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In This Issue

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A

Comments and Quotes

● A lot of goldfish ● Breeding discus ● Research medallion ● Purchase tax off ponds ● A very bitter pill

Where Do They Go?

THE figures issued by the Japanese Finance Ministry for fish bought by goldfish fanciers in Japan during 1966 might well stun the imagination. 180,000,000 goldfish were bought during last year, and this is on top of the 168,000,000 fish bought during the previous year. Figures to gladden the heart of the goldfish farmers, no doubt, who are also enjoying rising exports. One-third of these went to the United States and of the rest a large proportion went to France and Australia. The increased sales are being made possible with the new techniques worked out by the fish farmers, who are breeding the goldfish all the year round by heating the tanks and supplementing the fishmeal diet with protein, vitamins and algae. One wonders, however, whether the figures do not perhaps reveal that the Japanese, too, have the problem of multiple goldfish deaths shortly after purchase that we hear so many complaints about in this country, or are there really at least 340,000,000 goldfish swimming about in happy domesticity in Japanese homes and gardens?

History Repeats Itself

SOMETIMES the feeling that it has all happened before is very strong, and this feeling is one we get often when the discus fish comes under discussion. When we are asked about their keeping or breeding we look at the list of conditions that are known to apply in the tanks of aquarists who have been successful with the discus. It's then that memory switches back to around 1930, when much the same kind of advice about water conditions, for example, was being handed out to those whose ambition it was to breed the angel fish. Somehow the difficulty with angel fish is not there any more, and today we hear plenty of instances of angels pairing up and spawning in community tanks that have not been prepared in any special way.

What is the explanation of this? Does it mean that just as, it is said, brass begets brass so breeders beget breeders? Do the fish originally from the wild slowly adapt themselves to aquarium conditions in a way that leads to an inherited domesticity over several generations?

If this is true then history is repeating itself yet again, for in Europe it appears that German aquarists are now breeding more discus fish than anyone else and it was from Germany that our aquarium strains of breedable angels originally came. In theory, at least, we should be hearing of more and more breeding successes with the discus in the next few years.

New Underwater Research Award

A SPECIALLY designed medallion forming a Duke of Edinburgh's prize for outstanding underwater research performed or published during the year has just been awarded for the first time. Its recipients are the Cambridge Univer-

sity section of the British Sub-Aqua Club, for their studies of fish behaviour.

Purchase Tax Off Ponds

CONGRATULATIONS from the hobby are due to Mr P. L. Builder, managing director of Pump Distributors Ltd. After a protracted series of representations to the Commissioners of Customs and Excise his firm has been told that pre-fabricated garden pools, cascades and waterfalls are no longer to be subject to a purchase tax charge. The reduction in prices of these items that results will benefit both trade and fish-keeping generally.

A Very Bitter Pill

IF your favoured remedy for white spot disease is quinine it will no doubt not have escaped your notice that the price of this drug and of proprietary white spot cures that include it as their active ingredient have really zoomed upwards in the last few years. In fact, since 1960 quinine itself has increased in price by no less than 700%!

The story behind this increase is not a pretty one. Investigations by an American Government committee have disclosed that the rise is the result of a secret price-fixing agreement made between a number of drug firms in different European countries. These firms have attempted to corner the market by under-cover buying of some 80% of a U.S.A. stockpile of quinine. The drug is, of course, important as a malaria cure, and large quantities are being used at present in Vietnam. So don't let off steam at your dealer or the manufacturers of the aquarium proprietaries about high prices—very much deeper issues than profits in the aquarium trade are involved!

LETTERS

Feeding and Holidays

I WAS very interested in Arpee's comments (PETFISH MONTHLY, June) on the subject of the feeding of fish during the holiday period. I think his solution, to call upon the services of an aquarist friend, may well be the ideal one, but it is really not always possible. Trained neighbours and friends may be the next best thing, but I am really quarrying his condemnation of the suggestion that the fishes can be left for a fortnight without food. I agree that this could not be undertaken if tanks of fry or very small fish were involved, but I have often left well-planted community tanks without food during the holiday period without any losses taking place; nor did the fish look any the worse for the experience. I think the secret lies in previous conditioning in preparation for the holiday, and I see that the fish are exceptionally well fed during the previous month with as varied a diet as possible. Then, on the day I go away, the fishes are given a generous quantity of live *Daphnia*. This alone provides them with food for several days. I must admit we take our holidays during the summer months and it might certainly be more difficult to feed the fish up in this way at a time when we might be going winter sporting!

London, S.E. 15 L. BUSHELL

This letter wins this month's aquarium aerator prize.

Overzealous Splits

WITH reference to the remarks of Mr Bill Armitage (PETFISH MONTHLY, May 1967) concerning split fins in guppies, I would suggest, from my own observations, that split tails in male guppies can be blamed almost entirely on the male guppy's courtship behaviour. When he is showing off in front of a female, he will try to spread his tail wider than it is, with the result that the tail nearly splits in two.

With a brood of young guppy fry, the general practice of most guppy breeders is to separate the males from the females as soon as they can tell the difference. All the males are kept in one tank—the females in another—until the time comes when the fish are a few months old and it is possible to select the best males and females and place them together for breeding. These males, seeing females for the first time, spread their tails wider than they have ever done before, resulting in split tails and sometimes even split dorsals.

I once placed six males in a tank with six virgin females and within a week all the males had split their tails. Males that are kept together away from females fight and damage each other's tails. I never keep males on their own now. I always have at least the same number of females as there are males in one tank. These females are not from the same brood as the males—they are from an older generation.

I find that if males are brought up with females, from about 6 weeks old, they start to spread their tails in front of the females at an early age. This gives them strong tails and when they are old enough to place with your best virgin females they do not split their tails.

Bury, Lancs T. A. HARDMAN

Appreciation

SINCE I first read about your magazine in a paper out here, I have persuaded my mother to post P.F.M. to me every month and I must say it is a wonderful magazine, full of interesting ideas. I myself had quite a problem here with the breeding of angel fish and was near the end of my tether until I read the January

Continued on page 125

LETTERS

Continued from page 122

edition of P.F.M. which explained quite thoroughly how to breed angels successfully. You can understand it is almost impossible overseas to gain the advice of a breeder on fish problems. Now there is no problem at all thanks to D. B. McInerny.

B.F.M.O., Singapore R. P. SKIRROW

Mr McInerny's articles have been the subject of many appreciative comments and we expect that readers, like ourselves, will be sorry that his 'Course for the would-be breeder of tropicals' has now been concluded. However, we are hopeful that Mr McInerny will continue to contribute to our pages in the future.—EDITOR.

A Cabinet Aquarium

THE growing popularity of the furnished jar at aquarists' shows, as revealed by Mr Fred Underwood's helpful article in the June issue of PETFISH MONTHLY, is an interesting development. It seems to me that this technique could be used more, for the economical housing of small fishes in pairs, if rows of the jars are mounted above 'hot boxes' containing electric lamps or electric soil-warming cables to provide the heat. If the jars were shelved in this way in a kind of cabinet I think the effect would not be unattractive. I have noticed that some aquarists have even fitted small lamps for overhead lighting in the caps of show jars, and lighting in some such form would obviously add to the effect of such a display.

This idea reminds me of a scheme I read about in an old aquarium book by the Reverend Bateman when I was a boy. This author's suggestion was to make a 'Cabinet Aquarium' (I think this was the actual title used) with jars of various kinds to separate and keep for study all kinds of pond life—water beetles, caddis larvae, water scorpions, water spiders and so on. In fact I did develop something along these lines in my bedroom at the time. I would like to read other people's comments on the idea of making a 'Cabinet Aquarium' for small tropical fishes.

London, S.W.20 K. PRINGLE

A Special Report

AS even the most unobservant aquarist has now been made aware, the ill-fated tanker *Torrey Canyon*, which struck the Seven Stones reef off Lands End in March, did, in doing so, inadvertently cause what was possibly the greatest ever danger to the littoral flora and fauna of the coast of south-west England.

As you mentioned in your 'Comments and Quotes' section last month: 'This disastrous wreck and its threat to British beaches and marine life proved to be an item of major public interest'. The Marine Study Aquatic Society of Great Britain became deeply concerned in the efforts being made to lessen this catastrophe and decided to assist by the means at its disposal, primarily by accumulating all correct available data, as we, as well as yourselves, were astonished by the apparent lack of reliable information.

One of our officers went to Plymouth and then to the affected areas to collect information and collate our activities with those of other organisations. This action resulted in M.S.A.S. obtaining the required material and we have devoted our next journal to the *Torrey Canyon* disaster and its effect on the shore and off-shore marine life of the area.

Our journal is normally available to members only, but we feel that as this matter may be of interest to others we are making copies of this illustrated edition available to anyone wanting a copy. The journal will cost 2s 11d (5d postage included) and any income obtained above the cost of production will be used to further investigations in this field.

G. H. JENNINGS
for M.S.A.S.G.B. (General Secretary),
23 Canfield Gardens, London, N.W.6

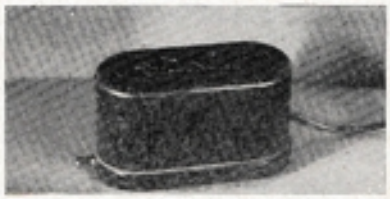
Simple Biological Filters

AQUARISTS may be 'strangely unwilling' to try the elementary type of biological filter described by Capt. L. C. Betts (PETFISH MONTHLY, May) but his mention of it recalled to mind where I had seen inverted funnel filters extensively used. This was in the otherwise bare quarantine tanks of one of our main tropical fish importers, and I remember thinking when I saw them that this simple idea must be a very effective one for it to be used by professionals.

Taunton, Somerset N. CAPE

Prize Letters

TO the writer of the letter judged by the Editor to be specially worthy among readers' letters published in each month's issue, PETFISH MONTHLY will award a prize of a well-known make of aquarium aerator (as pictured here).



PETFISH MONTHLY will be glad to have your experiences, comments, suggestions etc. in letters on any matter associated with fish-keeping. Write to the Editor, PETFISH MONTHLY, 554 Garratt Lane, London, S.W.17.

personal comment

by **ARPEE**

THE correspondence continues to come in about white spot and its cures. Mr Glover's article describing his high-power filtration method was stimulating, but I was left with two doubts. The presence of ozone in the system was given little credit for success against the disease, and I failed to see quite what advantages (other than the obviously successful results!) which the filtration system has over that of a complete water change every day. Mr Butcher stated in his article (PFM, November, 1966) that chloramine is effective against the disease (Halamid belongs to this group of drugs), and suggested that ozone could also be efficacious. Mr Glover seems to have confirmed this to some degree, but, like all the other methods, nothing seems absolutely infallible. This suggests to many aquarists that there are several strains of the disease, and I personally find this fits the facts quite well.

A particularly sinister feature of the disease is that certain outbreaks seem much more persistent than others. A dealer I know, armed with all the resources of the hobby, had one isolation tank tied up for 6 months without bringing off a cure. I have recently just put paid to an outbreak which had lingered on since last October. We have both cured the occasional outbreaks at other times by conventional methods, quite quickly and effectively, but this 'persistent ich' is extremely worrying, and one can sympathise with many a beginner who has disgustedly given up the hobby at an early stage when faced with an apparently unending battle and a steadily increasing collection of ineffectual remedies. Indeed, desperation often seems to take hold of us when, after several weeks of following the rules, the spots keep reappearing.

On four occasions during the last outbreak I had, I thought that I had got things under control (I was using Halamid). However, a group of cardinals and neons repeatedly showed spots whilst the other inhabitants of the community tank were clear. Although I broadly followed the rules I was less conscientious about water changes than I should have been, hence a massive dose of the chemical gradually built up and the plants began to deteriorate. Although the majority of fishes seemed unaffected there were one or two interesting exceptions.

A silver dollar gradually became less silvery and more white-looking, and a glowline rasbora and a cardinal became deformed along the spine. As soon as the last spots had gone I gradually decreased the temperature, and after 14 days I made a major water change. Each week thereafter I changed about a quarter of the water, and the three fishes mentioned seemed to improve in appearance. Although I had given them up for lost, they are still alive, and the dollar has regained its original colour. In retrospect I have little doubt that I relied on the chemical too much, and if I had had greater faith in the Premunity-Commensal theory, and had left well alone after taking the initial precautions, maybe the community would have adjusted itself with less discomfort than it did in the event.

In support of this theory, I did less and less to the tank towards the termination of the outbreak because I had virtually resigned myself to taking the tank down and treating the infected fishes in a bare tank, but, suddenly, one day the spots were gone and there was another little mystery.

Summer and flies means that household aerosols will be much in evidence. Please make sure that these are kept well away from your tanks, as most of them are absolutely fatal where fish are concerned. If they have to be used, make a cover for your aquaria, and leave these in position until an hour after spraying. Even this isn't completely safe.

I was talking with a dealer last summer who had had some quite inexplicable deaths in some of his tanks. He had used aerosols in another part of the premises, which was physically isolated from the tank area. He had lost fishes in several widely separated tanks, and although he had a shrewd idea that aerosols were at fault, he could not account for the way in which they had been transmitted. The only suggestion I could make was that certain larger creatures like cockroaches, beetles or large blowflies had been sprayed with the poison, but had survived long enough to stagger to a tank and fall in. I should be pleased to hear of any other theories as to how this may have happened, as it may help some of us to minimise losses this coming summer.

Whilst on the subject of cockroaches I wonder how many aquarists, in their early days, fell into the trap, as I did not all that long ago. A combination of poor light, not very clear water and the immensity of the creature at the back of the tank induced me to enquire the price of the new type of dwarf gourami. The dealer was very kind and understanding, but it has taken a lot to live it down. . . .

I was glad to see a letter in the September issue from Miss Shelley of Morden, who sprang to the defence of china ornaments, plastic flowers *et al.* in the aquarium, principally because she admits to not using them herself! I am quite sure that, as she points out, the use of these artificialities does give some people much pleasure, but I do wish that whoever these people are, they did not term themselves aquarists. I am quite prepared to believe that a tankful of bubble-blowing plastic molluscs and treasure chests would charm the class of seven-year-olds at school, but how the serious aquarist can come to terms with them still leaves me quite baffled. In passing I would exclude coloured gravel from my list of dislikes, since not all of it is patently horrible, but I still think it needs choosing with great care. We have so far only heard the female viewpoint, and I suspect that the ladies are much more susceptible to the little china figures than are the males amongst us, from whom I should certainly welcome further views.

Growing Fish to Maximum SIZE

Careful attention to management during the most rapid phase of their growth is the way to get the best aquarium specimens

By F. N. GHADIALLY, M.D., Ph.D., D.Sc.(Lond.)

The size of this giant gourami (Osphronemus) can be judged from dimensions of the tank (24 in. by 12 in. by 12 in.) in which it was exhibited at last year's ASLAS Show

THERE can be few things which delight an aquarist more than compliments on the large size and fine condition of his fishes. Most of us would agree that some aquarists seem to be unusually good at this game and can grow fishes to amazing proportions.

