H. Berger. Pompon: 1, Mrs. P. Whittington; 2 and 3, H. Berger; 4, J. Pollard. Pearlscale: 1, Mrs. P. Whittington; 2 and 3, T. Longstaff; 4, Mrs. P. Lambert. Common Goldfish: 1, D. J. Mackay; 2, S. R. Lewis; 3, T. Longstaff; 4, D. Lambert. London Shubunkin: 1, 3 and 4, Mrs. P. Whittington; 2, J. Pollard. Oranda: 1 and 3, H. Berger; 2, J. Webster. Broadtail Moor: 1, 2 and 3, J. Kingsland; 4, L. B. Clapp. Fantail: 1 and 2, J. Kingsland; 3, S. R. Lewis; 4, J. Pollard. Comet: 1, D. J. Mackay. Gold Fish Breeders: 1, J. Kingsland; 2, G. King; 3, T. Longstaff; 4, B. Cook. Native and Foreign: 1, D. Lambert; 2 and 3, R. Trim; 4, E. Binstead. Centrar Chidae: 1, T. Longstaff; 2, E. Binstead. Koi: 1, Mr. and Mrs. Brown; 2, 3 and 4, D. Herman. Best Basic Variety: 1, G. King. Best Fish in Show: J. Kingsland.

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THERE were 504 entries in 46 classes for the **St. Helens A.S.** open show. Results:—Guppies: 1, Miss Smelter (Merseyside); 2, D. Conway (Darwen); 3, B. W. Carter (St. Helens). Platies: 1 and 3, B. and B. Durham (Longridge); 2, Mr. and Mrs. J. McCarthney (St. Helens). Mollies: 1, J. O'Connor (Runcorn); 2, M. Hayes (Leigh); 3, T. L. Penny (St. Helens). Swordtails: 1, B. W. Carter (St. Helens); 2, B. and J. McCarthney (St. Helens); 3, D. Garstand (Longridge). A.O.V. Livebearers: 1, K. Thompson (Merseyside); 2 and 3, B. and B. Durham (Longridge). Small Anabantids: 1, W. Hayes (Loyne); 2, Mr. and Mrs. Tomlinson (Macclesfield); 3, Mr. and Mrs. Aspinall (Sandgrounders). Large Anabantids: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, D. Algie (St. Helens); 3, Mr. and Mrs. Iddon (Sandgrounders). Fighters (self-coloured): 1, D. Conway (Darwen); 2, J. D. Haley (Darwen); 3, Mr. and Mrs. Riley (Leeds). Fighters (multi-coloured): 1, B. W. Carter (St. Helens); 2, J. D. Haley (Darwen); 3, G. Kenyon (Skelmersdale). Small Barbs: 1, T. Mackinnon (Southport); 2, Mr. and Mrs. Underwood (Southport); 3, R. Boardman (St. Helens). Large Barbs: 1, T. Mckinnon (Southport); 2, R. Boardman (St. Helens); 3, Mr. and Mrs. Baldwin (Sandgrounders). Dwarf Cichlids: 1, Mr. and Mrs. Ryan (Sandgrounders); 2, Mr. and Mrs. Stevenson (Osram); 3, J. Corbet (Merseyside). Large Cichlids: 1, Mrs. P. A. Taylor (Atlantis); 2, Mr. and Mrs. Underwood (Southport); 3, C. Martin (Skelmersdale). Rift Valley Cichlids: 1, Mr. and Mrs. Iddon (Sandgrounders); 2, Mr. and Mrs. Gough (Wynnstay); 3, Mr. and Mrs. Underwood (Southport). Angels: 1, Mr. and Mrs. Aspinall (Sandgrounders); 2, J. O'Connor (Runcorn); 3, G. Kenyon (Skelmersdale). Small Characins: 1, K. Thompson (Merseyside); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, Mr. and Mrs. Underwood (Southport). Large Characins: 1 and 2, Mrs. S. Underwood (Southport); 3, Mr. and Mrs. Stevenson (Osram). Toothcarps: 1 and 3, E. Jones (St. Helens); 2, N. and M. Rimmer (Sandgrounders). Danios: 1, S. Farrell (Merseyside); 2, T. McCarthney (St. Helens); 3, E. Jones (St. Helens). Rasboras: 1 and 3, A. Vaissiere (Liverpool); 2, T. Penny (St. Helens). Minnows: 1, J. D. Haley (Darwen); 2, Mr. and Mrs. Underwood (Southport); 3, Mr. and Mrs. Baldwin (Sandgrounders). Corydoras and Brochis: 1, Mr. and Mrs. P. Taylor (Atlantis); 2, J. McCarthney (St. Helens); 3, B. W. Carter (St. Helens). A.O.V. Catfish: 1, Mr. and Mrs. Gough (Wynnstay); 2, J. McCarthney (St. Helens); 3, T. McCarthney (St. Helens). Sharks: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, P. and H. Bachelor (Loyne); 3, R. I. Payne (Merseyside). Foxes: 1, Mr. and Mrs. Stevenson (Osram); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, Mrs. Winstanley (Runcorn). Loaches: 1, I. McCarthney (St. Helens); 2, Mr. and Mrs. Muckle (Runcorn); 3, J. Doddy (Darwen). A.O.V.: 1, P. and H. Bachelor (Loyne); 2, Mrs. P. A. Taylor (Atlantis); 3, G. Kenyon (Skelmersdale). Pairs Egglayers under 3 in.: Mr. and Mrs. Goddard (Macclesfield); 2, K. Thompson (Merseyside); 3, B. W. Carter (St. Helens). Pairs Egglayers over 3 in.: 1, K. Thompson (Merseyside); 2, Mrs. K. Davies (Dunlop); 3, Mr. and Mrs. McCarthney (St. Helens). Pairs Livebearers: 1, N. and M. Rimmer (Sandgrounders); 2, L. Groves (Sandgrounders); 3, B. and B. Durham (Longridge). Breeders Livebearers 1-10: 1, Mr. and Mrs. Goddard (Macclesfield); 2, D. Harvey (Sandgrounders); 3, B. W. Carter (St. Helens). Breeders Livebearers 11-20: 1, Mr. and Mrs. Goddard (Macclesfield); 2, B. and B. Durham (Longridge). Breeders Egglayers 1-10: 1, F. S. and A. Hopwood (Blackburn); 2, G. Kenyon (Skelmersdale); 3, E. Jones (St. Helens). Breeders Egglayers 11-20: 1, M. Lawson (St. Helens); 2, Mrs. Baldwin (Sandgrounders). Breeders Coldwater: 1, Mr. and Mrs. Tasker (Sandgrounders). Common Goldfish: 1, Mr. and Mrs. Harvey (Sandgrounders); 2, Mr. and Mrs. Baldwin (Sandgrounders). Shubunkins: 1, Mr. Donway (Sandgrounders); 2, J. O'Connor (Runcorn). Fancy Goldfish: 1, Mr. and Mrs. Harvey (Sandgrounders); 2 and 3, B. Newport (Runcorn). A.O.V. Coldwater: 1, Mr. and Mrs. Underwood (Southport); 2 and 3, J. A. Walker. Marine (any variety): 1, Mr. and Mrs. Iddon (Sandgrounders). Ladies (any variety): 1, Mrs. Muckle (Runcorn); 2, P. and S. Taylor (Atlantis); 3, Mrs. A. Algie (St. Helens). Mini Jars: 1, 2 and 3, Mr. and Mrs. Stevenson (Osram). Junior Coldwater: 1, D. Harvey (Sandgrounders); 2, P. and S. Taylor (Atlantis); 3, G. Lawless (Leigh). Junior Livebearers: 1, D. Garstang (Longridge); 2, P. and I. Iddon (Sandgrounders); 3, S. Tomlinson (Macclesfield). Junior Egglayers: 1, S. Lawson (St. Helens); 2, M. Coates (St. Helens); 3, L. Groves (Sandgrounders). Any Variety of Female Fish: 1, K. Thompson (Merseyside); 2, B. W. Carter (St. Helens); 3, J. Bradshaw (Longridge). Best Fish in Show was won by K. Thompson of Merseyside with Brachythiphis Rhabdophora in A.O.V. Livebearers with 78 points.

