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Comments and Quotes

- Fish that soothe (other fish)
- What attracts eels to rivers
- Pests can be useful
- Marine national parks
- Oil pollution

Tranquillity is Catching

THE value of the aquarium as a soothing influence in the dental or hospital waiting room is a well-accepted phenomenon. The human animal finds his fears lighten as he watches the inhabitants of the aquatic world moving serenely about. Rather more bizarre is the news that the sight of a tankful of fish also allays the fears of other fish.

The need to soothe an animal's fear is a very real problem to scientists studying animal behaviour. The results of ethological studies on courtship and aggressive behaviour, for instance, would be seriously affected if the animals being studied were prevented from behaving absolutely normally by fear of their surroundings or of the presence of the observer. Fish in tanks kept in busy surroundings usually come to accept the outside disturbances and settle down to normal patterns of behaviour. However, Dr G. W. Barlow of the University of California, Berkeley, studying cichlids, noted that his fish were much more fearful on Monday mornings after a weekend in a deserted laboratory, and how they settled down again after a day in which a few thumps on the tank and movement in front of it had occurred. Experimenting further, Dr Barlow found that if his cichlids could see other fishes swimming calmly about in the well-established tank, although they were of different species this had a calming effect on the experimental fishes.

Dr Barlow believes that if this applied to a wider range of animals and those more difficult and expensive to work with than fish, it may be that one batch of animals, such as a tankful of fish, already acclimatised to laboratory conditions, and quite unfraids, could be used in future to quieten the nervous ones. At present, these either have to be allowed a long 'settling in' period or studied behind screens; and neither method is entirely satisfactory. In the one case the animals become quite tame but far too interested in what is going on in other parts of the room, or if kept in an apparently empty room become aware of the slightest activity or sound from behind the screen or from the lone observer.

Eels Nose it Out

IT is known that one of the ways in which a fish might recognise a certain river or stretch of water that it had inhabited before is by smell, of water plants present in the area for example. This is one explanation for the ability of salmon to return from the sea to rivers in which they were originally hatched. A report this year from the Fisheries Research Board of Canada shows that use of the same kind of sense can influence fish behaviour in another way.

Young eels ascend rivers from the sea and although it might be thought that the change from saline to fresh water is what the eels seek and react to, experiments by Dr S. G. Miles of Dalhouse University,
Welcome to New Readers

IF you are seeing PETFISH MONTHLY for the first time as a result of a visit to The Aquarium Show in London this November we would like to welcome you to our readership. As the only British magazine whose pages are devoted solely to the hobby of keeping fish we know you will find plenty to interest you and of practical help for you in this and every issue. PETFISH MONTHLY can be ordered through any newsagent or will be sent to your home each month for £1.50 yearly (17s 6d for six issues) if you let us have your name and address. If fish-keeping is your interest you cannot afford to be without PETFISH MONTHLY.

Mr H. W. Bowler

WE announce with regret the death of Mr H. W. Bowler, which occurred suddenly on 9th October.

Mr Thomas Horeman writes: 'Bill' Bowler, who was in his sixties, had been in the aquatic trade for some thirty-odd years, and was actively concerned as co-director with his son in the administration of Scanco up to the time of his death. Originally Bill owned a retail pet shop at Southampton, and from this emerged the progressive development of a specialisation in aquatics. This was a natural result of his recognition of and desire to encourage the enthusiastic and absorbing interest in this field shown by his son Eric from an early age. In 1953 as South Coast Aquatic Nurseries Ltd. father and son developed London's Aquarium on the Festival of Britain site at South Bank, with Eric as curator. One result of this was accumulation of experience in the importation of fishes and especially the importing and aquarium maintenance of marine tropicals. An aquatic plant nursery at Parkstone, Dorset and business premises in south London preceded the building of the now well-known Colnbrook, Bucks. fish houses of Scanco for the large-scale importation and distribution of fishes and equipment. Bill Bowler was always ready to help newcomers to retailing with advice and had the best interests of the aquatic trade at heart. To his widow, Flora, and their son and daughter, the condolences of us all are sincerely offered.
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Flowers in the Tank

JUST recently one of my Sagittaria flowered and perhaps my information will help R. Bourne of Southport (PFM, October). Exams for the past couple of weeks and swotting for a few weeks before mean my tanks have been rather neglected, resulting in a light covering of mulm over the plant roots and the rest of the tank. Tank lighting is two 60 watt bulbs, one at each end, but I had a covering of floating Indian fern. I find that if you let your tank get along itself without too much 'interference' the plants get on better; some growers of land plants find this also!

Glasgow, E.3

R. ALLAN

Discus Fish

I HAVE purchased eight discus and would like to get in touch with others interested in the same fish; and with importers or people who might have a pair of large ones to sell as the ones I have got are only 1 inch in diameter.

Brighton, Sheffield

A. WILLIAMS

Who Doesn't Know, Doesn't Care?

THIS is in reply to charges made against all fish hobbyists in general, in the quote published in the August issue of PFM (Comments and Quotes) from a pet-trade journal, and in response to 'Don't Know, Don't Care' in the last (October) issue.

Yes, indeed, every retailer is bound at some time or another to meet such an individual as portrayed in the extract mentioned, during the course of his everyday business. We have all met the odd idiot, the self-important, the know-all, the fellow who makes a nuisance of himself generally, but we don't go around pointing the finger of suspicion in the direction of all members of the community. Mr L. B. Katters has indeed made quite an indictment against my fellow aquarists and the hobby in general. I therefore take this as a personal affront, and in defence I submit the following.

Mr K., in the nearsightedness of his observations, has overlooked some very valued evidence. To wit—has it ever occurred to him to look in the other direction? Is everything he sees in his own and fellow traders' establishments beyond reproach? Has he never seen a diseased fish sold to an unsuspecting customer? Has he never seen predatory fish sold to a young aquarist as suitable for a community set-up? Has he ever seen, as I have, fish purchased from a society member at 3s per pair and sold within minutes to a member of the public at 30s for the pair, as supposedly direct imports from America at considerable expense?

I know full well these are isolated cases, and are not representative of the general aquatic trade. I would not dream of suggesting otherwise. Does the general aquatic trader pay a fair price for fair quality? Does he consider 150% a reasonable profit for no outlay whatsoever other than the purchase price. One can understand the dealer endeavouring to cover his losses on imported stock—

I believe the mortality rate is quite high, but this is not the case with local-bred fish. I have seen 9d paid for black mollies and next day saw them marked up at 2s 6d and 3s. Is this giving the club member a fair deal?

I think not.

As to the attack on members of clubs who sell stock from their homes, I would submit that it is their right and, indeed, privilege so to do and thereby recover some of the running costs. I do not believe that this, in any way, damages the aquatic trade or club activities.

PFM—in reply to this indictment, our plea is NOT GUILTY.

Birmingham

PHIL JINX

Age for Line Breeding

IN reply to the letter by Mr P. Jinks, published in your September issue, I must state that I have not yet found a sterile female, but accept that keeping my female guppies virgin for 9 months may be the cause of some trouble. I’ve had twice recently—females due to have a fourth or fifth batch dropping infertile eggs. I intend to modify my approach and start with females 4-5 months old, but I will continue to use only older males.

I accept that, with a good strain, true line breeding by the methods advocated by Mr Jinks and Mr Unwin is practicable, but improving the strain is impossible without selective breeding between fish old enough and big enough to allow the best to be selected. By any other means the breeder will be lucky indeed if his tanks do not end up like those described by Arpee in Personal Comment (September, PFM). While this cannot have happened to Mr Jinks, whose fish have been breeding true for 10 years, the line cannot have improved either.

Tonbridge, Kent

IAN T. MATHEBON

When White Spot Comes

I HAVE carried out some experiments over the last few years. I hope you do not think it is egotistical of me to pass on my findings as I am only a very amateur aquarist.

I have, during these experiments, tried to induce white spot by poor feeding, to lower the fish’s resistance, and then by chilling by sudden drop of temperature, as much as 12°. I have done this with the two species I think are the most susceptible to infection—Hemigrammus ocellifer (beacon fish) and Botia macracantha (clown loach). During the experiments I have never let the subjects come in contact with wild food of any description, feeding only with dried food, chopped meat, tinned peas etc.

Although I have succeeded in killing a few specimens, I have never been able to induce white spot in spite of the appalling conditions the fish were subjected to. In fact, the only times I have any of my tanks infected with
white spot is on the introduction of new stock. Even then I find it is nearly always wild stock, very rarely home-bred fish.

This leads me to the conclusion that, in spite of what a lot of text books and dealers say, unless the protozoan itself is introduced there is no white spot.

Walworth, London, S.E.17

MRS M. E. BOCHIE

Show Delays

I WOULD like to comment on the letter from Mr R. Buller (PPM, September) in which he remarks that the judging of open shows is taking much longer these days, and queries whether this is because the fishes benched are of a higher standard, or the classes are becoming too large. I feel it is a case of both being true. Fishkeeping today, is perhaps regrettable, becoming more and more of a competitive hobby, and it therefore follows that support given to open shows is increasing, and that the standard of support on the show bench is also increasing in order to offset this additional competition.

I feel quite sure that Mr Buller, or any other exhibitor for that matter, would not want to see a 'rushed job' done of the judging, as this, in turn, would considerably lower the standard of judging itself, and probably cause much more discontent to the exhibitor than having to wait longer to see the results.

A society itself is by no means a disinterested party to the question of the completion of judging on time, as the earlier the judging is completed the more opportunity the society has of attracting members of the public to its exhibition, thus providing extra revenue.

In many instances the delay in opening a show to the public can be attributed to the exhibitors themselves. To take an example, the 1967 Newport A.S. Open Show allowed for the benching of exhibits between 9 a.m. and 12.30 p.m., and due to the great volume of entries that came in during the last quarter of an hour of the official benching time, we were still in the process of benching exhibits at 1 p.m. I am deeply appreciative of the fact that some exhibitors travel long distances to attend open shows, and I would certainly not expect anyone to commence their journey at some unearthly hour of the morning in order to bench exhibits at 9 a.m. However, it would indeed seem that the latecomers are nearly always aquarists who live within close travelling distance of the show venue, and have no difficulty with transport, time off work etc.

It also sometimes happens that exhibitors who are travelling long distances to the show are held up for reasons that are no fault of their own—traffic jams, train delays etc., and are unable to reach the show hall until judging is nearing completion. What is one to do in these circumstances? Are we to refuse to accept the entries? Surely any self-respecting society would, if possible, arrange to accommodate the late arrivals provided a good reason for the lateness has been given, in full knowledge that it is the exhibitors that make or break a show, and their support for future occasions would be most welcome?

Mr Buller, in his letter, does not indicate whether he holds any administrative capacity in a society that sponsors open shows, but I trust that these few observations will lead him to a better understanding of the many problems that befall the show organisers, whose responsibility is to attempt to please all their exhibitors, even if, at times, there are some who are not quite satisfied that their particular complaint has been resolved, and their wishes satisfied.

Show secretary, Newport A.S.

M. J. PARBY

Marine ‘Velvet’ and ‘White Spot’

I REALISE that Dr Zdenek Lucky in his article on ‘Velvet and White Spot Disease’ in PPM (September, 1968) has totally confused his discussion to freshwater fish but I feel that many readers could make the false assumption that it also applies to marine fish. I hasten to point out that although there are similar organisms which produce similar infections in marine fish, they should not be regarded as their freshwater counterparts in all aspects.