The purpose of this article is to examine how one can proceed to rear large quality specimen fishes, but before we do this it would be advantageous to recall some general biological facts about growth of fishes and other animals.

It is now well known that fishes grow more or less continuously throughout their life span. This is in sharp contrast to man, where virtually no increase in length (height) is possible after the age of 20 years or so when the bones 'unite'. Perhaps I should explain more fully what is meant by this term.

If we examine, say, a long bone such as the femur from the thigh of a child we shall find that the bone is made up of three distinct sections separated by two cartilaginous plates. The long central portion of bone is called the diaphysis and each of the two end pieces is called an epiphysis. The lengthening of the bone of the child as it grows is achieved by division of cells in the cartilaginous plates. The newly formed cartilage is replaced by quite an elaborate and intricate process to form new boney tissue. In the terminal stages when the adult state is reached proliferation of cells in the cartilaginous plate ceases and the plate itself is destroyed and replaced by 'boney tissue'. Thus at this stage the epiphysis fuses or unites with the diaphysis. Since no growing cartilaginous plate now remains it is easy to understand that when this stage is reached any further lengthening of the bone is quite impossible.

Growth in the Young

In fishes there are no such structures, hence fishes can and do (if conditions are favourable) continue to grow throughout their life. However, as every aquarist knows, the rate of growth of baby fishes is much greater than that of adults. For instance, just consider the size of a newly hatched angel with that of an 8 to 10 weeks' old one (so-called saleable size) and you will see what I mean. At a guess one would say that a several-hundredfold

increase in size (on a weight basis) has occurred within a relatively short period of time. Such a phenomenal increase in weight or in length, of course, does not occur in the later years of a fish's life.

For many years now aquarists have therefore argued that the first few months of the life of a fish are critical from the point of view of growth and the ultimate size that can be attained. It has thus been stated that any stunting in size produced by poor feeding, bad management or neglect at this stage cannot be completely made good at a later date even by the most expert treatment. A few, however, have argued that since fishes grow continuously good treatment at a later date can undo most and probably all of the damage done in the earlier stages.

There is some truth in both statements. One might perhaps compromise by saying that short periods or a moderate degree of maltreatment in youth could be made good later on and may not affect the ultimate size that is reached, but if we are trying to produce really large specimens the chances of success are better assured if we use stock which has received first-class treatment from the very beginning. In any case, since there is uncertainty about this point it would be best if we took no chances and gave the fish first-class treatment throughout its life right from the egg stage.

If we accept this then it follows that since most of the tiny little fishes purchased in shops have made one or more journeys in plastic bags, passed through many hands and suffered variations in diet and water conditions over a fairly protracted period of time, they are not the ideal material for our purpose.

Fishes obtained from a competent fellow aquarist are to be preferred, for they offer many obvious advantages, not the least of which is that you can at least get a fairly accurate history of the specimens to which you are going to devote time and effort in growing up. But the ideal material, of course, is the fish you have bred yourself. Here everything from the egg and fry stage is completely under your control and given the necessary equipment and knowledge there is no reason why you should not produce outstanding specimens.

Genetic Factors

But before we see how this can be achieved let us for a moment consider what factors determine the ultimate size to which an animal will grow. Briefly this can be considered under two headings: genetics and environment. As is now well known, one of the factors affecting the size to which an individual can grow is the genetic make-up of that individual. Thus no amount of forced feeding could make a mouse grow to the size of an elephant or make an individual descended from a pygmy race with an average height of 4 ft. grow into an 8 ft. giant. One could say that genetic factors set a limit to the maximum size that an individual can attain.

Environmental factors like nutrition operate within this limit to establish the final size that the individual reaches. If a litter of animals is divided into two groups, one fed adequately and the other semi-starved or maintained under other adverse environmental conditions, then as one would expect the better fed and looked after group will outstrip the others in size.

Obviously if large fishes are the aim it is worthwhile to start off with fishes derived from outstanding sized parents. What a difference there is between the size and quality of livebearers (like swordtails and platys) that we see at shows and livebearers reared from indifferent stock obtained from unknown sources! The best way to start producing large specimen livebearers would be to obtain some babies born of these prize fishes, but this may not always be possible.

Another way in which one can increase the size of a strain of fish is by selective breeding. In any given brood of young one almost invariably finds individuals who grow faster and bigger in size than others. If these individuals are separated from their slower growing brethren and later used as parents, the resultant second generation babies are likely to be on an average bigger than the individuals of the first generation. Selection for size can once more be employed and in time it would be possible to obtain fish that have the genetic potential to grow to quite an outstanding size for the species concerned. This is a slow process and one has to persevere with it for many years over numerous generations, but it is a fundamentally sound idea.

There can, however, be complicating factors for quite often the largest fish in the brood are not necessarily the best coloured or best shaped specimens. This is only too well known to fancy goldfish breeders. The largest fish or two which one would liked to have retained as breeding stock have poor fins, eyes or colouring, making them undesirable as potential breeding stock.

In such cases one has to compromise in one or other direction. One could for instance accept a somewhat smaller fish with all the desirable features. By such series of selections over the years aquarists have 'improved' size, shape and colour of many fishes. Only by comparing our best aquarium specimens with similar species caught in the wild can one appreciate the remarkable feat that has been performed.

Environmental Factors

Let us proceed to examine the environmental factors which affect the size of our fishes. In brief these boil down to good feeding and aquarium management. Much has been written on these topics so a brief summary will suffice. Feeding for maximum growth demands that the maximum amount and variety of good food is got into the fish at a fairly fast pace.

Since large quantities of food placed in the water would soon rot and pollute the water it follows that frequent feeding with smaller amounts will be required. Even so, with intensive feeding and the resultant larger amount of excretory material produced frequent partial changes of water are necessary. This is good aquarium practice anyway, but is doubly important when intensive feeding is indulged in. To summarise then, the idea is to push the feeding as far as possible without fouling the water.

The next important environmental factor is swimming space or water volume. You must have often heard it said that to grow big fishes you need big tanks which are not overcrowded.

This is a generalisation with a lot of truth in it but we could also add that a competent and knowledgeable aquarist can grow some pretty large fishes in small tanks.

To be continued next month

Is it New to You?

Koi Carp

A new challenge for the coldwater specialist

By R. M. WHITTINGTON

THIS year has seen an event which if pursued intelligently could leave its mark on the aquarium hobby in no uncertain way. I mean the availability through greater imports of the Japanese coloured carp known as nikishi koi. The existence of these was first known to me 5 years ago when I met them in the establishment of an importer who was, I believe, a 'lone wolf' at this time. He was bringing them over from Japan in quantity, many colour patterns being seen, and the fish were quite large—anything up to 15 inches and a couple of pounds weight.

The carp have found their way to the big London stores, and I understand the intention was to supply them to owners of landed estates with large lakes, as a very pleasant alternative to common or mirror carp. As an anglers' fish in such circumstances they will prove of undoubted interest as they are reputed to grow up to 20 pounds weight and maybe more.

There is not a lot of information available about koi. They are certainly known in America, and GARDEN POOLS by Paul Stetson shows 19 named specimens of different colour patterns and states that the species arose by careful crossing between *Carassius carassius*, *Carassius gibelio* and *Cyprinus carpio*, all well known fishes to British aquarists.

There have been several advertisements for koi in PETFISH MONTHLY this year. Large koi are expensive, but others are well within the reach of the average aquarist. Naturally, they will not appeal to everyone, and growing as they do to a large size it is evident that they must be kept in outdoor ponds. A pool the size of a tennis court seems ideal, but taking the rules of space for size already mooted for other coldwater fishes, a pond of 10 ft. square dug and lined with Plastolene sheet is not an impossibility, and 25 koi should be capable of existence in a thriving condition; with 4 square ft. surface area to each fish they would grow to a reasonable size.

It is known that they become very tame, and will feed from the hand. Being carp they should be omnivorous in diet. Large worms, slices of brown bread, dog foods, chicken pellets, dried meat meal pellets as sold for pond feeding, and boiled wheat or even porridge all suggest themselves as being part of a suitable diet.

At this early stage in our knowledge of koi, many problems spring to mind, and amongst them are the following:

(1) Koi have been seen with and without barbels. Are these derived from both *Cyprinus* and *Carassius* carp as we know them?

(2) Do they exist in the metallic and nacreous groups, as do goldfish, and if so, from where do the 'mirror scaled' fish derive?

(3) How many distinct colour patterns are there available; do they breed true between themselves or can more colours be obtained from crosses?

(4) Are all the hybrids fertile?

(5) Are the organising bodies of the hobby prepared as yet to examine the fish with a view to providing standards?

It is early in the show season as I write, but I am sure we shall see a few koi on the bench this summer, and I wonder what the judges will make of them?

There is much to be learned about these new fish, and I hope there are aquarists somewhere who would be interested in the study of koi carp. What we really need is a 'Non-Goldfish Society' to carry out a campaign of research!

Book Review

Krankheiten und Schädigungen der Fische by Prof. Dr H.-H. Reichenbach-Klinke.

Gustav Fischer Verlag, Stuttgart, Western Germany. 1966. Pp. XII + 389, with 330 black-and-white text illustrations and 2 tables with 8 colour pictures. DM 74 (£7 8s 0d approx.).

THIS book on diseases and other afflictions of fishes is directed to the problems of the practical fishkeeper in the most general sense as well as to biologists and veterinarians working on pathology and parasitology of fishes. Although, as usual, diseases of freshwater fishes are the main subject, the author has tried to include the more common parasites and diseases of marine fishes as well, which is of particular interest for keepers of sea-water aquaria and of marine fisheries experts.

In the first chapter general symptoms of disease are described and a summary is given of possible causes of a series of main symptoms observed either externally or on post-mortem internal investigation. This general introduction is systematic with respect to the separate organs that are the main sites of certain infectious agents, referring to the later chapters for details.

Chapters II–XIII deal with infectious diseases (viral and bacterial); fungus and algae as parasites; infusorians as fish parasites (protozoöses); parasitic Coelenterata; worm infections (helminthoses); infections by arthropods (Crustacea, Linguatulidae and mites; the well-known fish louse and its relatives come into this group); parasitic vertebrates; tumours; non-parasitic diseases other than tumours; recovery of wounds

and regeneration; anomalies; fishes as carriers of parasites of man. Chapter XIV is devoted to medication of fish diseases, and chapter XV gives a list of fishes of high economical importance and the most common parasites found in each of them.

The book ends with a list of names of fishes in German, English, French and Italian, together with their scientific names, which is most helpful, although there are some minor omissions and deviations.

A small number of printing errors was encountered, none serious, with at p. 97 'Negu von', which should read 'Neguvon'—perhaps the only one which could give rise to misunderstanding since to the German word 'von' means 'of'.

Treatment of the subject is very thorough indeed and the book contains an enormous amount of important information. The illustrations are of a very high standard and most helpful in recognising disease symptoms and identifying parasites. The text makes easy reading, although admittedly this might not hold true for the novice in the field of biology; some general knowledge of zoology at about grammar school ordinary level or advanced experience in fishkeeping combined with reading about water organisms would be most advantageous. Extensive and reliable information is given both with respect to diagnosis and to treatments, including modern drugs. At the end of each chapter lists of references to original papers in the world literature are given, facilitating further specialist studies.

The book is printed on an excellent quality of glossy paper and it is handsomely bound. Although its price seems a bit expensive, the book gives real value for its money and is to be highly recommended.

C. van DUIJN Jnr.
F.R.M.S., M.I.Biol., A.Inst.P.

Lessons for Far East Exporters

At the Singapore Aquarium Show, left, Mr Choo Eng Kee (seen above, centre, with colleagues Mr Chia, left, and Mr Wong, right) gained the major guppy awards

ON his return to Singapore from a world study trip Mr Choo Eng Kee, one of the leading exporters of tropical fish in The Republic, said the industry could become a big dollar earner for Singapore if local breeders discarded old and outdated methods of cultivation and embarked on new techniques. There are about 300 tropical fish breeders and exporters in Singapore. Mr Choo is sole proprietor of Tropical Fish Aquarists which operates from a 7 acre farm in Singapore. His tour included Europe, the United Kingdom and America, where he called on leading breeders and importers and also visited the world's biggest fish breeding farms in Florida.

'The tropical fish business in Europe and America is a billion dollar enterprise' said Mr Choo, adding, 'this is the second largest hobby in the world apart from stamp collecting.'

Mr Choo said that although there are hundreds of breeding farms scattered all over Europe and America, the demand is so great that the supply is limited and consequently many of the importers rely to a great extent on imports from Far East countries. 'Singapore and Malaysia should cash in on this as the demand is growing' he stressed.

Another reason given for the demand for tropical fish from the Eastern countries, according to Mr Choo, is that it is cheaper to import than to breed.

'But we must learn to adopt some of the techniques that they use in the Western countries' said Mr Choo. He observed during his tour that the leading farms used water from artesian wells and the system of water circulation and air was provided by specially developed equipment. 'This is cheaper and much more clean than the stagnant muddy water we see in Singapore. They have even developed special diets with the aid of science for the proper breeding and cultivation of fish.'

Mr Choo, who spent several days in England in April and attended the annual Pet Trade Fair at Harrogate, had useful discussions with breeders and importers who came from all parts of the world. A former vice-president of the Singapore Aquarists Society, Mr Choo told PETFISH MONTHLY that at a recent public show held in Singapore his entries of guppies took all the major awards. The show was staged in the Van Kleef Aquarium and attracted a large number of visitors.

Readers' Queries Answered

Vacation Care

I am contemplating going on two weeks' holiday shortly and am rather worried about my tropical fish. I cannot get anyone either to feed the fish or to turn the light on or off.

One excellent way to cope with this problem is to make use of an automatic feeder, such as the 'Lazy Susan' which will provide a daily feed over a 15-day period. Failing this, and assuming you are referring to a community tank or tanks containing medium-sized fish, if there is time to bring them into condition beforehand it is often safer to leave the tank unfed than to rely on 'helpful' neighbours, who have been known to 'overfeed' the tank and cause the death of all the stock. Fry, of course, need constant feeding and tanks of young fish would probably not survive this period. Large cichlids will also be somewhat hungry, but community fish can be fed well on live food, preferably *Daphnia*, for as long as possible before the holiday (in addition to dried food) and then on the day or day before the holiday starts a really heavy feed of *Daphnia* can be put into the tank and the fishes left to eat it as they will.

Unless the lighting can be brought down to a very low wattage, it would be preferable to leave the tank unlit. Normal tank wattage would cause the tank to turn green if left on continually for 2 weeks. Without light, if the tank is in a dark part of the room, one or two plants may be lost but the majority will recover if they are given a little extra light later.

Aquarium Cine

I have recently bought a cine camera and have tried to photograph my fish tanks without success. I am using an 8 mm. camera with a close-up lens using 40 ASA colour film. Lighting is by two 375 watt Photo-floods and I am using an aperture of f16. I have tried lighting from the side of the tank, but results have been poor.