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RESULTS of the **F.G.A. N.W. Lancs./Man.** open show were as follow:—Delta: 1, R. Jones; 2, D. Conway; 3 and 4, B. Morris. Long Dorsal Veil: 1 and 2, S. Croft; 3, R. Hill; 4, Mrs. J. Croft. Short Dorsal Veil: 1, J. Hesketh; 2 and 4, W. Blades; 3, B. Morris. Fantail: 1, J. Hesketh; 2, R. Hill; 3, W. Blades. Topsword: 1 and 2, D. Summers; 3, R. Hill; 4, T. Rybacki. Bottomsword: 1 and 2, S. Croft. Doublesword: 1, A. Clegg. Colour Male: 1, Mrs. M. Jones; 2, B. Morris, 3, J. Grearson. Original Veil; 1, J. Hesketh; 2, Mrs. J. Croft; 3, B. Morris. Cofertail: 1, Mrs. J. Croft. Dovetail:

1, Mrs. J. Croft. Roundtail: 1, B. Morris. Lyretail: 1, D. Summers; 2, J. Hutchings. Superba: 1, Mrs. M. Jones; 2, S. Croft; 3, T. Hallett; 4, T. Rybacki. Wedge: 1 and 2, T. Rybacki; 3, S. Croft; 4, Mrs. M. Jones. Natural: 1, R. Mercer; 2, J. Hutchings; 3, R. Hill. Scallop: 1, D. Newsome. Cefer Female: 1, Mrs. J. Croft. Roundtail Female: 1, R. Clarke. Colour Female: 1, Mrs. M. Jones; 2, D. Newsome; 3, T. Rybacki; 4, B. Morris. Breeders Males: 1, T. Hutchings. Breeders Females: 1 and 2, R. Jones; 3, S. Croft; 4, R. Clarke. Breeders Pairs: 1 and 2, R. Jones; 3, J. G. Chisholme. Advanced Muster Breeders: 1, R. Clarke. Junior Males: 1, 2 and 4, T. Hutchings; 3, K. L. Morris. Junior Females: 1, T. Hutchings; 2, K. L. Morris. Ladies Males: 1, Mrs. S. Standen; 2, Mrs. F. Morris. Ladies Females: 1, Mrs. F. Morris; 2, 3 and 4, Mrs. I. Brown. Best Male: 1, R. Jones. Best Female: 1, T. Rybacki. Best Breeders: 1, R. Jones. Best in Show: 1, R. Jones.

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RESULTS of the **Corby and District A.S.** open show were as follow:—Class B: 1 and 2, A. and M. Crew (Wellingborough); 3, J. T. and F. Mayle (Leicester New Park); 4, J. and P. Patching (Wellingborough). Class Ca: 1, R. Anderson (Rugby); 2, J. T. and F. Myle (Leicester New Park); 3 and 4, R. Elliott (Corby). Class Cb: 1, M. Dore (Reading); 2, Mr. and Mrs. Darby (Midland Aquatic Study Group); 3, J. Sievewright (Corby); 4, E. Rudd (Queen of the Midlands). Class C: 1, M. Dore (Reading); 2, R. Elliott (Corby); 3, J. Miles (Basingstoke); 4, S. Wise (Cannock). Class Da: 1, T. Panther (Kettering); 2, D. Brine (Nuneaton); 3, D. and M. Page (Corby); 4, A. and M. Crew (Wellingborough). Class Db: 1, A. and M. Crew (Wellingborough); 2, R. Elliott (Corby); 3, R. Anderson (Rugby); 4, R. Eady (Leicester New Park). Class Dc: 1 and 3, N. Campbell (Corby); 2, J. and P. Patching (Wellingborough); 4, B. Towler (Kings Lynn). Class D: 1 and 4, B. Towler (Kings Lynn); 2, L. Godwin (Leicester New Park); 3, R. Elliott (Corby). Class E: 1, R. Walden (Peterborough Fishkeepers); 2, M. and B. Coe (Wellingborough); 3, R. Elliott (Corby); 4, L. Godwin (Leicester New Park). Class F: 1, Mr. and Mrs. Darby (Midland Aquatic Study Group); 2, J. Miles (Basingstoke); 3, R. Elliott (Corby); 4, J. Sievewright (Corby). Class G: 1, N. Campbell (Corby); 2, Mr. and Mrs. Darby (Midland Aquatic Study Group); 3, J. Sievewright (Corby); 4, J. T. and F. Mayle (Leicester New Park). Class H: 1, K. Cromar (Kettering); 2 and 4, R. Elliott (Corby); 3, L. Godwin (Leicester New Park). Class J: 1, K. Swan (West Midlands Study Group); 2 and 4, E. Davies (Corby); 3, L. Godwin (Leicester New Park). Class K: 1, 2 and 3, R. Elliott (Corby); 4, K. Swan (West Midlands Study Group). Class L: 1 and 3, K. Beaver (Jones and Shipman); 2, M. Dore (Reading); 4, Mr. and Mrs. Darby (Midland Aquatic Study Group). Class M: 1 and 2, A. and M. Crew (Wellingborough); 3, Mr. and Mrs. Darby (Midland Aquatic Study Group); 4, J. Miles (Basingstoke). Class Nb-m: 1, A. and M. Crew (Wellingborough); 2, L. Godwin (Leicester New Park); 3, M. and B. Coe (Wellingborough); 4, A. Lyons (Rugby). Class No-t: 1 and 4, J. T. and F. Myle (Leicester New Park); 2, G. Woolley (Corby); 3, D. McAllister (Corby). Class O: 1 and 2, A. and M. Crew (Wellingborough); 3, M. Evans (Leicester); 4, M. Short (Corby). Class P: 1, B. Forsyth (Corby); 2 and 3, D. Hutchison (Kidderminster); 4, R. Wilson (Corby). Class Q: 1, L. Godwin (Leicester New Park); 2, E. Rudd (Queen of the Midlands); 3, R. Wilson (Corby); 4, P. Eady (Leicester New Park). Class R: 1, J. T. and F. Mayle (Leicester New Park); 2, N. Boot (Leicester); 3, R. Vickers (Kettering); 4, R. Wilson (Corby). Class S: 1, R. Wilson (Corby); 2, E. Rudd (Queen of the Midlands); 3, A. and M. Crew (Wellingborough); 4, K. Swan (West Midlands Study Group). Class T: 1, 2 3, and 4, J. T. and F. Mayle (Leicester New Park). Class U: 1, S. Twynham (Reading); 2, D. Hutchison (Kidderminster); 3, L. Godwin (Leicester New Park); 4, P. Hand (Corby). Class V: 1, 2 and 3, D. Hutchison (Kidderminster). Class W: 1, A. and M. Crew (Wellingborough); 2 and 4, K. Beaver (Jones and Shipman); 3, J. Sievewright (Corby). Class Xb-m: 1, A. Love (Corby); 2, E. Davies (Corby); 3, K. Swan (West Midlands Study Group); 4, J. Sievewright (Corby). Class Xo-t: 1, 2, 3 and 4, J. T. and F. Mayle (Leicester New Park).