In marine fish Amyloodinium ocellatum causes ‘velvet’, a very effective killer as opposed to freshwater ‘velvet’. It is primarily a gill parasite causing haemorrhages and adhesions of the gill filaments, which severely interfere with respiration. The first symptom of the disease is a marked increase of gill respiration followed by diminishing of appetite and a general deepening of pigments. In such a condition a fish quickly succumbs to respiratory stress. It is only normally in advanced stages of infection that the parasite appears on the skin and fins as typical powdery velvet patches characteristic of the disease. Often death occurs before this stage is reached and probably explains the mysterious death of seemingly healthy, vividly coloured, marine fish. Death can occur in as little as 4 days after the first symptoms manifest themselves and curative action must be taken immediately. The best cure I have found is a rapid decrease in salinity (where the species can tolerate this condition) coupled with permanganate treatment. Where this is not applicable the addition of two teaspoons of 20 vol. hydrogen peroxide per gallon of water per day should be continued until a cure is effected.

In marine fish Cryptocaryon irritans causes ‘white spot’ and seldom causes the death of its host. It takes the form of discrete small white pustules on the body and fins and also the gills. It is the easiest of all marine diseases to cure with quinine hydrochloride or sulphate; this is not toxic to fish even at concentrations as high as 5 mg. per litre. A suitable concentration for treatment is 0.1 mg. per litre.

I trust this information will obviate any misunderstanding which could arise as to the difference between fresh and salt water forms of these diseases.

Horsey, London, N.8

J. B. CLARK, B.SC.

Don’t Forget the Beginner!

As a newcomer to the hobby of tropical fish-keeping I was interested to see PETFISH MONTHLY. May I suggest to you that the inclusion of a beginners’ page or section would, I am sure, be welcomed by many people like myself who need rather fuller guidance than it is possible to find in a book.

Manchester

W. RILEY

Your suggestion has been acted upon—see the article on page 339.—EDITOR, PETFISH MONTHLY.
LINE BREEDING OF GOLDFISH—2

Continuous Selection of Breeders

By L. C. BETTS

Parent' fish having been selected in the way discussed in part 1 of this series, preparations for spawning should be made. Hand-spawning is the advocated procedure, and details of this and the requirements for it were presented fully in V1968 (April and May issues this year). The time for action is when the males or even only one male can be seen to be 'driving' the females.

Three weeks after the batches of fertilised eggs have been obtained by hand-spawnings, the fry should be sufficiently developed for it to be recognised whether the desirable characteristics are present, and the failures should be removed daily. By the time 6 weeks has passed the first sorting should be completed. With a biological filter working, the rearing tanks (24 in by 12 by 12 in.) are now capable of holding 30 fish, so that the tanks should be cleaned out and the fry reintroduced. If six males have been used, it is likely that the spawnings from four of these will have proved useless. These males and the fry associated with them should be removed from all future operations.

Of the two spawnings left, one will have a higher percentage of desirable fry than the other, and it is the fry from the better of the two which will be used in establishing the future strain. From 6 weeks onwards then, the father and the fry will receive special treatment, together with the specially chosen mother. As the fry grow, particular attention must be paid to those developing the particular characteristic sought, so that they can be segregated at the earliest opportunity, for these are the fish which will lay the foundation of the future lines.

Colour change in metallic fish cannot be too early, and the author has had one spawning where some of the metallics were coloured at 3 to 4 weeks. Whether it be hood, eye or finnage development, these must show before the fry are 6 months old. By the following December the breeder should be left with 20 or so fish 1½–2 inches long, perfect miniatures of the parents except that, in comparison with the standard fish, the tail (for example) will not be as full or as long as in the adult fish relating size with age.

With twintails, for instance, the tail at 8 months would only be one-half of the body length instead of one-and-a-quarter times the body length of an adult. The development of the finnage is associated with age, and if the length is too great at too early a stage, it will become floppy as time goes on. At this stage it should be mentioned that temperatures should not be allowed to drop below 88°F (30°C) for the first 18 months, so that growth will be consistent and feeding continuous.

As a years must elapse before the young can be used for breeding, the second spring necessitates the use again of the originally selected male and female. The fry from this mating will be grown on so that by the arrival of the third spring, the males obtained in the original spawning will be used. These males are now mated with the original female in the same way as in the first spawning. However many males are used, there is bound to be one male that will throw a higher percentage of desirable fish than the others. This male and the fry are grown on in the usual way, but by now there should be at least 60 which are retained for the winter against the 20 which were retained after the original mating.

By the time the fourth spring arrives, the breeder should have the following breeding stock: the original male and female (father and mother) and selected males and females (sons and daughters) from the first spawnings, and selected males and females (grandsons and grand-daughters and half-grandsons and half-grand-daughters) from the second spawnings. By now it will be clear also that not only will the desirable characteristics appear in the young, but the undesirable ones as well.

For instance, in breeding twintails, the young will separate out into two groups, one with broad tails and one with forked tails. As the broad tails is the feature required, all fish showing this forked tail will have to be dropped.

From then onwards matings should be made with a male from the previous generation, i.e. grand-daughter to son, half-grandson to daughter etc. This ensures to some extent vigour and virility in the strain, the lack of which can cause it to die out. Take particular note of those fish which feed constantly and grow quickly. Sometimes these fish may lack fin development in the early months, but usually they catch up with time. Young fish are difficult to inspect because of their smallness, but a good quick guide is the dorsal fin and the body depth.

As a general guide to selection for breeding stock, the following points are helpful when sorting out fry. Bottom feeders are better prospects than those that spend their time at the surface.

Slow development fry make poor adults. This applies to growth, colour change, development of eyes and hood.

Never breed with a fish taking longer than a year to develop the desired characteristics.

Fry should be plump but not fat.
Barb Breeding (*Barbus arulius*)

**By RUDOLF ZUKAL**

*Photographs by the author*

Translation by F. MARSH

This somewhat larger representative of the aquarium barbs is not as well known to many aquarists as the four-banded Sumatra barb (*B. tetrazona sumatrana*) or the five-banded barb (*B. pentazona*). I cannot explain why this is so because *B. arulius* is a very beautiful and elegant barb, up to 4 inches in size, and quite a peace-loving fish, which really enlivens the community tank with its fast swimming. One should not, however, keep this species on its own for then the fish become timid.

The *arulius* barbs arrived in Europe from their home in India for the first time in the year 1944, although they had already been described in 1849 by Jerdon. The fish then first described came from the neighbourhood of Travankur, in north India. The present-
As first the pair of barbs swim around the breeding aquarium in an inquisitive manner and at very great speeds.

day importers give the habitat of these fish also as Cauvery and especially north-east of Bombay.

The body of this barb is lightly patterned and the sides are slightly compressed; at the mouth are a pair of barbels. The upper half of the body and the back is coloured various shades of brown, the under part is silver with a reddish gleam. The scales, particularly on the upper side of the body, are decorated with many tiny green glittering spots. Round the jaws are bright green spots. The body is decorated with dark oblique bands and large dark spots. The tail fin is yellowish to reddish with striking red points. The dorsal fin is bordered outside with carmine red, the ventral fins are whitish. The dark eye has a green glaze. The difference between the sexes is not always easy to recognise with young fish, but
the mature fish are easier to distinguish. The male has prominent and separated dorsal fin rays and in the female the dorsal fin is rounded off.

These fish can be recommended to every aquarist who owns a large tank. Normal, not hard, tapwater kept at about 70°F (20–22°C), and not too thick planting suits the fish best. As these fish prefer to be near the bottom of the tank, it is advisable not to put sand which is too coarse in the tank. As I have already mentioned, one should keep the fish in a community with several other species and have several, eight to ten, of each kind. Then the aquarium is properly inhabited. The barbs chase each other, playing in the water in swirling movement, when they are not looking for food. Also other kindred fish are harmlessly chased. B. arulius will really
Spawning of the *Arulius* Barb

Spawnings of the *Arulius* barb can also occur close to the tank bottom, as these pictures show. Grains of gravel swirl upwards as the male makes violent movements.

feed on anything, but living food is preferred.

My breeding pair, shown in the photographs, were obtained from my friend who did not have much interest in keeping them. In the community tank the fish swam joyously round the tank and flirted with other barbs. Meanwhile I prepared a medium-sized tank (approx. 18 in. by 18 in. by 12 in.) for the spawning of the fish. Normal drinking water, 12 dH, pH 7, was warmed. Towards the back wall of the tank I placed a piece of tree root and in the middle a large bunch of Java moss. In this Java moss I set a few *Cabomba* plants. For 3 days I let the filter run and kept the temperature constant at about 80°F (26°C).

On the fourth day the pair were put in. And then what I had feared happened. The fish disappeared in the dark background and it was several days before they really came to sight. I wasn't able to observe them taking food, they disappeared again so quickly. After about 10 days I first saw them here and there as they swam very fast through the aquarium. And at last came the time when I could see them 'showing-off' to one another. And after this behaviour
came the spawning. The egg-emission in the plants lasted about 3 days and 200–300 eggs were laid.

Then I put the fish back in the community tank. After 36 hours the young hatched. On the sixth day they swam free in the water and received the best live food. They grew fairly quickly, and after about 3 weeks I could notice the dark markings.

What’s New?

‘Rockwork’
Aquarium Liner

FOR those without the time or inclination to make their own rockwork, Arbe Products have provided a solution. Sets of stratified rockwork, moulded in a dark grey plastic and tinted with a faint hint of red and green, are now available for use inside the aquarium. A back panel and a set of two side panels can be made up into a complete underwater cave scene. The side panels are 11 in. high and fit inside a 12 in. wide aquarium. These cost 22s 6d a pair. The back panel will fit a 2 ft tank and retails at 19s 9d.

Both side panels are moulded to provide a space behind which heater and thermostat can be hidden.

Further pictures of the spawning embrace taking place close to the tank’s gravel floor

Sea Water Aids

NEWS of the enlargement of the Marina range for the marine aquarist comes from North Agencies. Additional to their Marina no. 1 remedy, a whole range of products for the marinist is announced. These include a marine white spot remedy, pH buffer, fungus remedy, algal fertilising solution, trace element solution and three types of marine bactericide, retailing at 5s 6d and 8s. An Algi-Gro Test Kit enabling the marine fishkeeper to check his tank water for algal growth chemicals, offered as of particular use to those anxious to maintain a ‘natural’ or ‘semi-natural’ tank, is also available at £2 15s 0d.
New Water Treatments

THREE new aids to aquarium-keeping are announced by Scano. Wash is a non-toxic antiseptic aquarium cleaner for use in sterilising aquaria and gravel. It is packed in a white plastic container and retails at 45 6d a bottle. An eggcupful to a pint of water, used as a net dip, is the advocated way to ensure that disease is not transferred from one tank to another. Chlorine-gon is made to speed the process of obtaining water suitable for replenishing or setting up the aquarium: costs 3s 9d a bottle. One drop of Snails-gon (3s a bottle) to the gallon of aquarium water is stated to be sufficient to ensure the death of most of the snail population within one day. After the dead snails have been siphoned out, the process can be repeated in 3 days to remove any that re-appear.

Testing Water Reaction

By H. J. VOSPER

ALTHOUGH the exact way in which the 'acidity' or 'alkalinity' of water influence animal and plant life is not yet fully determined, it is generally true to say that water reaction is a governing factor for life. As is well known, the reaction is recorded according to the 'pH scale' (concerned with the hydrogen ion concentration in the water), and measurement of the pH value is easily done by one of the quick methods available. The easiest, and generally least reliable, is by the use of 'indicator papers', which are available in small booklets of coloured strips. A strip is dipped into a sample of the water under test and the resultant colour is compared with a chart of pH values attached to the booklet. Yet for the amateur the most effective method lies in the employment of 'short-range indicator solutions' applicable to the exact purpose for which the test is being undertaken. Naturally it is very convenient to establish the general condition first, to which end one can use a 'wide-range' or 'universal' indicator, and to continue with the appropriate short-range indicator afterwards.