The first requirement is a good camera. The cheaper ones are really not good enough. Artificial-light film and not daylight film must, of course, be used. It is advisable not to get in too close and some of the best photographs are taken without the use of a close-up lens. Set the camera about 5 ft. from the tank with lighting slightly higher than the camera. The light should be pointed down so that the glare does not reflect into the lens. Possibly the lighting is not strong enough. A single Spectro-Sun iodine-quartz lamp should be sufficient.

" Who left the light on, then? "

Tank Lighting

I have been told that too much illumination makes fish go blind. However, I am interested in setting up a marine tank and after spending all that money on them I want to be able to see them. What wattage and lighting should I use?

Lighting for aquaria is required for good plant growth and for decorative effect. Provided that the light comes mainly from above (and not from the sides) few fishes are affected by light intensities within the range provided by ordinary illumination methods. It is incorrect to say that blindness can result from use of artificial light. As fishes have no eyelids, however, they do not enjoy sudden light and at night, room lights should be put on first for a few minutes before the lights over the aquarium are switched on. Since with marine tanks plant growth is not the main object of the lighting, the duration of lighting can be as long as required by the aquarium owner. A little algal growth may develop if the light is on most of the day but not usually to an unmanageable extent. Suggested lighting for a 24 in. aquarium is two 40 watt lamps or one 15 watt (18 in.) fluorescent tube, but with a planted tank it is often necessary to experiment with wattages and length of time of illumination to obtain the right amount to produce a healthy plant growth without causing the aquarium to go bright green.

How Many?

Would you please advise me how many tropical fish I can put into a plastic aquarium tank measuring 13½ in. at the top, tapering to 10 in. at the base; width, 8½ in. at top tapering to 6 in. at base. Also the varieties to choose for colour?

It would be advisable to keep only the smaller varieties of tropical fish in a tank of this size and of these no more than about 10. A possible choice might be: two neons (or, for even brighter colouring, two car-

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A Compact Breeding Installation

By CAPT. L. C. BETTS

MOST goldfish enthusiasts start in a small way with one or two tanks, but if their initial enthusiasm survives they usually land up with a collection of tanks too small to be effective and an assorted medley of old water tanks, discarded kitchen sinks, an array of plastic bowls and with garden ponds hastily thrown together from holes dug in the ground and lined with plastic sheeting. It is to these hobbyists that this article is dedicated and to those others who would like to take up goldfish breeding but are prevented by lack of space or lack of funds. Three years ago I constructed the installation described at one end of my garage and the results have more than justified my dearest hopes.

It was not fortuitous that after my car was safely housed and the doors were shut, there still remained 4 ft. 6 in. of free space at the end of the garage, which on an 8 ft. width gave me 36 square feet of floor space to play with. In the dreaming stage of the planning, three concrete tanks or 'trays', each 10 in. deep, were visualised one above the other. With suitable reinforcement the ends of the 'trays' could be butted into the brick and concrete walls of the garage and with each tray approximately 30 in. from front to back there would still be nearly 2 ft. between the front of the car and the fish tanks.

The first tank would be laid at ground level, the second one 18 in. above that and the third 18 in. above the second. The motive force for the water would be gravity flow, except for the initial lift which would be by pump to a holding tank just above the third 'tray'. As the water would have to be lifted from ground level to the holding tank, an Otter water pump was chosen to do the 7 ft. lift.

Passing from the theoretical stage to the practical one, the following plan evolved. Each 'tray' or tank would consist of a receiving section at one end for the water, which would then pass into and through the biological filter (graded clinker medium) via an air brick in the dividing wall and similarly pass out from the filter into the main fish-holding area. The receiving section would be 6 in. wide; the filter would be 15 in. wide, leaving the main holding tank just short of 6 ft. On these measurements the main holding tank would be 6 ft. long by 30 in. wide by 9 in. deep, i.e. of roughly 70 gallons capacity. At the end of each of the top two tanks farthest from the receiving section, a weir would have to be constructed to maintain the level of water in each tank and provide an outlet to return the water for recirculation.

With these details in mind the materials had to be chosen. As secondhand bricks and ballast were on hand, all that was needed was some sand and cement, some old wood for shuttering and household water fittings and six air bricks (9 in. by 9 in.).

Allowing for the secondhand bricks and the poor quality of the wood shuttering, construction was not too difficult and the result not too bad. Each tank was supported on its own brick wall, which in turn was keyed to the garage wall. The tank bottoms were 2 in. thick and made of 3 : 2 : 1 mixture of ballast, sand and cement. When finished and hardened the concrete and bricks had two good waterproofing coats of Snowcem.

Once the cementing was completed the fitting out could be tackled. This consisted of fixing a 30 gallon capacity round aluminium 'header tank', 30 in. diameter by 12 in. deep, above the topmost concrete tank, in which four ¾ in. holes were bored and hose connections fitted. The purposes of these were to receive (1) the water from the pump (this fitting was at the highest level), (2) and (3) the delivery pipes to fill the concrete middle and top tanks and (4) the overflow pipe returning any surcharged water back to the pump.

Only two fittings were now necessary to complete the circuit and these are the 'depleted water' overflows from the two top tanks. They were made by cementing a roofing tile across the corner of the tank to form a weir and then boring a hole in the tank wall just off the bottom with connections to deliver the water into the bottom tank, where the pump is located.

In summary, then, this is what happens. The pump is located in the bottom tank and lifts the water to the header tank at the highest point. From here the middle and top tanks are fed by gravity through ¾ in. plastic hose and the water, after passing through a filter and through the main body of each tank, then passes over a weir for delivery to the bottom tank. Here the water passes through a filter, through the body of the tank and on to the pump chamber for a further circulation. It will be noted that the bottom tank does not receive its water from the header tank direct, as this presents design problems.

Although the bottom tank receives its water from the top two tanks immediately after it has been used by them, before reaching there the water has been re-aerated by passing over a weir and it has also been filtered by the filter in the bottom tank; thus the water has been revitalised, although not quite so efficiently as in the top two tanks.

In operation this installation has proved an unqualified success. In 1965 it supported five pairs of twintails and six pairs of singletails (shubunkins), who each spawned regularly in May, June, July and August. It also grew on the fry until they were ready to be transferred elsewhere, although from the egg stage to 8 weeks old they were raised normally in a glass aquarium. The rigours of the winter were alleviated by a little added heat and the heightened temperatures of the summer were modified by a little town's water added at intervals. The ¼ in. graded clinker which went into the filters was

obtained from a sympathetic sewage works manager (who shall be nameless) and beyond a complete drain out and flushing in early 1966, no maintenance other than the fortnightly cleaning of the pump has been necessary.

One modification was added subsequently. It was impossible to look into the top tank without steps, so to give added height a small wall 12 in. high was built to stand on. This reduced the walking space between car and fish tanks but once cemented up proved to form a valuable holding tank for *Daphnia*. A ½ in. pipe between the bottom tank and the *Daphnia* tank gave a common water level which proved a great boon when a young fish jumped the overflow weir and got jammed in the hose to cause the middle tank to flood at the tank top. Fortunately the water ran down the front into the *Daphnia* tank and so back into the system again.

Hose pipes, by the way, are best confined to ¾ in. size. The ½ in. size does not carry sufficient capacity to offset the algal growths which develop with time inside the pipe and restrict the volume and rate of flow of the water.

Small items of design which affect the overall oxygen concentration of the water can be fitted at all points where water is delivered. Jets of water will entrain bubbles of air at the point of entry and can be equal to or greater than an air diffuser in effect.

In gravity flows, it is not a good policy to use too small a delivery hole as the pressure is not sufficient to carry through even small pieces of debris. It is better to let the water run over a plain surface and bubble against an obstruction. For example, on the delivery of the water from the pump to the holding tank it is possible to fit a sheet of 18 size aluminium that has been bent in such a fashion that it will hook on to the tank and provide a platform in which the pumped water will run along and hit a turned end, which throws the water up and out in a thin sheet. Weirs, too, should be so fitted to utilise the full length of their construction to ensure that the water layer passing over them is no deeper than the thickness of paper.

Another improvement on my design would be the provision of glass windows in the concrete fronts to enhance the enjoyment of looking at the fishes. When my next fish house is built this will be incorporated (D.V.!).

BREEDER'S NOTEBOOK

My First Spawning of *Barbus schuberti*

By MRS J. H. PARTRIDGE

A LARGE well-planted aquarium housing several types of barbs makes a very pretty scene, and spawning most of them creates no great peoblems. I have spawned quite a few but never with such surprising results as my first attempt with the *Barbus schuberti*.

About a year ago I bought two very small ones but they grew well and it soon became clear that I had two females. Obtaining barbs all the year has always been a peoblem, so that I was unable to get any more for quite a long time. Then, a short while ago I saw some offered for sale in an advertisement and after a variety of mishaps due to the vagaries of British Railways the fish arrived. They were very small, almost still in the fry stage, and one died a few days after arrival, but the other one is still going strong and has grown quite well although only a third the size of the two females.

Until very recently I was not sure of this young barb's sex, but thought it was a male. Then I decided to try and prove which sex it was by attempting to spawn it with one of the females. So far it has not shown the slightest interest in either of them, which made me doubt that it was a male. A 24 in. by 12 in. by 12 in. tank was already set up for breeding barbs, though I had not decided which one I was going to breed. The breeding tank had about 8 in. of aged tap water, a thicket of nylon wool mops in the centre and the temperature was set at 79°F (26°C).

I placed the small barb in the breeding tank on its own for 2 days and continued feeding in the usual way. About 10 p.m. on the third day I introduced a female, turned off the light and left them to get on with it. Much to my surprise the following morning they were eagerly spawning. Two hours later when they seemed to be tiring but had so far made no attempt to eat any of the 200 to 300 eggs I could see on the wool, I decided to remove them and added a few drops of methylene blue to the water. It was a big disappointment when less than 24 hours later all the eggs on the wool mops turned white, but in the hope that there would still be some eggs that would hatch I left the tank undisturbed.

On returning from work the following day, which was less than 48 hours after spawning, I was delighted to see quite a few larvae bobbing about in the gravel. Three days later, when they were free-swimming, I could see that the spawning had been a good one and I had no longer any doubt about the sex of this young barb.

The fry grew rapidly on Infusoria and at the end of the week it became quite clear that they were grossly

overcrowded. I decided to transfer the fry to a wooden trough lined with polythene and capable of holding double the capacity of water. This I did by siphoning off all the fry from the tank through a rubber tube into buckets and then pouring them slowly into the trough, a cupful at a time, and at the same time counting them. The total was 1,948 fry.

They are now 3 weeks old and growing rapidly on brine shrimp etc. So far there have been very few casualties and even after culling out it looks as though I shall still have at least 1,000 to find homes for!

Aqua-tip

HAVING recently built a fish house and having a fair number of large fish, I have found that conventional fish food was rather expensive, a large tin lasting me only about a fortnight! Because of this, I decided to have a go at making my own. After looking in various books on the subject I found the main ingredients required were fish, meat, greens, cereal. I read this over to myself and suddenly thought of a T.V. advert which used to say '. . . with fish and meat it's quite complete . . . ' and so a tin of that particular cat food was purchased from the local supermarket. For greens I mixed spinach puree (although I have used mashed peas as well). For cereal I used some baby cereal that my young son refused to eat. This contained egg and added protein.

To make the fish food, the spinach and cat food were well mixed together and enough cereal was added to make a fairly dry paste. This was then spread on a baking tray (after getting permission from my wife! This is most important for the success of the recipe as a rather potent fishy aroma spreads around the kitchen in the next operation). The tray was then placed in a moderate oven, Regulo 5, until the mixture was thoroughly dry and brittle. It was then broken up into small pieces and stored in a sealed container, in my case a 2 oz. coffee jar.

The total cost of this food was only 2s 6d, including the price of the baby cereal.

When my food was first tried on the fish, results were disappointing as they did not seem over-keen, but when a small quantity of their usual dried food was added they seemed to eat it. After about a week, the proprietary food was left out of the feeding and only the home-brew offered. This was then eaten quite readily.

I have been using this food for about 2 months now and all my fishes are feeding well and looking well on the diet. Pairs of fish fed entirely on this food have been spawning and I find that it is not only cheaper but quite successful.

K. MARTIN

Secretary, Swindon & D. New A.S.

East is East

By JIM KELLY

THEY say that when two Englishmen get together they form a queue, two Scotsmen a Burns' Society and two Irishmen—well, they just fight! I read an addition to this which stated that when two Japanese gentlemen meet they bow politely and one of them then commits hari kari.

The post-war Japanese nation startled the world by breaking into the electronics industry. 'Suicide!' said the world but the evidence of markets now jam-packed with the products of the Japanese activity are enough to prove that when an Oriental starts something he means business. Japanese ideas have paid off and none more so than in the sphere of fishkeeping.

On an average, the Japanese T.V. screens about six programmes per week on the hobby, some of them in beautiful colour! Most of these run for at least 30 minutes . . . not for the Sons of Heaven the typical English reference to aquarists lasting all of 3 or 4 minutes!

How the Doctor Did it

In such a programme, a Doctor Shozo Yamomoto, a medical practitioner from Osaka, was describing his set-up for the benefit of the viewers. But what a set-up!

As the camera panned the aquarium both freshwater and marine fishes were to be seen happily swimming side by side in the same tank.

Commentator: 'But aren't those fish in that tank both fresh and salt water?'

Doctor: 'Yes, that is part of my hobby. I keep them together.'

Commentator: 'But my knowledge of the hobby says this is impossible?'

Doctor: 'Impossible to our way of thinking, but the fish aren't aware of this. They have been together now for quite some time.'

Commentator: 'But how do you do it?'

Doctor: 'Bundo-To is added to two parts of fresh and one of salt water.' (Bundo-To is a patent medicine to overcome fatigue and help invalids recuperate. It is made from sugar and various other chemicals.)

Now I realise that one swallow doesn't make a summer but as if in confirmation the following week saw the same thing again, this time with a 900-gallon tank belonging to Mr Miyato of Tokyo. Imagine my feelings as a guppy fanatic when I saw one of my favourite fish dancing like mad before a clown (*Amphiprion percula*).

And as if that wasn't enough to task the credulity of any fishkeeper who happened to be viewing there was the sight of a butterfly fish (*Chaetodon vagabundus*) playing 'Chase Me Charlie' with a goldfish. I felt like dashing

—and Salt is Fresh

outside and buying the first ceremonial dagger I came across.

Out trotted the same question. Like some Hollywood-trained American Indian the announcer asked: 'How?'

'Can't say,' came the reply from Mr Miyato. 'I am in the process of getting my idea patented by the Japanese Government.'