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THE **Leicester A.S.** is staging a large exhibition of furnished tanks, at the City of Leicester Show, to be held in the Abbey Park, Leicester, on Monday and Tuesday, 28th and 29th August. There will also be a breeders class for Society members, and a pond with surround layout. The monthly meeting is on the first Thursday in the month, at the St. Matthews Community Centre, Malabar Road, off Humberstone Road, Leicester, at 7.30 p.m. All who are interested in the hobby are welcome. Secretary, S. Poynton, 35 Briar Road, off Scraptoft Lane, Leicester; show secretary: N. Boot, 124 Tudor Road, Leicester.

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RESULTS of the annual open show of the **Blackburn Aquarist Waterlife Society** were as follow:—Guppies: 1, D. Wright (Blackpool); 2, W. Blades (F.G.A.); 3, N. & M. Rimmer (Sandgrounders). Platies: 1, T. Mackinnon (Southport); 2, J. & B. McCarthney (St Helens); 3, B. W. Carter (St Helens). Mollies: 1, Mrs. Ludlow (Independent); 2, B. Steadman (Runcorn); 3, Mr. and Mrs. R. Iddon (Sandgrounders). A.O.V. Livebearers: 1, B. & B. Durham (Longridge); 2, Lee Groves (Sandgrounders); 3, A. Smart (Alfreton). Swordtails: 1, Mr. and Mrs. Stevenson (Osram); 2, M. Allinson (Sandgrounders); 3, M. Jones (Darwen). Small Characins: 1, Mr. and Mrs. B. Walsh (Blackburn); 2, Mr. and Mrs. Underwood (Southport); 3, D. Hulse (Oldham). Large Characins: 1, D. Moseley (Blackpool); 2, Mr. and Mrs. Stevenson; 3, R. A. Johnson (Hyde). Dwarf Cichlids: 1, Mr. and Mrs. Ryan (sandgrounders); 2, R. I. Payne (Merseyside); 3, Carl & Merl (Sandgrounders). Large Cichlids: 1, A. Smith (Blackpool); 2 and 3, Mr. and Mrs. Underwood. Rift Valley Cichlids: 1, Carl & Merl (sandgrounders); 2, K. A. Aldred (Hyde); 3, J. Clark (Skelmersdale). Angelfish: 1 and 3, G. Kenyon (Skelmersdale); 2, P. Yates (Blackburn). Small Barbs: 1 and 2, Mr. and Mrs. Stevenson; 3, R. Boardman (St Helens). Large Barbs: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, T. Mackinnon; 3, B. & B. Durham. Toothcarps: 1, N. & M. Rimmer; 2, B. Hayhurst (Accrington); 3, E. Jones (St. Helens). Minnows: 1, Mr. and Mrs. Baldwin; 2 and, Mr. Mrs. Underwood; 3, R. J. Stephens (Blackburn). Danios: 1, W. Hayes (Loyne); 2 and 3, J. D. Hiley (Darwen). Rasboras: 1, L. Penny (St Helens); 2, B. W. Carter; 3, Mr. and Mrs. Muckle (Runcorn). Fighters: 1, Mr. and Mrs. Riley (Leeds P.O.); 2, B. W. Carter; 3, J. & B. McCarthney. Anabantids: 1, P. Kenyon (Sandgrounders); 2, Mr. and Mrs. Aspinall (Sandgrounders); 3, J. and B. McCarthney. A.O.V. Anabantids: 1, Mr. and Mrs. Baldwin; 2, B. Wilson (Skelmersdale); 3, F. Summers (Skelmersdale). Sharks: 1, Mr. and Mrs. Baldwin; 2, Mr. and Mrs. B. Walsh; 3, D. Moseley. Foxes: 1, Mr. and Mrs. Riley (Leeds P.O.); 2, Mr. and Mrs. Ham (Lytham); 3, Mr. and Mrs. Stevenson. Pairs, Egglayers: 1, Mr. and Mrs. B. Walsh; 2, Mr. and Mrs. Riley; 3, J. & B. McCarthney. Pairs, Livebearers: 1, A. Smart; 2, B. & B. Durham; 3, J. Hutchings (F.G.A.). Breeders, Livebearers: 1, B. W. Carter; 2, G. & C. Berry (Blackburn); 3, J. Hutchings. Breeders (Egglayers 1-10): 1, R. I. Payne; 2, Carl & Merl; 3, E. Jones. Breeders (Egglayers 11-20): 1, Mr. and Mrs. R. Iddon; 2, Mr. and Mrs. Baldwin; 3, R. I. Payne. Loaches: 1, I. McCarthney (Skelmersdale); 2, Mr. and Mrs. Riley; 3, Mr. and Mrs. Ham. Corydoras: 1, T. McCarthney (Skelmersdale); 2 and 3, B. W. Carter. A.O.V. Catfish: 1, P. J. Harwood (Darwen); 2, Mr. and Mrs. Baldwin; 3, C. & M. Wadman (Blackburn). Juniors, Livebearers: 1, D. Garstang (Longridge); 2, P. Durham (Longridge); 3, P. & I. Iddon (Sandgrounders). Juniors, Egglayers: 1, I. McCarthney (Skelmersdale); 2, D. Harvey (Sandgrounders); 3, Lee Groves. A.O.V. Tropical: 1, Mr. and Mrs. B. Walsh; 2, P. Yates (Blackburn); 3, G. Kenyon. A.V. Marine: 1, Mr. and Mrs. R. Iddon. Common Goldfish & Comets: 1, D. Wright (Blackpool); 2, Mr. and Mrs. Baldwin; 3, Mr. and Mrs. B. Dawson (Heywood). Veiltails: 1, 2 and 3, Mr. and Mrs. Hewitt (Osram). Fantails: 1, Mr. and Mrs. Hewitt; 2, S. Foote (Accrington); 3, C. Wallbank (Accrington). A.O.V. Fancy: 1, R. Duckworth (Accrington); 2, Mr. and Mrs. Harvey (Sandgrounders); 3, Mr. and Mrs. Hewitt. A.O.V. Cold Water: 1, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Widd (Osram); 3, S. Walsh (Accrington). Shubunkins: 1, S. Foote; 2, Mr. and Mrs. Hewitt; 3, C. Wallbank. Moors: 1, 2 and 3, S. Foote. The best fish in show award was won by Mrs. Smith from Blackpool. Altogether there were 647 entries from 29 societies.