Field biologists find that the turbidity and colour of natural waters tend to affect the reading of pH values where visual tests are in use, so to clear colloidal particles a flocculating substance such as precipitated barium sulphate is first added to the water sample under test. The substance is allowed to settle after a vigorous shaking, so that a clear liquid remains above the solids. To overcome the problem of a coloured water it is necessary to view the standard colour chart through an equal volume of the cleared, coloured water.

The Table shows useful short-range indicators, which should cover all aquarium purposes and they, like the universal indicators also shown, may be obtained 'off the shelf' or ordered through a local chemist.

Most liquid indicators are supplied in some form of dropper-bottle, but in any case these bottles can be obtained for a few pence. The procedure is to add a few drops to a small (about 25-50 c.c.) sample of the water under test and to match the resultant colour against a chart supplied, or otherwise to judge by comparison and in relation to the colour ranges indicated above. The Harrington Universal bottle has a written colour description, the B.D.H. bottle has a printed colour chart forming part of the label. British Drug Houses Ltd also produce barium sulphate in small and suitable plastic containers.

Suggestions as to appropriate pH values at which to aim are almost as numerous as the books in which they appear, while methods of changing the values are also well documented, and this is not the occasion to discuss the point.

We regret that some of our regular features have had to be left out of this month's issue and that the Photographic Competition results are delayed until the December PFM.
In most articles on marine fish-keeping the difficulty of providing live foods for marine tropics is mentioned. They say that freshwater guppies are good food fish but warn you that as they die in a few hours a careful watch has to be kept to make sure they are all eaten. Mollies can be kept in pure sea water but the number and frequency of young dropped per brood is less than guppies. If therefore guppies could be acclimatized to pure sea water they would be much more useful as a source of live food. A search through the aquatic literature showed that no-one appeared to have tried this; in fact some books said that guppies could not be converted to full sea water. So I decided to try.

In all the experiments described, the temperature was kept at 68-72°F (20-22°C). The water used was fresh water from the tap (very soft and slightly acid) and natural sea water (sp. gr. 1.024) both adjusted for temperature. Food was newly hatched Artemia given twice a day in quantities that were consumed in 5 minutes. When the saltwater content reached 50%, Artemia was added once a day in excess so that some was left the next day. Aeration was supplied to all jars continuously. Gravid females were kept individually in fresh water to provide experimental material. Each experiment was done with the brood from one female.

In the first experiment, five 3-day old guppies were put into each of five jars. The water was changed weekly. At the first change sea water was substituted for 5% of the volume of freshwater. At the second change 10% was changed, at the third change 15% and so on in 5% increases until the fish were in undiluted sea water. Out of the original 25 guppies, 15 survived to the sea water stage and appeared to be fit and healthy.

Having established that guppies would live in pure sea water, the experiment was designed to see whether the rate of conversion could be speeded up. Five 3-day old guppies were put into each of six glass jars. The water was changed weekly. In two jars sea water was substituted in 5% increases at each change. In another two jars sea water was substituted in 10% increases at each change. In the last two jars sea water was substituted in 20% increases at each change. Fish subjected to 5% increases all survived through to the sea water. The ones given 10% increases also survived, although they went into 'shock' at each change but recovered. Fish given the 20% increase went into shock at the first change and never recovered.

A third experiment was set up like the second one only that the water was changed every 2 days. The fish given 5% increases again all survived. The ones given 10% increases had one or two deaths at each change and the third batch again never survived the first 25% change.

From the last two experiments it appeared that the 'shock' due to the change was killing them, so a different approach was tried. Thirty 3-day old guppies were put into freshwater in a plastic bucket with a hole in the side covered with fine mesh netting to prevent them escaping. A second bucket containing sea water at the same temperature was suspended over the first bucket. A drip arrangement was rigged up to supply sea water from the second bucket into the first bucket at a rate of 500 mL/hr. The first bucket contained 6 litres of freshwater and aeration was supplied to keep it thoroughly mixed. The drip was run for 24 hours after which the guppies were transferred to a tank of sea water. All the guppies were alive and healthy.

Many broods of young guppies and also fully mature adults have been converted by this method. A population of guppies has now been maintained in seawater for over four generations. They breed freely in sea water, broods of 40-50 young being not uncommon from large females, and grow to a good size. The young and adults are fed on newly hatched Artemia and dried foods. Also halves of shore crab (Carcinus) are hung in the tanks and the guppies seem to enjoy eating the soft gonads.

A few adult marine guppies kept in your tropical marine tank would supply your fish with a periodic live food supplement or alternatively a separate tank could be set up to breed marine guppies as food.
THE AQUARIUM CATFISHES—7

ALTHOUGH atmospheric breathing is relatively common among the world’s freshwater tropical catfishes, two families of Afro-Asian catfishes in particular are noteworthy for having evolved breathing systems which are rather amazing in their efficiency, their sophistication and their rather novel approach to the problem.

Other fishes employ such devices as the labyrinth chamber of the gouramies, the intestinal respiration of the loricariid catfishes (which consists of merely ‘swallowing’ air) and even the somewhat lopsided system of paired lungs found in the reedfishes of the family Polypteridae. Efficiency varies from fair to quite good, and all the systems allow survival under conditions which otherwise would cause the death of the particular creature involved.

Whether any or all are evolutionary stepping stones toward a terrestrial existence is subject to controversy, but all have a vital point in common: dependency on an uncontrollable intermediary act of Nature is removed. By reaching directly into the atmosphere for the vital gas exchange instead of waiting at the mercy of its dissolution into the water, an excess hazard is removed and an unnecessary step is dropped, thereby increasing both the durability and efficiency of the animal, and giving him greater adaptability.

The genus Clarias is not only the largest but also the most widespread of the air-breathing members of the family Clariidae. Its members are found throughout tropical Africa, Malaysia, India, Burma and South China, as well as many Indo-Pacific islands. Since the genus includes one of the most common catfishes of the Sea of Galilee, this is among those referred to by St Matthew: ‘They gathered the good into vessels, and cast the bad away’. Scaleless fishes were considered unclean and it was forbidden to eat them, so they were thrown away. In the Mohammedan religion it is also forbidden to eat scaleless fishes, but Day noted that in India Clarias and certain schilbeid catfishes were allowed to be eaten by those in poor health because of their supposed medicinal value.

The accessory air-breathing apparatus employed by
the clarid cattfishes consists of tree-like 'branches' of spongy vascular material supported by cartilage, extending from the second and third gill arches, which extends into the enlarged gill cavities.

The close and rather similar family Heteropneustidae (Saccobranchidae), instead of the bush-like structure, employs a pair of long sacs which also originate from the second and third gill arches and extend almost to the tail. The gills are fused and form a valve to open or close the sacs for respiration.

Although a number of species have found their way into the aquarium at one time or another, by far the most common aquarium species is Clarias batrachus from Thailand and nearby areas. Aside from sharing the oddities of the other Clarias species, Clarias batrachus has the further distinction of being one of the rare examples found in the animal kingdom which is apparently firmly established in its albino form as well as the normally pigmented form. There are occasional albinos ( unpigmented individuals) among many creatures, but an established 'race' of a given species which is separable from its normal form only on a basis of its albinism is indeed rare.

From a standpoint of interest in the unusual, what could be more intriguing than a fish that makes land excursions not only out of desperation arising from intolerable conditions, but also through choice? Traveling from waterway to waterway out of curiosity or perhaps pure wanderlust is in itself unfishlike. But perhaps it makes more understandable how a family of such similar species becomes so widespread, since this terrestrial meandering allows them to populate areas that would be inaccessible to them through more normal piscatorial procedures. At least a few of the clarids are certainly approaching the true amphibious state, for they also are known to leave the water at night to hunt on the land.

Probably the most widespread African species is Clarias mossambicus, which is said to reach a length of 5 or 6 feet in South Africa. This is an indication of one of the aquarium-keeper's problems encountered with larger Clarias and such near relatives as Heterobranchus longifilis; that of size and corresponding appetite.

In aquaria I have seen Clarias batrachus in both the albino and normal mud-brown form that were in excess of 2 feet in length. In this length this is a heavy-bodied fish with a rather large mouth and the inclination to use it both in feeding and aggression, especially against his own kind. If several are present, a sort of 'pecking order' is usually established, which combined with a mistrust...
for each other can result in a standoff situation that is something less than total warfare. Fortunately, dispositions seems to mellow somewhat with age.

*Heteropneustes fossilis* from Thailand belongs to the close family Heteropneustidae, and has reportedly been bred in the aquarium. The most noticeable difference in this fish from *Clarias* is in the presence of a little flag-like dorsal fin entirely unlike the cel-like dorsal of the other. Boiled oatmeal, earthworms, dog food, cat food, ox heart or almost any other type of protein fare will be eagerly eaten, and in many ways, not the least of which are size and temperament, this is a more satisfactory aquarium fish. Clarids and Heteropneustids seem to have exceptionally wide temperature ranges, and their care is similar in almost all ways.

Water conditions seem to have little effect on members of either family, generally speaking. Aquaria must be covered, for at night the fish will seek a way out. Activity, as with many catfishes, is greatly increased at night.

The Claridaceae and Heteropneustidae are among the most interesting of fishes from an evolutionary and ecological standpoint. They vary from the cel-like *Channa labrosus* and Gymnallabes to the clumsy bulk of *Heterobranchus* in form. Their tenacity and lust for life is almost unbelievable and their aquarium longevity is certainly exceptional. I have personally kept one Congo species, *Clarias bythipogon*, and the Asian *Heteropneustes fossilis* for over 13 years. In spite of the fact that for the last year or so the latter has been living minus the caudal fin and the last few vertebrae, which dropped completely off due to fungus after an attempt by a larger fish to swallow him neatly stripped all the skin from his posterior one-fourth, this individual seems little the worse for age and wear.

Certainly, the larger species are not suitable for the average aquarist except on a temporary basis. Unfortunately, these seem to be most often imported since they are possibly more common in Nature. With African imports increasing perhaps some enterprising soul will give aquarists a chance to see smaller species of *Clarias* such as the little 6 inch *Clarias carinii* of East Africa. Hopefully also, imports may increase in such milder-mannered and occasionally available species as *Channalabes* and *Heteropneustes*.

To be continued

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**Transatlantic TOPICS**

EVEN the most ingenious traveller, who can spend hours relating how he whooped it up in Manhattan, threw paving stones on the left Bank, stood London on its head, will grind to a halt when discussing San Francisco—since the shattering earthquake of 18 April 1906, the 'Heart of the Golden West' has continued to shake the world.

So much, that a reader of this column queried my recent statement that the attendance figure at the San Francisco Aquarium Societies Show last year was 75,000. He asked had I, being a true fisherman, been carried away?

A letter from Gerald F. Carrier, executive at The California Academy of Sciences, assures me that not only were the figures correct but were checked electronically as well!

You Societies over here that are boasting a four figure attendance at our British shows, please note—one critic who claim the reason is that America is such a big country should remember that the population of 'Frisco is smaller than London, Birmingham or Glasgow, and just about equals that of the City of Manchester. The secret behind the Americans' success? **success proving that in this day and age trees still grow in Brooklyn and 'miracles' still occur in New Jersey.**

Many clubs in search of something to fill the club programme cast envious glances at the wealth of films and tapes they see advertised in the Stateside press.