Think of the effects this would have on the hobby if it gained ground, to say nothing of the effects on our poor furnished aquaria judges. Those who scoff at the idea—let them remember that we also laughed in our tea when the Japanese said they would make wireless sets to fit inside a matchbox; fairly doubled up with mirth when they announced they would build an oil tanker bigger than our 'Queen's'. Have they settled the argumentative question of what constitutes a community tank?

Guppy Comment

By
BILL ARMITAGE

IT is only when one is present at the preliminaries to benching at a combined table show of guppies and other varieties of fish, that one realises the advantages the guppy breeder has over the exhibitors of other fish. The guppy breeder arrives at the show with his fish in standard show jars neatly packed in a case, while the exhibitor arrives loaded with bags of water, jars and tanks of various shapes and sizes. The guppies are shown and judged with a minimum of handling on a decorative stand; the benching of the other fish in odd-shaped containers on staging of many dimensions leaves a lot to be desired when compared with the neat and orderly set-up of the guppy display.

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There are several pitfalls which the novice guppy breeder must avoid. The first and by far the most important is the problem of runts. It is essential that all malformed fish be destroyed as soon as any deformity becomes apparent. One has to be ruthless—there is no other answer. If allowed to breed a runt can do untold damage to a strain.

Another fault of almost equal importance is overfeeding. It takes a great deal of time and patience to find a measured diet, therefore it is advisable for the beginner to watch a more experienced breeder feeding his fish before attempting to feed his own.

The beginner will soon find that lighting plays a big part in the maintenance of his furnished tanks. For instance, if the light is too strong, especially if it is direct sunlight, algae will soon establish itself, and if allowed to thrive will in a very short time envelope the whole of the tank. Therefore it is essential from the very outset that the novice should use only the amount of light necessary for the growth of his plants.

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Guppy breeders sometimes tend to overlook the Indian fern as a utility plant, because of its low price. But beginners shouldn't allow this to deter them from growing it. In a display tank, if well grown its soft, pale green foliage makes it a very decorative plant, and in this respect it rivals a lot of plants in the higher price range.

From the beginner's point of view it has many advantages. The fact that it will grow under most conditions makes it particularly useful, and as its growth is very profuse it feeds greedily on any waste matter that may collect on the bottom of the tank, thus disposing of any toxic substances. The young floating plants which are cast off by the parent plant are most useful in the breeding tank, as they provide excellent cover for young fry; having served this purpose they can then be planted in the compost to propagate.

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There is no doubt that the public relations of both the specialist guppy clubs are sadly lacking. Meetings have been held between the F.G.A. and the F.G.B.S. to try and fix a set of common standards. It has been said that joint shows aren't the answer to this question. If this is true how can we assess the good and the bad points of each other's standards without such shows? Surely everyone concerned agrees, there are good and bad points on both sides, otherwise why the meetings? When all is said and done, we are only in a hobby so why not let us bury our hatchets, and let us have some joint or invitation shows. We may all then find we have a lot more virtues than shortcomings.

PETFISH MONTHLY Review of

Breeding the Discus Fish

Our knowledge of the possibly unique breeding habits of the discus fish has developed continuously over the past 30 years or so through the efforts of a number of aquarists and scientists. Growth of this knowledge provides an example used more than once by the late Dr Myron Gordon of the way in which observant aquarium-keepers can make valuable contributions to scientific studies of the habits of fishes. This article reviews the information on discus breeding that has been recorded in a variety of publications, many of which are now difficult to obtain without access to specialist libraries, with the aim of providing a guide for the amateur breeder of this species

DISCUS fish have never been kept in large numbers by aquarists for the obvious reason that these are expensive fish to buy. Despite the small size of the aquarium discus population, however, there have been numerous reports of this fish spawning in tanks ever since importation began. This made it seem that this species shows no great reluctance about producing eggs in aquaria, although the frequency with which aquarists managed to get hatchings was very low and the incidence of rearings lower still.

The reputation of being difficult to rear was thus soon established for discus fry. Serious breeders tried all the known fry foods but without notable successes. Then the story of the dependence of the young fry on their parents (and hence the breeder's dependence on the good instincts of his fish!) began to unfold.

In 1955, Roy and Gwen Skipper, well-known husband and wife aquarists of Hendon A.S., had their first spawning of discus fish, and published the results of this with their observations in the British journal WATER LIFE in the following year. They removed the eggs, laid on a leaf of *Echinodorus rangeri* on 23rd October, from the breeding tank, and although these hatched the fry slowly died away. Newly hatched brine shrimp, slipper animalculae (*Paramecium*) and micro worms were all offered but were ignored by the fry. The account of subsequent events that was later published is in part printed here.

Report by Roy and Gwen Skipper

Only six fry were left on 1st November and these had not grown at all. Even the finest of pond Infusoria was not accepted. By 2nd November the last of the fry had died. We were very disappointed, but we had the good fortune to have a second spawning coming along.

This spawning we decided to leave with the parents and, although not successful, we made some interesting observations. Fungussed eggs were ignored entirely; this is surprising, as most cichlids remove them. Both parents fanned the eggs, taking positions each side of the leaf and fanning the eggs violently with their pectorals. The pectoral fins of a *S. discus* are quite enormous and are equipped with very powerful muscles, thus a great deal of water is moved when this operation is in progress.

The fourth day after spawning the parents moved the wrigglers to the underside of the leaf and a certain amount of mouth-cleaning went on. Any wrigglers that fell off the leaf were picked up by one of the parents and blown back on to the leaf. At this stage there was much less fanning going on. The parents cared for the wriggling alevins until the sixth day after spawning and then they ate them.

There followed a spawning session extended over 8 weeks with the pair laying eggs regularly at 6 day intervals. Many things were tried and each spawning was split and subjected to different treatments. Water conditions, temperature, filtration, aeration, circulation, antibiotics and a host of different microscopic foods (pure cultures obtained through the good services of the Curator of the Culture Collection of Algae and Protozoa at Cambridge) were investigated, but still the fry did not feed. When the end of the spawning period came we were thankful for some rest. The quest for an answer to the problem had occupied a great deal of time and it was always early morning before we got to bed.

The advice and co-operation of notable breeders and ichthyologists was sought, among them Dr E. T. Trewavas and Messrs A. Fraser-Brunner, E. Roloff, M. Smykala, F. Bates, I. D. Cameron and W. A. Bone. The information gleaned was put into practice, but still with no success. Twelve days from the egg was the best

Discus Dates

1840	Named (*Symphysodon discus*) and described by Dr Johann Heckel.
1933	First exported from the Brazilian Amazon and given the popular name 'pompadour'.
1935	First recorded aquarium spawning by Gustave Armbruster of Philadelphia. Other records followed this, such as those by Dwight Winter of Pittsburgh and (in 1939) by Hansjoachim Mitsch of Berlin, and the difficulty of raising the fry became well recognised.
1949	Young discus were observed to hang against the sides of their parents by Mrs W. T. Dodd of Portland, Oregon.
1955	Spawnings were recorded by Lois Saphian of St Louis, with some success in rearing limited numbers of the young in the absence of the parents.
1956–57	Reports by Roy and Gwen Skipper (Hendon A.S.) in Britain and by Gene Wolfsheimer of California in the U.S.A. described the feeding process of the discus fry.
1959	W. H. Hildemann, after laboratory investigation of specimens provided by Roy and Gwen Skipper, reported that 'discus milk', produced by the skin of the parents, was the natural first food of the fry.
1961	Stimulation of production of 'discus milk' by injection of the hormone prolactin into *S. discus* was reported by N. Egami and S. Ishii.
1964	Skin changes in *S. aequifasciatus axelrodi*, resembling those accompanying the 'milk' production, after injection of prolactin, were recorded by V. Blum and K. Fiedler.

Opposite page: while the male discus (left) keeps guard the female deposits eggs on the edge of a tile. Our front cover picture this month shows the parent discus guarding the newly hatched, non-swimming fry still attached to a leaf

Photographs by GENE WOLFSHEIMER

we could do, and never did we observe (microscopically or otherwise) any food taken by the fry.

The rest period lasted 6 weeks and on 8th February we had another spawning. On this occasion the help of Mr and Mrs J. Robertshaw, also of Hendon A.S., was enlisted. The eggs were shared, and an even greater number of conditions were tried in an endeavour to get the fry to live and feed, but the net result was the same as before. The fry absorbed the yolk sac and then died.

The second spawning (new series) followed on 15th February, and it was agreed to let the parents have another attempt at raising a family. Our diary notes are as follows:

14th February. The pair were cleaning a leaf of *Echinodorus rangeri*; this was a half-hearted effort and not at all like the usual cichlid pre-spawning clean-up. The pair had a peculiar courting action which consisted of a convulsive shudder or shake. This was a definite sign that a spawning would take place within 24 hours.

15th February. As in all previous spawnings, the fish chose the early evening to spawn—7 p.m.—and, as always, on the lower half of an *E. rangeri* leaf's upper surface. Half of the leaf was cut off and given to the Robertshaws, leaving about 150 eggs.

16th February. Both parents were tending eggs with care.

17th February. The parents were fanning eggs continuously.

18th February. The parents transferred the now wriggling eggs to the underside of an old *E. rangeri* leaf.

19th February. The wriggling fry seemed to have been reduced in number considerably and we estimated about 80 were left.

20th February. The fry were now wriggling feverishly on the ends of individual threads. The parents mouthed the fry and transferred them about the leaf. The continuous fanning had now been reduced to an occasional flutter of fins.

21st February. The fry were now concentrated in the centre of the underside of the leaf, wriggling violently. The male seemed to want to keep the female away by blocking her path.

By 22nd February the fry were free-swimming and a number were swimming around the parents' heads and bodies. The remainder were concentrated in a large 'drop' somewhat like a swarm of bees hanging on a bough from which the fry left periodically and swam around the parents, returning to the swarm occasionally. By evening all the fry had left the leaf and were surrounding the parents like 'flies round a jampot'. They appeared to be biting at the parents' skin, mostly around the dorsal area.

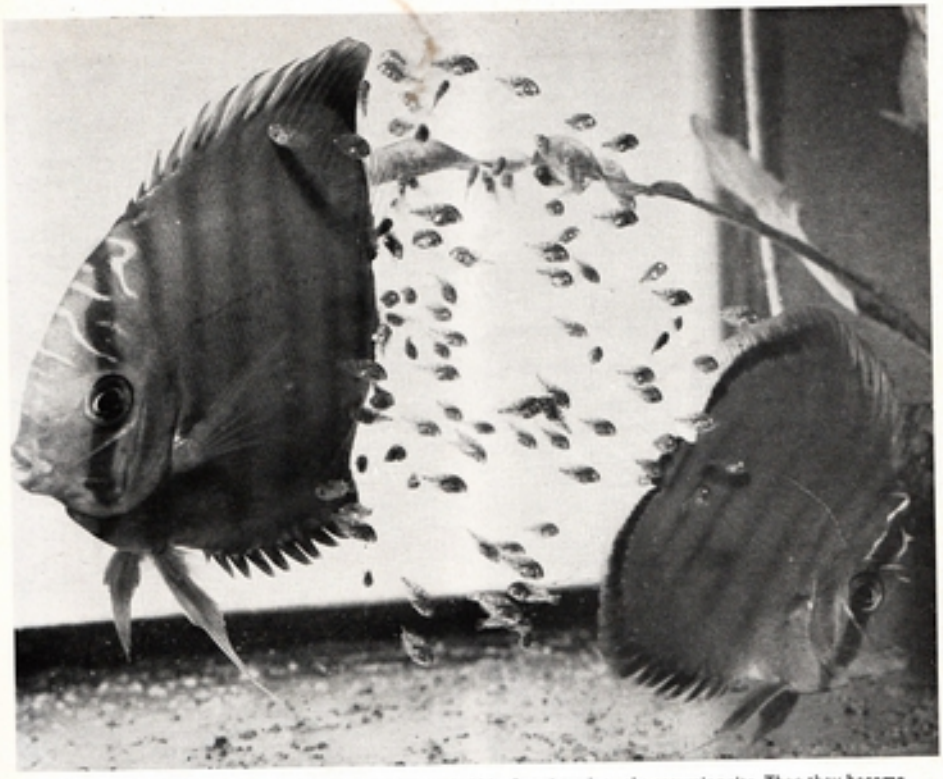
23rd February. All the fry were definitely feeding, pulling and jerking off both parents continuously. We had to call in several other observers to witness the strange behaviour, we were so sure nobody would have

Summary of discus breeding data from published reports

	Armbruster (1935)	Mitsch (1939)	Saphian (1955)	Wolfsheimer (1957)	Skipper (1956)
Temp.	85°F (29°C)	86°F (30°C)	80°F (27°C)	79°F (26°C)	75–85°F (24–29°C)
Water pH	6·8	?	6·8	6·9	6·2–6·6
Hardness (p.p.m. as calcium carbonate)	?	?	50*	68*	80†
Origin of breeders	Imported	Imported	Imported	Bred in U.S.A.	Imported
Size of breeders	—	—	—	4 in.	4–5 in.
Tank size	'Large'	80 gallons	50 gallons	30 gallons	72 in. by 15 in. by 15 in.
Spawning surface	Slate	Stone	Slate	Red building tile	*Echinodorus* leaf
No. of eggs	—	200	200	—	250–300
Hatching time (days)	2–3	—	2	2	2
No. reared	47	46	167 (five spawnings)	125 (two spawnings)	41
Additional notes	Eggs removed from parents	Parents removed	Eggs removed from parents	Young reared with parents	Young reared with parents
Spawning interval when young not kept			8 days 10 days 18 days	5 days 6 days	6 days

* Ion-exchange water softener used.

† By progressive addition of filtered rain water and distilled water to tap water initially 300 p.p.m.



For about the first 4 days after hatching discus fry are held by fine threads to the spawning site. Then they become free-swimming and swarm around the parents. The fish on the left is the male

believed us. Although both parents seemed capable of feeding the young, both had rest periods and, by a flick of the body, were capable of wiping off all the fry on to the other parent.

24th Febeuary. The fry had grown apace and some were ¾ in. long and ¼ in. deep. We tried feeding newly hatched brine shrimp, but this was ignored.

25th February. The fry were still feeding continuously from parents and growing rapidly.

27th February. The male parent was seen to bully the female and, as most of the fry were now feeding from the female, it was decided that the male fish should be moved.

28th February. The female was much more settled now that the male had been taken out and the fry were still feeding from her. No other introduced foods were taken.

1st March. A few of the more adventurous fry took a little brine shrimp today.

2nd March. The fry really went for brine shrimp today so feeds were arranged every 2 hours throughout the day. Nevertheless, they were still feeding from the female, too, and never ventured more than 1 in. or so away from her side. The female was able to draw the cloud of brine shrimp around her by 'pulling' the water with her pectorals.

3rd March. The fry were now feeding on micro worms and *Cyclops* nauplii (through 60-to-the-inch mesh gauze).

4th March. The fry were getting a little more adventurous and venturing slightly farther afield. *Cyclops* nauplii were fed mostly, as they were plentiful and lived longer in soft water than brine shrimp. Size of fry was now about ¾ in. long and ¼ in. deep.