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AT the May meeting of the **Goldfish Society of Great Britain**, Mr. Joe Linale spoke to the 60 members on Goldfish Genetics. He also had on show some very fine specimens of Goldfish which he used to emphasise the points he was making. After tea a "question time" was arranged with the panel consisting of four people: Mr. K. Speaks, Mr. D. Mills, and both Roger and Pam Whittington. This proved very popular and many questions about fish breeding were asked.

During the afternoon the first of the Table Shows were held for the Morris Cluse Breeders Trophy. This first show being judged by Mr. G. King and Mr. J. Bundell, was for pairs of single tailed-fish and dorsal-less fish breed in 1977.

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THE first meeting of **Bristol A.S.** at their new headquarters at St. Ambrose Church Hall consisted of a discussion on proprietary fish foods and fry foods.

The results of the table show were as follow:—Lionheads: 1, 2, 3 and 4, V. Cole. Comets: 1 and 2, C. Hayes; 3, P. L. Norman; 4, H. C. B. Thomas. Pearlscales: 1 and 3, R. Williams; 2 and 4, W. G. Ham.

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THE results of the fifth open show of the **Scunthorpe and District A.S.** were:—Guppies: 1, Mr. and Mrs. P. Smith (Scunthorpe and District); 2, Mr. and Mrs. J. Riley (Leeds P.O.); 3, Mr. Draper (Alfreton). Platties: 1, Mr. Draper (Alfreton); 2 and 3, M. Price (Castleford). Swordtails: 1, J. Harrison (Grimsby and Cleethorpes); 2, Mr. and Mrs. Hill (Scunthorpe Museum); 3, Mr. and Mrs. Lake (Sth Humberside). Mollies: 1, D. and W. Jordon (Sth Humberside); 2, M. Price (Castleford); 3, Mr. and Mrs. P. Smith (Scunthorpe and District). A.O.V. Livebearers: 1, K. Prendergast (Boston); 2, T. Bushfield (Barnsley); 3, D. and W. Jordon (Sth Humberside). Small Characin: 1, A. Frisby (Wyke); 2, Mr. and Mrs. Hill (Scunthorpe Museum); 3, Mr. and Mrs. Lake (Sth Humberside). Large Characins: 1, A. Cook (Retford); 2, Mr. and Mrs. Daines (Doncaster); 3, Mr. and Mrs. Bradley (Retford). Dwarf Cichlids: 1 and 3, Mr. and Mrs. Campbell (Ashby); 2, Mrs. Bee (Grimsby and Cleethorpes). Rift Valley Cichlids: 1 and 2, Mr. and Mrs. Burman (Ashby); 3, A. Frisby (Wyke). Angels: 1, Mr. and Mrs. Jarman (Barnsley); 2, Mr. Lambie (Louth); 3, Mr. and Mrs. G. Martin (Scunthorpe and District). A.O.V. Cichlid: 1, Mrs. Bee (Grimsby and Cleethorpe); 2, S. Harrison (Grimsby and Cleethorpes); 3, T. Walker (Hull). Small Barbs: 1 and 2, M. Price (Castleford); 3, Mr. and Mrs. D. Caldow (Scunthorpe Museum). Large Barbs: 1, Mr. and Mrs. Roberts (Doncaster); 2, M. Burrows (Hull); 3, H. Thorpe (Doncaster). Corydoras and Brochis: 1, S. Harrison (Grimsby and Cleethorpes);