Because of postal restrictions, exchange or hire of film seems out of the question to the average British hobbyist, but what about tapes? With nothing but two revolving spoons on which to focus the attention of the audience recordings have to be good to hold the member's attention—I fear that our aquarists have been lulled into an expectancy of professionalism, as displayed by
sound radio and the television screen. But we are easy-going folk and feel sure we would be willing to give ‘amateur’ tapes a try.

What about the differences between the two countries’ electricity supplies? The U.S. supply has an A.C. frequency of 60 Hertz as opposed to 50 Hertz over here. That means that machines would have to be adapted if transferred from country to the other, but that doesn’t apply to tapes; if a recording was made on an American recorder then it will play back on a British machine provided that the recording speed and track are the same. Having belonged to a transatlantic tape exchange group for a decade, I speak from experience.

* * *

The Chicagoland Aquarists Council has held its first Judging Seminar. Conducted by Ron Klotz and Zane Scooby, it boasted such eminent speakers as Tom Kelly and was held in conjunction with the South Suburban Aquarium Society’s Show. But what is a Judging Seminar? In brief, it is an attempt by experienced fish judges to not only explain how and why they pointed the fish the way they did, but to educate the exhibitor in the practices of better showmanship.

As a judge myself, I should hate to have to explain my every action, but it used to be the practice in the old days for the judge to give a few words after a show, with comments about the exhibits in general. Alas! Time and the increase in the number of exhibitors in British shows now generally stamps ‘hurry-up’ on these functions and the poor adjudicators hardly have sufficient time to give the fish more than a cursory glance.

My general impression of a one-day show is a large number of folk desperately trying to beat the clock: bench the exhibits, ‘can someone hurry up the judges, we are running late’, and ‘that’s it, let’s go’ have become the order of the day.

Some, thankfully in the minority, are so anxious to see how their fish have fared that they cannot even wait for the official announcement. They hover round the judges, getting in the way of those hard-working officials, trying desperately to chivy things along, eager to see where the stickers are going.

Isn’t it time we gave some serious consideration to the ‘seminar’ type of education for the sake of all concerned? And stop encouraging what I loosely term the ‘bench and bolt’ brigade!

* * *

Joe Russo. Remember that name because I predict we shall be hearing from this man in the piscatorial field. Already on the Dean’s Honours list for outstanding students, Joe attends Triton College in Northlake, on the outskirts of Chicago, and if the connotation with Triton, the demi-god son of Neptune isn’t enough, he has already made his mark as a fish journalist of some capacity in the society magazines over there.

In a recent article, J.R. has this to say, words that will certainly interest those marine readers:

‘Water is an important part of the fish’s diet! Most freshwater species obtain water directly through their gills. The only time the hobbyist could run into this problem of water deficiency is when he is keeping marine fish. In their natural habitat, salt water species get from 70 to 90% of their water from their food. For that reason, marine in the home aquarium should be fed live foods great things as much as possible. Dried foods may be incorporated in their diet but must never be used as a staple diet.’

Already an officer of the Northern Illinois Aquarist Association, Joe has one sure-fire formula for success—he writes from experience.

* * *

Lake Erie, when it freezes over in winter, is a Mecca for fishermen eager to get on to the ice and try their luck. During the spring thaw, when heavy winds and fluctuating temperatures cause the ice to break up, the Coast Guard are kept busy rescuing stranded anglers adrift on their own miniature iceberg.

Three such fishermen, stranded on a loose ice flow, drifted into the open waters of the Lake and were picked up by the rescue cutter, all excepting one man who refused to move on the grounds the fishing was too good—he was stopping where he was. Not having any legal jurisdiction over him, the Coast Guard reluctantly left him, rod in hand, oblivious of the danger.

Though many such ‘sportsmen’ killed pursuing this dangerous practice, this story had a happy ending . . . another boat picked him up the next day miles away from the first spot.

The report doesn’t tell us whether he found the enforced exposure to wind and weather worth it or not, but the number of fish he did or didn’t catch will no doubt be the subject of his conversation for many months to come. A case of the one that didn’t get away!

* * *

"Why can’t you go to the petshop to get your fish like everyone else?"
Beginner's Guide to Fish-keeping

FISH-KEEPING is a hobby in which the growth rate of interest is frequently explosive. A small community tank can, and often does, in the space of a couple of years, lead to the acquisition of a further three or four tanks, the production of several broods of guppies, platys and swordtails, perhaps a host of small zebras and the first pangs of desire to own a pair of discus. It is the preliminary steps up which the newcomer needs a helping hand. This is not to suggest that the new fish-keeper will lack advice. He sometimes receives such a torrent of conflicting tales that numbed confusion is the only result! For he will soon find that though there are a few basic rules that can be broken only at risk to the tank’s inmates, the fish themselves are full of idiosyncrasies and surprises and constantly prove exceptions to any expert’s rules.

So to start at the beginning. The first decision that has to be made and one that causes the beginner much thought is whether to keep tropical or coldwater fish. Often newcomers to the hobby cast envious eyes at the tropical aquarium but finally plump for the tank of goldfish on the assumption that it must be easier to keep and to clean since there is none of that ‘electrical paraphernalia’ connected with the warm water aquarium.

Then, with memories of the goldfish in the bowl won at the fair as the only guide, the new tank remains unlit and unplanted and shortly the gloomy sight of two finfolded inhabitants dimly seen through the muck puts the potential fish-keeper off the hobby for good.

Rule number one for the new fish-keeper is that the tank for either tropical or coldwater fish must be of adequate size for the number of its inhabitants, must have a cover to keep the dust out and the fish in, be furnished with gravel and plants and given light to enable the plants to grow. Then these conditions being equal, and contrary to what the layman usually believes, the community of small and medium sized tropicals is the easier one to maintain.

A well set-up and ‘balanced’ tropical tank will make the following demands upon its owner’s time—the front inside glass will require scraping perhaps once a fortnight, the sediment composed of fish droppings and bits of rotting leaves will require removal by means of a siphon tube once every four weeks or so, and the water lost by evaporation and possibly by siphoning replaced. Perhaps once a year the major part of the water will need changing and, with available facilities, many fish-keepers would choose to take down the tank completely every twelve months. The coldwater tank, housing larger-bodied fish inclined to root about amongst the plants and gravel, does need more partial water changes to maintain its freshness.

Any problems of supplying heat to tropical fishes have their counterpart in maintaining coldwater fish in comfort during a prolonged hot spell or, more usually perhaps in this country, making certain that the fancy types of goldfish are not experiencing excessive chilling due to being housed in an unheated front room or out-
house. Above all, with tanks of similar size, it is the
tropical one that can hold the greater numbers and
variety of fish, with the prospect of early additions to the
fish population, and all the attendant interest of this
increase of stock.

Now, what sort of tank to house the fish in? Apart from
the number of fishes that a particular sized tank can hold,
it is necessary to consider the size of tank that the novice
can most easily maintain and, again somewhat surprisingly
to the newcomer, this is not at all likely to be the smallest
tank available. The smaller the quantity of water the more
scrupulously clean it must be kept. However, it is a brave
new hobbyist who can consider tanks over 3 ft. in
length without a qualm and such sized tanks present
their own problems of decoration, and stocking with fish
of suitable size; cleaning such large tanks can be a real
chore, too, if any emergency should arise in the begin-
ner's early days. Tanks of between 2 ft. and 3 ft. are most
suitable to house one's first fish community. A tank
15 in. high gives a better plant growth than one only 12
in. high and the tank most to be recommended to the
beginner is perhaps the one 24 in. long, 12 in. wide and
15 in. high. Its single-iron frame can be galvanised or
coated with nylon to give additional years of service to
the frame, or there is the stainless-steel tank, the greater
expense of which is offset by the permanency of its
structure.

Assessment of the number of fish that a tank can hold
is based upon surface area. Fish take in through their
gills the oxygen dissolved in the water. Through their
gills also passes out the waste product of respiration—
carbon dioxide. If too great a concentration of carbon
dioxide develops in the water it also accumulates within
the fish to its detriment and ultimate death. Coldwater
fish are mostly large-bodied, have a high rate of oxygen
consumption and are very sensitive to accumulated waste
products. An inch of fish to 24 square inches of water
surface is the most useful rule for the coldwater fish-
keeper's stock. A tank with a surface area of 24 in. by
12 in. will therefore hold 12 in. of coldwater fish or four
fish with a body length of three inches. The quantity of
small-bodied tropicals, adapted to living in warm
water with a lower oxygen content, that can be housed
in a similar sized tank can be assessed at a lower rate—
say 1 inch of fish body to 10 square inches of water
surface or about 25 small tropicals (to allow for growth)
in a tank 24 in. by 12 in. by 15 in.

Of the equipment needed for the tropical tank, it is the
aerator that seems most to take the imagination of the
beginner. In fact, aeration is not essential and can be a
positive danger if the novice thinks that, as a result of
using an air pump, the numbers of fish that a tank should
hold can be doubled. It is of use, however, in keeping
the water moving (thus dispersing any pockets of colder
water in the tank and accelerating the exchange of gases
at the water surface). Also, the acquisition of an aerator
means that a filter can be used to assist in keeping the
tank clean.

The only 'essential' equipment in a coldwater tank is
the thermometer, plus, in a tropical tank, a heater and a
thermostat. Immersion heaters of various wattages are
sold for this purpose. For a 24 in. tank kept in a living
room a heater of 120 watts will be sufficient, placed
horizontally just above the gravel. For a 36 in. tank,
either one long heater of 150 or 200 watts can be used
or two 75-100 watt heaters placed one at each end of the
tank. Thermostats, which act as switches, turning the
heater on and off when the desired temperature is
reached, can be of the submersible, partly submersible
or external type.

Next month we will consider the wiring together of the
equipment and the lay-out of the tank 'furnishings'.

By PETER UNWIN

'Bubble, bubble, toil and
trouble ...' That line always brings
to mind the three witches in Macbeth
gathered round their evil-smelling
cooking pot concocting their spells,
but (being a guppy breeder) it also
reminds me of aeration.

'To aerate or not to aerate' has
troubled the minds of hobbyists
since the invention of the air pump,
though in those halcyon days,
aquarists were unencumbered by the
vast array of filters and aerators
available to-day, to them it was the
simple choice of having a stream of
air bubbles in their aquaria or
not having one.

The astounding thing is that
conversations with first-class guppy
breeders have confirmed the fact
that they agreed the use of aeration
often resulted in bigger and better
shaped fish, to say nothing of the
apparent pleasure the fish derived
from the stream of moving air and
water. Anyone who has watched
guppies being borne swiftly across a
taxi will confirm this—like school-
boys on a slide, they constantly
came back for another try. The
reasons why the fish should grow
bigger are the same for the human
body builder and his pre-occupation
with regular exercise.

Returning to Macbeth, the last
line uttered by the three old crones
at the end of the first Scene: 'Hover
through the fog and filthy air' brings
to mind the warning not to run air
pumps in a room full of smoke.
These pumps draw their supply of
air from the surrounding environment and it doesn't help the fish one iota if that air is polluted with fug from cigarettes and paint fumes.

The boy is father to the man! So too, the best female guppies to choose for a breeding programme are sisters to the male—providing they have hybrid parents.

This brother-to-sister cross is called 'full sibbing', a term beloved of the geneticist.

If this type of cross isn't possible, then select your females where possible to match the males. Though there is no hard and fast rule for this, we have learned over the years that certain Standard types generally provide certain shapes in the male progeny.

Clear finned, generally round-tailed guppy females are notable for siring the swordtail and short-finned males; shark tail or Superba females, the broader caudal.