10th March. The fry were still growing well, fed at 2-hour intervals, but were feeding from the female occasionally.

17th March. Four young were removed to a prepared 36 in. by 15 in. by 15 in. tank and they fed straight away. They seemed rather lost without the female as she had taken the youngsters to the food.

18th March. Some of the fry now took dwarf white

worms, chopped ordinary white worm and even tried to eat some of the white worm fed to the female. The parent guarded her brood well and challenged any strange observer, sometimes herding her brood behind a rock if she thought things were not quite right.

On 28th March all the fry were removed from the female and transferred to the 36 in. by 15 in. by 15 in. tank. They were 42 in number and were still feeding from the parent occasionally. A day later the fry were feeding on unscreened *Daphnia*.

On 29th Apeil the fry (still 41 of them) averaged 1⅛ in. long and 2 in. deep and were perfect miniature *S. discus*, showing remarkable colour.

Summarising, we are well aware that our report conflicts with others, but we deign to offer the following synopsis of what we did to rear successfully five wild baby pompadours ¾ in. long to 6 in. adult specimens, capable of breeding:

Water. Soft; not more than 80 p.p.m. (about 5·5 English degrees—Clark). Acid, pH 6·2 to 6·6.

Food. Adults: white worms, garden worms, gnat larvae, glassworms, *Daphnia*, scraped raw meat (beef and ox liver), herring roe (hard), minced shrimp or prawn. It is advisable to vary the diet continuously as it is quite difficult to get *S. discus* to take different foods if they have been used to repeated feeding on one particular type.

Fry. The newly hatched *S. discus* are not small, perhaps just under the size of angels, but their mouths are extremely tiny, and for a time it appears that they are only capable of sucking food in. Fourteen days from spawning is the earliest we have known *S. discus* to take newly-hatched brine shrimps or sifted *Cyclops* nauplii.

Tank set-up. Lime-free compost and rocks to conserve the soft, acid character of the water. Plants should be of firm-leafed species, such as *Echinodorus* or *Sagittaria*. Floating plants are also appreciated.

Temperature. 75–85° F. No increase in temperature necessary to induce fish to spawn.

Filtration. Continuous peat filter, using only nylon yarn and horticultural peat filling.

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In the U.S.A. Gene Wolfsheimer was also making observations on the nature of the feeding of discus fry, and these he reported in THE AQUARIUM at the beginning of 1957. An extract from Gene Wolfsheimer's article is given.

Report by Gene Wolfsheimer

It was a typical cichlid spawning with the chosen site the building tile. This had been picked at and scrubbed clean with their mouths. Soon the rubbing actions of the female against tile started producing eggs and she was followed by the male in a similar manner. He spread his milt over the eggs, fertilising them.

The next day the eggs had disappeared, probably eaten by the disturbed parents because of the other two fish in the aquarium with them. Five days later they spawned again. During this spawning the other two fish were removed without giving the breeding fish much anxiety. These extra two fish, which were an easily apparent sexed pair, were placed in the other aquarium with the remaining three discus.

The breeders took care of their eggs by fanning them and picking them clean but many started fungusing and on the third day the eggs were eaten.

Three days later, on 10th October, the pair spawned again. They took good care of the small spawning this time. The cooperation between them was something to behold. One was always on top of the eggs, fanning and picking them clean. The other fish stood guard duty, touring the aquarium for possible hidden enemies. As the touring fish moved up to relieve the fish caring for the eggs, the switch was made with a beauty and grace and without the fanning missing a beat. Occasionally both worked over the eggs.

On 13th October the eggs hatched. Still unable to swim, and being sustained by their yolk sacs, the fry were removed to a previously cleaned underside of the sword plant leaf. The aquariums for the discus are bare with the exception of a potted sword plant and some *Cryptocoryne griffithi*. Water sprite floats at the surface and the fish seem to enjoy a sense of security this gives them. The aquarium bottoms are bare for easy cleaning.

From the underside of the leaf, the new fry were moved to the side of the plant pot by day, only to be moved back under the leaf at night.

The fry were free-swimming on the 17th and unlike

Discus fry in their early stages attach themselves repeatedly to the sides of both parents and feed on the secretion ("discus milk") formed by the skin

other young cichlids who school up and start searching for their first food, the baby discus immediately went up to the sides of the parents. They seemed to stick very closely and at this time were observed most carefully. As past discus breeders have reported, it was found to be quite true. The young fish were nursing off the sides of the parents. The protective slime that covers the sides of the adults also supplied the first and only food for the babies. It was an experience I had yet to witness during my fish-breeding career—to watch the fry head into the huge sides of the parents, apparently dig its head in, jerk to one side with a tearing motion and go back to do this again and again. When there seemed to be a scarcity of this food on one of the parents, the fry would migrate to the other. At first such baby foods as newly hatched brine shrimps and screened rotifers were ignored. After about a week of feeding off of the adults, a few fry would venture away long enough to try and snatch at some of these foods. They grew quite rapidly and eventually were netted out to be raised separately and to give the parents another opportunity to spawn again . . .

It has been noted since, that just prior to spawnings the parent fish seem to acquire an extra-heavy coating of this protective slime. When light reflects off them as they turn into a certain position, their sides seem to be covered almost frost-like in appearance.

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Investigations by W. H. Hildemann

Further observations by Roy and Gwen Skipper led them to think that microscopic life on the skin of the discus parents was being used as food. Accordingly, they offered the fry likely microscopic organisms such as the alga *Oedogonium* and the infusorian *Vorticella*. However, this did not prove to be a successful measure to keep the fry alive in the absence of their parents. What was the food that the skin of the parents yielded?

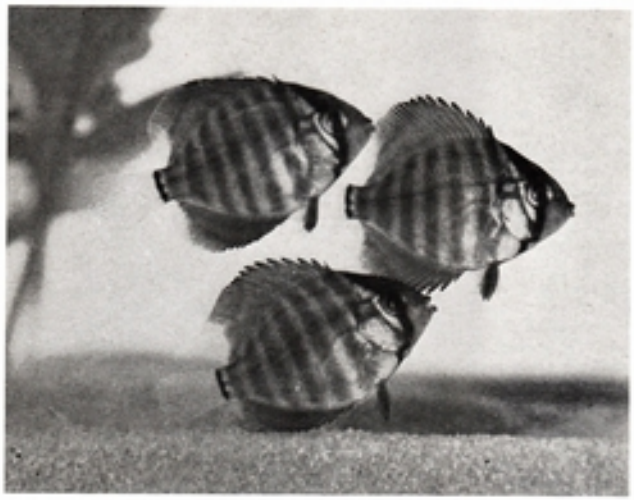
Dr W. H. Hildemann, who became interested in the problem, suggested to Roy Skipper that a special secretion from the adults' skin might be the source of nourishment. For this aspect to be further examined, Roy Skipper agreed to allow his breeding discus to be anaesthetised and microscope examination of their skin was made.

Dr Hildemann reported his findings in THE AMERICAN NATURALIST in these words:

'The skin and scales of non-breeding adults revealed nothing extraordinary—only the dense melanin pigmentation and scattered guanin crystals which make this species so colourful. A slight mucous coating, especially above the lateral line, was seen under high magnification. Adult breeders in process of rearing young, however, presented an entirely different appearance. Even to the unaided eye, it was apparent that both parents possessed an abundant whitish material over the entire surface of the body. Under the microscope no algae, protozoans, rotifers, or crustaceans were observed on the parents, but a copious mucous secretion with a granular composition covered the entire body including the fins. The secretion was more concentrated dorsally and, when rubbed gently with the finger, it became filamentous. Clumps and filaments of this mucus were readily dislodged into the surrounding water by rubbing the skin. The mucus had considerable cohesiveness and even the larger young had to tug and jerk to remove it from the parents. When placed on a glass slide and examined at 430 × the mucus was observed to be acellular and amorphous and, therefore, undoubtedly a secretion.'

In this 'tail-on' view of a female discus the clustering of the fry about her body is well demonstrated. Feeding from the parents occurs for about a week

In this way the nature of the 'discus milk' came to be established, although its exact chemical make-up and what causes it to be produced were questions awaiting answers. The likelihood is that the 'milk' comes to be



Three young discus fish, beginning to assume the typical discus shape at about 6 weeks. Growth of the fry is rapid once the 'milk' stage is passed. Frequent feedings with brine shrimps have been found to give best results by most breeders of this species, followed by larger foods such as Grindal worms and white worms as the fish become bigger

made as a result of a breeding hormone being released within the fish during spawning.

In recent years it has been shown by injections of the hormone prolactin that discus fish can artificially be made to secrete the 'milk' and that the skin changes normally occurring after spawning also develop after the prolactin injection. Prolactin is a hormone known to play a part in the repeoductive activities of many animals, so that its involvement in this special aspect of discus breeding is not too surprising.

The Editor gratefully acknowledges the co-operation he has received from Gene Wolfsheimer and Ray Skipper in the preparation of this review.

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dinals), two zebras, a pair of platys (one red and one yellow wagtail perhaps) and a pair of black mollies. One kuhli loach as a scavenger in a smaller tank and an *Otocinclus* or sucking catfish as an algae-eater (the more usual sucking loach would be too large).

Community Cichlids

Keeping larger fish is a new venture for me. I have recently acquired two young zebra cichlids and two fire-mouths. Will these fish live in a community tank with fish of their own size, such as swordtails? If the answer is no, is it possible to keep a variety of cichlids together?

It is unreliable to offer general statements about the behaviour of cichlids towards one another or to other fishes because individual fishes vary in their aggressiveness and much depends on other circumstances. Young cichlids reared in a community tank with other fish that they subsequently outgrow in size sometimes continue to live peaceably with them, but if they develop the breeding urge then the other fishes might suddenly be attacked. Also, in tanks 36 in. or longer, it is more possible that a peaceful community will be established since there is more room for the fish to claim the small areas of 'territory' that they like to keep as their own. This is the main factor that will decide whether a variety of cichlids can be kept together. If they have room to keep clear of one another then, apart from occasional boundary skirmishes, there should be no damage. Again, however, if one pair begins to breed they are likely to become more of a threat to others. Care should be taken with such 'uneasy' communities to see that all the fish are getting their proper share of food, because the dominant fish may well scare the others away at feeding times.

Aquarium-Keeping in Denmark

AT the Midland Association of Aquarists Societies anual convention and open show that was held at Leamington Spa on the 14th May (at which Lockheed A.S. were the hosts) the chief speaker was Mr Leif Christensen, famous Danish aquarist and breeder and secretary of the Copenhagen Aquarium Society. Mr Christensen's topic was the aquatic hobby in Denmark and some very interesting comparisons were made with the hobby's organisation in this country. Mr Gerald Jennings, of the International Marine Study Society, who was himself lecturing at the convention, gives the following report of Mr Christensen's talk.

The organisation of the hobby in Denmark shows a marked difference from the set-up in this country. There, the Danish Aquarium Union (D.A.U.) is now the major central body. There is a 'House of Representatives', consisting of persons who each has already been elected as chairman of a small area group of societies. For instance, let us say there are four societies in Jutland. Each society elects one member to the area group committee, so that this committee consists of four officials, one of whom is chosen to be chairman. This chairman, together with the chairmen of all other areas, makes up the 'House of Representatives' of the D.A.U.

The membership fees to the societies are about the equivalent of 35s. This figure includes an annual subscription to the printed monthly journal published by the D.A.U. The D.A.U. obtains its income by a charge to member societies of 2s per head. The magazine is unique in Europe in that it is planned to form an up-to-date reference library on all subjects. The pages have a filing code and are not numbered. Each page has printed on either side only one topic and the advertisements are printed together so that they can be removed in their entirety without loss to any article. The folders in which the pages can be filed are all cross-referenced and when one item is superseded by later information the affected page is discarded and a new one inserted. In this manner the book is kept up-to-date.

There is a large open show held in Copenhagen annually, with one of the three Copenhagen societies sponsoring it each year. There is no entry fee for exhibits—but beware! All the exhibits are furnished aquaria and vivaria, divided into two classes: over 100 litres (22 gallons) and under 100 litres. This includes breeders' classes, where the whole brood has to be shown. The show lasts for about 10 days, during which time the fish are on view to the public. A lottery is also held and would seem to be a very profitable concern, judging by the numbers of tickets seen littering the floor in Mr Christensen's cine film of the occasion which was screened at the convention.

The society to which Mr Christensen belongs celebrated its fiftieth anniversary in 1965, when the King of Denmark attended their show. The meetings of this society, which are usually held monthly, are also well organised affairs. Starting with the business and the Board's report, the main speaker or a film follows; then comes an auction of fishes bred by members and a tombola to raise a little more money. No wonder these Danish societies can boast of healthy bank accounts!

Club News

AT the members show held by **BURTON & D. A.S.** at the end of May it was felt that the efforts of judge Mr F. Fibiger of Derby really contributed to make the show the success it was. The best tropical fish in show award went to Mr J. Hunt for a redtailed black shark and the best coldwater fish award to Mrs E. Hunt for a shubunkin. Other awards were:

Anabantids: 1, Mr B. Pointon (74 pts); 2, Mr R. Forman (72); 3, Mr G. Jackson (69); 4, Mr R. Walker (68). Barbs: 1, Mr G Jackson (74); 2, 3 and 4, Mr J. Hunt (72, 69, 66). Catfish and loaches: 1 and 2, Mr H. King (77, 69); 3, Mr R. Walker (76); 4, Mr J. Hunt (68). Cichlids: 1, 2 and 3, Mr J. Hunt (70, 69, 68); 4, Mr H. King (67). Characins: 1, Mr B. Pointon (68); 2, Mr G. Jackson (67); 3, Mr H. King (64); 4, Mr J. Hunt (72, 69).

Guppies: 1 and 4, Mr G. Chester (74, 71); 2, Mr H. King (73); 3, Mr B. Pointon (72). Mollies: 1, Mr B. Pointon (68); 2, Mr H. King (67); 3, Mr J. Hunt (66); 4, Mr G. Chester (63). Platys: 1, 2 and 4, Mr J. Hunt (68, 65, 66); 3, Mrs R. King (67). Swords: 1, Mr B. Pointon (72); 2 and 3, Mr J. Hunt (68, 66); 4, Mr G. Chester (63). Rasboras, danios, white cloud minnows: 1 and 2, Mr J. Hunt (74, 73); 3, Mr G. Jackson (66); 4, Mr H. King (63). A.o.v. tropical: 1, 3 and 4, Mr J. Hunt (87, 69, 68); 2, Mr R. Walker (70).

Goldfish variety: 1 and 2, Mrs E. Hunt (83, 82); 3, Mr J. Hunt (81); 4, Mr A. Hunt (79). A.o.v. coldwater: 1, Mr B. Forman (69); 2 and 3, Mr J. Hunt (68, 67); 4, Mr A. Hunt (63).