2, M. Price (Castleford); 3, Mr. and Mrs. Campbell (Ashby). Naked Catfish: 1, Mr. and Mrs. Honnor (Doncaster); 2, Mr. and Mrs. J. Riley (Leeds P.O.); 3, H. Thorpe (Doncaster). A.O.V. Catfish: 1, P. Battersby (Scunthorpe and District); 2, S. Murtin (Scunthorpe and District); 3, Mr. and Mrs. Dobson (Keighley). Killifish: 1, D. Barrett (Thorne); 2, Mrs. Bee (Grimsby and Cleethorpes); 3, A. Frisby (Wyke). Small Anabantids: 1, Mrs. Anderson (Wyke); 2, Mr. and Mrs. Riley (Leeds P.O.); 3, Mr. and Mrs. Hill (Scunthorpe Museum). Large Anabantids: 1, Mr. and Mrs. Copley (Doncaster); 2, K. Lancashire (Doncaster); 3, Mrs. S. Richardson (Wyke). Fighters: 1, Mrs. Anderson (Wyke); 2, Mrs. Bee (Grimsby and Cleethorpes); 3, Mrs. Gray (Wyke). Loaches: 1 and 3, Mr. and Mrs. Daines (Doncaster); 2, Mr. and Mrs. Barlow (Sheaf Valley). Sharks and Foxes: 1, H. Thorpe (Doncaster); 2, Mr. and Mrs. Roberts (Doncaster); 3, Mr. and Mrs. Jarman (Barnsley). Rasboras: 1, Mr. and Mrs. Daines (Doncaster); 2, A. Simpson (Barnsley); 3, Mr. and Mrs. Bradley (Retford). Danios and Minnows: 1, Mr. and Mrs. Lake (Sth Humberside); 2, A. Cook (Retford); 3, S. Harrison (Grimsby and Cleethorpes). A.O.V. Tropical: 1 and 2, G. White (Ashby); 3, Mr. and Mrs. Caldow (Scunthorpe Museum). A.O.V. Coldwater: 1, A. Cook (Retford); 2, D. and W. Jordon (Sth Humberside); 3, Mr. and Mrs. Roberts (Doncaster). Pairs Egglayers: 1, A. Cook (Retford); 2, Mr. and Mrs. J. Riley (Leeds P.O.); 3, Mr. and Mrs. Lake (Sth Humberside). Pairs Livebearers: 1, Mr. and Mrs. Hill (Barnsley); 2, K. Prendergast (Boston); 3, Mr. and Mrs. Chester (Retford). Breeders Live (A and B): 1, Mr. Draper (Alfreton); 2, Mr. and Mrs. Copley (Doncaster); 3, A. Simpson (Barnsley). Breeders Live (C and D): 1, T. Bushfield (Barnsley); 2, Mr. and Mrs. Hill (Barnsley); 3, S. Murtin (Scunthorpe and District). Breeders Egglayers (A and B): 1, D. Barrett (Thorne); 2, B. Banks (Thorne); 3, Mrs. R. Davies (Wyke). Breeders Egglayers (C and D): 1, Mr. and Mrs. Bollen (York); 2, Mr. and Mrs. Copley (Doncaster); 3, B. Banks (Thorne). Novice Livebearers: 1 and 3, Miss J. Davies (Wyke); 2, Master P. Bushfield (Barnsley). Novice Egglayers: 1, Mrs. R. Davies (Wyke). Female Livebearer: 1, T. Bushfield (Barnsley); 2, D. Barrett (Thorne); 3, K. Prendergast (Boston). Female Egglayers: 1, Mr. and Mrs. Honnor (Doncaster); 2, Mr. and Mrs. Copley (Doncaster); 3, Mrs. S. Richardson (Wyke). Best in Show: G. White (Ashby). Exhibits in Show, 379.

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THE **Evesham Fishkeepers Society** met at Church Meeting Rooms for the last time in July. Will members and friends please note the changes of meeting time and venue?

Tony Artus of Gotherington was a welcome guest and spoke reminiscently of his many years' experience in tropical fish and pond-keeping. He very kindly judged the table show which featured A.V. Cichlids with the results as follows: 1, D. Goll; 2, F. Thornton; 3, Mrs. L. Wright; 4, C. Launder.

The Society meets on the first Wednesday of every month, at 8 p.m. Venue from 2nd August, Hampton Scout Hut, Pershore Road, Evesham, Worcs. Visitors and new members welcomed. Club secretary: K. R. Baker, 124 Kings Road, Evesham, Worcs.

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RECENT activities of the **Merseyside A.S.** have included a very successful annual open show which was held in May. It was one of the best supported shows in the area for a number of years with 700 entries, which was an all-time record for the society. Best in show was won by T. McKinnon with a Clown Barb. Approximately 100 (members and visitors) attended the second club auction also held in May. At the meeting in June the society had a slide show on Goldfish, with an interesting talk by E. Seymour. Also in June a questions and answers night was held with F. Mulla and S. Canavan supplying the answers. A very enjoyable evening and 70 members attended. Early in July, the third of five table shows was held. There are 113 entries, an increase on the previous table shows. The Best in Show was won by F. Mulla with a Cichlasoma Severum.

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THE **Sunderland A.S.** held a meeting in June at which the following officers were elected: chairman, A. Moore; vice-chairman, D. Wright; secretary, R. Gleghorn; treasurer, Mrs. J. Wright. Further members are welcome at regular fortnightly meetings held at the Willow Pond Public House. Further details are available from R. Gleghorn, 34 Chatsworth Street, High Barnes, Sunderland, Tyne and Wear. Tel. No. Sunderland 56170.

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THE **Northwich and District A.S.** held their inter-society meeting in June between Wrexham A.S., Warrington A.S. and Chester A.S. A quiz was also held and the results were as follow: 1, Northwich A.S.; 2, Wrexham A.S.; 3, Warrington A.S.; 4, Chester A.S. The results of the table show were: Guppies: 1, G. Kent (Wrexham); 2, D. Clarke (Northwich); 3, M. Gleave (Northwich). Swordtails: 1, H. Buckley (Northwich); 2, D. and G. Potter (Warrington); 3, Mr. and Mrs. Williams (Wrexham). Small Barbs: 1, R. and P. Smith (Wrexham); 2, L. and D. Thorne (Northwich); 3, F. Ouiver (Wrexham). Dwarf Cichlids: 1, Mr. and Mrs. Orchard (Wrexham); 2, T. and W. Brown (Warrington); 3, K. Lawless (Warrington). Rasboras, Danios and Minnows: 1, E. Jones (Wrexham); 2, R. and P. Smith (Wrexham); 3, Mr. and Mrs. P. Jones. Catfish Corydoras and Brochis: 1, Mrs. C. Salisbury (Wrexham); 2, and 3, K. Lawless (Warrington). Characins: 1, K. Lawless (Warrington); 2, J. Higham (Warrington); 3, M. Gleave (Northwich). Fighters: 1 and 3, H. Buckley (Northwich); 2, D. and G. Potter. Pairs Egglayers: 1, Mr. and Mrs. Jones (Wrexham); 2, L. and D. Thorne (Northwich); 3, J. Buckley (Northwich). Pairs Livebearers: 1 and 3, L. Bradley (Northwich); 2, L. and D. Thorne (Northwich). 1, Wrexham A.S., 23 pts.; 2, Northwich A.S., 22 pts.; 3, Warrington A.S., 15 pts. The inter-society shield was won by Wrexham A.S. The Best Fish in Show was a Corydoras Species entered by Mrs. C. Salisbury (Wrexham).