To save a barrel of correspondence, there is no list in existence nor could there be one that shows what male should be crossed with what female, for the sake of the beginner, we wish there were!

Even a strike at the local airport didn't prevent the members of the P.G.A. collecting entries for their Third International Show. Entries came from as far afield as Germany and Austria, but the charges levied on each average 4 kilo box came to around £5 and this didn't exactly encourage the practice of inviting overseas entries.

The laugh came when the bills were examined in detail and it was found that a large proportion of the charge was for 'handling charges': a strange fact seeing that the porters were all on strike and the goods were collected and handled by the members themselves!

Then isn't it a typical British characteristic to pay someone else for the privilege of doing the work yourself?

Dick Eisenmann, of Guppy Associates of Greater Cleveland, U.S.A., is no stranger to the champion position at shows.

This year his winning team of female guppies won him the laurel leaf at a show held in Toronto and prompted the suggestion that the International Fancy Guppy Associ-

These two unretouched photographs are different views of the same guppy. At first sight it looks like a coloured female but it can be seen that it shows an apparent gonopodium as well as highly coloured dorsal and caudal fins. This fish was brought to PFM for examination, by Mr J. Murrell of Harlow, when it was 6 months old. It had appeared in an otherwise normal batch of guppies and Mr Murrell was certain that hormones had not been used on the fish. Although he had observed it to be chased by males he had also seen it chase females; attempts at mating were observed and a gravid spot appeared to be present, as shown in the photographs. The fish was passed to Dr Alex Comfort of University College London, for further examination. Although the occurrence of such 'inter-sexes' is not uncommon in guppies, particularly when hormone preparations are in use to heighten coloration, such fish are usually sterile; the gravid spot in this specimen looked as if young fish could be present.

The high metabolism of Poecilia is well known. They grow fast, eat fast and need high protein diets—watch a male guppy in a tank for a few minutes and you will see what I mean.

Most prepared foods on the market usually don't exceed about 40% protein content. At least that was the case until a few years ago manufacturers started catering for the guppy's needs with special diets; some of these are so chock full of protein they come as high as 75%, to say nothing of added vitamins and minerals.

It is the addition of the latter that tends to give these kinds of foods a 'musty' odour of malt, but don't be alarmed, this is quite normal, and the food quite wholesome. The smell comes from the fermentation solubles used in the manufacture.

If you prefer to add vitamin

Continued on page 347
Three Main Groups

By Dr. JOACHIM SCHULZE

In this report on the results of a collecting expedition in S. America, the southern species mentioned should be valued highly by the aquarist not only because they have been previously neglected but because of their great interest. On the basis of the bibliographical data\(^1\)\(^2\) all areas below the southern tropics in which various *Echinodorus* species have been gathered are marked on the distribution map. They are the provinces Paraná and Rio Grande do Sul in S. Brazil, Uruguay, Paraguay, as well as more provinces of middle and north Argentina, namely, Misiones, Formosa, Chaco, Tucumán, Cordoba, Corrientes, Entre Ríos, Buenos Aires, Neuquén. The whole plain between the Cordilleras and the South Atlantic should also be borne in mind, extending in the north to somewhat beyond the Pilcomayo River, the northwest river boundary between Paraguay and Argentina, into the tropical distribution area, and in the south near Neuquén the 42\(^\circ\) latitude line has up till now been the most southerly extension of the genus, as there *E. patagonicus* Specgazzini is found.

In this study no systematic description will be given of any known or of new and still doubtful *Echinodorus* species, for my main purpose is to describe the ecological factors and to give information about four new kinds which were found on the expedition. However, to make it easier to survey the whole complex of the species I have made a short summary in which the

South America. The cross shows where new species of *Echinodorus* have been found and numbers indicate previously recorded sites of occurrence of the genus: 1. south Brazil; 2. Uruguay; 3. Paraguay; 4-12. Argentina: Misiones (4), Formosa (5), Chaco (6), Tucumán (7), Cordoba (8), Corrientes (9), Entre Ríos (10), Buenos Aires (11), Neuquén (12) *Echinodorus* have been placed in three large groups, which can be distinguished one from the other chiefly by means of size and leaf shape.

1. *Echinodorus cordifolius*–*grandiflorus* complex. The plants of this group mostly grow very large; leaf blade and leaf stem together can reach 3 ft and more, the emersed inflorescence become even 6 ft. and more high! The leaf blade is characteristically broad, ovate and at the base of the leaf more or less deeply cordate. The maximum breadth of the leaf is typically two-thirds of the length, and the length of leaf often reaches 20 inches.

Here belongs the very well-known *E. cordifolius* (L.) Grisebach, earlier called *E. radicans* (Nutt.) Engelmann. Because of the similarity of many plant species in this group it is indeed doubtful if the aquarist’s tank always contains this particular species, when we talk about ‘radicans’. The most important other kinds of this group are: *E. grandiflorus* (Chamisso et Schlechtendahl) Micheli with further variations, *E. muriatus* Grisebach, *E. tunicatus* Small, *E. macrophyllus* (Kunth) Micheli, *E. longifolius* Archevalda, *E. bracteatus* Micheli, the newly determined *E. horizontalis* Rataj and others.

In Fig. 1 one specimen of this group is shown in an
Fig. 1. A specimen of Echinodorus tunicatus growing in an aquarium. This is an example of the group with heart-shaped leaves. A particularly useful aquarium species as it does not become excessively large.

Fig. 2 (below). The narrow-leafed Amazon plant (Echinodorus amazonicus), one of the best known aquarium plants (formerly E. brevipedicellatus).

The plant species illustrated is particularly good to make use of in aquaria, because it will not become excessively big in the aquarium and will not therefore tend to grow out over the water surface area, which happens with most other kinds of this group.

2. Echinodorus amazonicus-ellipticus complex. In this group we are mostly dealing with plants that become very large but whose leaf shape, however, varies. Every nuance from quite slender ribbon-shaped leaves tapering at both ends to the thick-set elliptical, broad ovate leaf is found. The broad ovate leaf blade occurs less often; mostly the leaf is rounded at the base, though sometimes it is also truncated and then there is a tendency to a cordate base. Here again one sees that transitions are in progress and collecting the species together into definite
groups is extraordinarily difficult. A large number of Echinodorus species belong here, among which are widely used in the aquarium world. A significant species is shown in Fig. 2: the narrow-leaf sword plant. This was for a long time known as E. brescianicus, but the earliest research of Reichenbach in 1864 showed that this name is not valid on the grounds of description.

Fig. 4. The black Amazon (E. sp. peruvianum), from the upper Amazon district and imported from Iquitos, has not yet been identified botanically.

Fig. 5. Strong primary veins are seen on the undersides of the leaves of Echinodorus pellucidus, a beautiful new import from the Argentine region.

Fig. 3. Suitable for large aquaria is Echinodorus Martii, one of the most beautiful of the second group described in the text.
knowledge of the plant. It has also recently been defined as *E. amazonicus* Rataj. It was collected in its natural surroundings at the same location as the species shown in Fig. 1, that is in the area round the mouth of the Amazon, from whence the plants have been imported since long before the last World War. Pictures of the plants' natural surroundings will be included in a later article of this series. Today both these plants, together with the broad Amazon sword plant, are collected in great numbers in Singapore and exported to Japan, Western Europe and the U.S.A.

Besides these two best known sword plants the following are to be mentioned in this group; *E. Martii* Micheli, *E. longistylis* Buchenau, *E. ellipticus* (Martius) Micheli, *E. argentinensis* Rataj, *E. uruguayensis* Arechevaleta, *E. Andriacusii* (Hooker et Arnott) Small from Mexico, *E. subalatus* (Mart.) Grisebach, the species newly introduced some years ago from Peru beyond Iquitos, and still undefined, *E. spec. peruense* or 'Black Amazonas', and the species *E. spec. acutifolius*, with small narrow leaves which have dark specks, newly introduced from Brazil. Also there are the well-known celoophan Amazon sword plant from mid and north America *E. Bertea* (Spreng.) Fassett, and *E. pellucidus* Rataj with longish elliptical leaves that was gathered in the extensive marsh areas of the mouth of the R. Plate in Argentina and has proved itself a very profitable and decorative aquarium plant.

Some of the species mentioned here are pictured in Figs. 3–7. We must distinguish particularly carefully in these plants of the second type-complex between the submerged and emerged leaf shapes, for they change
quickly. The emerged leaves mostly have a sharply foreshortened, thickset shape and the leaf structure is much tougher. The underwater leaves on the other hand are elongated, more ribbon shaped and of a more tender, softer structure. In the usual type of aquarium only the underwater leaves of plants are seen, and for _Echinodorus_ to show the emerged form with leaves out of the water an aqua-terrarium is required—a tank with plenty of warm humid space above the water surface.

Botanical descriptions of plants mostly refer to the leaves formed above the water, because these are always of greater value for identification. The great differences which can occur between under and above water leaves are shown by _E. subalatus_ (Mart.) Grisebach. Fig. 6 shows an underwater form in which the plant develops very long narrow lanceolate leaves. In an extreme example the leaf stem grows to over a yard long, and the narrow leaf blades perhaps to 20 inches in length, while the blade width hardly exceeds 1 inch. On the other hand, in natural surroundings we find this species out of the water with oval, broad egg-shaped leaves, the leaf blades up to about 8 inches long and 4 or 5 inches wide.

3. _Echinodorus_ dwarf plant complex. In plants of this group we have small, longish, lanceolate leaves and species that produce numerous runners. Under favourable growth conditions in the aquarium one gets a pleasant grassy plant, which is well suited for the foreground of tanks. The number of varieties in this group is much larger than has been recognised up till now.

The best known is _E. intermedius_ Grisebach. Very much like it and very much disputed with regard to differentiation of the species is _E. Grisebachii_ Small as well as _E. magdalenensis_ Fassett. Also the smallest of all _Echinodorus_ species known up till now, _E. tenellus_ (Mart.) Buchenau will give us still more problems botanically. Fassett distinguishes in _E. tenellus_ alone four varieties, namely var. _tenellus_, var. _ecostatus_, var. _parvulus_ and
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One perennial headache for the breeder is the odd appearance of fish in his tanks with deformed or twisted spines; in the jargon of the specialist, the fish are 'bent!' Many theories to account for this have been propounded, ranging from embryonic deformity to lack of vitamins, the absence of the D vitamin bearing most of the accusations. According to those 'who know', the guppy manufactures this vitamin in its liver, so unless that organ is diseased the fish should never lack it even if absent from its diet.

Despite that fact, many guppy men still insist that they have rid their tanks of fish displaying these symptoms by the simple expedience of adding halibut oil to the diet. The capsules sold for human consumption seem to be the favourite; after being expressed from the pierced gelatinous cover, the oil is simply mixed with any prepared dried fish food. Only mix a small quantity at a time as this mixture won't keep.

In the complete guide to tropical fishes, by Earl Schneider and Leon F. Whitney, both practical aquarists of repute, it is claimed that vitamin D deficiency can be caused by lack of ultraviolet light from the sun. The authors also mention that the guppy (Poecilia reticulata) and the zebra fish (Brachydanio rerio) are particularly prone to this deformity.

References


Fig. 9. A new dwarf variety from Brazil with very narrow, long leaves, Echinodorus tenellus var. paralelo. It reproduces rapidly by the formation of off-shoots.

var. latifolius. Moreover according to his view there are three more very similar species, such as E. isthmicus Fassett, E. quadricostatus Fassett and E. magdalenensis Fassett. One finds all sizes up to a leaf length of about 10 inches and breadth of about ½ inch. In Figs. 8 and 9 are shown several kinds imported from Brazil and cultivated in aquariums.
Readers of detective fiction will be familiar with the author’s threefold formula by which crimes are run to earth through opportunity and, finally, the motive. Pursuing these, the culprit is usually run to earth during the final chapter. Some fishkeepers think that disease is a similar situation and given sufficient knowledge any affliction can be diagnosed and the appropriate medication applied—if it was that simple, we would all be knee deep in guppies.

