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The Editor accepts no responsibility for views expressed by contributors.
INDIAN FERN

Written and illustrated
by J. Dunbar

*Ceratopteris thalictroides*, or Indian fern, must be one of the most useful plants available today, both for decoration and the protection of new-born fry.

For decoration in the community aquarium there are many uses. At its different stages of growth, it can be used either in the foreground, middle or for the rear of the tank. This gives you plants of three varying sizes. I have found that as the plants reach four to six months of age, the leaves stay rather narrow, unlike the leaf illustrated in the photograph; at this stage I usually remove them, replacing with a younger specimen.

While being decorative, Indian fern can be used in the rear corners where it will camouflage the uplift tubes of undergravel filters and heaters and thermostats. On mature plants stems can reach eighteen inches in length.

The plant is such a rapid grower, usually sending out new stems every ten to fourteen days, that one is able to prune away decaying leaves, but always leave the tank with plenty of lush green foliage. The decaying leaves usually have a number of young plants growing from them; these are plucked off and replanted in the gravel where they will soon take root.

Indian fern is a plant which isn’t very particular as to its water conditions making it an excellent plant for the beginner who can use it as a centre-piece.

I have found that the plant grows as well in tanks having outside filtration as in those with undergravel filters. All the Indian fern plants which I have, descended from one original plant which I bought some three years ago.

For the aquarist who goes in for breeding livebearers, Indian fern is a blessing for the protection of new-born fry. Young plants from decaying leaves can be scattered over the aquarium’s water surface as in the photograph; where, after a week or so, long hairy roots will hang down into the water, providing ample hiding places for the fry.
The AQUARIST Crossword
Compiled by M. W. CLARKE

CLUES ACROSS
1. Marsh type plants for the pond (9).
2. Lady in distress on the coral reef (4).
3. Rodney takes this to the bankside to help relaxation when fishing (4, 4).
4. It usually contains three or more medical movements (5).
5. Long flowing fins often do so (3).
6. Lovers can run away from home to do so, for fish to a corner of the tank (5).
7. Prosecute (3).
8. Angular point of view (7).
9. Loricaria aurea (8).
10. Angry mountain of fame (4).
12. Rear of the notch (5).
13. A game bird (5).
14. Once a larva it's always a larva (7).
15. The first (7).
16. The street for nimble journalists (5).
17. Avoid (5).

CLUES DOWN
1. A game for Ambonides microcephalus (7).
2. Prize-winningichlid from Russia (3, 5).
3. To artificially supply water (8).
4. Genus of very decorative plants (10).
5. Grounded for ladies' handbags (9).
6. Scientifically they are known as Botia's (7).
7. Or phony "get somewhere fast" type of plant (9).
8. Recluse of the webbed (6, 4).
10. A Swiss bungalow (6).
11. Spats is mainly composed of this if where the mun is said to find is true (9).
12. Certain essential with the good lumpers (5).
13. Idea, may be silver or golden (4).
14. Liquid measurable in yards (3).

Solution on page 405
March, 1972
OUR EXPERTS' ANSWERS TO YOUR QUERIES

TROPICAL QUERIES

by Jack Hems

I have purchased some young snakeskin gouramis. Will these anabantids live on good terms with my moonlight, giant striped, blue and Leer's gouramis in a four-foot tank?

The snakeskin gourami (*Trichogaster pectoralis*) is not a quarrelsome fish, but I think you ought to know that it does grow to a very large size. In less than eighteen months a 2 in. fish may attain some 6 or 7 in. And this is not maximum size. I have seen specimens of almost a foot.

I should like to know how to keep and feed the mudskipper.

Fishes of the genus *Periophthalmus* need a spacious aquarium furnished with stonework and tree branches making islands in the water. This should be salty and not more than about 4 to 6 in. deep. The temperature inside the aquarium should be in the neighbourhood of about 79°F (28°C). The best known mudskipper is *P. barbarus*. This species takes worms of various sorts, small grubs, flies, and the like, quite freely. I have even seen specimens swiping miniscule heaps of a well-known flake food off a rock.

I should like to be given some details of the spawning habits of the bumble-bee catfish (*Leiocassis siamensis*).

Up to the present time this fish has not bred in captivity. Indeed, no member of its family, the *Bagridae*, is believed to have bred (as yet) in captivity.

Have I done wrong in introducing Arnold's cichlid into my community tank?

If you mean the dark-spotted fish known to science as *Pelmatochromis arnoldi*, then the answer is yes. This 3½ to 4 in. cichlid is a great bully and fin-tearer. It is best given a tank to itself.

I placed some pieces of cork bark in my aquarium about a week ago, but now the water is quite brown. Will the colour of the water have a harmful effect on the fish?

The water in your aquarium must be changed very gradually for fresh over the next few weeks. You should have given the cork bark a good soaking before you introduced it into your tank. For if you leave things as they are the increasing acidity of the water will kill the fish.

I have just bought two *Cichlasoma festivum*. The dealer told me this cichlid will not harm the other fish in my aquarium. Is this correct?

*Cichlasoma festivum*

In its larger sizes, *C. festivum* is not to be trusted with fishes much smaller than itself but, in general, it is a timid species that avoids contact with the other inmates of a community tank.
Since introducing a couple of *Gyrinocheilus* loaches into my aquarium, I have had nothing but trouble. They stir up sediment and they chase after my large angel fish and bite at their sides. Yet the books and a lot of dealers praise these loaches for the good they do in the aquarium. What is your opinion of this fish?

Firstly, let me say that *Gyrinocheilus aymonieri* is not a member of the family Cobitidae and is, therefore, not a loach. It is pure and simply a fish with a sucker mouth. That *G. aymonieri*, like some of the loaches, finds the body slime of some fishes attractive to suck is a well-known fact. Hence it is best to keep it away from pancake-sided fish or sluggish fish with tall sides. All bottom-searching and bottom-frequenting fish will stir up sediment. The remedy here is to keep the bottom clear of excessive sediment by regular siphoning. To sum up, then, my opinion of *G. aymonieri* is that, given a well-tended aquarium and the right companions, it is a useful fish to have around; for it does live almost exclusively on algal growths.

I have just taken possession of a three-foot tank. Discussing the setting up of this tank with some fishkeeping friends, I was given to understand that it will cost a small fortune to furnish it with plants. Is this true?

It is not true. Provided you buy plants such as *Hygrophila polysperma*, *Sagittaria subulata*, and, perhaps, a swordplant (*Echinodorus* or two to give height and add to the decorative effect, you should have some change to come from a £1.

What size tank would I need to house a pair of full-grown red oscars? Furthermore, what requirements in the way of food and temperature would promote rapid growth of young oscars to breeding size?

A tank 48 in by 15 in. by 15 in. would make a good home for a pair of full-grown oscars. A temperature of about 75°F (24°C) would suit the fish very well. As for food, red meat, cooked and minced offal such as heart and chicken liver, young livebearers, and earthworms would make a satisfactory diet.

I should like some information on the platinum tetra. My local dealer appears to know little or nothing about this species but insists that it will give no trouble in a community tank.

The platinum tetra (*Gephyrocharax atracaudatus*) is one of my favourite fish. It is lively, swims mostly in the middle levels of the water, is a shoaler, eats anything, is long-lived (upwards of four years) and is as glittering on the sides as a piece of white gold sprinkled with the dust of blue diamonds. It is native to Panama and attains about 2 in.

I should like to keep some discus fish in a large aquarium I have just bought second-hand. Our tapwater is soft and, under test, gives a pH reading of 7.0. Do you think I should go ahead and buy some discus fish?

The water should suit the discus very well provided it is acidified by straining it through peat to give a reading of 6.5 to 6.8. But make certain that the compost you use is lime-free, and any rockwork used for decoration, or else you will soon find the pH will rise to 7.2 and above. Another thing, before filling your second-hand tank with water, give it a good soaking in two or three changes of water and then, before finally setting it up, cover all interior seams and the underside of the top angles of the frame with silicone rubber sealant.

Would you recommend Ulrey's *tetra* for a community tank housing a collection of smaller fishes?

*Hemigrampus ulreyi* is a fish I would most certainly recommend for a community aquarium. It is pleasingly coloured, active, hardy, easy to feed on anything alive or dried, and does not fall out with other species.

**Goldwater Queries**

I have an old weathered, cattle drinking trough made with concrete which is 54 x 15 x 10 inches, on each side of a division. Are there any fishes smaller than goldfish which I could keep and perhaps breed in it and could I grow a water lily in the trough?

The trough should make a good receptacle for fishes. As it is rather shallow any extremes of weather could affect it but as you are able to run a heater to it this would be all right in cold weather. However, in very hot weather the water would warm up a lot but if you had any of the goldfish varieties I do not think that they would be upset by this. Many of these fish can stand a water temperature of nearly 80°F, and if you have a water lily or some duckweed to shade out much of the sun, the fish should come to no harm. There are not many fishes smaller than goldfish which you could keep. Perhaps Bitterling would be useful but they would not breed unless the tank contained plenty of mulm in which the mussels could live, as
these are essential for breeding Bitterling. I feel sure that you would be successful with shubunkins or fantails as you could transfer the parent fish to the other side once spawning has taken place. There are a few water lilies which could grow in your trough, such as the types *Nymphaea pygmaea*, *sp.* You would have to set them in a shallow tray so that the crown of the plant was well below the surface.

There is no need to treat the concrete trough in any way as its age would make it quite safe for fish. It is only fresh concrete which could give off free lime which could harm the fishes.

I have a tank 24 × 18 × 12 in., in which I have six goldfish about four inches long. A short time ago one of the fish began to lie on the bottom and made frequent rushes to the top to expel a quantity of bubbles. It later died. A week later another fish was acting in the same manner. I have frequently refilled the tank from a bucket which has been used for working with bacteria. Could there have been something in the bucket which affected the fish?

If the bucket had been used continuously in the laboratory for bacteriology experiments it is possible for some bacteria to have got into the tank. The action of the fish suggests that it is swim-bladder trouble but of course it is quite probable that this could have been partly caused by something introduced with the water from the bucket. You state that the goldfish are four inches long; if this refers to body length then you may be over-stocking as the tank will only hold, safely, 12 inches of body length of fish. Clean out the tank and restart with water from a safe source.

I have made a pond in the garden with the aid of a plastic liner and filled it with water. I have planted it with cuttings. As I shall not be able to stock the pond with fish until the spring, should a keep the same water or empty it and refill with fresh before introducing the fish?

You should keep the pond filled with water until about a fortnight before you want to put your fish in. Then a good wash round and fresh water should be quite safe by the time the fish arrive. The water plants will not grow during the winter and you may have to replace them if they have not got established by the start of the warmer weather.

I have a 24 × 12 × 12 in. tank in which I have 3 comets and 2 goldfish. I have an aerator but at night the larger fish go to the surface and blow a few bubbles. Do you think I am over-crowding the tank with fish?

The tank should be safe with 12 inches of body length of fish. However, this is not the end of the problem. When fish mouth at the surface it is a sure sign that the water is impure. This could be caused by the wrong feeding as well as if the water did not contain sufficient oxygen. When water lacks oxygen it is usually the larger fishes which are in trouble first. Although you have an aerator this will not clear foul water. I suspect that you have been over-feeding with dried fish which has tended to pollute the water when it started to decay. See that you have sufficient water plants; do not overstock nor over-feed and all should be well.

If I buy some Koi in the spring will it be safe to put them straight into an outside pond?

It depends on whether the fish have been reared in this country in fairly cold conditions or are recent imports from Japan or a warm water source. If you make enquiries from the supplier he should be able to advise you. Certainly it would be dangerous to put Koi into a garden pond in the spring if they had been raised under almost tropical conditions. In such a case they should be gradually brought down to about the temperature of the water in the pond.

I have two tanks, 24 × 15 × 12 in., with cold-water fish. I have an assortment of plastic plants and after a time they smell badly, but yet the water has no offensive smell. I change part of the water once a fortnight and add fresh. Is this safe and how can I clean the plastic plants to stop the bad smell?

The quick way to stop the plastic plants from smelling is to sling them out of the tank and replace them with proper growing water plants. If you are going to use the plastic plants I do not see why you cannot go the whole hog and use plastic fishes. There may be a use for such plants in a marine tank where few plants could grow but in a coldwater tank I think they are not only useless but quite out of keeping with the whole idea of freshwater aquaria.

In your articles you sometimes refer to large, medium and small ponds. This is rather vague and I would like to know how you define them?

Naturally, the measurements of a particular pond are likely to vary with one's own estimates. When I refer to garden ponds I do not include small lakes or large ornamental ponds likely to be found at stately homes, etc. I can only give a rough estimate which will be found applicable to garden ponds in general. Although no hard and fast rule can be given I usually refer to a small pond as one of not more than about 7 ft. by 5 ft. A medium pond would be about up to 14 ft. by 10 ft., and any above that I class as a large pond. As for stocking them it is not necessary to estimate the number of fishes as you would for a tank. There is a great deal of difference between the two. One usually allows 24 square inches of surface
area to each inch of body length of fish but this would be too much for the garden pond. A small pond should not hold more than about twelve fishes of not more than four inches long overall. This allows for their growth and perhaps breeding. When considering the stocking of larger ponds, the rate of growth must be taken into account more particularly as the fishes are likely to grow at a faster rate. For instance, if several Orfe are placed in a fair sized pond they could grow very quickly and four inch fish could be a foot long inside three years, as long as they were well fed.