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A GLORIOUS June Sunday and a grand total of 451 entries combined to make yet another successful open show for **Salisbury and District A.S.** in June.

A welcome feature of the show was the good support given to the extended cold water classes, which attracted 75 entries. This should encourage the committee to even greater things next year. The Best Fish in Show award went to a Garra Taeniata exhibited by Mrs. I. Bebb of Bournemouth A.S. and the F.B.A.S. Championship Trophy for Class D was won by a Cichlasoma Spilurum exhibited by Mr. P. Fitchett of Nailsea A.S.

The full show results were as follow: Class Ba: 1, R. F. Adams; 2, T. Dowell. Class B: 1, W. Hastings; 2, Mrs. I. Bebb; 3, G. Arnold; 4, T. Liston. Class Ca: 1, W. Rundle; 2, J. Jackson; 3, A. Chaplin; 4, N. Devine. Class Cb: 1 and 4, T. Liston; 2, J. Jupe; 3, G. Smallwood. Class C: 1, T. Liston; 2, J. Miles; 3, A. Chaplin; 4, P. Lawrence. Class Da; 1, E. Tubb; 2, R. Cotton; 3, L. Smeedon; 4, P. Fitchett. Class Db: 1, A. McKinley; 2, W. West; 3, S. Wood; 4, G. Arnold. Class Dc/a: 1, 2 and 3, D. Eidlestein; 4, R. Batten. Class Dc/b: 1, 2, 3 and 4, S. Pitcher. Class Dc/c: 1 and 2, B. Knight; 3, S. Pitcher; 4, T. Liston. Class D: 1, P. Fitchet; 2, W. West; 3, D. Eidlestein; 4, W. Hastings. Class Ea: 1, T. Jennings; 2, R. F. Adams; 3, E. Tubb; 4, A. Wing. Class E: 1, R. F. Adams; 2, T. Liston; 3, Mrs. I. Bebb; 4, G. Smallwood. Class F: 1, Mrs. I. Bebb; 2, J. Miles; 3, W. Rundle; 4, M. Brown. Class G: 1, E. Eidlestein; 2, W. West; 3 and 4, J. Jennings. Class H: 1, B. Knight; 2, J. Griffiths; 3, W. Hastings; 4, R. Bond. Class J: 1, D. Goss; 2, Mrs. I. Bebb; 3, W. Hastings; 4, J. Rundle. Class K: 1, W. Hastings; 2, D. Goss; 3, J. Warndell; 4, D. Kerr. Class L: 1, R. F. Adams; 2, D. Kerr; 3, A. Chaplin; 4, J. Varndell. Class Ma: 1, E. Tubb; 2, J. Miles; 3, B. Knight; 4, J. Varndell. Class M: 1, Mrs. I. Bebb; 2, G. Arnold; 3, B. Fitten; 4, W. West. Class Nb-m: 1, K. Sellwood; 2, J. Jackson; 3, S. Wood; 4, D. Jennings. Class No-t: 1, M. Munsbridge; 2, R. Bond; 3, C. Robinson; 4, Mrs. I. Bebb. Class O: 1 and 3, F. May; 2, P. Baker; 4, Mrs. I. Bebb. Class P: 1 and 2, Mrs. I. Bebb; 3, P. Jones; 4, G. Arnold. Class Q: 1, Mrs. I. Bebb; 2, S. Pitcher; 3, W. West; 4, M. Chiverton. Class R: 1, J. Griffiths; 2, C. Robinson; 3, P. Fitchett; 4, J. Jupe. Class S: 1, Mrs. I. Bebb; 2, A. Chaplin; 3, T. Liston; 4, R. Bridle. Class T: 1, M. Munsbridge; 2, R. F. Adams; 3 and 4, J. Hoare. Class Uad: 1 and 3, G. Axe; 2, J. Griffiths; 4, F. May. Class Ubc: 1, J. Rundle; 2, J. Griffiths; 3 and 4, K. Forward. Class Va-g: 1, 2 and 4, A. Roberts; 3, G. Axe. Class Vh-l: 1, 2, 3 and 4, F. Orme. Class Wc: 1 and 2, G. Axe; 3, K. Forward; 4, S. Pitcher. Class W: 1, K. Blanchard; 2, J. Jennings; 3, G. Axe; 4, G. Arnold. Class Xb-m: 1, J. Jennings; 2 and 3, A. Tubb; 4, W. Rundle. Class Xo-t: 1, J. Griffiths; 2, G. Arnold; 3, R. F. Adams; 4, P. Fitchett. Class Y: 1, D. Rigiani. Class Z: 1 and 2, W. West. Class Fam: 1, J. Jennings; 2, A. Tubb; 3, M. Chiverton; 4, P. Baker.

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AT the May meeting of the **Thorpe and District A.S.** members were entertained to quiz organised by the club table show secretary. Table show results were as follow: Class 1 (Pairs): 1 and 3, M. Ottaway; 2, G. Balls. Class 2 (Sharks): 1, P. Sparks; 2, C. Fearnley; 3, M. Ottaway. Class Juniors (combined Sharks and Pairs): 1, D. Hunn; 2, A. Kemp; 3, J. Norton.

June saw two club visits, first to the Waveney Fish Farm, Diss, where the manager, David Laughlin, provided a guided tour of his water gardens and retail sections. Much interest was taken in a recently constructed Koi pool and also some Koi fry spawned at the farm. The second visit was a coach trip to London Zoo and the Aquarium, followed on the return trip home by a visit to Waterlife Research at Heatheow. At the July meeting members were entertained by an excellent lecture by members of Koi East Anglia illustrated with slides showing fish, and some of the members' pools. Of particular interest was a series of slides showing some sick fish receiving medical attention with injections and also the Koi brought and displayed at the meeting. At the meeting the chairman informed the members that the club was now a member of the East Anglian Federation of Aquarists and would now be competing in inter-club shows with other clubs in East Anglia. Results of the table show were as follow: Class 1 (Cichlids): 1 and 2, T. Driver; 3, P. Sparks. Class 2 (Platys): 1, K. Appleton; 2 and 3, G. Balls. Juniors: 1, 2 and 3, D. Hunn. Meetings of the society are held on the first Wednesday of the month at the Canary Public House, Heartsease, Norwich, at 8 p.m. and new members are always welcome. (Membership enquiries to Trevor Cork, Tel.: Norwich 405176.) Anybody interested in exchanging club magazines should contact the club editor, Kevin Appleton, 46 Oak Lane, Old Catton, Norwich, tel.: (0603) 411443.