It was once calculated that starting with just a male and female guppy and ignoring deaths through disease etc., if allowed to interbreed freely their descendants would number some three million fish by the end of the first year. 

It’s amazing just how much useful equipment can be picked up for a song at the war surplus stores scattered throughout these islands. These shops attract me whenever my travels take me to a new town. Rummaging through a ‘pick-where-you-like’ box, I came across a huge Thermos container used by H.M. Forces to keep liquids warm. Ex-members of the Royal Air Force will recognise them as the flasks given on flying trips full of hot coffee.

Mine cost me five bob and, cleaned up, it has made a useful wire fish transporter, the added advantage being that no matter what the temperature outside, my guppies enjoy a steady temperature; all I had to replace was the large cork stopper and I did that for just a few pence more.

Dwarf cichlids: 1 and 3, Mr J. Parsons (Cardiff); 2, Mr D. Warnheart (Cardiff). A.O.V. egglayers: 1 and 2, Mr J. Parson (Cardiff); 3, Mr D. Warnheart (Cardiff); 4, Mr L. Nightingale (Cardiff). A.O.V. egg-eater: 1, Mr J. Parson (Cardiff); 2, Mr D. Warnheart (Cardiff); 3, Mr L. Nightingale (Cardiff). A.O.V. aov: 1, Mr J. Parson (Cardiff); 2, Mr D. Warnheart (Cardiff); 3, Mr L. Nightingale (Cardiff). A.O.V. aov: 1, Mr J. Parson (Cardiff); 2, Mr D. Warnheart (Cardiff); 3, Mr L. Nightingale (Cardiff). A.O.V. egg-eater: 1, Mr J. Parson (Cardiff); 2, Mr D. Warnheart (Cardiff); 3, Mr L. Nightingale (Cardiff). A.O.V. aov: 1, Mr J. Parson (Cardiff); 2, Mr D. Warnheart (Cardiff); 3, Mr L. Nightingale (Cardiff). A.O.V. egg-eater: 1, Mr J. Parson (Cardiff); 2, Mr D. Warnheart (Cardiff); 3, Mr L. Nightingale (Cardiff).

THE SIXTH annual open show of NEWPORT A.S. was ‘bigger and better than ever, special display stands being provided, by the International Marine Study Society and the Newport section of the Fancy Guppy Association that considerably enhanced an occasion that has become the highlight of the year for many West Wales aquarists. The entries were judged by Mr W. Hadland, Mr G. Stone and Mr H. C. B. Thomas (Bristol), Mr L. Nightingale (Cardiff), Mr K. Ferrante (Llanwit Major) and Mr G. H. Jennings (I.M.S.S.). The Mayor and Mayoress of the County Borough of Newport, Alderman and Mrs William C. Huckle, presented the awards.

Special awards were made as follows. Highest aggregate points in show Mr F. Brown (Bristol); best fish in show, Mr P. Player (Burry); best breeders team, Mr J. Smithson (Bridgend); best coldwater fish in show Mr B. Harding (Burry); best tropical marine, Mr D. Bevan (I.M.S.S., Swansea); best native marine, Master M. Bromham (Newport); best Corydoras, Mr J. Smithson (Bridgend); best D. Warnheart (Cardiff), best aov egg-eater, Mr P. Player (Burry); best guppy, Mr R. S. Wigg (Llanwit Major); best barb, Mr D. Warnheart (Cardiff). Best furnished aquaria, Mrs M. Payne (Newport).

Other results were: Siamese fighting fish: 1 and 2, Mr F. Brown (Bristol); 3, Mr J. Parson (Cardiff). Anabunda: 1, Mr B. Harding (Burry); 2, Mr J. Parson (Cardiff); 3, Mr M. J. Parry (Newport). Barbs: 1, Mr D. Warnheart (Cardiff); 2, Mr R. Chard (Cardiff); 3, Mr F. Brown (Bristol). Hemiglyptus: 1, Mr J. Smithson (Bridgend); 2, Mr F. Brown (Bridgend); 3, Mr J. Smithson (Bridgend). Corydoras: 1, Mr J. Smithson (Bridgend); 2, Mr F. Brown (Bridgend). A.O.V. egglayer: 1, Mr J. Parson (Cardiff); 2, Mr D. Warnheart (Cardiff); 3, Mr J. Parson (Cardiff).

AT the end of last year, members of OLDHAM & D.A.S. numbered six. Nine months later, the 30 members of the Society were receiving congratulations for their first, very successful, open show. From 300 entries, the best fish in the show award was presented by the Mayor to Mr P. Barrett (Bury). Detailed results were as follows.

Guppies: 1 and 2, Mr Duffy (Nottingham); 3, Mr D. Cooper (Oswestry); 4, Mr and Mrs Moseley (Lancashire); 5, Mr J. Parsons (Cardiff); 6, Messrs H. and M. Trinder (Gloucester); 7, Mr and Mrs Standen (Lowestoft). Large barbs: 1, Mr K. Perkins (Huddersfield); 2, Mr B. Thompson (Gloucester); 3, Mr J. Parson (Cardiff); 4, Mr J. Parson (Cardiff); 5, Mr J. Parson (Cardiff); 6, Mr J. Parson (Cardiff); 7, Mr J. Parson (Cardiff); 8, Mr J. Parson (Cardiff); 9, Mr J. Parson (Cardiff).

F.G.A. Secretary

Change of Fancy Guppy Association secretary, Mr Fred Campbell (37 Cardigan Drive, Bury, Lancs) replaces Mr Roy Beresford. Mr Beresford will still continue as a member of the management committee.
Over 400 Entries at Nottingham

THE REPUTATION of the NOTTINGHAM & D.A.S. national open show for a fine selection of interesting fishes was well maintained this year, from among more than 400 entries bunched. The coldwater entries included green and gold tench, orfe, orangas and Bristol and London shubunkins, though it was the entry of Mr G. Fern in the common goldfish class that won the best coldwater fish in show award and the Brentnall Cup. Mr Fern also won the award for the best breeder. Many of the good-sized tropicaPs were the entries of Mr and Mrs J. and H. Dernie, who were again outstandingly successful at this show and whose orange chromide won the best fish in show award, the best tropical award, the Sycos Cup and the AINcows Cup. Mr A. Deakin was awarded the C. & M. Hill trophy for the best marine exhibit.

The winning entries in the furnished aquaria were outstanding. The coldwater tank set up by Mr B. W. Forain, who won the Brown & Taylor Cup, featured golden rudd in a most pleasing arrangement that was highlighted by the use of pale-coloured sand and grits. The tropical furnished aquarium, also by Mr P. Reynolds (Poultry Supplies Cup) made effective use of the contrast of light-green leaves of water wisteria against light and dark grey rock and showed a brilliant touch in repeating the long vertical lines on the rock face in a clump of tall hair grass.

A display put on by the Trent River Authority that included tanks of gudgeon, ruffe, stone loaches and pike fry around a good deal of interest, as did a fine display of stampers featuring fishes that the Society's president, Mr C. Hill, arranged specially for the show.

Common goldfish: 1, Mr C. Hill; 2, Mr B. Forain; 3, Mr and Mrs J. and H. Wright. London shubunkins: 1, Mr W. Forain; 2, Mr C. Hill; 3, Mrs C. M. Beard. Bristol shubunkins: 1 and 3, Mr G. Fern; 2, Mr C. Hill. Carassius auratus: 1, Mr G. Fern (most coldwater, Brentnall Cup); 3 and 4, Mr G. Fern. Black moor: 1, Mr O. Pearson; Oranda: 1 and 3, Mr C. Hill; Orfe: 1 and 2, Mr B. W. Forain; Rorid: 1, Master D. Beard; 2, Mr B. W. Forain; Tench: 1, Master D. Beard; 2, Mr B. W. Forain; 3 and 4, Mr and Mrs J. Wright. A. O. coldwater: 1, Mr B. Forain; 2, Mr C. Hill; 3, Mr J. W. Ford. Breeders coldwaters: 4, Mr G. Fern (best breeders): 2 and 3, Mr G. Fern. Brachydanio: male: 1, Mr and Mrs J. and H. Dernie; 2, Mr F. Underwood; 3, Mr P. Reynolds. Betta splendens: female: 1, Mr and Mrs J. and H. Dernie. Thick-lipped gourami: 1, P. and H. Hodgkinson; 2, Mrs C. M. Beale; 3, Paul Hodgkinson. Dwarf gourami: 1, Mr and Mrs J. and H. Dernie; 2, Miss C. Sisson; 3 and 4, Mr and Mrs J. and H. Dernie. Lace gourami: 1, Mr and Mrs J. and H. Dernie; 2, Stephen Chamberlain. Blue gourami: 1, Mr G. Hallam; 2, Mr D. A. Page; 3, Miss C. Sisson. A. O. gourami: 1, P. and H. Hodgkinson; 2 and 3, Mr and Mrs J. and H. Dernie. A. O. a. ornamental: 1, Mr J. and H. Dernie. Rasbora: 1, Mr J. and H. Dernie. Barbs: 1, Mr G. Hallam; 2, Mr H. N. Nutt; and 3, Miss C. G. Sisson.

Mr and Mrs Dernie had a long list of awards to their credit at Nottingham:

- Labeos (sharks): 1, Mr A. Garratt; 2, Mr and Mrs J. and H. Dernie; 3, Mr G. H. Colton. Flavies and Glochidia: 1, Mr A. Hill; 2, Mr P. Reynolds. Neons and carinias: 1 and 2, Mr D. Wray; 3, Mr J. Wood. Rosaceos and rubellinor: 1, Mr D. Wray; 2, Mr and Mrs J. and H. Dernie; 3, Mr and Mrs J. and H. Dernie. Perchinas: 1, Mr and Mrs J. and H. Dernie; 2, Mr J. Wood. Golden orfe: 1, Mr R. Cox; 2 and 3, Mr A. Sexton. Chathanae, a. O. coldwater: 1, Mr P. Reynolds; 2, Mr H. Nutt; and 3, Miss C. Sisson.

Hendon Congress Changes Venue

Hendon & District Aquatic Society have announced with apologies that, because of circumstances beyond their control, the date and venue of this year’s Congress, published in the October issue of PFM, have had to be changed. The new date is Saturday 7th December 1968, and the Congress will be held at Edgware School, Green Lane, off Spur Road, Edgware, Middlesex, at 6 p.m. The speakers at the Congress are Mr Thomas Horeman and Mr Anthony Evans. Tickets (price 8s each, juniors half-price) are available from Mr Keith Purbrick, Secretary, Hendon & D.A.S. 3 Holme Way, Stanmore, Middlesex.
WESTON - super - MARE & D.T.F.C., in conjunction with the West Mendip Guppy Association, have invited Dr J. C. Kaye of the University of Birmingham, Department of Zoology and Comparative Physiology, to give a talk on the biology of fish breeding. The date is the 25th November at 7.30 p.m. and anyone interested in attending is asked to get in touch with Mr J. Stait, Ben Venuto, South Road, Lympstone, nr Weston-super-Mare, so that some idea can be gained of possible attendance figures.