Furnished aquaria tropical: 1, Mr B. Pointon (78); 2, Mr G. Jackson; 3, Mr H. King (72); 4, Mr G. Chester (70). Furnished aquaria coldwater: 1, Mr H. King (77); 2, Mr J. Hunt (74); 3, Mr A. Hunt (73); 4, Mr B. Forman (70).

Monthly meetings of the Society are held at the Fox and Goose, Bridge Street, Burton on the second Thursday of the month at 7.45 p.m. New members are welcome and can obtain details from the secretary, Mr R. Tagg (81 Hillside Road, Linton, Burton-on-Trent).

NEWS from **YEOVIL & D. A.S.** indicates great activity on the part of members in this show season. At the Bath open show, Mr G. Gillard was awarded a first (*Botia lecontei*), a second (*Rasbora elegans*) and a third (blue platy), while Mr N. Wright was awarded a first (goldfish) and a second (breeders class). At the recent Trowbridge open show winning exhibitors were: 2, Mr A. Nicholls (sail-fin mollie); 2 and 4, Mr A. Nicholls (red platy); 4, Mr N. Wright (breeders class); 3 and 4, Mr G. Gillard (red platy and *Metynnis*); 4, Mr W. Reeves (goldfish); highly commended, Mr W. Reeves (rudd).

Nearer home, club members competed among themselves for the Stainer/Enticott Cup, which is awarded annually for the best pair of tropical fish on show. Mr D. S. Langdon, president of the society, judged the red platys exhibited by Mr A. Nicholls to be the winning fish (2, Mr G. Gillard with a pair of *Metynnis* and 3, Mr N. Stainer with *schuberti* barbs). The annual inter-

club show with TAUNTON A.S. also took place recently. The judge was Mr Matley of Bournemouth and awards were made as follows: Coldwater: 1, London shubunkin (Taunton); 2 and 3, Bristol shubunkin (Yeovil). Tropical: 1, marble headstander (Taunton); 2, redtailed black shark (Taunton); 3, red fighter (Yeovil). Taunton therefore hold the shield for 1967.

AT the annual dinner and social of the **ISLE OF WIGHT A.S.**, Mr and Mrs J. Stillwell travelled over to the Island to present the cups and trophies that had been competed for over the year. Awards were made as follows: The I.O.W. challenge cup (points cup), Mr W. Bradley (runner up: Mr E. T. Davison); Hors shield (furnished aquaria), Mr J. Woods; Tetra cup, Mr W. Bradley; Guppy cup, Mr S. Stevens; best tropical fish, Mr E. T. Davison; Hendon cup (best coldwater fish), Mr E. T. Davison; Plant cup, Mr R. Netten. Medals awarded for more than 3 firsts: Mr E. T. Davison (8 firsts); Mr W. Bradley (5 firsts); Mr R. Netten (3 firsts).

At the society's A.G.M. officers elected were: chairman, Mr W. G. Jones; vice-chairman, Mr K. Willis; treasurer, Mr L. Davis; secretary, Mr E. T. Davison (Aquarium Cafe, Old Village, Shanklin, I.O.W.); show secretary, Mr J. Hobbs; curator, Mr S. Stevens; committee: Mr J. Nolan, Mr J. Woods; Mr W. Bradley, Mr C. Petty.

Finally, to round off a busy month, a very pleasant outing was made to Marshall's Aquaria, Buckhurst Hill. After lunch in London, two hours were spent at Marshall's and the last boat was caught back to the Island.

FOLLOWING the suggestion for mini-tanks made in PETFISH MONTHLY, this type of show has become very popular with members of **SOUTHEND, LEIGH & D. A.S.** and Mr S. C. Halsey who was judging the recent mini-tank table show had a difficult task with so many entries reaching a really good standard. Places were finally awarded as follows: 1 and 2, Mr E. Thompson; 3, Mr R. Wallins; 4, Mr Plappert. Results of other well-supported table shows have been: Platys: 1, Mr Plappert (red wagtail); 2, Mr D. Cheswright (black); 3, Mr Plappert (festival); 4, Mr D. Cheswright (red). Swordtails: 1, Mr S. Norris (green); 2, Mr D. Roberts (red); 3, Mr E. Thompson (red); 4, Mr J. Cooper (red Simpson).

The club is now meeting at St. Andrews Hall, Electric Avenue, Westcliff-on-Sea (opposite the Essoldo Cinema and 100 yds from Chalkwell Park). New members are always welcome and can obtain details from the secretary, Mr M. J. Willis (17 Arundle Gardens, Westcliff).

SEVERAL members of **NEWPORT A.S.**, led by the general secretary Mr Ivor Phillips and show secretary Mr Michael Parry, visited CHELTENHAM A.S. on the 26th April to compete in an inter-club table show there. The judge was Mr R. Pinks, well-known author and hobbyist, who admirably coped with the difficult task. The result proved to be a victory for the visiting society, who won by 543 points to 536 in the egglayer class and by 551 to 541 points in the livebearer class. Individual winners were: Egglayers: joint 1st, Mr F. G. James (Newport) and Mr N. Hughes (Cheltenham); 3, Mr F. G. James (Newport); joint 4th, Mr J. Parry (Newport) and Mr L. Tomlin (Cheltenham). Livebearers: 1 and 2, Mr F. G. James (Newport); 3, Mr R. Compson (Cheltenham).

At the society's monthly meeting, the guest speaker was Mr Norman Mason-Smith of Cambridge who took with him his excellent 8 and 16 mm. films on aquatic and allied subjects. Club members were joined by visitors and friends from the neighbouring societies of BARRY, CARDIFF and LLANTWIT MAJOR for this meeting.

The fifth annual open show of the society has been arranged for Saturday, 16th September, the venue being Duffryn Junior High School, Newport and three judges for the event have so far been appointed: Mr Barry James (Cheltenham), Mr Dennis Bayldon (Weston-super-Mare) and Mr Jim Sanders (Bridgend).

A LECTURE by a local veterinary surgeon provided a very interesting meeting for members of **RUNNYMEDE A.S.** recently. The lecturer explained that the study of fishes was gradually winning the interest of members of his profession and that hobbyists might look forward to greater co-operation with veterinary practitioners in future. Recent lectures have given members of the club a really varied programme. They have enjoyed a slide and tape show on plants loaned by Rugby A.S., a talk on fishhouse construction, a talk on marines and a demonstration by two club members on how to furnish a 4 in. by 4 in. show jar.

Table show results have been: Characins: 1, Mr Shanks (black widow); 2, Mr McDowall (penguin); 3, Mr Richardson (Australian rainbow). Cichlids: 1 and 3, Mr Grovenor (angels); 2, Mr Shanks (firemouth). Pairs: 1, Mr K. Smith (fighters); 2, E. Parry (rosy barbs and guppies). Coldwater: 1 and 2, Mr N. Rickards.

IF the LIVERPOOR SECTION of the **FANCY GUPPY ASSOCIATION** were to adopt a motto it would surely have to be 'Excelsior'. Entries, attendances and new memberships increase with each successive show. At the May open show, 160 top-class guppies were entered, there was a very large attendance and six new members were recruited. Competition on the show bench was so keen that the award for best fish in the show resulted in a draw between six very good guppies, each with 77 points. Quite an achievement for so young a section. One of the highlights of the show was a demonstration given by Mr Bill Henderson on how to set up a tank; this tank was later the prize in the raffle. The chairman, Mr Ken Rigby, presented silver guppies to both Mr Brian Grice and Mr Ken Clarke.

ALTHOUGH other shows were being held on the same day as the **LEIGH A.S.** annual open show, the number of entries was nearly 30% up on last year's figure. A special attraction was the stand put on by members of the Liverpool Section of the Fancy Guppy Association. Judges Mr C. Walker (F.B.A.S.) and Mr A. E. Bloom (F.N.A.S.) carried out their task with the efficiency associated with the bodies they represent.

The trophy for the best tropical entry in the show was won by Mr Thomalla (Merseyside) while the best coldwater entry award went to Miss C. Brothwood (Leigh). Results were:

Guppies: 1, Mr Forsyth (Liverpool F.G.A.); 2, Mr Brothwood (Leigh); 3, Mr Hughes (Warrington). Platys: 1, Mr Williams (Chorley); 2, Miss B. Kay (Huddersfield); 3, Mr Forsyth (Liverpool F.G.A.). Swordtails: 1, Mr C. Vaughan (Liverpool F.G.A.); 2, Mr A. Shaw (Leigh); 3, Mr D. Ridyard (Leigh). Mollies: 1, Mr Hamblett and Mr Tench (Warrington); 2, Mrs Jones (Valley); 3, Mr Brothwood (Leigh).

Small characins: 1, Mr C. Eastham (Leigh); 2, Mr I. Boardman (Leigh); 3, Mr Walley (Leigh). Small barbs: 1, Mr Thomalla (Merseyside); 2, Mrs Standen (Lancaster); 3, Mr Hamblett (Warrington). Large characins: 1, Mr Brothwood (Leigh); 2, Mr Smith (Aireborough); 3, Mr Brown (Wigan). Large barbs: 1, Mr K. Willet (Lytham); 2, Mr L. Kaye (Huddersfield); 3, Mr H. Greenhall (Leigh).

Dwarf cichlids: 1, Mr D. Stotton (L.A.B.); 2, Mr D. Smith (L.A.B.); 3, Mr I. Boardman (Leigh). Large cichlids: 1, Mrs Jones (Valley); 2, Mr T. Hallett (Clitheroe); 3, Mr T. Matthias (L.A.B.). Anabantoids: 1, Mr D. Ridyard (Leigh); 2, Mr I. Boardman (Leigh); 3, Mr R. Walley (Leigh). Fighters: 1, Mrs Jones (Valley); 2, Mr Hamblett (Warrington); 3, Mr L. Kaye (Huddersfield).

Rasboras: 1, Mr Thomalla (Merseyside); 2, Mr Ellis (Valley); 3, Mr R. Walley (Leigh). Danios: 1, Mr Smith (Aireborough); 2, Mr D. Ridyard (Leigh); 3,

Mrs Standen (Lancaster). Toothcarps: 1, Mr J. Boardman (Leigh); 2, Mrs Standen (Lancaster); 3, Mr Crompton (Salford).

Loaches: 1, Mr J. Hancock (Leigh); 2, Mr Higham (Warrington); 3, Mrs Whittle (Leigh). Catfish: 1, Mr L. Kaye (Huddersfield); 2, Mr D. Grundy (Leigh); 3, Mr H. Silcock (Leigh). Sharks: 1, Mr Thomalla (Merseyside); 2, Mr Norris (Warrington); 3, Mr C. Eastham (Leigh). A.o.v.: 1, Mr Brothwood (Leigh); 2, Mr H. Silcock (Leigh); 3, Mr Beswick (Warrington).

Fancy goldfish: 1, Master J. Ridyard (Leigh); 2, Master A. Kaye (Huddersfield); 3, Mr Clarke (Warrington). Common goldfish: 1, Miss C. Brothwood (Leigh); 2, Mr D. Stotton (L.A.B.); 3, Master and Miss Tench (Warrington).

Pairs egglayers: 1, Mr Thomalla (Merseyside); 2, Mrs Standen (Lancaster); 3, Master D. Bond (Leigh). Pairs livebearers: 1, Mr T. Hallett (Clitheroe); 2, Mr Adair (Liverpool F.G.A.); 3, Mr Higham (Warrington). Breeders egglayers: 1, Mrs Standen (Lancaster). Breeders livebearers: 1, Mr Tench and Mr Hamblett (Warrington); 2, Mr L. Kaye (Huddersfield); 3, Mr Brothwood (Leigh). Junior: 1, Master S. Kaye (Huddersfield); 2, Master Hallett (Clitheroe); 3, Master D. Bond (Leigh).

The F.B.A. stand prize winners were: Mr K. Rigby, Mrs P. Rigby, Mr C. Vaughan, Mr T. Hallatt, Mr Forsyth, Mr Henderson, Mr Senior, Miss J. Peet. The best fish on the stand was a double sword with 77 pts entered by Mrs P. Rigby.

THE EFFORTS of the F.G.B.S. and the F.G.A. to achieve agreement on standards are not being allowed to flag. At the Spring Assembly of the **FEDERATION OF GUPPY BREEDERS SOCIETIES,** to which the WEST MIDLAND SECTION were the host club, a good deal of time was taken up in the comparison of the standards of the two organisations. Mr G. Davis, who had gone to a great deal of trouble to have line drawings made for all to see on the notice board, was given the job of explaining the different points of each class type. The president, Mr K. G. Pearce—who is also a member of 'Guppies Incorporated', a body set up of two members of the Judges and Standards Committees of both organisations—explained what steps had been taken so far in coming to an agreement on a set of standards that would be accepted by both F.G.A. and F.G.B.S. A joint show by both groups to be held at the Kingstanding Settlement, Kingstanding Road, Birmingham on Saturday 8th July was also discussed. This started off a barrage of questions on finnage size and shape that kept Mr Davis busy. Considering that he also judged three classes of guppies as well, it can be said that he had a great deal to do with the success of this meeting.

Results of the meeting, where 213 jars were benched, were: Silver pin winners were Miss M. Lindley, Mr F. D. Hall (2), Mr M. Reynolds and Mrs D. Court. Mrs Court also won a gold pin for a bottomsword.

Class winners were:

Speartail, Mr F. D. Hall; cofortail, Miss M Lindley; roundtail, Mr R. Cheshire; doublesword, Mr B. Walker; bottomsword, Mrs D. Court; topsword, Mr P. W. Jinks; lyretail, Mr S. Sharrard; coloured veil, Mr F. D. Hall (best fish in show); black veil, Mr B. Walker; fantail, Mr D. Adshead; triangletail, Mr F. D. Hall; scarftail, Mr A. Wilkinson; grey female, Mr J. Croft (best opposite sex); gold female, Mr P. W. Jinks; coloured female, Mr A. Wilkinson; albino female, Mr A. Wilkinson; Robson female, Mrs D. Court; wedgetail female, Mr D. Adshead; Metropolitan female, Mr M. Reynolds; breeders males, Mr A. Wilkinson; breeders females, Mrs D. Court (best breeders team).

TREASURERS of societies affiliated to the **FEDERATION OF BRITISH AQUATIC SOCIETIES!** *Have you paid your subscriptions for the year yet? Over sixty societies in the counties listed below have done so, but there are many more to follow and the treasurer, Mr R. Dove of 5 Farm Close, Crowthorne, Berks. would find it very helpful if those who have not yet done so would send him their affiliation fees as soon as possible. Paid up members are: Bedfordshire, 2; Berks, 3; Bucks, 1; Cambridge, 1; Dorset, 1; Essex, 6; Herts, 2; Hants, 7; Glos., 2; Ireland (Fed.), 1; Kent, 5; London area, 10; Middlesex, 1; Sussex, 5; Surrey, 8; Somerset, 3; Wales, 2; Wilts, 1. Other societies who are interested in joining the F.B.A.S. should write for details to the secretary, Mr Ken Pye, 35 Steeles Road, London, N.W.3.*

AT the **OSRAM A.S.** open table show at the beginning of May, the judges were Mr B. Pengilley (F.N.A.S.), Mr P. Moorhouse (F.N.A.S.), Mr G. R. Collins (F.N.A.S.), Mr L. Baxter (F.N.A.S.) and Mr J. Gibbons (F.N.A.S.). There were 320 exhibits and the best on show was awarded to Mr J. Robinson of Merseyside whose exhibit in the large characin class was awarded 85 points.