The reason why I recommend the rate of stocking for a tank is that through years of trial and error I have established that, with proper care, this is a safe rule. The old one which I disproved many years ago was to have an inch of fish to each gallon of water. This could have been safe for a tank with a fairly shallow depth, but a gallon of water in a container which was very deep could not sustain as many fish as one of the same capacity but very shallow, giving a much larger surface area.

I have a tank, 24 x 12 x 12 inch, with a red-cap oranda and two fantails. The red-cap has the white tubercles on its gills and front fins and is chasing the fantails about the tank. If spawning for this not unusual for early January. The tank water is at 60°F?

It may be unusual but it is the temperature of the water which as brought the fish into breeding condition, and of course, the male must be in prime condition. I made experiments over many years and found that the average temperature of the pond water when my fish spawned was 61°F. Some were in the lower fifties and some in the upper seventies. Orandas can breed with fantails but the youngsters will be a mixed bag.

Last year we bred a number of shubunkins but lost most of them through dragon-fly larvae which hatched from the weed. Is there any way of stopping this loss in future?

It is always a tricky task to catch any pests which may have hatched in the rearing tank. I have had some trouble in the past through the tadpoles of newts which have hatched from eggs laid on the weed when in the pond. I find that an excellent method to adopt is to visit the tank at night with a strong torch. Many pests either come to the surface at night or are easier to see and catch at night time. If this is unsuccessful you can get a spare tank ready with water from the hatching tank. Then catch the fry with a white based saucepan, or similar object. Any pests can be seen easily and removed. Treat the fry very carefully as they are rather delicate when small. The weed from the hatching tank can be washed and the tank refilled, using the original water.

March, 1972

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IVY-LEAVED DUCKWEED

by B. Fry

IVY-LEAVED DUCKWEED is a charming little plant that either grows well for you or not at all. It is, or appears to be, the only member of its far-flung genus which does not float water-repellent foliage at the surface; ordinarily it grows on or near the bottom or just below water level.

The leaves or fronds are narrowly lanceolate in shape, about ½ in. long and joined one to another by narrow stalks. The roots are as slender as threads. Every frond has its own little root. Where conditions are to its liking, ivy-leaved duckweed forms tangle masses of pale- to dark-green foliage. It is hardly necessary to say that these tangled masses of greenery make a safe retreat for pursued or shy fry. And as a spawning plant for small oviparous fishes such as Tanichthys albonubes or Schubert's barb it is one of the best.

Lemma trisulca, to give this plant its botanical name is widely distributed and occurs in most parts of the world, excepting Africa and South America. A handful of L. trisulca taken from lake or pond can usually be acclimatized to the warmer water of a tropical aquarium without much difficulty. It is advisable, though, to bring about this temperature change very gradually.

The great enemy of ivy-leaved duckweed is algae. For once algae gets in among the fragile foliage and is not kept under control, the plant is doomed. Fortunately ivy-leaved duckweed is tolerant of a fair amount of shade. It is, therefore, not too much of a business to keep algae at bay.

Once upon a time, L. trisulca was included among the long list of medicinal plants used by herbalists. It was prescribed for all sorts of illnesses such as gout, jaundice and inward inflammations. In the aquarium, ivy-leaved duckweed is not faddy about the mineral content of the water and will even stand some salt. It flourishes best, however, in crystal clear water rich in the nitrogenous excretions of fish.

One last word. It is a plant ideally suited to a pea-floor aquarium inhabited by a trio or small family of killifish, tiny livebearers such as Heterandria formosa, or pygmy centrarchids.
I would like to begin this month's feature by thanking those people who sent me Christmas cards—especially the Officers and Council of the Federation of British Aquatic Societies. I must also apologize for no W.Y.O.? appearing in the January issue of the magazine. Unfortunately, because of university examinations and other work, my copy did not reach the Editor until it was too late to appear in the January issue. However, I have now been able to use some of the many letters for which I did not have space in previous editions.

Mr. D. Preece writes from 3 Morgan Terrace, Park Hill, Tredegar, Mon., on the subject of convict cichlids—raised by Master Andrew Patterson. Mr. Preece informs us that a description of these fish can be found in Innes' book, or in McLemere's book, under the guise of "zebra cichlids." Mr. Preece recently purchased a pair of these fish, which readily spawned. About 80 fry were hatched, 30 per cent of them being albinos. During spawning, the parent fish killed four 1½ in. marble oscars, two Tilapia of 1 in., two 1 in. blue acara and two marble angels. He retained seven fry, and although he is now well aware of their ferocious nature when breeding, he is tempted to introduce just one into his large tank to see how it behaves with other fish when it is free of the responsibilities of breeding. The latest addition to Mr. Preece's large tank is a 1 in. tiger oscar, and it is being fed on chopped earthworms, raw liver and Tetramin. Mr. Preece found Mr. D. K. Brown's article on "The rearing of young Discus" (May edition) to be the most fascinating item in The Aquarist last year, and his favourite aquarium books are Innes', and McLemere's "All about Tropical Fish"—the latter book he describes as being "... truly exceptional—a supreme book for the average aquarist."

Regular writer Mr. S. Fox, of 126 West Farm Avenue, Longbenton, Newcastle upon Tyne, NE12 8RJ, sends his views on some of my recent comments on aquatic plants. In his opinion, most aquarium plants are problem plants to somebody. Regarding Cabomba: he says that one should only keep the particular species of Cabomba which will thrive in the specific conditions in any given aquarium, and he states that the aquarist would have to spend some time and money in order to find the most suitable species.

Mr. J. Amott, who lives at 7 Market Place, Codnor, Derby, admits that he is past the "three score years and ten," and he says that his methods, like himself, are "somewhat ancient." He never tests his water, but can grown Cabomba without any trouble. He seldom uses aeration, and only makes occasional use of an outside filter. He says that many would consider his water to be "dirty water"—but his fish are trouble-free and non-cannibalistic. He finds that Cabomba does best in gravel which is fresh, and starts to fail after such gravel has been in use for more than two years. Mr. Amott considers that washing the gravel does no good; it needs to be thinly spread outdoors so that the sun and weather can get at it. It is then suitable for Cabomba again. He pinches any flower buds off his plants as he finds that flowering diminishes the vigour of the plants.

Mr. S. A. Heap, of 108 Aldwyn Crescent, Hazel Grove, Stockport, Cheshire, SK7 5HX, is a member of the Belle Vue Aquarium Society, and has regularly been sending me copies of the Society's most interesting magazine, Aquascopes. He also writes about Cabomba plants. His plants, grown at pH 6, and a water hardness level of 130 p.p.m., and pH 7, and 150 p.p.m., with three 40 watt bulbs over a 36 in. × 15 in. × 15 in. tank, and two 40 watt strip lights over a tank of the same size, grew so quickly that he had to pull them out each week, cut them in half, and replant the flowering tops. After several such cuttings, the plants flowered. As it became difficult to get rid of unwanted plants, he gave all his stock away, and none is now flowering. His plants flowered with under-gravel and with outside filtration—also with no filtration at all.

In a second letter, Mr. Heap informs us that, many years ago, he found a large tortoise wandering in the road. The tortoise hardly ever drank water. Mr. Heap thinks that the drilling of a tiny hole in the edge of a tortoise's shell would be painless, and he wonders if Miss L. G. Williams will ever have her ears pierced. His tortoise hibernated in a box of straw in his greenhouse, and during the summer it was allowed to wander wherever it wanted. Neighbours frequently had to return the animal. (My own tortoise, Tojo, who featured in recent columns, has refused to hibernate this year—so far. It's now near the end of December, and for the first time in many years he just will not
go to sleep—even though he has been placed in a box of hay, kept in a cold outside store. I wonder if the mild weather which we’ve had so far is the cause? Have any other readers met with the same problem this winter?

Mr. T. Wielogorski’s home is at 44 Wilton Crescent, Wimbledon, London, SW19 3QS, and his ‘A’ level studies have been taking up so much of his time that he has had to cut down on his stock of fishes. (I know exactly the problems of trying to combine studying and fishkeeping—but it’s even more difficult when one does a full day’s work, and some writing for magazines, as well!) He has a pair of Dwarf Gouramies in a tank which is heavily planted with Vallisneria and pygmy chain swords. His pair spawned and produced 100 plus fry, but an attack of white spot killed off the fry. He’s hoping to have another spawning soon. (I’ve still been unable to raise any of the fry produced by my pair—about which I wrote in the December issue.) Mr. Wielogorski also has an adult Oscar in another tank, and it tears up the plants and has a voracious appetite for Tetramin and snails. He is trying to find a mate for his fish but considers £1.50 to be too expensive for his pocket. He finds that Tetramin is appreciated by all his fish and, as the makers claim, it does not cloud the water. Mr. Wielogorski asks if readers have had any success in (a) keeping crayfish, and (b) in acclimatising shore crabs to the aquarium.

Master A. D. Heath is 16 years old, and writes from 14 Grosvenor Avenue, Carshalton, Surrey, on the subject of planting an aquarium with only one kind of plant. In a 3 ft. coldwater tank he has more than 150 Vallisneria plants which developed from 12 originals, and more are being produced each week.

Other kinds of plants do not grow in the tank. In contrast, in his 2 ft. tropical tank, where Cryptocorynes and swords predominate, Vallisneria will not grow at all. Master Heath strongly disapproves of filters, aerators, etc., being used in aquaria. He thinks that tanks should be as “natural” as possible—even though there are certain things which the aquarist must do to his tanks. W.Y.O.? is always the first item which he reads in the magazine.

Another letter on the “single” planting theme comes from Mr. T. Barr, of 40 Oxford Close, Mitcham, Surrey. About two years ago he kept a 36 in. × 15 in. × 15 in. tank, lighted by two 25 watt bulbs and a 24 in. warm white florescent tube, and planted exclusively with Vallisneria spiralis. The tank was choked with plants in just eight weeks, and required constant thinning. Several plants flowered, but although attempts at pollination were made, no seeds were produced. When he plants Vallisneria, Mr. Barr cuts back the leaves to about 6 in.; when two or three new plants are produced on runners, he discards the parent plant. This method gives him plants with leaves of well over 24 in. in length. When Cryptocorynes and Sagittaria were introduced into the tank, the Vallisneria suffered a noticeable set-back. Mr. Barr concludes that Vallisneria seems to do best on its own.

I recently asked readers to give us prices of fish, plants and equipment, taken from advertisements in old editions of The Aquarist. Mr. Barr has copies back to 1949. He says that the average price of heaters was about 15s., and air pumps from 25s. to £3. Plants’ prices were quite low: Vallisneria 3d., Spatterdock 2s., and large Cryptocorynes at 3s. 6d.; however, fish were quite expensive: black widows at 4s.,
neons at 8s. 6d., harlequins at 7s. 6d., etc. These prices were taken from a 1952 edition. Mr. Barr points out that 8s. 6d. in 1952 would be equal to at least £1.00 today, and he says that ours must be the only hobby where prices over a period of twenty years have actually been reduced or, at least, maintained.

It's always pleasant to receive a letter from a lady aquarist, and Mrs. D. Hanning writes from 11 Seaton Place, Ford, Plymouth, PL2 1PS, on the subject of Cabomba. She has a 19 in. × 11 in. × 14 in. all-glass tank, without a heater. It is lighted by a 40 watt bulb, contains guppies, swords, and white clouds, and is planted with only Cabomba. She started with only a few small pieces of the plant, and now has a forest of it in three tanks—as well as having given some plants away. The plants grow very long, but have never flowered. Her other tanks contain Cryptocorynes, Amazon swords, Hygrophiila and hairgrass—plus one plant which she cannot find in her aquarium book. (Photograph 1 shows bladdernose—an interesting aquarium plant which catches tiny aquatic animals for its food. Notice the tiny “traps,” which capture the plant’s “food,” in this close-up photograph.) Bladdernoses are some of the few aquatic plants which obtain their nourishment in this way.) Mrs. Hanning was given two small pieces of Hygrophiila about six months ago, and as soon as the plants reached 6 in., she nipped off the tops and planted them. She now has a 3 ft. tank filled with 12 in. tall Hygrophiila plants, and has no room for any more.

In the November issue, I quoted from a reader who told about an aquarist who had been bitten by his piranha fish. Confirmation of the piranha's attack on its owner comes from Mr. R. B. Rosher, of 58 Fintryside, Mains of Fintry, Dundee, Angus, Scotland, who sent me three cuttings from local newspapers. Apparently the owner of the fish, Mr. Gordon Chalmers, who lives at 121 Butterburn Court, Dundee, had been attending to his fish when his piranha bit his finger. The resulting wound from the 6 in. fish required four stitches. The fish later died, and a post-mortem report from Dundee University said that the cause of its death was probably haemorrhaging in the region of the heart. (I wonder if the piranha’s sole found a place in heaven?)