AT the September meeting of AIREBOROUGH & D.A.S. 50 members and guests attended the annual auction when the president officiated as auctioneer and spent over two hours selling fish, plants, equipment, live foods and books. Results of the talks show at this meeting were: Catfish and loach, excluding Corydoras, advanced: 1 and 3, Mrs R. Robinson; 2, Mr B. Megson. Novice, 1 and 2, Mr J. Robinson. Junior: 1, Master A. Flesher. Platy's, advanced: 1 and 3, Mr H. Gardiner; 2, Mr W. Naylor. Novice, 1 and 3, Mr J. Robinson; 2, Mr C. Thompson. Junior: 1 and 2, Master A. Stretton; 3, Master M. Robson. Fish of the month: Mr H. Gardner's variegatus platy.

Members are busily involved now with arrangements for the seventh annual open show at the beginning of December. A new 'Breeder's Section' has been introduced this year, divided into two classes with trophies for best livebearer breeders and egglayer breeders. This section makes a total of 48 classes to compete for, with plaques for every class winner and five major trophies.

AT the annual general meeting of LLANWYT MAJOR A.S. Mr. D. Snowball was elected chairman, vice-chairman Mr A. Lewis, secretary and treasurer, Mr R. S. Wigg (17 Ham Lane South, Llanwit Major, Glam., CF 6 9RP): show secretary, Mr J. Sanders; librarian, Mrs A. Lewis; auditor, Mr K. Farrant. The secretary reported that the Society had had a successful year, both financially and on the show bench. The Society's judges had covered many miles to assist with judging shows in S. Wales and further afield. Recent meetings have included a very informative talk by Mr Churchill of Cardiff illustrated by over a hundred colour transparencies, and a table show at which great interest was focused on the tropical marine angel belonging to Mr Ken Farrant, which he took with tank and water over 30 miles to the meeting. At this table show, Mr Alan Rogers was awarded the best fish in show for a very good cardinal and will receive the Stampton Cup at the annual dinner. This fish won Mr Rogers a second at the Cardiff Open Show. Other table show results were: a.v. egglayers: 1, Mr A. Rogers; 2, Mr A. Ibberton; 3, Mr D. Songhurst. A.v. livebearers: 1, Mr A. Rogers; 2, Mr and Mrs A. Lewis; 3, Mr D. Songhurst. Guppies: 1, Mr S. Nelson; 2, Mr A. Ibberton. Livebearers: 1, and 2, Mr R. Wigg.

MR F. Brown of BRISTOL A.S. has been achieving much success on the show bench both at home and further afield. At the Yate & D.A.S. second open show Mr Brown secured a first and several second cards and at the club's table show for barbs Mr Brown took first and third place with Mr M. Howe second. In the class for goldfish, Mr R. Berry took first and second and Mr J. Phillips third place. Also at the Yate show Mr J. Phillips took a first and second in the shubunkin class. The club has recently enjoyed a 'Fishy Forum' when coldwater enthusiasts in the club took along tropical fish to be discussed and assessed by the tropical experts.

THE BEST fish in show award at the HARLOW A.S. open show was won by Mr A. Millhouse (Bethyl Green) with a piranha. Over 400 entries were received from clubs including Tottenham, Bethnal Green, Walthamstow, Chingford, Mid-Herts, Stone, Brent, Blackwater, Witam, Thurrock, Guildford, Freeland, Kingston and Edmonton. F.G.A. Special awards made included the Heppel Cup for club furnished aquaria that was presented to Harlow A.S. itself (2, Blackwater A.S.; 3, Bethnal Green A.S.; 4, Chingford A.S.), the F.B.A.S. Trophy for male guppy (Mr D. Curry, F.G.A. Edmonton) and the Rose Bowl to the club gaining most points. Harlow were again successful here, with Walthamstow second (77 points), Thurrock third (25) and Tottenham fourth (20). Details results were:

Guppies: 1, Mr P. Mundoch (Harlow); 2, and 3, Mr D. Curry (F.G.A. Edmonton). A.V. fighters: 1, Miss L. Durrant (Thurrock); 2, Miss J. Durrant (Thurrock); 3, Miss D. Durrant (Thurrock). Mollies: 1, Mr M. Smith (Walthamstow); 2, Mr L. Davison (Mid-Herts); 3, Mr F. Pinson (Chingford). Swordtails: 1, and 2, Mr B. Mather (Walthamstow); 3, Miss J. Read (Walthamstow). Platy: 1, Mr K. Appleby (Thurrock); 2, Mr P. O'Brien (Thurrock); 3, Mr J. Duncan (Harlow). A.V. livebearers: 1, Mr D. Durrant (Thurrock); 2, Mr G. Greenhalph (Kington); 3, Mr E. Gee (Blackwater).}

SALISBURY & D.A.S. was formed about 8 years ago and held their first open show recently. As a result of vigorous recruiting drive last year membership has steadily increased to 40 and the fourth annual open show held this year was a great success. Over 350 entries of good standard, were received. F.B.A.S. judge Mr. J. Stillwell (Portsmouth), Mr R. Matley (Bournemouth) and Mr C. A. T. Brown (F.G.A. Tottenham) judged the best fish in show award to Mr F. Brown of Bristol for a Mystus catfish. Mr R. Brown of Downownt awarded the highest number of points in the show, and special awards were made to Mr Jeffery for the best characin in show and to Mr Brown for the best breeders egglayer. Detailed results were:

Guppies (male): 1, Mr C. Bees; 2, Mr R. Brown; 3, Mr D. Mothers (Walthamstow). Guppies (female): 1, Mr C. Bees; 2, and 3, Mr Brown, Platt; 1, Mr S. Cooke; 2, Mr T. Garcia; 3, Mr T. Coombes, Mollie; 1, Mr R. Brown; 2, Mrs S. Sandsbury; 3, Mr D. Jones. Swordtails: 1, Mr T. Garcia; 2, Mr R. Harvey; 3, Mr R. Brown. A.V. livebearer: 1, Mr R. A.S.; 2, Berl-Wilts. Platy: 1, Mr Pennan; 2, Mr R. Brown; 3, Mr I. Goddard. Cichlid: 1, Mr R.
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SOUTIEND, LEIGH & D.A.S. called a special general meeting recently to discuss the holding of an open show in 1969. The date for this has been fixed tentatively for May or June. The show committee elected was: show secretary, Mr R. Passmore (39 Grafton Road, Canvey Island, Essex); advertising, Mr R. O. Orford; electricians, Mr S. Norris and Mr R. Nield; general members, Mr R. Blonham and Mr E. Bloxham. Highlights of recent ordinary meetings have been a talk by Mr Ed. Nicoll of Thurrock on ‘Unusual Fishes’; a judging competition (1, Mr T. Clark; 2, Mr Proctor; 3, Mr N. Sellers); a ciclid table show (1, Mr H. Hattam, oscar; 2, Mr R. Passmore, discussion; 3, Mr R. Parker, Jack Dempsey); and a home furnished-aquaria competition (1, Mr D. Finch; 2, Mr R. Bloxham; 3, Mr T. Bobbin).

THE BEST fish in show award at DEWSBURY & D.A.S. open show went to Mr W. Parkin of Huddersfield. Detailed results were:

- **Livebearers:** 1 and 3, Mr and Mrs Dervish (Workham); 2, Mr H. Green (Sheffield); 3, Mr B. H. (Barnsley); 4, Mr Benny (Skelton); 5, Mr E. S. Whitehead (Bradford); 6, Mr and Mrs Dervish (Workham); 7, Mr J. B. H. (Barnsley); 8, Mr H. Green (Sheffield); 9, Mr B. H. (Barnsley); 10, Mr E. S. Whitehead (Bradford); 11, Mr and Mrs Dervish (Workham); 12, Mr H. Green (Sheffield).

- **Breeders (guppies):** 1 and 3, Mr and Mrs Dervish (Workham); 2, Mr E. S. Whitehead (Bradford); 4, Mr B. H. (Barnsley); 5, Mr H. Gardner (Barnsley); 6, Mr and Mrs Dervish (Workham); 7, Mr J. B. H. (Barnsley); 8, Mr H. Green (Sheffield); 9, Mr B. H. (Barnsley); 10, Mr E. S. Whitehead (Bradford); 11, Mr and Mrs Dervish (Workham); 12, Mr H. Gardner (Barnsley).

- **Breeders (egglayers):** 1 and 3, Mr and Mrs Dervish (Workham); 2, Mr E. S. Whitehead (Bradford); 4, Mr B. H. (Barnsley); 5, Mr H. Gardner (Barnsley); 6, Mr and Mrs Dervish (Workham); 7, Mr J. B. H. (Barnsley); 8, Mr H. Green (Sheffield); 9, Mr B. H. (Barnsley); 10, Mr E. S. Whitehead (Bradford); 11, Mr and Mrs Dervish (Workham); 12, Mr H. Gardner (Barnsley).

- **Breeders (cichlids):** 1, Mr and Mrs Dervish (Workham); 2, Mr E. S. Whitehead (Bradford); 3, Mr B. H. (Barnsley); 4, Mr H. Gardner (Barnsley); 5, Mr and Mrs Dervish (Workham); 6, Mr J. B. H. (Barnsley); 7, Mr H. Green (Sheffield); 8, Mr B. H. (Barnsley); 9, Mr E. S. Whitehead (Bradford); 10, Mr and Mrs Dervish (Workham); 11, Mr H. Gardner (Barnsley); 12, Mr and Mrs Dervish (Workham).

 Membership of Harlow, Enfield, Methil Green, Tottenham and Chingford societies enjoyed an interesting meeting when **Walthamstow & D.A.S.** acted as hosts at an area group-meeting recently. Walthamstow gained the highest number of points in the table show. The feature of the evening was a slide lecture given by Mr D. Smalley (G.S.G.B.) on keeping and breeding goldfish. Even tropical enthusiasts showed keen interest; and further attractions were the varied species of goldfish on display and the illustration board prepared by Mr Smalley to show the step-by-step method of breeding goldfish. Recently the society staged a display of fishes at an exhibition in aid of the World Wildlife Fund. The exhibition was sponsored jointly by the London Borough of Waltham Forest and the South West Essex Group of the W.W.F. Society’s display consisted of several furnished aquaria, an ornamental pond and a display of individual fishes. The fishes formed two competitive classes, one for a. s. tropical (1, Mr N. Parmentier; 2, Mr M. Parmentier; 3, Mr R. Taylor) and the other for coldwater (1, Mr D. Smalley; 2, Mr G. Fleming).
THIS year THURROCK A.S. members have celebrated their first ever, very successful Open Show. In attendance were their twelfth and general meeting. They have also entered their Society Tableau at the Aquarium Show this month. Secretary Mr. T. F. Hendle, of 47 Fulbrook Lane, South Ockendon, Essex, welcomes enquiries from prospective new members. The Society's headquarters are at the Parish Hall, Gipsy Lane, Grays, Essex.

Wells and the first card in the bar class went to Master D. Boult. Mr. H. Harris obtained first place in the breeder class (2 and 3 Mr. F. Underwood).

THE SECOND open show held by MID-HERTS A.S. was an international one with entries from the Brooklyn (U.S.A.) A.S., Canadian Aquarium Society being received. From 147 entries, trophies went to the home team for the club obtaining most points, to the Radlett Section of the F.G.A. for the club making the most entries, to Mr. T. Coulager, F.G.A. for the best British guppy, to Mr. Cliff Wakeford, Ontario, Canada, for the female guppy, to Mr. L. Weller, Mid-Herts and F.G.A. for the best male guppy, to Mr. D. Phillimore, Wallamtham and F.G.A., for the best female guppy, to Mr. T. Croucher, F.G.A., for best breeders guppy and to Mr. P. Bird, Mid-Herts for the best fish in show, an eglaying toothcarp. Detailed results follow.