Other results were:

Anabantids: 1, Mr E. Price (Gorton); 2, Mr E. Fletcher (Glossop); 3, Mr F. Mulla (Merseyside). Fighters: 1, Mr E. Mackay (Oxram); 2, Mr W. Booth (T.A.B.); 3, Mr K. Wilbraham (Oxram). Small barbs: 1, 2 and 3, Mr F. Gregory (Oxram). Large barbs: 1, Mr M. Parkes (Merseyside); 2, Mr R. Scoltock (Oxram); 3, Mr R. Wilkinson (Halifax). Labeos and sharks: 1, Mr G. Kershaw (Heywood); 2, Mr Scray (Halifax); 3, Mr Tomkinson (Glossop).

Small characins: 1, Mr K. Wilbraham (Oxram); 2, Mr G. Hammett (Glossop); 3, Mr and Mrs Charlton (Stockport). Medium characins: 1, Mr E. Price (Gorton); 2, Mr A. G. Whyte (Halifax); 3, Mr Rowbottom (Macclesfield). Large characins: 1, Mr J. Robinson (Merseyside); 2, Mr F. Mulla (Merseyside); 3, Mr R. Wilkinson (Halifax). Dwarf cichlids: 1, Mr D. Crook (Glossop); 2, Mr L. McCourt (Gorton); 3, Mr F. Mulla (Merseyside). Angels: 1, Mr M. Taylor (Rochdale); 2, Mr Longbottom (Mixenden); 3, Mr F. Woodward (Blackpool).

A.o.v.: 1, Mr Cass (Macclesfield); 2, Mr P. Hodgkinson (Gorton); 3, Mr F. Mulla (Merseyside). Toothcarps: 1, Mr and Mrs Charlton (Stockport). 2, Mr M. Taylor (Rochdale); 3, Mrs Hodgkinson (Gorton). Rasboras: 1 and 3, Mr F. Gregory (Oxram); 2, Mr Hodgkinson (Gorton). Danios: 1, Mr Ingram (Glossop); 2, Mr A. Beasley (Oxram); 3, Mr K. Ashworth (Oxram).

Guppies: 1, Mr Johnson (Stockport); 2, Mr Howarth (Glossop); 3, Mr A. Beasley (Oxram). Swordtails: 1, Mrs Percy (Heywood); 2, Mr W. Benning (Stockport); 3, Mr A. G. Whyte (Halifax). Mollies: 1, Mr J. Pogson (Oxram); 2, Mr D. Crook (Glossop); 3, Mr N. Lomas (Glossop). Platys: 1, Mr Hodgkinson (Gorton); 2, Mr R. Birch (Heywood); 3, Mr E. Fletcher (Glossop).

Loaches: 1, Mr J. E. Shore (Oxram); 2, Mr N. Taylor (Oxram); 3, Mr Hodgkinson (Gorton). Catfish: 1, Mr W. Booth (T.A.B.); 2, Mr K. Wilbraham (Oxram); 3, Mr E. Price (Gorton).

Goldfish: 1, Mr Howarth (Glossop); 2, Mrs T. Davies (Heywood); 3, Mr H. Penkell (Oxram). Shubunkins: 1, Mr R. Birch (Heywood); 2, Mr Endon (Sheffield); 3, Mr Bassett (Glossop). Veiltails: 1, Mr A. Phillipson (East Lancs.); 2, Mr Endon (Sheffield); 3, Mr H. Penkell (Oxram). Orandas: 1, Mr A. Phillipson (East Lancs.); 2, Mr R. Birch (Heywood); 3, Mr H. Penkell (Oxram).

Breeders egglayers: 1, Mr W. Taylor (Oxram); 2, Mr L. McCourt (Gorton); 3, Mr K. Wilbraham (Oxram). Breeders livebearers: 1, Mr A. Beasley (Oxram); 2, Mr A. Maltby (Rochdale); 3, Mr Shields (Halifax). Breeders guppies: 1, Mr J. Gibbons (Heywood); 2, Mr R. Birch (Heywood); 3, Mr R. Preston (Heywood).

A.o.v.: 1, Mr G. Hammett (Glossop); 2, Mr W. Booth (T.A.B.); 3, Mr E. Price (Gorton). Pairs: 1, Mr F. Gregory (Oxram); 2, Mr Johnson (Stockport); 3, Mr Scray (Halifax). Oxram juniors: 1 and 2, Master E. Jones; 2, Master E. Bolton.

LEAMINGTON & D. A.S. members have been very busy with shows recently: two M.A.L. shows, to one of which they were the host society, the M.A.A.S. convention and their own M.A.L. eliminator table show on 17th May. The success of the M.A.L. show at the Riverside Youth Centre was due in no small measure to the enthusiastic help that club members gave, 32 out of 50 members turning up to assist. The judges at this show were Mr Cook, Mr Brown and Mr Woodall and the best in show award was made to Mrs Ball of Atherstone with a cardinal tetra that gained 84 points. The furnished jar competition was very popular and there were 15 entries to be judged by Mr Bob Deacon; including a marine jar. Awards were made to: 1, Mr Woolterton (Rugby); 2, Mrs Woolterton (Rugby); 3, Mr T. Dobson (Leamington); 4, Mr D. Ward (Leamington).

OFFICERS elected for 1967 at the **CAMBRIDGE & D. A.S.** annual general meeting were: president, Mr Elkerton; chairman, Mr Betts; vice-chairman, Mr R. Edney; secretary, Mrs G. Hulyer (The Cemetery Lodge, Newmarket Road, Cambridge); treasurer, Mr N. Radford; assistant and show secretary, Mr W. Isgrove (74 Milton Road,

Cambridge); librarian, Mr A. Hulyer; publicity, Mr G. P. Rivett; support committee, Mr Able, Mr Freeman, Mr Hulyer, Mr Human, Mr Sanderson, Mr Sharp. An increase in membership and an entertaining future programme looks like heralding in one of the most successful years in the society's history. There is a new venue to be noted—the Rose and Crown at the corner of Newmarket Road and East Road, Cambridge, where meetings are held on the first Tuesday in each month. All welcome, juniors needed!

The Cup Final did not deter about 200 people attending the most successful show ever held by the Society. There were over 140 entries, judged by Mr Stewart of London, who awarded the best fish in show and best egglayer prize to Mr A. Hulyer for his snakeskin gourami (89 pts). Best livebearer award went to Mr Ott, best coldwater to Mr M. A. Hulyer and best fish bred to Mr W. Isgrove. Class winners were:

Coldwater: 1 and 2, Mr A. Hulyer; 3, Mr Betts. Guppies: 1 and 2, Mr Ott; 3, Mr Sharp. A.o.v. livebearers: 1, Mr Ott (bi-fin swordtail); 2, Master Startup (red tuxedo); 3, Mr Edney (red swordtail).

Barb: 1, Mr Ott (*B. cumingi*); 2, Mr Edney (tiger barb); 3, Mr Ott (*B. schwanenfeldi*). Anabantids: 1, Mr A. Hulyer (snakeskin gourami); 2, Mr Georgeson (black paradise); 3, Mr Edney (paradise fish). Cichlids: 1, Mrs Hanks (*P. kribensis*); 2, Mr A. Hulyer (blue acara); 3, Mr N. Radford (firemouth). Catfish and loach: 1 and 2, Mr Hulyer (albino Clarias, marbled botia); 3, Mr G. P. Rivett (striped botia).

Characin: 1, Mr Dant (scissortail); 2, Mr G. P. Rivett (X-ray); 3, Mr K. Able (black widow). A.o.v. egglayer: 1, Mr Dant (blue parchax); 2, Mr Cooper (Australian rainbows); 3, Mr G. P. Rivett (flying fox). Pairs: 1, Mr W. Isgrove (dwarf gouramis); 2, Mr Hulyer (blue acaras); 3, Mr Georgeson (snakeskin gouramis). Broods: 1 and 2, Mr Edney (opaline gouramis and guppies); 3, Mr Isgrove (guppies). Furnished aquaria 12 in. by 8 in. by 8 in.: 1, Mr Edney; 2, Mr Sanderson; 3, Mr Rivett.

THE MIDLAND AQUARIST LEAGUE's show season runs from September to June and the **COVENTRY POOL & AQUARIUM SOCIETY** acted as hosts at the final match of the season on the 21st May. The League was formed in Coventry in 1963 when delegates from Atherstone, Coventry, Leamington and Rugby met to form the Inter-Society League (as it was then called) for the purpose of holding table shows, stimulating the hobby and encouraging greater communication between clubs in the Midland area. Subsequently joined by Northampton A.S., the Midland Aquarist League holds four shows each season, one show per club, catering for two classes and one breeders class each show. The number of fish are restricted for each society and first awards get 4 points, second awards 3, third awards 2 and all other entries 1 point.

Results at the Coventry show were:

A.o.v. livebearers: 1, Mr R. Scally (lyretail black mollie, Coventry, 72 pts); 2, Mr B. Woolerton (sunset platy, Rugby, 72); 3, Mr and Mrs Pearson (marigold platy, Rugby, 69 pts). A.v. guppy: 1, Mr S. Clayson (Northampton, 71½ pts); 2 and 3, Mrs M. Ball (Atherstone, 72, 68). Breeders livebearers: 1, Mr R. Scally (blue festival platys, Coventry, 76 pts); 2 and 3, Mr D. Delves (festival platys, redeyed red swords, Atherstone, 73½, 73 pts).

Open classes: a.v. aquarium plant: 1, Mr B. V. Woolerton (77 pts); 2, Mr and Mrs Scally 74 pts); 3, Mr and Mrs Pearson (61 pts). Pairs egglayers: 1, Mr F. Underwood (silver tetra, 84 pts); 2, Mr T. Grant (*Colisa lalia*, 80); 3, Mr T. Lockman (*Panchypanchax playfairi*, 78).

Thus the final results of the 1966-1967 competition saw Coventry in the winning place with 79 points, Atherstone 75, Rugby 71, Leamington 64 and Northampton 47. Mr Les Dodge, secretary of M.A.P.S. and chairman of M.A.A.S. presented the COVENTRY EVENING TELEGRAPH Trophy to the winning society (in token only, as it happened, since the trophy itself did not arrive in time). Whilst the judging was taking place, Mr Anthony Evans, editor of PETFISH MONTHLY, gave a talk on the physiology of fishes with particular reference to the varied uses of the swim bladder.

THE **MIDLAND ASSOCIATION OF AQUARISTS' SOCIETIES** annual convention and open show held at Leamington Spa by the host club LOCKHEED A.S. was a most successful occasion. Detailed show results have not reached us yet, but reports of the excellent talks and large audience have. As well as a lecture and film by Mr Leif Christensen of Denmark, a very enjoyable talk was given by Mr Gerald Jennings of the International Marine Study Society, illustrated with slides of very high standard.

The report has reached us, however, from the **FEDERATION OF GUPPY BREEDERS SOCIETIES**, of the results of their first open show of the year that was held at the M.A.A.S. Convention. There were 218 entries, judged by Dr Cole, Mr N. Court, Mr M. Delingpole, Mr A. Lindley and Mr S. Sharrard. Great interest was shown by the public and other exhibitors at the convention and judging was still in progress when the barriers were opened and within minutes the benches were crowded. The manner in which the judges continued with their work and yet satisfied the many inquiring enthusiasts was really worthy of note. The best in the show was a grey female with 91 points. Best opposite sex was a coloured veil with 74 points. Class winners were:

Cofertail, Miss M. Lindley; speartail, Mr F. D. Hall; scarftail, Mr K. G. Pearce; black veil, Mr N. Court; lyretail, Mr S. Sharrard; topsword, Mr V. Howes; fantail, Mr F. D. Hall; gold female, Mr P. W. Jinks; coloured female, Mr F. D. Hall; Metropolitan female, Mr F. D. Hall; roundtail, Mr R. Cheshire; pintail, Mr F. D. Hall; coloured veil, Mr F. D. Hall; doublesword, Mr B. Walker; bottomsword, Mrs D. Court; triangletail, Mr J. Lindley; grey female, Mr D. Barnett; Robson female, Mrs D. Court; wedgetail female, Mr T. Nason; breeders males, Mr T. Nason; breeders females, Mrs D. Court.

AT the second annual inter-club table show held recently, **PORTSMOUTH A.S.** were hosts to KINGSTON, SOUTHAMPTON, GOSPORT, ISLE OF WIGHT, BRIGHTON, NEW FOREST, MID-SUSSEX, READING and WORTHING A.S. Each club was limited to 12 entries and the plaque awarded for the highest number of points went to Kingston A.S. (2, Portsmouth; 3, Southhampton; 4, Reading; 5, Gosport; 6, Isle of White and Brighton; 7, New Forest; 8, Mid-Sussex and Worthing; the show was judged by Mr C. A. T. Brown from London).

The results of the table shows at the last two club meetings in May are also to hand. At the first show for danios, minnows, labyrinths and miniature aquaria (judge: Mr C. Sprinks from Southampton), results were:

Miniature aquaria: 1, Mr J. Stillwell; 2, Mrs J. Stillwell; 3, Mrs L. Howard; 4, Mr G. Marks. Danios: 1, 3 and 4, Mr M. Mason; 2, Mr A. Smith. Minnows: 1 and 3, Mr V. Hunt; 2, Mrs J. Stillwell. Labyrinths: 1, Miss M. Webb; 2, Mr A. Smith; 3, Mr H. Hooper. The best fish in the show award was presented to Mr M. Mason for a danio.

The second table show, for cichlids and characins, was judged by Mr J. Stillwell. Cichlids: 1, 2 and 3, Mr H. Hooper. Characins: Mr P. Wyllie; 2, 3 and 4, Mr G. Marks. Best fish in show, a cardinal exhibited by Mr P. Wyllie.

Mr A. W. SPENCER, show secretary of **ATHERSTONE A. S.** thanks everyone for their good wishes to him on entering hospital for a major operation. He looks forward to meeting all his friends at shows later in the year.

It is regretted that in error the size of the stainless steel aquarium priced £4 8s 6d in Norwood Aquarium's advertisement last month (page 112) was given as 30 in. This should have read 24 in.

In Brief . . .

. . . THE VENUE for the **BRADFORD & D.A.S.** second Open Show on 17th September has now been reported to us. The show will be held at the Textile Hall, Westgate, Bradford 1 and show secretaries are asked to note this as it does differ from the location of Bradford's first show this April.