A quick jump takes us across to 21 Slemish Way, Tonagh Estate, Lisburn, the home of Mr. I. McMahon, who writes on the subject of marine fish. Recently he purchased three Hyweare marine underwater filters and some more coral sand. He completely covered the base of his tank with these filters, and then added a layer of filter wool—so that the sand would not be sucked through the filters. He has an average depth of 2 in. of sand, and the difference which this set-up made to his aquarium is "fantastic." The fish are more active, feed better, and look better. Mr. McMahon had trouble in trying to keep the pH of his marine tank at 8-3, but when he added some Seacoal to his filter his problems were solved. He feeds his fish on Tubifex, white worms and flaked foods. He recently bought a Powerstream Conversion Kit and finds that it is "great." Mr. McMahon says that he recently sent a query to Interpet, and that it is "a really first-class firm to deal with." He ends by saying that he would very much like to set up a 7 ft. marine tank.

Mr. T. Massey, a regular writer, lives at 22 Cypress Gardens, Yew Tree Estate, Walsall, Staffs., and he would like to know what other readers consider to be the easiest and most difficult fishes to keep. His choices are any species of tetra for the first group, and gouramis and angelfish for the second group. Mr. Massey kept a 24 in. tank, planted with only Amazon sword plants, for six months; the plants grew fairly well but he thought that the tank looked drab, and added other kinds of plants. About six months ago he purchased two baby discus, costing 75p each. His fish would only eat chopped Tubifex and presented him with a feeding problem. After a time the fish refused to eat, and finally died. "No more discus for me!" says Mr. Massey.

Talking of discus, I thought that you would be interested to hear of an incident which I recently had with my own two young discus. (Photograph 2 shows the smaller of the two.) Since the fish has been "off colour," I had been keeping them at a temperature of 90°F to help kill off any disease organisms. Before bed one night I decided to give the fish a complete water change. This was done, the fish replaced in the cleaned tank, and I went off to bed. Next morning, before I rushed out to school, I glanced into the tank to see how the fish had reacted to their water.
PRODUCT REVIEW

BILOGICAL UNDER-GRAVEL FILTER, manufactured by Algarde Plastic Products, 49 Dury Falls Close, Hornchurch, Essex. The filter is available in two sizes: 23in. x 11in. at £1, and 17in. x 9in. at 89p.

These two new filters, from Algarde Plastic Products, are undergravel filters made from a "solid," ribbed base, of a light plastic—grey in colour. This base has rows of perforations. The edges of the base are flat, for about 1in., and make a good close contact with the base glass of the aquarium. Each base plate has a plugged opening at each of the two back corners, and the supplied air-lift can be fitted into either opening. The air-lift is easily fitted, and is of clear plastic.

To use the filter, it is placed in the clean base glass of the aquarium. Clean aquarium gravel is then used to cover the filter plate, and this, together with the water, seals the edge of the plate to the aquarium base glass. (It may also be stuck in place using a silicone sealer, but this is not essential.) A minimum of 1 in. of gravel is recommended—but a greater depth makes the filter even more efficient. The air-lift accepts 1 in. plastic air line tubing, which is pushed down to near the base of the expansion chamber of the base plate. One may also fit an air stone if desired. When an air pump costing about £2—£3 is used, aquarium water is filtered about three times per hour, using one air-lift; this turnover rate is suitable for marine aquaria, but ordinary tropical freshwater tanks can be operated with a smaller air pump. For a very high rate of water turnover, an extra air-lift may be purchased and fitted. With an undergravel filter, one does not have to change filter wool, charcoal, etc.

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Under test, I found the filter to be most efficient in operation, producing a clean aquarium. The air supply can be regulated to produce the required rate of water turnover. For larger tanks, two filters can be used.

Although I do not personally use undergravel filters at present, there are many people who do, and for such people I could certainly recommend either of these filters as being both well made, efficient, and reasonably priced.

B.W.

AQALARM, supplied by Aqualarm, 168 Woodlands Road, Ditton, Maidstone, Kent, price £7.50, including postage and packing.

This new item, which is fully guaranteed for one year, is a well-designed product which is very pleasing to the eye (see illustration on page xxii of December issue). It provides the serious aquarist with a piece of equipment which should remove all worries about tanks over-heating or dropping in temperature.

The unit has a metal case, which is blue in colour, and is fitted with four rubber feet to prevent furniture from being scraped or scratched. The front of the unit is painted in matt black, has three red lights, and a switch for turning on the unit's buzzer warning system.

For use, the unit needs two thermostats for each aquarium which is to be monitored. There are two three-core leads from the unit. One of these is wired to the mains, and the other bears a connector for wiring up to the thermostats needed for each tank. When the two thermostats are fitted, the "over" thermostat is adjusted until it operates at a temperature just above the normal operating temperature of the tank. The "under" thermostat is adjusted until it operates at a temperature just below the normal tank
temperature. When both are correctly adjusted, the
“over” and the “under” temperature lights on the front
of the unit will both be out when the unit is switched
on. The mains light will be lit when the mains are on.
When the unit and thermostats are thus adjusted, the
buzzer switch is clicked to the “on” position—and no
sound is emitted. Should the temperature in the
monitored tank rise above normal, the buzzer—which
is loud enough to be heard from quite a distance—will
sound, and the “over” light will light up. The con-
verse happens with the “under” thermostat and light.
One can thus immediately hear, and then see, whether
the heater in the tank has failed, allowing the water to
cool, or whether the thermostat has failed to cut out
the heater, causing the water to over-heat. One can
quickly correct the offending item. Should the mains
supply fail, the buzzer will sound and the mains light
go out. One can then check fuses or check for a power
cut—and take appropriate action. (The buzzer is
operated by a battery fitted in the unit.) The unit
should be tested every three months, following the
instructions supplied with the unit. A number of tanks
can be monitored with the same unit, but each needs
two thermostats for the unit to work. Thermostats are
not supplied with the unit, the reasons given being
that individuals can buy those best suited to their
needs and pockets. The Aqualarm may be placed in
the lounge, and an extension lead taken to, say, another
room, or to a fish house.

I found the unit to be most efficient in operation,
and it would be ideal for the aquarist who keeps large
numbers of fishes, or smaller numbers of expensive
fishes. However, I do have a number of reservations—
although these are purely personal. For each tank, one
must buy two extra thermostats, and these would cost
about an extra 50p each; another point is that, with
two extra thermostats in a tank, one has to try to
conceal these if the aquarium is kept for decorative
purposes.

However, disregarding these two points, this
efficient and neat little unit is a good form of “insur-
ance” for the aquarist who has an expensive collection
of fishes—or for the ordinary aquarist who does not
want to take any chances with his stock. For those
who can afford this unit, I consider that it would be
a good investment. Even one warning from it could
save more than the cost of the Aqualarm and thermo-
stats.

B.W.

COLOUR AND PATTERN
INHERITANCE
IN KOI

by F. L. Vanderplank Ph.D.

Koi or Japanese Carp can be obtained in a very wide
range of self and mixed colours, also in a wide range
of different scale types of patterns. Some aquarists
are under the impression that there are certain set types
that are bred by the Japanese. One such reader,
Mr. J. F. Gregory, wrote in the July (1971) Aquarist
“I understood that Koi had been line-bred to keep
varieties pure and not crossed and mixed up just to
see what could be produced!” This is quite a widely
but erroneously held belief which has been obtained
from writers about Koi and possibly from the
Japanese themselves. Koi are highly complex hybrids,
crosses between at least two different species (possibly
three species) and therefore have a very mixed
chromosomal and genetical make-up and cannot be
line-bred. The probable reason why some people
have come to think that Koi are line-bred is because
of the Japanese names for the different colour-groups,
but these Japanese names are merely descriptions of
the different colour-groups or varieties. As I have stated
in another article, the unnatural colours of goldfish and
koi (and other fish) is due to a virus (or viruses) of the
natural pigments of these fish. Since the natural
pigments of these fish can be made up of several
different chemicals, the action of the virus produces
different colours from these. The mixed colours of
shubunkins and calicos is caused by a conflict of two distinctive types of pigmentation in goldfish and to obtain one hundred per cent nacreous (calico) offspring a metallic goldfish must be crossed with a matt goldfish; if nacreous (calico) fish are selfed only 50 per cent will be nacreous. To obtain one hundred per cent mixed coloured koi, white (pearl) koi must be crossed with red. Most offspring will be red and white (Kohaku); the numbers of other colours will depend on genetical variations of the chemical nature of the pigments. Many koi are treasured for the brilliant metallic lustre which is caused by very heavy deposits of guanine. This does not appear to follow any known genetical pattern and so is most probably caused by another virus, as is the black pigment in many tropical fish and in goldfish, but not the black pigment found in koi. Koi have been produced by crossing the common carp with goldfish varieties which originated from two species of carp independently, namely the Crucian carp, sometimes known as the Prussian carp, Carassius carassius and the Chinese carp Carassius auratus. Both these species have now been completely inter-bred in the present-day goldfish. If naturally coloured “goldfish” are crossed with naturally coloured carp, the same hybrid as koi is produced but in its natural olive-green colour. The Chinese bred naturally “goldfish” for food. The Japanese bred carp purely as food and similarly in Europe carp were, and still are, bred primarily for food. Due to the atrocious conditions used for breeding “goldfish” the red, orange and yellow colours were produced due to viral infection of the fish’s pigment, also many abnormal shapes of the body and fins were produced by genetical mutations. The Chinese, being artistic people, kept and then developed these monstrosities for decoration of their ornamental pools.

The Japanese developed red (or golden) carp at a much later date and then koi. The multiplicity of colours is a very recent development (during the last thirty years). The Germans and Central Europeans developed common carp with very large scales on their sides known as mirror or German carp. Also another true variety is one with very fine scales and often called a scaleless variety. The Japanese have inter-bred both these varieties into their Koi breeds which adds to the complexity of varieties available. The large-scaled variety is called by the Japanese Dough which by which they mean Dough which is what a German calls himself, so there is no particular mystery about these European-scale varieties that have been introduced into koi. Only the numbers of different varieties have been considerably increased by this hybridisation. These large scales are due to true genetic mutations and are generally recessive, but they follow definite patterns and are transmitted in accordance to the normal genetical laws. However, the pigmentation, and hence the colours of large-scaled varieties, is not a genetical mutation and does not follow any definite pattern, but there are tendencies for certain colours to be associated with particular patterns. At present koi, even the common self-coloured metallic varieties, are relatively expensive when compared with goldfish but many people were successful in breeding them this year (1971) and I see no reason why koi should not become as plentiful as common goldfish. However, certain colour combinations and scale patterns will not be so easy to breed until a great deal more is discovered about the genetics and the viral infections of the fish’s pigments. Koi do not need any special treatment to breed; in fact they can be treated exactly the same way as for breeding common carp. However, to obtain the maximum numbers showing fancy (or unnatural) colours special treatment of spawn and fry during the first six weeks is necessary. Details of such treatment is at present a trade secret but I have little doubt that it will become common knowledge before very long. Some commercial breeders have spent a great deal of money on research into breeding of koi and so cannot be expected to divulge their information as freely as some people expect. As with other breeds of domesticated animals, it will be quality and rarity that pays the best prices and the Japanese have produced some really fantastic fish. No doubt we shall be able to do the same once we have built up the necessary breeding stock.

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Crossword Solution

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  M  A  R  G  I  N  A  L  D  A  M  S  E  L  R  A  2
  A  E  R  E  R  P  N  O
  R  O  D  S  R  E  S  T  S  O  N  A  t
  B  O  I  P  H  N  K  C
  L  S  A  G  E  E  L  O  P  E  H
  E  C  A  E  R  C  S  U  E
  S  L  A  N  T  E  D  M  E  K  S
  r  E  W  H  I  P  T  A  I  L
  P  R  E  T  O  N  C
  E  T  N  A  L  L  C  E  N  T
  H
  N  P  O  L  A  R  C  A
  Q  U  A  I  L  A  X  O  L  O  T  L
  U  T  A  A  B  R  E  V  E
  I  N  I  T  I  A  L  F  L  E  E
  T
  N  N  E  V  A  D  E  R
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CONTROLLING
FREE-SWIMMING
GREEN ALGAE

by F. L. Vanderplank Ph.D.