Furnished aquaria 24 in. by 15 in. by 12 in.: 1, Mr. J. Harvey (Harrow); 2, Mr. C. Withers (Mid-Herts); 3, Mr. R. Savile (Mid-Herts). Furnished aquaria, 18 in. by 10 in. by 12 in.: 1, Mr. D. V. Letts (Mid-Herts); 2, Mr. F. Funnel (Unbridge); 3, Mr. A. E. Walsh (Unbridge).}

Playa: 1, Mr. R. S. C. Wingrove (Wycombe); 2, Mr. R. F. C. Newnham (Wycombe); 3, Mr. J. R. Cox (Wycombe). Awards: 1, Mr. D. Phillimore (Wallamtham); 2, Mr. E. Clark (Unbridge); 3, Mr. B. Funnel (Unbridge).
In Brief...  

SECRETARY OF DIDCOT & D. A.S. is now Mr D. C. Whiting, 28 Blenheim Close, Didcot, Berks.  

FOUR STAR A.S. is a new Society formed in the Hensworth district, Yorks. Chairman is Mr L. Green; secretary is Mr H. S. Pugh of Earl Street, Fitzwilliam, Mr Penderst, Yorks. Enquiries from prospective members welcome.  

WARSOP DISTRICT AQUARIUM SOCIETY meet weekly on Monday nights at 8.00 p.m. at the Hare and Hounds, Warsop. New members and visitors welcome; further details from secretary Mr B. Ives, 35 Edward Street, Warsop, Mansfield, Notts.  

Mr R. G. Pickard (160 Lavender Avenue, Mitcham, Surrey) is the secretary of the SOUTHPARK AQUATIC (STUDY) SOCIETY.  

OFFICERS elected by WEDNESBURY A.S. for 1967/68 are the following: President, Mr E. Skidmore; chairman, Mr E. Hyde; vice-chairman, Mr W. Devison; secretary, Mr G. Wardle (60 Morris Avenue, Bentley, Walsall, staffs); treasurer, Mr A. Wood; show secretary, Mr D. Highfield; assistant show secretary, Mr T. Shipren; committee, Mr B. Caley. Breeders club: livebearers, Mr. J. Reeves; egglayers, Mr. T. January. Visitors are always welcome at the monthly meetings, first Monday of the month at The Woodman, Wood Green Road, Wednesbury.  

MR F. CAMPBELL, 37 Cardigan Drive, Bury, Lancs, replaces Mr R. Beresford as Association Secretary of the FANCY GUPPY ASSOCIATION. Membership enquiries and requests for Standards Handbook to the new secretary, please.  

IN THE BURTON & D. A.S. table show for fish bred by members in the last 6 months, Mr B. Pointon took first and second places in the egglayers class with thick-lip gouramis and black widows. Mr G. Mead obtained 72 points with copper tetras. Livebearer class results were: 1, Mr J. Hunter; 2, Mr G. Mead (guppies); 3, Mr J. Quinn (albino sword).  

EALING & D. A.S. much enjoyed their colour-slide show on various aspects of fishkeeping given by Mr Jack Norris of Narrack A.S. Table show results for r asbornas, minnows and danios were: 1, D. Key (junior); 2, Mr R. Sellers; 3, P. Carter (junior). First place in the dwarf cichlid class went to Mr Ted Tagg.  

NEW ADDRESS of the general secretary of the INTERNATIONAL MARINE STUDY SOCIETY, Mr Terence Hall, is 40 Broadhurst Gardens, London, N.W.6.  

THE newly formed SYDENHAM & PENGE A.S. meets at 8.30 p.m. on every other Wednesday (next meeting 19th November) at Anerley Town Hall. Secretary is Mr P. Ridlington, 23A St Aubyns Road, Upper Norwood, London, S.E.19.  

OFFICERS OF BETHNAL GREEN A.S. for 1967–68 are: chairman, Mr A. Collins; show secretary, Mr L. Smith (2 Mercers Road, Holloway, N.19); secretary, Mr A. Millhouse. Club activities take place at the L.C.L. Evening Institute, and Mr F. Tomkins is the resident lecturer. Show secretaries are asked to note that show schedules are now available for the Hackney Show.  

THE class for furnished show jars (won by Mr A. Hastie and junior L. Urquhart) attracted the largest number of entries at the DUNDEE A.S. table show in September. Other winners were: catfish 'A' and 'B', Mr Brian Hill (first overall and Amalphi cup); first junior, Fraser Smith. Loaches, Mr G. Mitchell; first junior, G. Yule, Exotic coldwater, L. Urquhart (and first junior); native coldwater, Mr D. Towns.  

NEW show secretary of SCARBOROUGH & D. A.S. is Mr J. Stephenson (19 Endcliff Crescent, Scarborough). Members of this new club have enjoyed a varied Performance...
programme—a talk by Mr Baker on neon and cardinals, a slide show on cichlids and a quiz by secretary Mr E. W. Dickinson (won by Mr Stephenson). The first table show was judged by Mr G. Hawkinsby of York and winners were: euplotes, Mr Trinder; a.o.o. livebearers, Mr Brunt; catfish, Mr Joaesses, Mr Stephenson; barbs, Mr Hodgson; coldwater, Mr Porton. The best fish in show was a very fine safflin mollie belonging to Mr Brunt.

... NEW P.B.A.S. 'B' class judging recently completed at Tropical, Mr R. L. James, Mr G. Harrison, Mr D. V. Jones, Mr R. J. Brown, Mr R. Armstrong, Mr J. J. Sanders, Mr J. V. Jeffries and Mr D. F. Harding. Tropical and coldwater, Mr D. Crisp, Mr K. Nutt, has been upgraded to become an 'A' class judge. Largo, Towngate, Rhondda, Clapham, South Park and Suffolk are recently affiliated Societies.

... SECRETARY Mrs P. M. Hoyle of the COLWYN BAY & D. A.S. wishes to record special thanks to the friends and members who helped to salvage the club's first two winter meetings from complete disaster. For both these meetings, in spite of bookings made last April and early May, the slides and taped lectures, paid for in advance, failed to arrive in time and no replies could be obtained to correspondences. An earlier barbecue held on the beach, was, however, a great success. The weather stayed fine, Mr Michael Taylor was an excellent chef, assisted by Mr Graham, and over 100 members and friends bought tickets.

... A WELCOME return visit was made by Mr W. Corby to the ILFORD & D. A. & P.S. On this occasion Mr Corby talked about breeding anabantids with particular reference to the Siamese fighter and the leeri. The society had one of its most popular talks on ornamental fish and plants in September and future meetings are: a lecture by Mr Rob List on Monday, 11th November; a programme on fish houses and fish shows by Mr J. M. Morrie on 9th December; and prize awards for 1968 and slide show on Monday, 12th January. All are welcome at these meetings. For further information please contact secretary Mr R. J. Nutt, 163 Heath Road, Chadwell Heath, Romford, Essex.

... NEW FOREST A.S. held a joint meeting with SOUTHAMPTON A.S. which was judged between the two clubs. A slide show, judged by Mr Jones of Southampton and Mr R. Nutt of New Forest, Southampton took the first four places. The monthly club meeting devoted the evening to a discussion of ways of attracting new members. Mr D. Harding was awarded first place in the table show, common goldfish class, and Mr R. Travers in the class for coldwater plants.

... ROCHALDE & D. A.S., formed only 5 months ago, have held a successful first open show and wish to thank all who participated. Officers appointed at the annual general meeting are: chairman, Mr J. Schofield; secretary, Mr R. J. Lord (61 Bridgfield Street, Rochdale); treasurer, Mr J. McEvoy; minutes secretary, Mrs V. Costello; show secretary, Mr P. Dunster (change of address: 63 Redcross Street, Rochdale); assistant show secretary, Mr P. Taylor; public relations, Mrs B. Lord; social secretary, Mr K. Whitehead. Meetings are now held on the first Tuesday in the month at Shubbers Arms, South Street. New members welcome.

... TONBRIDGE A.S. members enjoyed seeing a slide-tape show of the 1966 B.A.F. recently, followed by a very good set of slides of prize-winning exhibits taken at the Brighton open show this year by Mr A. Riley. Table show results were: fighters, 1, Mr J. Bellingham; 2, Mr R. Catmore; 3, Mr I. Mathiesen. A.o.o. labyrinths: 1, Mr M. H. London; 2, Mr J. Williams; 3, Mr J. Amos.

... RESULTS OF THE BOURNEMOUTH A.C. home-furnished aquarium competition were: 1, Mr Pick; 2, Mr J. V. Jeffery; 3, Mr F. McFarlane.

... Mr Robert McDonald, secretary of NEWTOWNABBEY A.S. reports that next August in Belfast it is planned to hold the biggest open show ever held in Ireland and societies will be busy this winter building stands to exhibit furnished aquaria. President of the society, Dr Gracey curator of Bellevue Zoo, supplied the projector, screen, sound equipment and two films for the club’s September meeting when everything went without a hitch, thanks to electrician Mr Alan McCormick, Mr Thompson, head keeper at the Zoo, who was also an ever welcome visitor at the meeting.

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Dates for Your Diary

29th-31st October, BRITISH AQUARIUM FESTIVAL at Bella Vue Gardens, Manchester. Enquiries to Mr G. W. Cooke, Spring Grove, Field Hill, Bailey, Yorks.

3rd November, MIKENDEN T.F.S., Open Show, Mikenden Community Centre, Clough Lane, Mikenden, Halifa克斯.

10th November, HALIFAX A.S., seventh Open Show, Smith Barber & Co. Ltd., Hebdenfield Mills, Halifax, 4 A-class judges, Schedules from Mr A. G. Whyte, 12 Rothwell Drive, Halifax.

11th November, THE AQUARIUM SHOW

15th November, HARTLEPOOLS A.S., tenth Open Show, Longyear Hall, Hartlepool. Schedule from Mr J. D. Want, 42 Sylvaeham Road, Hartlepool, Co. Durham.

22nd November, THE HACKNEY SHOW. Details from Mr Len South, 2 Moseworth Road, Holloway, London N.19.

3rd November, GSCB Quarterly Meeting, Conway Hall, Red Lion Square, Holborn, London. 8.30 p.m. Details from Mr Secretary, 27 Connaught Gardens, Edgware, Middlesex.


26th December, FEDERATION OF BRITISH AQUATIC SOCIETIES general meeting at Conway Hall, Red Lion Square, London, W.C.

December, THE HENDON CONGRESS. Edgware School, Green Lane, off Hendon Wood Road, Edgware, Middlesex. Commencing 6.45 p.m. Ticket from Mr Keith Purdy, 3 Holme House, Stannmore, Middlesex.

30th December, AQUARISTS' CONVENTION sponsored by HORSFORTH A.S. College of Technology, Leeds University, Woodhouse Lane, Leeds 1, Commencing 8.30 p.m. Tickets from Mr W. Audley, The Springfield Walk, Holmfirth, Nr Leeds, Yorks.


9th March, HUDDERSFIELD T.F.S., Open Show, Drill Hall, St. Paul's Street, Huddersfield.

16th March, TOP TEN AQUARISTS Tropical Fish Show and Exhibition at Huddersfield Town Hall. Details from Mr L. Kaye, S Tortise, Holmfirth.

15th May, RAINWORTH & D. A.S. Open Show. At Showrooms, E. Taylor & Sons, West End Garage, West Gate, Southwell.

20th July, GOSPORT & D. A.S. third Open Show. Details from Mr W. L. Wilson, 17 Connaught Gardens, Edgware, Middlesex.

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