. . . A CHANGE is also announced by **LEEDS & D.A.S.** This concerns the date of their Open Day Show. Originally planned for December, it has been changed to Sunday 26th November to avoid clashing with another local society. Club members recently enjoyed a talk by Mr R. Winterburn of Bradford on water gardens and results of the table show held at this meeting are: Marney trophy (plants): 1, Mr G. Boothroyd; 2, Mr G. Orchard; 3, Mrs P. McCourt. Society plaque (egglayer pairs): 1 and 3, Mr K. J. Bateman; 2, Mrs P. McCourt. Novice class: Master G. Hill.

. . . MEMBERS of **WALTHAMSTOW & D.A.S.** were able to benefit from the long experience of Mr H. Tisbury when he lectured to them recently on ponds and goldfish and they obtained a great deal of helpful information both from the lecture and from the answers to their queries that followed. The society meets at Winns Avenue School, London, E.17 (near the police station) on the first Friday and third Wednesday in each month at 8.0 p.m. and the secretary, Mr D. Smalley (7 Thorpe Hall Road, Hale End Road, Walthamstow, E.17), welcomes enquiries from prospective new members.

. . . RESULTS of the table show held at the May meeting of **HALTON & D.A.S.** are: Plants: 1, 2 and 3, Mr B. Dawson. Egglayer pairs: 1, Mr W. Emmett; 2, Master D. Sharp; 3, Mr M. Taylor.

. . . 27 MEMBERS attended the first meeting of the new **HORSFORTH A.S.** and were entertained with a slide show, a raffle and table show. The specified class, live bearers, was won by Master Paul Kirby; 2, Mrs B. M. Helm; 3, Master Paul Kirby. A.o.v. results were 1 and 2, Mrs Dickinson; 3, Mrs B. M. Helm, and a.o.v. junior: 1 and 2, Master Paul Kirby; 3, Master Andrew Jobins. Best fish in the show was adjudged to be the black shark belonging to Mrs J. Dickinson.

. . . **ELLESMERE PORT T.F.S.** greatly enjoyed a recent talk by Merseyside fishkeeper Mr I. Threlkeld on fish diseases and cures. At the April table show, the first prize and trophy went to a magnificent rosy barb entered by Mrs D. Andrews; judge Mr B. Connett passed on some very helpful and constructive criticism that could help to turn non-winners into future winners. Interested fishkeepers please contact secretary Mr R. Peers (32 Brownlow Road, New Ferry, Wirral, Cheshire).

. . . THE FIRST leg of the inter-society show between Chapeltown, Worksop, Cresswell and Sheffield was held in April. **CHAPELTOWN & D. A.S.** are hoping to retain the cup which they have held for 2 years although WORKSOP are at the moment leading the field. Club members very much enjoyed a recent lecture and film show by Mr A. Harper of Poynton. Any doubts about the setting up of a marine tank were soon dispelled by the thorough coverage that Mr Harper gave to the do's and don'ts of the subject.

. . . FOUR NEW MEMBERS were welcomed to the May meeting of **PONTEFRACT & D. A.S.** and were able to enjoy the lecture by Mr Greenall of Tadcaster on toothcarps. Table show results were: juniors: 1, 2 and 3, G. P. Nash. Livebearer pairs: 1, Mr G. Nash; 2, Mr L. Thorpe; 3, Mr D. Cohen. Egglayer pairs: 1, Mr Goodall and Mr Piper; 2, Mr G. Nash; 3, Mr D. Cohen.

. . . **HOUNSLOW & D. A.S.** hope to exceed last year's successful venture with this year's open show in September. They intend to improve still further on the number and quality of the trophies available; these evoked considerable admiration last year from competitors and spectators alike. Show schedules are obtainable from secretary Mr D. J. Woodward (16 Ellerdine Road, Hounslow, Middlesex).

. . . BEST FISH of the Month award went to Mr C. Burnap at the May meeting of **AIREBOROUGH & D. A.S.** Other table show results were: junior: 1 and 2, Master D. Lawson; 3, Master K. Lister. Novice: 1, Mr C. Burnap; 2, Mr B. Megson; 3, Mrs C. Burnap. Specified: 1, Mr J. Whiteley; 2 and 3, Mr P. Iveson. A.o.v: 1 and 2, Mr R. Lister; 3, Mr B. Megson. The lecture at this meeting given by Mr Skinner on breeding *Aphyosemion caeruleum* drew a very good attendance and the response at question time showed that members were enjoying themselves greatly.

. . . 15 MEMBER societies support the **ASSOCIATION OF SOUTH LONDON AQUARIST SOCIETIES,** who have planned an open show on the 2nd and 3rd July. A series of interclub matches are also being arranged and details of membership may be obtained from the secretary. Delegate meetings are held every quarter at the Association's headquarters at Sutton Adult School, Benhill Avenue, Sutton, Surrey and the next meeting will take place on 12th July at 8.0 p.m. At a recent meeting the executive committee appointed was: secretary; Mr I. G. Flintham (101 Strand on the Green, London, W.4); treasurer, Mrs Moore (160d College Road, Upper Norwood, London, S.E.19); chairman, Mr J. Thorne (10b The Grove, Isleworth, Middlesex); members, Mr F. Glynn, Mr B. Kemp, Mr R. Dudley and Mr A. Tucker.

. . . WINNER of the Points Cup for 1966–67 at **NOTTINGHAM & D. A.S.** is Mr K. Riley, and the Appreciation Cup awarded for services to the Society throughout the year has been presented to Mr and Mrs N. Goodliffe.

. . . GENERAL SECRETARY of the **FEDERATION OF GUPPY BREEDERS SOCIETIES** Mr Malcolm H. Delingpole, has moved and his new address is: Fairfield, Radford Road, Alvechurch, Nr Birmingham (Hillside 1019).

. . . 'A CHANGE of name is not indicative of a change of face', or so reads a report from the MARINE STUDY AQUATIC SOCIETY OF GREAT BRITAIN. The Society reports that due to the expansion of its overseas membership it has decided to adopt the name **INTERNATIONAL MARINE STUDY SOCIETY** from now on. Membership enquiries should be sent to Mr Keith Martin (158 Oxford Road, Swindon, Wilts.), who has been given the new post of membership secretary.

. . . THE **FANCY GUPPY ASSOCIATION** are congratulating themselves on coming to a very happy solution to the problem of relieving the work falling on the shoulders of their journal editor, Mr Jim Kelly. So reluctant were members at the A.G.M. to accept Mr Kelly's resignation (offered entirely because of pressure of business) that considerable discussion took place on the problem of reducing the amount of work involved in producing the journal, and Mr Kelly finally agreed to carry on as editor provided that members were prepared to accept

a very truncated office routine. It was felt that this involved very little hardship compared with losing the services of Mr Kelly in this post.

. . . RESULTS of the May table show for characins at the **BRISTOL TROPICAL FISH CLUB** meeting were: open section: 1, Mr P. Wright; 2, Mr M. Taylor; 3, Mr B. Kilminster. Novice section: 1, Mr B. Kilminster; 2, Mr E. Thompson; 3, Mr S. Allaway. At this meeting the members enjoyed a very enlightening talk from Mr J. Wheeler of Bradford-on-Avon on general fish-keeping.

. . . **WARRINGTON A.S.** report success in their search for new club premises. Meetings will be held in future at the Railway Social Club, Winwick Street, Warrington—in the town centre with plenty of car parks. So now the club can resume recruitment and publicity instead of being artificially restricted to an attendance of six dozen, and prospective new members should contact the secretary Mr R. Tench (288 Manchester Road, Warrington, Lancs.). Recent club news reports a most enjoyable lecture by Mr Eddie Pillinger, speaking for the trade on 'The other side of the Counter'. Results for fish of the month (cichlids) were: 1, Mr Malcolm Nadin (firemouth); 2, Mrs Stella Bond (jewel cichlid); 3, Mr Ron Tench (angel).

. . . **WORCESTER A.S.** will shortly be moving to new and better headquarters. In the meantime, meetings are held at the Labour Club, New Street, Worcester, to which new members are cordially invited. Awards made at the A.G.M. were: trophy winners, W.A.S. furnished aquarium: Mr J. Jones. Price challenge shield for table shows: Mr Wheelan and Mr Graham. Cup for livebearers, Mr and Mrs P. Fairhurst. The new committee elected at this meeting were: chairman, Mr D. Beecroft; vice-chairman, the Reverend Sell; secretary, Mr L. Cottam (117 Cloverdale, Stoke Prior, Bromsgrove); assistant secretary, Mr P. Price; show secretary and treasurer, Mr P. Fairhurst; committee, Mr R. Huse, Mrs D. Beecroft, Mr T. Smith.

. . . FIRST place in the third round of the **CRAWLEY COLLEGE A.S.** club championship went to Mrs. J. H. Partridge (*Nannostomus anomalus*, 79 pts); 2, Mr R. Partridge (*Rasbora borapetensis*, 78 pts); 3, Mr R. Partridge (*Phallichthys amates*, 77 pts).

Dates for Your Diary

1st July. **HUTTON GRAMMAR SCHOOL A.S.** second annual Open Show, Preston, Lancs. Details from show secretary, Mr D. J. Radcliffe, Kindra, Todd Lane South, Lostock Hall, Preston, Lancs.

1st July. **GOSPORT & D. A.S.** Open Show. Schedules from Mr K. Clough, 16 Newport Road, Gosport, Hants.

21st–22nd July. **ASSOCIATION OF SOUTH LONDON AQUARIST SOCIETIES** two-day Show. Community Youth Centre, Clifton Road, Isleworth, Middlesex (opposite Fire Station, London Road). Admission 6d (free by club badge).

2nd July. **LEAMINGTON & D. A.S.** second Open Show, Warwick Youth Centre, Coten End, Warwick. Details from Mrs S. Underwood, 22 Westlea Road, Leamington Spa.

2nd July. **MERSEYSIDE A.S.** Open Show. Montrose Athletic & Social Club, 5 Richmond Terrace, Liverpool 6.

2nd July. **LEAMINGTON & D. A.S.** second Open Show.

8th July. **GOLDFISH SOCIETY OF GREAT BRITAIN** quarterly meeting. Conway Hall, Red Lion Square, Holborn, London at 2.30 p.m.

8th July. **BASINGSTOKE & D. A.S.** Open Show. St Johns Ambulance Hall, Victoria Street, Basingstoke. Schedules from Mr A. Marshall, 61 Pitman Close, Basingstoke, Hants.

8th July. **CHELTENHAM & D. A.S.** first Open Jar Show since re-formation of old society. Christ Church Hall, Malvern Road, Cheltenham. Details from Mr R. Deadman, 42 Noverton Lane, Prestbury, Cheltenham.

8th–9th July. **ROMFORD & BEACONTREE A.S.** Dagenham Town Show, Central Park, Dagenham, adjoining Civic Centre. All enquiries to Mr J. M. R. Fyne, 3 Ashvale Drive, Cranham (phone Upminster 8433).

16th July. **BOURNEMOUTH A.C.** Open Show. Kinson Community Centre, Millhams Road, Kinson, Bournemouth, Hants. Details and entry forms from Mr I. Andrews, 17 Piemont Close, Parkstone, Poole, Dorset.

5–12th August. **PORTSMOUTH A.S.** fifteenth annual Open Show. Benching, 5th; judging, 6th; open to public 7–12th; prize-giving, evening of 12th.

13th August. **GORTON & OPENSHAW** third annual Open Show. Conservative Club, Gorton Lane, Manchester 18.

25rd–26th August. **MIDLAND OPEN SHOW** (the 24th). Bingley Hall, Broad Street, Birmingham. Details from Mr J. Witts, 120 Franklin Road, King's Norton, Birmingham 30.

26th and 27th August. **OSRAM A.S.** Two-Day Show.

2nd September. **HIGH WYCOMBE A.S.** annual Open Show. The Rye, High Wycombe, Bucks. This will include a guppy show put on by the THREE COUNTIES section of the **FEDERATION OF GUPPY BREEDERS SOCIETY.** Details from Mr C. E. Pike, 16 Ashley Drive, Tylers Green, Penn, Bucks.

2nd September. **FEDERATION OF BRITISH AQUATIC SOCIETIES** Assembly.

2nd September. **YATE & D. A.S.** first Open Trade Show. Schedules from show secretary Mr J. R. Powell, 114 Cranleigh Court Road, Yate, Glos.

3rd September. **REIGATE & REDHILL A.S.** first Open Show. Details from show secretary Mr G. Bass, 2 Caroline House, Rees Road, Redhill, Surrey.

9th and 10th September. **NOTTINGHAM & D. A.S.** Open Show. Further details awaited.

10th September. **HUDDERSFIELD TROPICAL FISH SOCIETY** Fifth Open Show.

16th September. **HOUNSLOW & D.A.S.** Open Show. Bulstrode School, Hounslow, Middlesex. Trophies presented for first, second, third in all classes. Show schedules from Mr Derek Woodward, 16 Ellerdine Road, Hounslow, Middlesex.

16th September. **NEWPORT A.S.** fifth Annual Open Show. Duffryn Junior High School, Newport.

17th September. **ATHERSTONE A.S.** second Open Show.

17th September. **STOCKPORT A.C.** Open Show.

17th September. **BRADFORD & D.A.S.** Second Open Show. Textile Hall, Westgate, Bradford 1.

23rd September. **BRACKNELL & D. A.S.** Open Show. Victoria Hall, Bracknell, Berks. Details and show schedules from Mr B. Johnson, 18 Highfield Close, Cove, Farnborough, Hants.

24th September. **BLACKPOOL & FYLDE A.S.** annual Open Show. Harrowside Solarium, South Promenade, Blackpool.

24th September. **MEDWAY A.S.** Open Tropical Show. St. John Fisher School, Ordnance Street, Chatham, Kent. Schedules from Mr K. Brown, 5 Allison Avenue, Gillingham.

30th September. **KINGSTON & D. A.S.** Open Show. St. Luke's Social Centre, Elm Road, Kingston-on-Thames. Details from Mr H. Towell, 11 Belmont Terrace, Chiswick, W.4. Phone CHI 7335.

1st October. **HEYWOOD & D. A.S.** Open Show. Labour Club, Bridge Street (opposite the Seven Stars), Heywood, Lancs. Extra class for marines.

7th October. **MID-HERTS A.S.** Open Show. St. Pauls Church Hall, St. Albans, Herts. Further information from Mr D. R. Lelliott, 19 Prospect Road, St. Albans.

15th October. **STONE A.S.** Open Show (provisional).

28th–29th October. **BRITISH AQUARISTS FESTIVAL** organised by the Federation of Northern Aquarium Societies, Belle Vue Zoological Gardens, Manchester.

11th November. **GOLDFISH SOCIETY OF GREAT BRITAIN** quarterly assembly.

26th November. **LEEDS & D.A.S.** Open Day Show. (Change of date).

2nd December. **FEDERATION OF BRITISH AQUATIC SOCIETIES** Assembly.

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