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AT the first meeting in June of the **Walthamstow and District A.S.** John Hancock, a subaqua diver, gave a talk on sea invertebrates. At the second meeting in June Alan Chandler gave a talk on growing and showing aquatic plants. The annual open show has now had to be postponed until November. More details at a later date. New members always welcome. Please contact Gerry Smith, 527 6303.

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CHANGES

CHANGES announced from **Paisley and District A.S.** are as follow: Owing to the resignation of secretary J. Wilson and his wife from the committee, Tank Manager, John

Thomson, was elected to the position. The full committee now is: president, Hugh Cameron; treasurer, Tom Currie; show manager, Russell Moore; fed. delegate, Trevor Heaton; secretary, John Thomson, 18 Castle Street, Paisley PA1 2JP.

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SECRETARY CHANGES

F.G.A. N.W. Lancs. Man.: New show secretary, D. Summers, 19 Rowland Street, Atherton, Manchester M29 9DS.

Paisley and District A.S.: New secretary, John Thomson, 18 Castle Street, Paisley PA1 2JP.

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VENUE CHANGE

The **Evesham Fishkeepers' Society** now meet on the first Wednesday of every month, at 8 p.m. at Hampton Scout Hut, Pershore Road, Evesham, Worcs. Visitors and new members are welcomed. Club secretary, K. R. Baker, 124 Kings Road, Evesham, Worcs.

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SHOW POSTPONEMENTS AND DATE CHANGES

The **Midland Aquatic Study Group** Open Show scheduled for 24th September has been postponed. A new date and details will be announced shortly.

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CANCELLATION

A. A. Jones & Shipman Aquarist & Pond Society—"Due to uncontrollable circumstances, this year's Open Show has been cancelled. We would like to take this opportunity to thank all those who have given us help with the last two shows.

Could those people who hold perpetual trophies, please return them before October, or as soon as possible, all postage, etc., will be refunded."

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AQUARIST CALENDAR 1978

2nd September: C.N.A.A. Welsh National Open Show at the Drill Hall, Park Street (near Bus and Rail, General Station), Cardiff. Details from C. Turner, 146 Arran Street South, Cardiff. Tel: 499982.

3rd September: Bethnal Green A.S. Open Show to be held Bethnal Green Institute, 229 Bethnal Green Road, E.2. Schedules available from the Show Secretary: Mr. W. R. Dale, 14 Rutland Road, Wanstead, London E11 2OY. Tel: 01-989 9015.

3rd September: Bridgewater A.S. Open Show at St. Georges Community Centre, Kenyon Way, Little Hulton, Worsley, Manchester. Details from Show Secretary, M. Burgoyne, 15 Pansy Road, Farnworth, Bolton, Lancs. Tel. Farnworth 792263.

3rd September: Castleford A.S. Open Show, Castleford Civic Centre. Secretary: Miss B. Stansill, 4 Milnes Grove, Airedale, Castleford WF10 2E2. Tel: 559615.

3rd September: Bridgwater and District Aquarist Society. First Annual Show to be held at the Newmarket Hotel, Bridgwater, Somerset.

3rd September: Open Show in aid of 'Action Research for the Crippled Child' at Shetland Road Hall, Southmead, Bristol. Schedules: D. Chinn, 28A Cavendish Road, Henleaze, Bristol 9. S.A.E. please.

3rd September: Wellingborough & District A.S. open show. Details from D. Thirkettle, 96 Grangeway, Rushden, Northants.

9th September: Hounslow and District A.S. Open Show at Hounslow Youth Centre, Cecil Road, Hounslow, Middx. Schedules obtainable from show secretary, Mr. A. Constantine, 77 Sparrow Farm Drive, Feltham, Middx. Tel. 01-751 0340.

9th September: Kingston and District A.S. Open Show. The venue will be The Raynes Park Methodist Church Hall, Worple Road, Raynes Park, SW20. Judging will commence at mid-day.

9th September: Bristol A.S. Open Coldwater Show. St. Ambrose Parish Hall, Streetford Road, Whitehall, Bristol 5. Schedules from W. G. Ham, 18 Imperial Road, Bristol BS14 9ED. Tel: 0272 776924.

10th September: First Open Show of the Evesham Fishkeepers Society. Venue, Public Hall, Evesham, Worcs. Schedules available from Mr. Peter Green, 21 Mount Road, Evesham, Worcs. Tel: Evesham 45995.

10th September: Longridge and District A.S. second open show at Longridge Civic Hall, Willows Park Lane, Longridge, Preston, Lancs. (15 minutes from the M6). Details available later.

10th September: Huddersfield T.F.S. Open Show. Venue: Deighton Youth Centre. Show secretary, D. Hill, 30 Celandine Avenue, Salendine Nook, Huddersfield. Tel: Huddersfield 650437.

10th September: Leamington and D.A.S. Open Show at Trinity Hall, Trinity Street, Leamington Spa. Schedules from Mr. H. Burridge, 56 Warwick New Road, Leamington Spa, Warwickshire.

10th September: British Koi-Keepers' Society third national open Koi show, Tatton Park, Cheshire. Information can be obtained from M. Waumsley, 165 Woodside Road, Amersham, Bucks. HP6 6NR.

16th September: Merthyr A.S. Third Annual Open Show will be held at St. David's Church Hall, Church Street, Merthyr Tydfil under F.B.A.S./C.N.A.A. rules, with plaques and cards for the first four places in each class. Schedules can be obtained from Show Secretary: Mr. E. Morgan, 27 Ty Gwyn Street, Penydarren, Merthyr Tydfil.

16th September: Ichiban Ranchu Society Show at 14 Garnetts, Takeley, nr. Bishops Stortford, Herts. Schedules from G. Lewis, 91 Bourne Avenue, Hayes, Middlesex UB3 1QP, phone 01-573 1770. Details of membership of I.R.S. from above show address.

17th September: Whitby & D.A.S. Third Annual Open Show will be held at the 'Spa Pavilion,' Whitby. Schedules will be available at a later date from the Show Secretary.

17th September: Wythenshawe and District A.S. Open Show at the Forum Hall, Civic Centre, Wythenshawe, Manchester.

17th September: Barnsley A.S. Open Show, Ardsley Oaks, Youth Centre, Doncaster Road, Ardsley. Please note change of venue. Benching from 12 (noon) to 2 p.m. Schedules obtainable from: Secretary, M. Whiteley, 10 Clough Road, Hoyland, Barnsley. Tel: Barnsley 742646.