One of the aquarist's most tedious problems is the growth of algae in his tanks and ponds. There are hundreds of different species of algae, which come in most colors from the deepest blue-green, so that they appear almost jet black, various shades of green, browns, reds and yellows. Most aquatic algae start life as free-swimming single cells; some spend all their lives in this stage, whereas others settle and grow into threads, or flocby masses. It is the single celled free-swimming algae that are most difficult to deal with especially when one has newly hatched or young fry, the algae prevents the fry from finding their natural foods and if the algae get too numerous they are apt to die and their dead decaying cells pollute the water with the liberation of sulphurous gases which kill all the fry. Many methods have been tried to control the growth of algae and the only successful one to date is to keep the fish tanks in such subdued light that green algae are unable to grow but the colourless forms of some of their species such as Buglina can and do grow in such conditions and can be a danger to fry. However, most fry can and do eat the colourless protozoa as they are not true algae. In fact quite a few of the free-swimming so-called algae are protozoa that have a symbiotic relationship with small algae. The green algae live inside the protozoa and benefit from the waste carbon dioxide and minerals while the animal benefits from the oxygen given off by the algae and possibly from other substances as well. The aquarist is not so much interested in the species and habits of the algae and protozoa as how to keep these under control. There is no doubt that fry grow quicker in a good light if algae can be controlled. In nature algae form the food of various rotifers, crustaceans (daphnia, etc.) and numerous similar species of small water animals, but these are also excellent food for fry and young fish, so do not survive long enough to control the algae in a tank with numerous fish fry. Many chemical methods of control have been tried and recommended from time to time; chemicals such as sulphate of iron, copper sulphate, permanganate of potash, etc., are all highly toxic to fish and although they can be used with large fish to control the algae, fry are more sensitive to these chemicals than are the algae and consequently they cannot be used. The ideal method of control would be some fish fry that feed on these free-swimming algae and only a few species do this and all that do are either rare or difficult in one way or another. However, tadpoles of the Clawed frog (or toad) Xenopus laevis feed ravenously upon most species of free-swimming algae and will clear most aquaria tanks in a few days. Not only that, they will not harm any young fry since they cannot, in their early stages, eat anything so big as a newly hatched Angelfish or Goldfish. Xenopus laevis are easily spawned either naturally or artificially with the injection of 300 to 500 international units of progesterone. Their eggs are small, transparent and not much bigger than those of Goldfish and at a temperature of 75-78°F they hatch in 3 to 4 days. The young tadpole is only slightly bigger than a newly hatched Goldfish and hangs on the sides or on vegetation for the first day or two then, like Goldfish, becomes free-swimming. The tadpoles are very small, transparent and spend all their time swimming in open water, feeding on free-swimming algae. They feed entirely on this for the first month or six weeks by which time they have grown to an inch in length and can then take small daphnids, but if no daphnids are available they will continue to feed on free-swimming algae. They will not and cannot eat any other kind of algae as all their food is consumed by filtering particles out of the water. They can be fed artificially on powdered nettle (stinging nettle) leaves or finely powdered dried shrimp. They grow to about 2 1/2 to 3 1/2 inches long in 3 to 4 months and

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THE AQUARIST
Tropical or Coldwater?

I have frequently seen, much to my concern, fishes more suited to the unheated aquaria sold as tropical fish, indeed some of them would be far more at home under ice during the more severe winter months than in an aquarium complete with functioning heater and thermostat, maintained at 75°F. I appreciate the fact that the dealers do stand a much better chance of maintaining a sale of them in tropical aquaria as coldwater fishes outside the goldfish range are not particularly popular. However, imagine the unfairness of it all when the coldwater enthusiast purchases such a fish outside the summer period and introduces it to a low water temperature. Such a drop in temperature would obviously be detrimental to the fish's well-being, disease being the result, or ultimate death.

What are these fishes more suited to the coldwater aquarium one might ask? Our native fishes are obviously discounted and one wouldn't really expect to see the very hardy Chinese Paradise Fish and White Cloud Mountain Minnows in the dealer's coldwater fish tank. I refer really to the fishes from North America. One species in particular, the Black-banded Sunfish (Elassoma canum) is more often seen as a tropical fish, indeed not so very long ago it was classified "A.O.S. Tropical" at the open shows. I have some good healthy specimens at home which are occasionally under ice during the winter months. This brings me to a statement in the "Tropical Queries" column of The Aquarist, November issue, which is misleading to say the least. Mr. Hems states "The Black-banded Sunfish thrives best in clear neutral to acid water kept at a temperature of from about 62°F to 75°F. This range serves only to "burn the fish up." Let's face it, a fish of this nature must be wintered, and I mean wintered properly. As a result the fish shows better health and colour the following spring. It comes from as far north as the State of New Jersey and as far south as South Carolina. The winters in this region can be very severe indeed.

I believe, though I am not certain, a number of these "tropical sunfishes" are actually imported from the Far East where they are, needless to say, bred in tropical conditions. A far throw from their natural habitat one would say and not the fish to introduce to the coldwater aquarium, however I have one such specimen of Black-banded Sunfish which survived the ice of last winter and it was given to me by a friend who originally plunged it into a pond during the early part of October direct from the dealer's aquarium. This is an exceptional case of direct introduction I must admit. Under no circumstances should one introduce fishes to coldwater conditions after they have been living in temperatures in the seventies, unless of course the transfer is to be carried out during the summer months. There is no risk in this case.

Although I have been describing a specific species of fish here one must not allude from this fact that there are other fishes of a similar disposition. The Red Shiner (Notropis lutrensis) often referred to as the Red Horse Minnow and Fire Minnow or other fanciful names dreamed up by wholesalers are slowly increasing in availability and moreover classified tropical. In view of the fact its natural environment covers roughly the same area of the United States as the Flier or Peacock-eye (Centrarchus macropterus) a coldwater species and sold as such, it can hardly be labelled a tropical fish. At this very moment I have a number of them living quite comfortably at a temperature of 40°F. Two months ago I acquired them at a dealer's establishment where they were housed in water registering 78°F and as a result had to gradually "break them down" to the temperature of the home aquarium. Under no circumstances— not a practice to be repeated too often. I have had the same trouble with another species, the Sailfin Shiner (Notropis kryptopterus).

I have actually seen other species such as the Blue-spotted Sunfish and to go outside the U.S.A. the Japanese Weather Lough and a fish similar to the Bitterling so far unnamed sold as tropicals.

There will perhaps come a time when coldwater fishes outside the goldfish range will increase in variety to such an extent that the demand for them will blossom out in this country. I trust by that time these fishes will be sold in accordance with the temperature range to which they belong.

V. B. HUNT, "Caeilus," 120 London Road, Widley, Nr. Portsmouth, Hants, PO7 5EW.

Jack Hems writes: Plainly Mr. Hunt is not a careful reader of the printed word; for those who are careful would have noticed that I made no mention of the temperature tolerance of the Black-banded Sunfish in the issue of November, 1971. I merely gave the temperature range that suits this fish best.

Well-practised fishkeepers know that, given an exceptionally good summer and a warm autumn, some of the hardier fishes of the United States can come through a winter outdoors with no ill effect.
fshes, in general, are not quite as pond—or coldwater aquarium—hardy (in an unheated room) as you would have the naive and the uninformed believe.

Cichlid Food

In answer to Mr. Peter Smallman’s letter (Dec. 1971 issue) regarding feeding Cichlids, the following may be of some help if he has a blender available.

Take calf liver, pass it through the blender with a little water to prevent the blades from sticking. Place the blended liver in a coated frying pan very lightly rubbed with cooking oil over a medium heat. Stir until it begins to change colour and continue a little longer to cook in this way and you will find that very soon all the water will come out of the liver (like scrambled egg separating). Pour off the water.

If at this stage the liver is too coarse for your fish, pass it again through the blender. I keep this in my deep freeze as I live in the Tropics, but in a cold country it would keep for several days.

For young fish, I dry it down still more in the oven, then regrind and dry until it is very fine and quite dry and powdery, then grade for baby fish.

The dry type floats for some time, but beware, use only the smallest pinch as it spreads over the surface of the water.

Most fish enjoy this and young fish grow well on it, in my experience.

Reta D. Cecil (Mrs.),
Valley View,
Lodge Hill,
St. Michael,
Barbados, West Indies.

Controlling Free-Swimming Green Algae

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then turn into frogs. The young frogs are ravenous eaters of fish fry and young fish and so the tadpoles are best fed to larger fish when their main usefulness is over which is at between 6 and 8 weeks old and just over an inch long. I find that Xenopus tadpoles not only keep the water clear of green algae but their excreta is eaten by the fish together with a large silicate which breeds in their guts and is continually excreted by them. Xenopus tadpoles can tolerate a water temperature range of 55–85°F and since Goldfish and Koi are best reared at 70–78°F for their first 6 to 8 weeks and most tropicals at the same temperature range, Xenopus tadpoles are ideal for the job. As mature Xenopus can be spawned to order I keep some 40–50 pairs so I have a ready source of spawn and young tadpoles to mix with my fancy goldfish, koi and other fry during the breeding season. Xenopus tadpoles can be used from late June onwards to clear algae in garden ponds but they or the frogs are killed in late September or October when the water temperature falls below 50°F.
Breeding Goldfish

PREPARATIONS for the SEASON

by Arthur Boarder

At the beginning of each breeding season coldwater fishkeepers will be looking forward once again to producing at least a few good specimens. Whether it is just a few ordinary goldfish for the garden pond or for some show specimens, the same enthusiasm will take hold. This is especially so when the fish with which one intends breeding from are fancy goldfish of a good or particular strain. When one is dealing with common goldfish there is not much to be done in the form of preparation as this is usually carried out in the garden pond and the fish need no more than a healthy state of the water for them to reproduce.

It is when a special strain is being used that one must be much more particular. Most healthy goldfish will get the urge to spawn in the spring as long as the pond water is in good condition. Of all the conditions necessary for such a spawning the most important one is the oxygen content of the water. When at school many years ago I was taught that water was composed of $H_2O$, meaning two parts of hydrogen and one part of oxygen. One would therefore imagine that at all times the water in either a pond or tank would hold sufficient oxygen for the benefit of the fish. However, this is not so as one soon learns that the water can contain several foul gases and also lack enough oxygen to enable the fish to remain healthy.

If a pond's water becomes very foul the nasty smell

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it gives off can be very unpleasant and indicates at once that it is unsafe for fishes. This bad smell is usually accompanied by a dull or bluish colour and also a bluish matter can cover any blanket weed or other plants in the pond. Such a condition is most dangerous and, unless altered, the fish would soon be at the top mouth ing for air. This condition will only occur when something is decaying in the water. Fallen leaves can sometimes cause this condition but more often it is decaying uneaten food which is the source of the trouble.

Providing the water in the pond is fresh and there are both sexes of goldfish in the pond, there is no reason why the goldfish should not breed. Once the days lengthen the fish get the spawning urge and so the production of eggs is possible. This may be quite a common occurrence but the rearing of many youngsters is quite another matter. As is well known to most pondkeepers, the fish are quite likely to eat their own eggs soon after they have been laid. Even if some escape and fry are hatched out, there is still the chance that many, if not, all will be eaten before they have a chance of growing into decent sized fish. The early days of their lives are the more dangerous and they resemble mosquito larvaes more than actual fishes and so are often eaten by hungry goldfish. It must be realised that goldfish, if hungry, will take most foods especially any which move. The sight of tiny wrigglers is a temptation which few fishes can resist.

This is not to state that it is impossible to breed fish in a garden pond, as many thousands are so produced every year. If a number of youngsters are reared in a pond then it is almost certain that the pond contains plenty of water plants. The more densely packed with plants the pond is then the better the chance of breeding goldfish arises. Goldfish, like many other kinds of fish, prefer to spawn among dense patches of water weed and in such cases the eggs stand a much better chance of survival than in a pond where the plants are scarce.

Another condition which helps to keep eggs and fry more safe is the structure of the pond. If there is a very shallow part of the pond, this is where the fish are likely to spawn. It seems a natural thing for them to choose water which is too shallow for normal swimming in which to spawn. Even in the wild, such coarse fishes as Roach, Rudd and Tench, will swim into water so shallow to spawn that their dorsal fins and sometimes half their bodies are out of the water. In the wild this shallow water is usually rather warmer than that further out and the fishes appear to realise that their eggs will hatch better in such water.

If one is constructing a pond with the hope that fishes will breed in it, then it is most important to provide such a shallow part or if not one could always be constructed afterwards with the aid of broken paving stones.

Where there is no such shallow part it is possible to get plenty of eggs which must be removed to hatch in safety away from the parent fish. I have used this method with much success for many years and my system is to tie bunches of fine-leaved water plants and anchor them in the shallow corner which was included when the pond was constructed. Once the fish spawn on these bunches they are taken to a hatching tank and fresh bunches are put in their place. This method is all right when one is on hand to save the eggs as laid, but if this is not possible, then one must use such dense masses of weed that it would be almost impossible for the fish to get to all the eggs once they are laid.

Fish prefer shallow water for spawning

This uncontrolled system of breeding is all right when dealing with common goldfish, or even if just one strain of fancy goldfish is kept in the pond. Where several or even more than one variety is kept it is very bad policy to allow the fish to interbreed which they would do if such a condition was allowed. What one has to realise is that the eggs of goldfish and most other kinds of fish, are not fertilised inside the body of the female. They are laid first and are then fertilised by the male fish. The eggs, (hard roe) are expelled by the female when she is encouraged by the attentions of the male, and he releases his milt (soft roe) into the water. The milt contains myriads of tiny sperms which are shaped something like miniature tadpoles and can be propelled through the water by a whipping of the tail. These sperms can live in the water for some time and appear to be attracted to an egg. When one is found, the sperm enters it and fertilisation takes place. If there are a number of males in the pond taking part in the
spawning chase it is possible for there to be thousands of live sperms from any of the males present milling around and so it is possible for one female to lay eggs and have several different males fertilise her eggs. This is the reason why it is very bad policy to allow goldfish of several varieties to interbreed in the pond.