17th September: Hastings & St. Leonards Open Show at The Zodiac Centre, Priory Road, Hastings, East Sussex. Show Manager: Mr. C. Pannell, 9 Edwin Road, Hastings, East Sussex TN35 5JT.

17th September: Priory A.S. Tynemouth open show Schedules from W. J. Walton 25 Rutherford St., High Howdon, Wallsend, Tyne and Wear NE28 0AW.

17th September: Wyre Forest A.S. open show, details to follow shortly.

17th September: West Cumberland A.C. open show to be held at The Calder Club, Mirehouse, Whitehaven, Cumbria. Show secretary, C. M. Davison, 3 Wodow Road, Thornhill, Egremont Cumbria CA22 2SD.

19th September: Aireborough and District A.S. Autumn mini-show and auction to be held at Greenacre Hall New Road, Side, Rawdon Nr. Leeds, details from show secretary, Mr. P. J. Smith 10 Wynford Rise Leeds 16. Tel: 675712.

22-23-24th September: Grimsby & Cleethorpes A.S. are displaying a Tableaux Stand in The Hobbies For All Exhibition at the Memorial Hall, Cleethorpes.

23rd September: Ilford & District Pondkeepers Society Open Show at The Lambourne Room, Ilford Town Hall, High Road, Ilford, Essex. Schedules from A. Wright, 96 Baron Gardens, Barkingside, Essex.

24th September: Chesterfield and District A.S. Annual Show at Clay Cross Social Centre. Details from B. Boyden, show secretary, 229 Lockoford Lane, Tapton Chesterfield Derby.

30th September and 1st October: Diss and District Fish Keepers Club will be holding their annual exhibition at the Diss Youth Centre, Shelfanger Road, Diss.

1st October: Eboracum A.S. Open Show at Nunthope School, Scarcroft Road, York. Judging starts approx. 2.15 p.m. Show secretary: M. L. Nobler, 6 Bellhouse Way, Ainsty Park Estate, York.

1st October: David Brown A.S. Second Open Show. Held in the Works Canteen, David Brown Tractors, Meltham, Nr. Huddersfield. Schedules available July onwards. For details send s.a.e. to the show secretary, Mr. J. Sykes, 27 Penistone Road, New Mill, Nr. Huddersfield. Or telephone (0484) 43398.

1st October: Midland Aquarist League Open Show, Loughborough. Schedules: Mr. F. Underwood, 10 Hyde Road, Kenilworth, CV8 2PD. Tel. 59280.

1st October: British Killifish Association. Annual General Meeting with members table show and auction of fish and eggs. Enquiries to Mrs. B. A. Brown, Publicity Officer, 173 Parr Lane, Bury, BL9 8JN.

1st October: North Wilts A. S. Second Open Show at the Mechanics Institute, Emlyn Square Swindon Wilts. Schedules from P. Taylor 7 Ridgeway Road Stratton Nr. Swindon Wilts. Tel: 0793-82-4114.

7th October: East London A. and P.K. Annual Open Breeders Show at Ripple Road School, Suffolk Road, Barking, Essex. Show schedules available later from show secretary, Mr. T. Waller, 1 Sparsholt Road, Barking, Essex.

8th October: Newbury and District A.S. Open Show at the Corn Exchange, Newbury. Schedules available from the Show Secretary, Mrs. S. Canning, 6 South End, Cold Ash, Thatcham, Berks. Phone No. Thatcham 64254.

15th October: South Leeds A.S. (SLAS) is holding its annual open show in Hunslet Boy's Club, Hillidge Road, Leeds, 10. Judging commences at 2.00 p.m., benching starts at 12.00 noon.

21st October: Goldfish Society of Great Britain 1978 Open Show and Convention at 10 a.m. at St. Pauls, Woodford Bridge, Chigwell Road, Woodford Bridge, Essex. Show schedules from A. Lesurf, 77 Hubert Road, Rainham, Essex.

21st October: Open Show and Convention, starting at 10.00 at St. Pauls Woodford Bridge, Chigwell Road, Woodford Bridge, Essex. Show schedules from A. Lesurf, 77 Hubert Road, Rainham, Essex.

21st-22nd October: British Aquarists' Festival, Belle Vue, Manchester.

29th October: Darwen A.S. Open Show at the Darwen Tower Room (Town Centre). Details from Mr. M. Jones, 16 Eaton Street, Darwen, Lancs BB3 3JS.

29th October: Midland Aquarist League Open Show and Last Inter-Society Show of the Year, Rugby. Schedules: Mr. F. Underwood, 10 Hyde Road, Kenilworth, CV8 2PD. Tel. 59280.

29th October: Doncaster and D.A.S. Open Show. Venue: Don Valley High School, Jossey Lane, Scawthorpe, Nr. Doncaster. Details from Show Secretary, Mr. B. Honnor, 67 Carr View Avenue, Balby, Doncaster.

5th November: Halifax A.S. Open Show at The Forest Cottage Community Centre, Cousin Lane, Illingworth, Halifax. Thirteen livebearer classes, plus eleven coldwater. Furnished aquaria, plants, etc. Schedules sent only on request. S.A.E. to: D. Shields, "Cobblestones," Gainest, King Cross, Halifax, HX2 7DT, or ring for details Halifax 60116.

12th November: Bradford & District A.S. Open Show is to be held at Textile Hall, Westgate, Bradford 1. Schedules and other information can be obtained from Mr. J. Cornforth (Show Secretary), 15 Weymouth Avenue, Allerton, Bradford, West Yorkshire.

18th November: Goldfish Society of Great Britain general meeting, 2.30 p.m., Conway Hall, Red Lion Square, London, W.C.2.

18th November: Catfish Association Great Britain Convention at Aylward Lower School, Windmill Road, Edmonton, London N18. From Holland, guest speakers Dr. H. Nijssen and Mr. I. Isbrucker. Tickets £1·50 from Gina Sandford, 5 Victoria Road, Earlswood Redhill, Surrey. Redhill 69339.

19th November: A.S.A.S. Convention Speakers D. Allison on Catfish, R. Roberts on Killifish 11 a.m. at Portsmouth Community Centre. Tickets 90p from G. A. Edwards 4 Hibberd Way, Bournemouth BH10 4EL. (0202) 523746.

19th November: Northallerton and District A.S. Open Show. Schedules available later, Show Secretary, B. P. Summerscales, 97 Long Street, Thirsk.