If one has stocked the pond with a number of different varieties of goldfish, then if good types are needed it is imperative to catch a particular pair for breeding once chasing occurs. In such a case once the pair are placed in a separate container away from other males, the resultant eggs can only be fertilised by the male present.

If the various kinds of goldfish are left to spawn among themselves there are likely to be many cross-bred types which are not worth the food they eat. This is why there are so few really good specimens of fancy goldfish seen today. So few breeders specialise in one variety as this is the only way to be sure that cross-breeds never occur. I have specialised in red-scalled fantails for the past thirty-four years and have not had any other variety in pond or tanks. If one is not particular what type of fish breeds in the pond, then as long as the water is in a good state and there are two sexes present, many fish can be obtained as long as there are sufficient water plants to provide cover for the eggs and fry.

For the specialist breeder it is much more important to take other steps when considering breeding. One will no doubt have preferences as to which variety to breed from. Once the mind is made up one should try to get as good specimens for breeding from as possible. This will save a lot of time but is not always an easy task to get the right type of fish. It must not be thought that one must get specimens with which to breed. It will be good enough for a start to get some fairly good specimens from a well established strain. If this strain has produced winners then it is almost certain that their progeny will also carry the genes of inheritance and so pass on some or all of the good points of the parents. I know how difficult it is to get almost perfect specimens of any of the fancy goldfish today, but one need not despair.

If it is possible to get some of the youngsters from a good strain this is half the battle. However, this fancy goldfish breeding is not for the impatient aquarist. It can be a long term job, in my own case I was breeding my strain for nearly ten years before I was able to show, but some of this time was taken up during the war years when there were no shows. Otherwise it would not have taken me so long perhaps.

When sorting out a particular pair of fancy goldfish for breeding, one is not always able to put together two show specimens. However, it may be possible to find a pair where the necessary points are carried by the two fish although neither has all those points. One may have the caudal fin required and the other may have an exceptionally good dorsal. One may be very deep in the body but lack one or two other features, whilst the other fish may not be as deep in the body but have good alternative points which might be produced in the progeny. After the first year it will be much easier to pick out the necessary fish with all the points required. I stated before that this is not a short-term task as it may be at least a year before a particular fish shows to advantage those points particularly required.

As I stated before it is not absolutely necessary to keep the pond to one special variety when breeding as long as one is able to sort out the breeding pairs once spawning is seen to be taking place. The best method to adopt is to keep only one variety or if not, to have either a fish house or separate tanks in which the differing varieties can be kept away from any others. When a fish house is available it is easier to sort out your breeding pairs and to make sure that no strangers are likely to be able to cross with your special fish. Under such strict segregation it is possible to know which fish are the parents of the fry and so keep records as to their potential. In my case I have rarely resorted to this method as I have only the one old established strain and so I can have twenty or more breeders in my pond and let them all spawn together. I do not know which fish are the particular parents of the fry but I do know that no other kinds or varieties have been present to cross with the fantails.

Although it would be possible to breed and rear some good specimens if I left the fish to themselves, I am afraid that very few really good fish would ever turn up. The main reason is that I do not have sufficient water plants all over the pond to give protection as I like the fish to spawn where I want them to, in the bunches provided. If any fry survived it is probable that they could be either single-tailed or at least of poor quality. The fact is that the best fantails would be unable to swim fast enough to escape the attentions of the parent fish. One point I must emphasise and that is, if several varieties are kept in the pond and a special pair are taken out when spawning to do so elsewhere, be very careful not to include any drop of water from the pond, as this could contain many sperms from unwanted males. The safest way would be to let the fish swim in clear water first.

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**ANSWER TO WHAT ARE WE?**

**PONDKEEPERS**

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4/1
Some Interesting
Live Foods (1)

MOSQUITOES

by S. M. H. Loquens

The common or Culex mosquito of the British Isles is just one of hundreds of species of mosquitoes known to scientists to date. It is estimated that in North America alone, there are some three hundred and fifty different kinds. It is well known that several of the tropical species are responsible for the spread of feverish diseases; the Aedes mosquito transmits yellow-fever and the Anopheles mosquito, malaria.

Both of these diseases were the scourge of tropical countries until the advent of modern medicine and methods of combating the insects in their natural environment. It was wholly due to the mosquito’s disease-bearing capabilities that the first attempts to construct the Panama canal were a failure. This gives some idea of how economically important it was to control this insect in the tropics. One may have no fear of contracting such diseases in Britain, however, as our native mosquito is incapable of transmitting such diseases, even if they were present.

The mosquito starts its life-cycle in almost any stretch of still water from a large pond to a water-butts or similar receptacle. The eggs are deposited, several hundred at a time, on the surface of the water. If one examines carefully a likely water surface, one may well see the greyish-coloured eggs floating together like a small raft. In this manner they drift about or adhere to aquatic vegetation for several days or a week or more, depending upon the temperature, before hatching. The larva that emerges is familiar to most people and widely known as a “wriggler,” due to its method of movement, a sharp side to side kicking action. It spends the greatest part of its time hanging head down and motionless from the water surface. During this period of apparent inactivity, the larva is, in fact, feeding upon microscopic animals and plants which it wafts into its mouth by means of special appendages. Throughout this time the larva breathes air through a small tube at the tip of its tail, hence the characteristic head-down, tail-up attitude of the creature. After a period of a week or two, by which time the larva is about three-eights of an inch long, it enters the third stage of its life cycle, the pupal stage.

The pupa is probably less familiar than the larva, a fact which could be attributed to the pupa’s rapid swimming powers when disturbed. It is unlikely, therefore, that one will be able to observe it for long in its natural habitat before it shoots off into the depths. It is from the pupal stage that the mosquito actually emerges. During the development period the pupa does not feed, but rapid changes take place within, until it finally splits along its back and the mosquito draws

Continued on page 416

THE AQUARIST
A DAY OUT
FOR THE AQUARIST

by Sonia Roberts

It is never easy to persuade the keen aquarist to spend spare time away from his, or her, own fish collection. However, the proliferating “zoo parks” of the U.K., well aware of the booming interest in fish-keeping, are themselves serving this interest by setting up, on a nationwide basis, aquaria centres which cover the full span of the hobby as well as exhibiting exotic species which are as yet beyond the scope of the home aquarist.

Since many of these centres are part of a general zoo or even in some cases a general entertainment complex—such as at the Tower Blackpool, offering pleasure activities from pony-rides for the toddlers to ballroom dancing for teenagers—every member of the family can also enjoy a day out while the aquaria addicts have their fun!

The West Country is an especially rich hunting ground in this respect. Aqualand, Beacon Quay, Torquay, has the largest collection of marine fish on exhibition in the U.K., and last year attracted some 100,000 visitors. It is a purpose-built aquarium sited on the ground floor level of the multi-storey car park thus eliminating the problem of where to put the vehicle while you study the fish.

A feature of the display is the generous size of the tanks which average 250 gallons and which include some 1,500 gallon tanks which, for marine specimens, are filled with natural sea water.

Largest specimen is Tiny, the three hundredweight loggerhead turtle which has frequently appeared on television, and this year a new penguin pool has been added.

Big strength of the aquarium, according to its curator, is the tropical-marine sector in which exhibits include trigger fish, scorpion fish, sea-horse and puffer fish. There is, however, also a section devoted to British marine life in which lobsters, eels, wrasse, pipe-fish and crabs can be viewed.

Aqualand is open from 10 a.m. to 10 p.m. from Easter to October, including Sundays and during the winter from 10 a.m. to dusk. Admission charges are 15p for adults and 7p for children. There is a novelty shop but no catering facilities.

Sister establishment to Aqualand is The Den, Teignmouth. This is a two storey purpose-built aquarium on the town’s central greensward area.

Prize exhibit here is the 9 in. long parrot fish of, as yet, a scientifically unidentified species which has been at the aquarium for two years. (Stress on tropical marine life and charges and entry hours as for Aqualand.)

Brixham Marine Aquarium provides a fascinating glimpse of the creature life around this popular resort fish centre. All the exhibits, which are returned to the sea in October when the aquarium closes for the season, are caught by local trawlers within a forty mile radius of Brixham.

Among the more spectacular specimens are local sharks and octopuses but there are also lobsters, ray, skate, mullet, mackerel and dogfish in tanks decked out with local sea anemones and coral. The live fish are backed up by displays illustrating the work of the local trawling fleets.

Open from 10 a.m. to 10 p.m. daily.

Plymouth Aquarium, The Laboratory, Citadel Hill, is in fact, a by-product of the Marine Biological Association of the United Kingdom although today 99 per cent of its tanks are devoted to creating exhibits of public interest rather than for research work. It receives some 90,000 to 100,000 visitors annually and among the more exciting current marine exhibits are locally caught stingray and octopuses. It concentrates on marine life from the Western Channel.

Open from 10 a.m. to 8 p.m. in summer and 10 a.m. to 6 p.m. in winter. Admission 7p, children half-price, with a well illustrated guide book available at 10p.

Paignton Zoo has a 39 tank aquarium showing tropical fresh-water fish and turtles including some large loggerheads and is part of the general tropical house complex for which a further 5p on the general admission charge of 30p for adults, half-price for children is demanded.

An attractive small scale aquarium can be viewed at The Harbour, Paignton and the charges for this Seashore Aquarium, which is open Whitsun to end September from 10 a.m. to 10 p.m., is 10p for adults, 5p for children.
Pensioners pay half-price admission, as do children to the Weston-super-Mare Aquarium and Mini Zoo by the Marine Lake. Price for adults is 10p and the aquarium is open from 10 a.m. to dusk throughout the summer.

Local and tropical fish are intermingled in the compact collection of the Exmouth Aquarium which backs up its tropical displays with an interesting exhibit of the shells of tropical marine life. Open from 10 a.m. daily, admission 10p.

John Dory photographed at Marine Biological Laboratories, Plymouth by D. Nicholson

It is the general policy of the zoo opened by Mr. C. H. Trevisick at Comyn Hill, Ifracombe, in 1950, to improve the level of pet animal keeping in this country as well as to put exotic animals on public display. Therefore, not only are the mixed aquaria live stock here, very generously housed spacewise, but the staff are prepared to chat, especially with juvenile visitors about improving their own home-management techniques. Open around the year 10 a.m. to dusk. Party rates for groups of visitors available. Admission 15p for adults, children half-price.

The North West
Seventy tanks concentrating on British marine fish living in natural seawater make up the Tower Aquarium, Blackpool. However, over the past three years this collection has been increased to include a display of both marine and freshwater fish from the tropics, now boasting some 320 species. They are especially proud of their 60 strong shoal of adult metynnis and have four pacus which, having been in the collection several years, have attained a length of 18 ins. Tank sizes range from 1,000 gallons up to 6,000 gallons in an attractive island site display.

Entry ticket is to Tower entertainment complex which offers all kinds of recreational facilities for all family members.

Marineland Oceanarium and Aquarium represents the first oceanarium to be built in Europe. As well as a wide selection of tropical freshwater and marine fish, the complex houses seals, turtles and alligators. There are performing dolphins and sea-lions and in season a number of tanks are devoted to the marine life of Morecambe Bay itself.

Admission 25p, children half-price and children under five free. Opening times 10 a.m. to 7.30 p.m. in summer, 10 a.m. to 4.30 p.m. winter.

Small collections of exotic fish can be seen at Birdland Aquarium, St. Anne’s Pier, Lytham St.
Annes, admission 5p adults, children half-price, hours 10 a.m. to 8 p.m., and at the Southport Aquarium, Marine Parade, Southport. The latter is conveniently near the children's "Peter Pan's Playground."

There is also an aquarium collection viewable at Southport Zoo where the facilities for handicapped visitors are especially praiseworthy.

Yorkshire

Opening a brand new aquarium section in the late summer of 1971 is the Flamingo Park Zoo, Kirby Misperton. The Curator here tells us that recognising the phenomenal growth in the keeping of the more easy tropical freshwater and marine fish at home, the emphasis of their new 14 tank display will be on the exotic: "the kind of fish which will extend the already keen aquarist's knowledge and inspire him to carry his own collecting into new fields." Already on order for delivery when the complex (which will ultimately be part of a tropical house set up containing birds, small mammals and equatorial plant life) is completed, are lung fish, climbing perch and electric cats. Concentration will be on freshwater types.

There is an excellent zoo for the aquarist with young children to visit as the grounds include a full-scale fair, a cowboy city with stage coach rides and picnic grounds. The car is well catered for, even to the extent of a filling station in the grounds. A house newspaper, Flamingo Park Gazette, priced at 2p explains the siting of all fish and sea mammal exhibits and publications on "Dolphins and Whales in Captivity" which additionally cover the sister collections at Dudley Zoo and Cleethorpes Marineland are available.

Admission 30p, children half-price, hours 10 a.m. to dusk; full catering facilities. Scarborough Zoo's Marineland section boasts a dolphin stadium seating 2,000 with seven "performances" a day. It has Europe's largest aquarium pool where visitors can watch the fish being fed by deep sea divers.

Admission 25p, children half-price, hours dawn to dusk.

Midlands

Aquarists who call at Natureland, North Parade, The Promenade, Skegness, get a specially warm welcome from aquarium curator Mr. Dales and will be given a tour of the back of the tanks and a chance to discuss the theories on aquarium lighting for better plant growth which this establishment has this year published in the International Zoos Handbook. Mr. Dales explains that the colour, number and quality of the filters has been constantly alternated in a very successful attempt to simulate the natural lighting conditions of many species.

This aquarium is, moreover, especially proud of its filtration methods which cleanse 6½ thousand gallons of sea-water intake an hour so efficiently that within 24 hours it can be used for tropical marine life. It supplies the research laboratories of Sheffield University as well as a number of other aquaria in the area with pure sea water and as well as its tropical marine fish, has the largest outdoor marine tank in Europe containing 20 cod weighing from three to 12 lb which, like the turbot, crab, plaice, etc., are hand fed at 3 p.m. each day by the diving-suited Mr. Dales.

Growing fish to giant size is something of a speciality at Natureland, where one of the prizes is the prize-winning lung fish, a first at the Belle Vue Aquaria Society show three years ago and presented by Mr. Joe Dernie and now measuring four feet long. There is a 600 gallon tank holding 50 Mozambique mouth breeders which tip the scale at 1½ lb each and another of Cichlids of super size and tinfoil barbs 12 in. long. The secret—says Mr. Dales—is feeding. Most such stock have, as regular part of their diet, trout-pellets obtained from nearby hatcheries.

There is also a full collection of the more conventional tropical and local marine and freshwater fish, one of the biggest invertebrates collections in the British Isles. A speciality of Natureland has been the hand-rearing of orphan seal pups abandoned on local beaches.

It is open from 10 a.m. to 7.30 p.m. in the summer and from 10 a.m. to 4.30 p.m. in winter. Admission: Adults 40p, children half-price. Party rates available for visitor groups.

There is an aquarium with mixed contents well worth a visit which is part of the Sherwood Zoo complex at Hucknall, Notts. Site of the establishment is on 17 acres of open parkland and to amuse the children there are rides, pet corners and a troupe of performing parrots.

Within Easy Reach of London

"Don't be misled by the apparently small size of the aquarium building, we have in fact quite a comprehensive freshwater collection" says the aquarium curator at Chessington Zoo, Surrey. There is an additional viewing charge of 2p over the normal zoo admission here and a feature of the collection are the tanks of red ear terrapins of the type sold through aquarist stores as pets.

Over the last two or three years the long-established Brighton, Sussex aquarium, on the south coast, has been completely remodelled and restocked. One of its more unusual exhibits is an otter colony which has been added to the established colonies of turtles, seals and seaions which have for many years been favourites with the visitors. Fish tanks hold a com-

March, 1972
prehensive selection of both marine and freshwater types of all sizes.

Pride of the establishment, however, is the recently built Dolphinarium which seats over 1,000 in a carpeted interior overlooking the 200,000 gallon warm sea-water pool. A concourse below water level provides light refreshments and an underwater view of the dolphins.

Dolphin displays can, of course, also be seen at the new Oxford Street, London, W.1, Dolphinarium, at Battersea Fun Fair and at the Windsor Safari Park.

Brighton Aquarium, Marine Parade and Madeira Drive is open daily including Sundays from 9 a.m. to dusk, admission 30p, children half-price.

Eastern Counties

Interest in aquatics on the part of the general public has this year encouraged Colchester Zoo to add a splendid new aquarium set-up to their natural parkland zoo. The overall aim, says director Mr. Frank N. Farrar, is to show healthy animals in congenial surroundings and thereby to encourage them to breed and the same basic approach will be adopted throughout the new aquaria areas.

Of special interest to children is the Harlow Town Park Pet's Corner. Admission here is free and normal domestic livestock and farm animals roam freely among the visitors while compact but comprehensive aquarium and vivarium facilities act as an inspiration to juvenile aquarist activities.

Mosquitoes

continued from page 412

itself out like a butterfly or moth from a chrysalis. This final act then completes the life-cycle.

It is the larval and pupal stages that makes a good live food for most species of fish, but some care should be exercised. The adult larva should not be fed to fish that are too small, as there is a real danger that in their enthusiasm to devour them, they may well choke. It is quite safe, however, to feed screened larvae, i.e. small ones sifted from the larger, and it will be found that these make an excellent rearing food. The anabantids appear to have a particular relish for the larger larva and will quickly come into breeding condition when given a liberal supply of them to feed upon. The pupae, because of their tougher outer coverings, may present difficulties to all but the larger fish species. The same precaution should therefore be carried out, and only those fish large enough to eat them should be allowed to tackle them.

The months of June to September are the time to look out for the above stages. If one goes armed with a net and a few sweeps of a pond's border are made, there should be little difficulty in gathering some. In my experience though, small containers such as water-butts, metal-tanks and even old saucepans, seem to yield the best catches. This is probably simply due to the fact that in a larger area of water the larva and pupae are more widely scattered, thus less are caught. When approaching likely places one should move with caution, as the slightest vibration or smallest shadow upon the surface will send them quickly to the bottom.

If larvae are present in numbers, a few decisive strokes just beneath the surface is all that is required; a few moments' pause between successive strokes will allow those missed to return to the surface and so possibly be caught with the next sweep.

The great advantage with mosquito larva as opposed to many live foods, is that they are not dependent upon dissolved oxygen in the water, but breathe atmospheric air (explained previously); thus considerable over-crowding of the catch can be achieved without the fear of mass mortality. Should too many be fed at once to fish, there will be no danger of oxygen shortage. A drawback that should be borne in mind, however, is that any uneaten larva may well be hastened through their development in a heated aquarium and one could easily have a fine hatch of mosquitoes when next the aquarium cover is removed.
THE ANGLERFISH

by Huw Collingbourne

It is hardly surprising that no one had found it, lying there on the sand in the pool. It looked like nothing more than a barnacle-encrusted rock, half buried in the sand. Even when dead its camouflage was perfect.

Upon closer examination the fish proved to have a tough dorsal skin, mostly grey but mottled with dark, nondescript colours approximating olives and browns. There were thorny projections on the back and several long, bony spines. The spine at the front of the head bore the vestiges of a fleshy appendage, identifying the creature as an anglerfish.

On the ocean bed the angler would hide amongst rocks or weeds where it would be perfectly camouflaged. Its first dorsal spine and vermiform lure would waggle about so that the lure would be the only conspicuous part and that would appear alive.

To a hungry fish, this would seem a lucky find indeed. But if any fish approached, the lure would be withdrawn at once and the angler’s cavernous mouth would open, suddenly swirling in a current of water and bringing the fish with it, of course.

Escape is impossible: many inward-pointing, needle-sharp teeth prevent anything leaving the mouth. Also, on the floor of the mouth is a bony palate with sharp ridges projecting inwards.

To preserve the dead fish, I placed it in a small, empty sweet-jar, filled with a 5 per cent solution of formalin. After the body had been preserved for some time, I was interested to note several white worms present also and another worm protruding from the anus. It seems the fish had been infected by intestinal worms and that these had been flushed out when their host’s body was pickled!
I walked into the pet shop, and he was the first thing that caught my eye—6 in. of majesty with a £12 price tag on him. Up to now my attempts at keeping marine fish had been rather dramatic. I had read the books, sought the little advice available but the fish still died. My longest success was a Sailfin Tang which lived for 4 months and was a reasonable size at 4 in.

At the time I had a 30-in. Juwel set-up with salt water and my 3 ft. SeAquarium Biosystem tank held my freshwater tropicals. I came to an arrangement with the shopkeeper and swapped my ozonizer (a piece of expensive equipment I consider unnecessary in a properly set-up tank) and on the 20th December, 1970, I became the proud owner of “Napoleon,” alias Acanthurus bleekeri. He ate, as soon as I put him into his cramped quarters, prawn, spinach and dry food. All went down the same way no matter how often he was fed. Because of his size it was obvious that the tropical fish had to go into another tank. This operation was carried out in an evening, the 3 ft. tank being washed, filled with gravel and water and allowed to stand for two days. Napoleon, on the second night, was introduced to his new home which he took to immediately, exploring every nook and cranny and enjoying his new-found freedom. His mouth, however, was badly swollen where he had bumped into the glass but on treatment with acriflavine on dried brine shrimp this disappeared in a couple of weeks. His next companions were a doctor wrasse and a domino damsel. The wrasse developed velvet after the introduction of a Xanthanus clown and both died leaving the damsel fish and Napoleon no worse for the experience. As Napoleon had nowhere to go at
night or when he was frightened, I made a retreat out of fibreglass which is his constant sleeping place and observation point. It was at about this time that he was put on a diet because he was getting very fat and he was fed only once a day instead of two or three times.

The next accident was when one of the tank coverslips slipped into the tank and, being frightened by the noise it made, he rushed about and cut his side very badly. I am sure that this affected me more than him as I had visions of fungus and other nasty diseases taking hold.

My next purchase was a parrot wrasse, and these three lived together until the damselfish went into the wrasse’s territory (a piece of coral where the wrasse slept) and there his life ended as he was trapped and torn to pieces. I arrived on the scene as the last blows were being delivered. The next two fishes were small butterflies, but they made the mistake of going into Napoleon’s cave and were each dispatched within a day with nasty bruises on their bodies.

It was about this time that Napoleon started to give up eating prawns. His diet consisted of flaked food and spinach as well as algae off the tank sides. I read in Mr. Cox’s book, Tropical Marine Aquarium, that these Surgeon fish mature at about 3 years. His strange and violent behaviour I put down to his coming of age. He has at least realised that he is a fully grown Surgeon fish and must stick to a vegetarian diet.

After a year he and a very quick wrasse are doing very well. He is now 8 in. long and still a bit podgy and can be easily hand-fed. His diet consists of Tetramin large flakes and brine shrimp (plus algae) and the wrasse has a supplement of prawn.

They live at a temperature of 80°F and the S.G. is 1.02. I change a third of the water every month and siphon the bottom gravel but so good is the under-gravel filter that hardly anything is picked up.

AN EXPERIENCE WITH FIGHTING FISH

by M. Murfitt (age 15 yrs.)

After a year of fishkeeping I was confident that I could look after fish other than guppies and swords. On 2/1/71 I proudly walked out of our local pet shop, clutching a brown paper bag with 42¢p worth of fish in it. When I arrived home I floated the plastic bag containing my latest possession into a two foot aquarium. Half an hour later my male Siamese fighter swam proudly out of the bag. This truly magnificent fish immediately swam into the plants and inhabited the flower pot, making my larger sucking loach homeless. After a couple of hours it had lost all of its shyness and swam happily round the tank with the others, occasionally showing off to the old guppy which got in its way.

Two weeks later I paid another visit to the pet shop and bought another fighter—this time a female. She was mainly blue, whereas the male was nearly all red. Two days later I put the female into the tank with the male from my community tank. Immediately he went wild and was displaying all his colours vividly; I switched off the light and left them to it after seeing the female hide in the plants.

When I came downstairs the following morning the male had built a small nest. After coming back from school I found he had destroyed the original nest and built a much larger one. He kept adding bubbles when he was not busy chasing the female, who had become battered by now. The next evening I came home to see my two fish breeding. I think that this will always stay in my mind after watching them in their embrace. I was quite amused when sometimes the male would be bent double and the female swam out of his grasp! The eggs, squeezed out by the male, fell towards the bottom of the tank where the male would dash after them, hold them in his mouth and put them in the nest. Whilst this was going on the female lay almost senseless at the top of the tank. During breeding the nest somewhat decreased in size. After about two hours the male began to attack the female, so I removed her.

The male was a good father, and he repaired the nest as well as enlarging it. Three days later the fry hatched. All that could be seen were little tails hanging out of the nest. As they fell out of the nest he dashed to them and blew them back into the nest. Alas, a few days later my luck ran out. After following the instructions on the Liquifry tube, I put two drops of the liquid food into the tank. Suddenly, all of the bubbles burst and despite the male’s frantic efforts to re-build the nest, all of the babies drowned. I think that the Liquifry must have affected the surface tensions of the water. I think that there could be a moral here—Let nature take its course.
THE AQUARIST

FISHKEEPING EXHIBITION

Once again the start of another show year is with us, bringing with it the hope that 1972 will continue the progress which has been evident over the past year with regard to the exhibits at Open Shows. Many open shows will be held throughout the year but without doubt one of the most interesting will be the Aquarist and Pondkeeper Fishkeeping Exhibition held in conjunction with the Federation of British Aquatic Societies at the Alexandra Palace on the 15th-16th July. All the family can enjoy the show, and there is ample parkland around the Exhibition Hall where the youngsters can play in safety. It is also ideal for picnicking. Should meals be required arrangements can be made through the Aquarist & Pondkeeper (write in for details). The cafeteria service is available throughout the show, and the bars are open during licensing hours.

With ample free car parking, the Alexandra Palace Exhibition hall is situated in North London within a short car ride of the North Circular ring road. This directly connects with the South Circular Road, the A1, A4, A10, A11, A13 and A40, and the M1 and M4.

The show this year is for two days only. The main reason behind this move is to encourage the aquarist to exhibit, it having been felt in the past that the three-day show was unpopular with the majority of exhibitors.

The tropical fish classes will be for both single fish and pairs, the coldwater classes being for single fish only.

Alexandra Palace and Park, photo: Aerofilms Ltd.

The Furnished Aquaria, Aquascope and Plant classes will again be to the fore, and from the evidence of previous years they should be well worth a visit to the Exhibition.

Judges for the Show will be invited from the Federation of British Aquatic Societies, Fancy Guppy Association, the Federation of Northern Aquarium Societies, Goldfish Society of Great Britain and the Midland Association of Aquarists Societies.

Specialist societies such as the British Killifish Association, Fancy Guppy Association, Federation of Guppy Breeders’ Societies, Goldfish Society of Great Britain, and the British Marine Study Society will be invited to exhibit displays.

These will be in addition to the various displays offered by the traders.

Willing enthusiasts will be required to assist in the breakdown of the show on Sunday evening. A number of volunteers have already offered their services, and if you are interested please contact the Show Secretary, Mr. Gerry Greenhal, 39 Garth Close, Morden, Surrey, who will be pleased to hear from you.

In conclusion, I should like to wish all the exhibitors, stewards, show organisers, etc., a happy and successful show.

C. A. T. Brown,
Chairman,
F.B.A.S. Show Committee.

Trade enquiries to - J. E. Young
The Aquarist and Pondkeeper, The Butts
Brentford, Middx. TW8 8BN Tel: 01-568 8441

THE AQUARIST

A young enthusiast admires one of the attractive displays at last year’s exhibition

420
Monthly reports from Secretaries of aquarists’ societies for inclusion on this page should reach the Editor by 5th of the month preceding the month of publication.

MEMBERS elected at the recent annual general meeting of the Ruddersfield T.F.S. were as follows: Chairman: Mr. J. O’Sullivan; Vice-Chairman: H. D. Rose; Secretary: Miss H. G. Morgan; Committee: Mrs. A. B. Birkett, J. R. Bower, J. T. Bland, A. H. Bower, A. B. Bower, Mrs. J. B. Bower.

ELECTIONS at the recent annual general meeting of the Cotswold Aquaria Club were as follows: President: J. Phillips; Treasurer: W. Harr; Registrar: Miss H. Morgan; Committee: Mrs. A. B. Birkett, J. R. Bower, J. T. Bland, A. H. Bower, A. B. Bower, Miss H. Morgan.

OFFICERS elected at the annual general meeting of the Coventry Aquarium & Aquarists’ Society were as follows: President: J. Phillips; Secretary: W. Harr; Committee: Mrs. A. B. Birkett, J. R. Bower, J. T. Bland, A. H. Bower, A. B. Bower.

THE TONBRIDGE & A.A.S. have had a varied programme recently. Visitors have included the proprietors of The Hive Aquarium, who took part in a series of questions and answers and included three Cichlid classes, R. A. Dodkins, B.A.P.A., who gave an enlightening talk on Cichlids, and brought along a large assortment of fish, and brought along A. Harris, B.A.P.A., of Redhill, Surrey.

Members have also been entertained by a visit to Fishes of Kent, hired from H. C. S., and a talk on Dwarf Cichlids by the proprietors, R. W. and J. E. P. They included T. Amos, R. Baker, J. Bellingham, R. Taylor and J. W. B. and their classes were as follows: Class D: Mrs. E. Bellingham; Class C: R. W.; Class D: J. Bellingham; Class E: J. Bellingham; Class F: J. Bellingham; Class G: J. Bellingham; Class H: J. Bellingham; Class I: G. B. Davenport; Class J: (O.T.): K. Shorrock.

The British Aquarist Study Group (B.A.S.) have held their next meeting on 26th March. This will be held as usual at the Fellows’ Lectures Hall, London Zoo, Regents Park, on 22nd April. At the opening the return of Mr. G. Hennings was welcomed. He will talk on the care of the difficult Characins. He is one of the most successful keepers of Characins in this country. A warm welcome is extended to anyone who wishes to come along. Tickets are 45p each and this cost includes light refreshments. Remember to bring along a talk by a second speaker. Tickets are available at the front desk of the Zoo at Old Hill, Woking, Surrey. Following meetings for the year will be on 13th May and 7th October.

For this year the officers of the Bristol A.S. will be as follows: President: H. Jago; Vice-President: J. Phillips; Treasurer: W. Harr; Registrar: Miss H. Morgan; Committee: Mrs. A. B. Birkett, J. R. Bower, J. T. Bland, A. H. Bower, A. B. Bower, Miss H. Morgan.

From AQUARISTS’S SOCIETIES
hobby particularly in the last few years. In reply Mr. Eason said that it was an achievement to reach the age of majority as many aquatic societies founder long before this period.

OFFICERS appointed for the Hall A.S. this year are as follow: President: R. Collingswood; Vice-President: G. Rooke; Secretary: S. Turner; Treasurer: D. Hartland Clare, Brussels Hull. Tel. 82223: Assistant Secretary: Mrs. B. Batch; Show Secretary: G. Andrews; Church Mount, Sproston, Hull. Tel. 811134: Assistant Show Secretary: Mr. F. B. Batch; Chairman: T. Douglas; Vice-Chairman: T. Hartland Clare; Librarian: J. Fawcett; Treasurer: G. Batch.

MEMBERS of the Hounslow and District A.R. were disappointed to hear that the speaker booked for the December meeting, Mr. A. R. Allen, was unable to come along.

Three of the members volunteered to do a short talk on different subjects to fill up the gap. Mrs. R. Breese spoke on Pondea fish, their breeding requirements and habits and the feeding and rearing of the young fish. This was followed by a talk on Gouramis given by H. F. Pratt, with special reference to the amusing antics of a large Orangefin owned by him. This led to a discussion on various gouramis. Lastly H. Parke gave a most interesting demonstration on building all glass aquaria, showing the members the correct way to go about it. This aroused much interest amongst the members.

SOME very interesting films were shown by Mr. Medved of the Knightsbridge Cinema Club in connection with the Harrogate Aquaria Association. The show was well attended. The main item of the evening was the showing of the film "The Inland Sea," made by one of the members. The film was about the process of making a pond and the various activities associated with it. It also showed the life cycle of the fish and the different stages in the care of the fish. The film was well received by the audience and was followed by a question and answer session. The evening concluded with the usual film of the Harrogate Aquaria Association and the film of the same name was shown again.

THE annual general meeting of the Harrogate Aquaria Association was held on Friday, 8th March. The meeting was well attended and the business was conducted in a most business-like manner. The Chairman, Mr. T. R. Batch, in his report, said that the society had made considerable progress during the past year. He thanked the Committee for their hard work and the members for their support. The report was unanimously adopted. The Treasurer's report was read and approved. The Committee's report was read and adopted. The accounts were also approved.

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IN January an Inter-Club Show and Quiz was held at Dunmow between Dunmow and Newport. The results are as follows: Dunmow won the Quiz by one point. The show was won by Dunmow. Best fish of the show was a Stickleback Barred Won by Mr. R. Thoday, of Dunmow. The judging was by Mr. J. Thomas of Combridges. There was an attendance of forty-five people.

AT the January meeting of the East Kilbride Aquarium Club, Mr. Norman Grant, the Club President, judged the table of Guppies, and a novelty class which consisted of any container set out in a humorous or attractive design. Mr. Grant then gave an excellent slide show of Freshwater fish which was enjoyed by all. The results of the table show were as follows: Senior Guppies (male): 1, A. Lyons; 2, J. Finlay; Guppies (female): 1, A. Lyons; 2, A. T., time given; 3, K. Novello; 1, J. Thomson; 2, J. Finlay; 3, J. A. H. Johnson. Senior barbs: 1, D. Watson; 3, K. McKenzie; 4, N. Murtough. Guppies (female): 1, G. Graham; 2, M. Wish; 3, D. Watson. Novelty: 1, K. McKenzie; 2, S. Thomson; 3, J. Thomson; 4, N. Murtough.

* * *

OFFICIALS for 1972 of the Hartlepool A.S. are as follows: Chairman, J. Baldock; Assistant Chairman, C. Corbin; Secretary, D. Barber; Show Secretary, J. Watson; Treasurer, H. E. Sinden; Hon. Member, J. Chamberlain; Treasurer, J. Williamson; Press Secretary: R. Stephens. All meetings are held on the first Wednesday of each month. The Officers are always welcome.

AT the annual general meeting of the Chelmsford A.S. the following officers were elected, Chairman: G. C. Allen; Secretary: W. H. Willoughby; Treasurer: M. J. Thomas; Barbs: 1 and 2, K. Turner; 3, T. Heath.

ARRANGEMENTS are now being completed by the Tottenham and District A.S. for the show to be held on Saturday, November 3rd, 1973, at 2-3 April, but this did not detract from the most pleasant and enjoyable day given by Mr. W. B. E. Mansfield when discussing "The Fish House." It was so enjoyable that he has been asked to give the Society another evening to discuss the subject. His reflection on feeding, playing, water conditioning, setting up of breeding tanks, condition of fish, and the feeding and raising of fish. He also judged the Table Show for Cichlids. In the Large Cichlid Class Mrs. K. Dainty was awarded first place and J. Dunnai took second and third places. Mrs. Dainty was also awarded first place in the Dwarf Cichlid Class with A. Taylor taking second and third places.

Members and visitors were told of a visit to London Zoo arranged for April to which the response was so good that almost half of the members and visitors responded almost immediately. They also heard that the Furnished Home aquariums would be judged by A. Robinson, and that Wetheringborough A.S., who usually turn in force on such occasions, have accepted an invitation to visit Kettering for the March meeting for an Inter-Society Table Show.

* * *

OFFICERS and committees of the Kilsby A.S. were elected to stand for the next six months as follows: President and Editor: H. Smith; Vice-President: G. Crossley; Secretary: Mrs. N. Flood; Treasurer: T. Williams. Assistant Treasurer and Raffle Steward: Mrs. O. G. Tyler; Librarian: M. A. P. Saunders; Trophy Steward: Mr. Brown; Junior Representative: A. D. Smith; Librarian: Mrs. G. August; Mrs. G. March, Mrs. H. H. Mumby, Mr. H. Mumby, Mrs. H. Mumby.

THI the January Meeting of the East Midland Group of the British Aquarists' Association held its Autumn meeting at the Midland Hotel, High Bullen, on the 2nd Tuesday of each month. The meeting was shown by slides and shown by photo groups on some of the best marine fish fish had seen for a long time. In the near future, it is planned to do some work together with a diving club, which will be very good for the B.A.A. The night ended with a general discussion.

A slide show and tape by C. A. T. Brown entitled "Fishing" were the main events at the January Meeting of Stevenage A.S.

The February Meeting was very well attended and a very interesting talk on filtration was given by G. S. Adams of Harrods Trophies. The next meeting is 1st March at 8 p.m., Redhill Community Centre.

* * *

THI February meeting of the Weymouth and District A.S. attracted a record attendance. Highlights of the evening were a demonstration and talk by T. Harman entitled "The Furnished Aquarium" and K. Forrester's "Twenty Questions" with Peggy Carter, A. Billington, E. Jones and A. Worth on the panel.

Table Show winners were: Male Guppies: 1, J. A. Worth; 2, E. Jones; 3, M. Medway. Female Guppies: 1, J. A. Worth; 2, E. Jones; 3, M. Medway. Extra Points went to J. A. Worth, E. Jones and A. Billington. The next meeting will be on 7th March at the North Somerset Hall, Weston-super-Mare, when the Table Show will be Corridors and A.O.V. Caiman.

A very full programme is being arranged for the year and many of the newer members are coming along well with their Guppy breeding. J. Regan has attained his Silver Badge and evidence of the improved standard is shown by the fact that three Silver awards were made at the Table Show. New members and visitors are very welcome on the fourth Sunday of every month at the Bede Centre, Abbeyfield Road, S.E.16 at 3 p.m. There is a Table Show at every meeting where some really good Guppies may be seen and always an interesting and informative programme. The Secretary is always pleased to receive letters or telephone enquiries, H. C. Brock, 20, Barnard Crescent, West End, Woking, Surrey. Telephone: Chobham 8783.

OWING to difficulty in finding suitable accommodation for the Table Show, the Annual Meeting was held at 7th March at the North Somerset Hall, Weston-super-Mare, on the fourth Sunday of every month at the Bede Centre, Abbeyfield Road, S.E.16 at 3 p.m. There is a Table Show at every meeting where some really good Guppies may be seen and always an interesting and informative programme. The Secretary is always pleased to receive letters or telephone enquiries, H. C. Brock, 20, Barnard Crescent, West End, Woking, Surrey. Telephone: Chobham 8783.

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THI January Table Show of the Carnforth and District A.S. was very well attended and an interesting talk was given by Mr. G. Tomkins. The class was A.V. Tropical Fish. Placements were as follows: 1st, Mr. J. Smith; 2nd, Z. A. M. Richardson; 3rd, I. H. H. Murray. The Society would like to thank Mr. Tomkins for his kind offer to hold the 28th January and help to make it a great success.

TWO meetings were held in January for members of Grimsby and Cleethorpes A.S. At the first on the 1st, R. Goodfellow, of St. Helens, gave a very interesting talk on all the fish that are safe for the aquarium and Mr. A. J. Howlett, of Newcastle, gave a slide show on class winners of open shows. Table Show was won by J. S. Lees; 2nd, R. Evans; 3rd, J. C. Robinson. A.V. Tropical Fish was won by B. L. Palletts (Female): 1 and 2, D. Kirk; 2, B. L. Palletts (Male): 1 and 2, S. R. Atkinson. The next meeting is the 28th January and held to make it a great success.

OFFICIALS elected at the annual general meeting of Torbay A.S. were as follows:
Chairman: M. Matthews; Vice-Chairman: F. Orme; Hon. Secretary: F. J. Deming, 299, Teguino Road, St. Marychurch, Torquay TQ1 4RT; Show Secretary: J. R. Beag, 26, Jordis Bred, Bucktenhjul, Devon; Hon. Treasurer: J. Spence; Magazine Editor: R. Barnes; Librarian: Mrs. F. Matthews; Social Secretary: Mrs. O. Brown; Auditors: J. Davis and G. Otley; Committee: Mr. M. Poole and Mr. T. Bowhay, Master C. Tolscher (Junior member).

THERE was a record attendance of nine hundred and eighty-two at the meeting of the St. Andrews and St. Leonard's A.S., held at the Cornwall Hall, Penzance, on 1st and 3rd of September, 2023. The meeting was chaired by Mr. T. Bowhay, Master C. Tolscher (Junior member).

THE following officials were elected at the meeting: Chairman: J. R. Beag; Vice-Chairman: J. Barnes; Treasurer: R. Trowbridge; Secretary: J. Crooke, 64, Milton Drive, Bideford Wood, Herts; Telephone: 01485 89785. Show Secretary: D. Hostell, 35, Kendux Drive, Bideford Wood, Herts. Telephone: 01485 99350.

The meeting included discussions on various topics related to the aquarium hobby. The speakers and discussions covered a wide range of subjects, including the history of aquatics, the latest developments in fish husbandry, and the importance of sustainability in the aquarium trade. The meeting was well received by all those in attendance.

The table was set for an evening of merriment, with a variety of refreshments prepared. The attendees were treated to a variety of cakes and pastries, which were enjoyed by all. The evening concluded with a farewell toast, led by Mr. T. Bowhay, Master C. Tolscher (Junior member).
NEW SOCIETIES

A new society has been formed in the Goose Green area, and will be known as the Goose and District A.S. Officers are: President, A. G. Smith; Hon. Secretary, Mrs. J. Jervis; Hon. Treasurer, Mrs. E. B. Holderness.

The Leytonstone and Stratford District A.S. now has a membership of about thirty. The society meets at the Broadway Club, Writtle Road, Leytonstone. The Chairman, R. J. Logan, welcomes all new members who wish to join. The society is affiliated to North East London area group.

A new Aquatic Society has been formed in Walthamstow, called Echorum Aquatic. Activities are held on the third Tuesday of every month at the Woolpack Hotel, Pesham Green, Leyton. Correspondence from other societies is welcomed. Details of membership, etc., from the Secretary, Mrs. H. Stover, 45 Hamilton Court, Teviot, Holly Bank, Walthamstow.

Officers elected at the newly-formed Newbury and District A.S. are: President, J. E. Gough; Vice-President, C. G. Smith; Hon. Secretary, Mrs. N. A. Smith; Hon. Treasurer, J. L. Smith; Other Committee members: R. G. Gough, J. E. Gough, C. G. Smith. All new members will find a warm welcome in the society. All correspondence is welcome.

Welewyn Garden City A.S. meet at "The Scout Hall", Great North, Welwyn Garden City, and hold their first and second Monday of the month at 8 p.m. Chairmen: M. Graham; Secretary: Mrs. N. A. Smith. Further details from the Secretary, Welewyn Garden 29666.

A new Society has a growing membership and new members are always welcome. Details can be obtained by writing or telephoning the Secretary, for further details.

SECRETARY CHANGES

Torbury A.S. F. J. Denning, 279 Teignmouth Road, St. Mary’s, Torquay TQ1 4RT.

Leominster and District A.S., Mrs. M. Snowdon, "Asgard", 20 St Margaret Road, Leominster, Hereford and Worcester.

Half Moon A.S. R. Green, 6 Robson Street, Southend, Essex. Tel: 561059.

Cheshunt and District A.S. B. Kerry, 153 Borrough Road, Cheshunt.

Riverside A.S. P. Maslin, 26 North Court, Tiverton, Exeter.

Whitby A.S. M. Rodgers, 34 Swaledale Avenue, Seaton Delaval, Northumberland.

Harrogate and District A.S.: D. Taylor, 1 Ashgrove Road, Edgar Gate, Yorkshire HG1 0BF.

Norwich and District A.S.: R. G. Green, 64 Furtherfield Avenue, Norwich.

Kidderminster and District A.S.: J. G. Wilkin, 56 Comberton Road, Kidderminster, Worcestershire DT1 6BP.

Peterlee and District A.S.: A. D. Bubblington, 40 Marlborough Road, Peterlee.

SECRETARY’S ADDRESS

Mrs. S. Kimbley, 35 Wansford Park Road, Ilfracombe, Exmouth.

AQUARIST CALENDAR

1972

5th March: Keighley A.S. Annual Open Show.


19th March: Tall Timbers A.S. Annual Open Show, High Street, Wollaton, Nottingham.


3rd April: Southport A.S. Annual Open Show, The Town Hall, Southport.


24th April: Gosport A.S. Annual Open Show, The Town Hall, Gosport.


22nd May: Carmarthen A.S. Annual Open Show, The Town Hall, Carmarthen.

29th May: Aberystwyth A.S. Annual Open Show, The Town Hall, Aberystwyth.

5th June: Isle of Wight A.S. Annual Open Show, The Town Hall, Ryde.

12th June: Isle of Wight A.S. Annual Open Show, The Town Hall, Ryde.

19th June: Isle of Wight A.S. Annual Open Show, The Town Hall, Ryde.

26th June: Isle of Wight A.S. Annual Open Show, The Town Hall, Ryde.


10th July: Isle of Wight A.S. Annual Open Show, The Town Hall, Ryde.

17th July: Isle of Wight A.S. Annual Open Show, The Town Hall, Ryde.

24th July: Isle of Wight A.S. Annual Open Show, The Town Hall, Ryde.


7th August: Isle of Wight A.S. Annual Open Show, The Town Hall, Ryde.

14th August: Isle of Wight A.S. Annual Open Show, The Town Hall, Ryde.


21st May: Yeovil & D.A.S. Open Show, The School Hall, Church Street, Martock, N. Yeovil. Show secretary: Mr. P. Knight, 5 Hill Terrace, Boweswater, Martock, Somerset.

27th and 28th May: Fancy Guipsey Association International Show at the Globe Farm Community Centre, Gilea Farm Road, Stubbington, Berkshire, 33. Open to viewing Sunday, 26th, 3 to 5 p.m. Show secretary: D. R. Beckett, 17, Pelmore Close, Woodrow South, Redditch, Birmingham.

28th May: Cotley and District A.S. Open Show. Sunday, Cotley Civic Centre. Further details will be available shortly.

28th May: Boston A.S. Open Show, Blackford Hall, Boston and Skegness. Show secretary: Mrs. J. D. Robinson, Lincolns. Details from S. Noble, 175 Wood Road Farm, Boston, Lincs.

4th June: Half Moon A.S. First Open Show to be held in the Hall, Petersham Club, Harrott Hill, Bingham, Essex. Schedules available from show secretary, Mrs. M. Wadstock, 133 Lammack Road, Blackheath, London.

4th June: Lahore and District A.S. Annual Open Show to be held at the Lahore Civic Centre, Granary Hall, Lahore. Show secretary: T. J. Parry, 1, New Street, Lahore.

4th June: Nelson and District A.S. fourth annual tropical fish show. Further details and show schedule can be obtained from the show secretary, Mr. H. Kuhns, 44 Sover Street, Lincoln.

4th June: Accrington and District A.S. Annual Open Show to be held at St. Peter’s Dance Hall, Bredbury Bridge, Accrington. Show secretary: Mrs. J. A. Walsh, 113 Lammack Road, Blackheath.

4th June: Lytham and District A.S. Annual Open Show to be held at the Lytham Civic Centre, Grayshott Hall, Lytham. Show secretary: T. J. Parry, 44 Sover Street, Lytham.

4th June: Lancaster and District A.S. Annual Open Show to be held at the Lancaster Civic Centre, Grayshott Hall, Lancaster. Show secretary: T. J. Parry, 44 Sover Street, Lancaster.

4th June: Preston and District A.S. Annual Open Show to be held at the Preston Civic Centre, Grayshott Hall, Preston. Show secretary: T. J. Parry, 44 Sover Street, Preston.

4th June: Ealing and District A.S. Annual Open Show to be held at Ealing Civic Centre, Grayshott Hall, Ealing. Show secretary: T. J. Parry, 44 Sover Street, Ealing.

4th June: Westminster A.S. Annual Open Show to be held at the Westminster Civic Centre, Grayshott Hall, Westminster. Show secretary: T. J. Parry, 44 Sover Street, Westminster.

4th June: GKN Ford and A.S. Open Show to be held at the GKN Ford Works, Darlaston, Stourbridge. Further show details available from Ken Barrow, 52 Ford Street, GKN Ford Works, Darlaston, Stourbridge.

4th June: Shrewsbury Civic Centre, Darlaston, Stourbridge. Directions can be obtained from Ken Barrow, 52 Ford Street, GKN Ford Works, Darlaston, Stourbridge.

4th June: Port Talbot A.S. Open Show to be held at Port Talbot, Gower Street, Port Talbot. Show secretary: T. J. Parry, 44 Sover Street, Port Talbot.

12th August: Annual Open Show of Portsmouth A.A. at the Portsmouth Community Centre, 12th August, Portsmouth. Show secretary: J. L. Berry, 74 Lymedown, Coler St, Rodfield, RMS 2QT. Tel: 70-67104.

9th July: Lowestoft A.S. Show, University, Lowestoft.

12th August: Plymouth A.S. Open Show at Plymouth Civic Centre, Plymouth. Show secretary: J. L. Berry, 74 Lymedown, Coler St, Rodfield, RMS 2QT. Tel: 70-67104.

2nd September: Yate and D.A.S. Open Show at Newman’s Farm, Yate, Nr. Chipping Sodbury, Glos. Schedules from show secretary, Mr. C. M. Emery, 134 Sodbury Park, Yate, Glos. Tel: C. Chipping Sodbury 319644.

2nd September: Brightholm Green A.S. Open Show at Full details later.

3rd September: Whitley Bay A.S. Open Show to be held at the Empire Ballroom, Whitley Bay. Show schedules will be available at a later date.

3rd September: Peterlee and District A.S. Annual Open Show at Edith Hall Community Centre, Peterlee. Schedules will be obtainable from A. D. Bebbington, 40 Marcliffe Road, Hevington Hill, Sunderland.

5th September: Weymouth & District A.S. Third Open Show, Small Sidney Hall. Details from R. E. Jones, 11 Lashow Road, Weymouth.


9th September: Barnsley T.P.S. Open Show at the Maplerigg and Staincross Village Hall, Maplerigg, Barnsley.

11th-16th September: Bristol A.S. Open Show, St. Michael’s Parish Hall, Bishopston, Bristol. Details from H. C. B. Thomas, 3, Greve Park, Bristol, BS6 7P.

15th September: Herstmonceux and District A.S. Annual Open Show will take place at the Herstmonceux Castle, Herstmonceux, Tel: Herstmonceux 7896.

16th September: Lowestoft A.S. Show will be held at The Tower Quay Church, Lowestoft.

16th-17th September: Etal & District A.S. Open Show at the usual meeting place: Northallerton Community Centre, Northallerton, W.13, Tel: 70-67104.

1st October: Birling and District A.S. Open Show to be held at the usual meeting place: Northallerton Community Centre, Northallerton, W.13, Tel: 70-67104.

28th January: Norwich A.S. Open Show to be held at the Norwich Civic Centre, Norwich. Show secretary: W. H. Smuts, 60 Swains Road, Norwich.

29th October: Doncaster and District A.S. Third Open Show.

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The British Aquarist Festival

Will be held this year at Belle Vue Zoological Gardens Manchester on Saturday 14th October and Sunday 15th October.

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THE BRITISH AQUARIST FESTIVAL