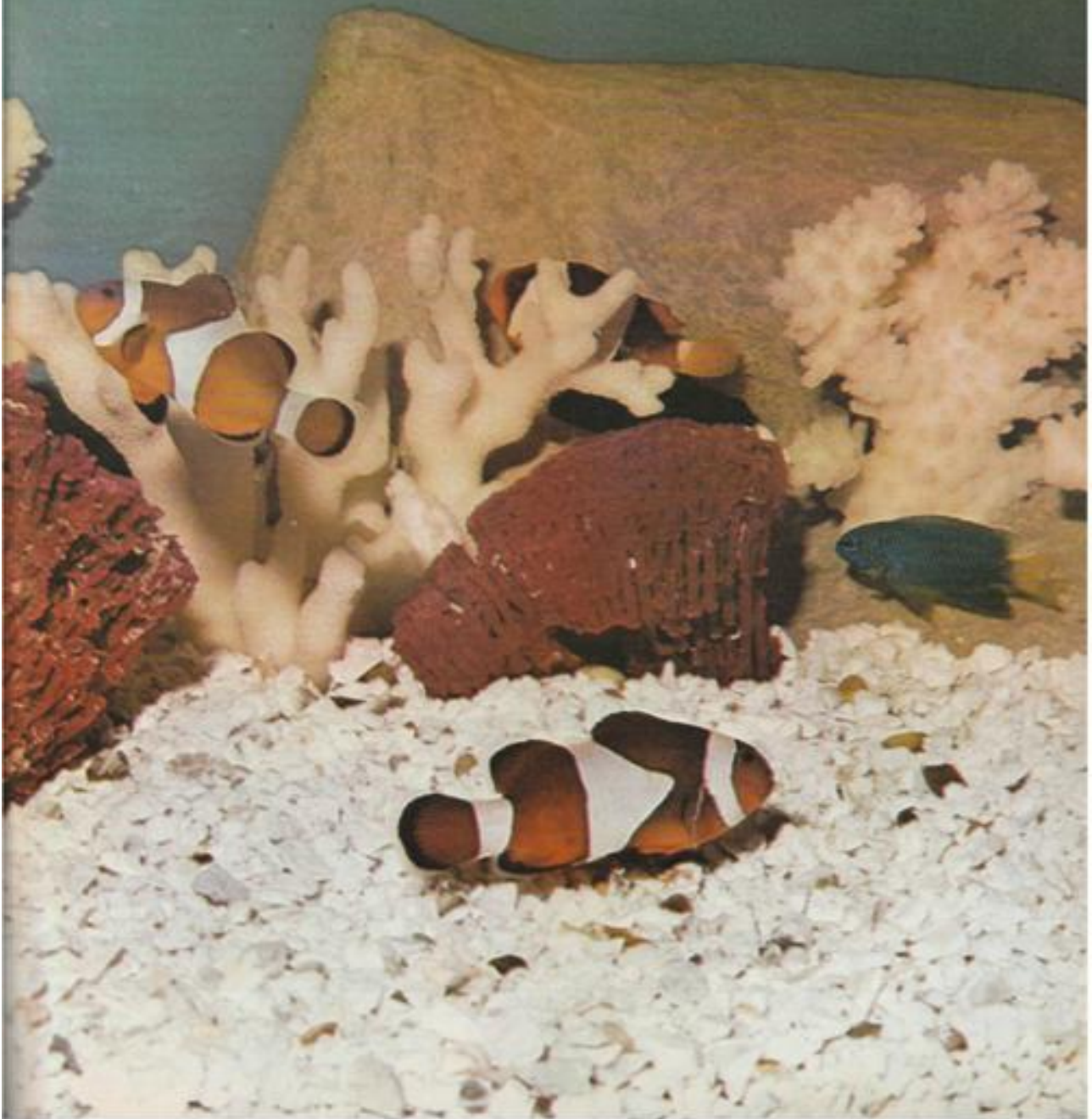


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THE AQUARIST

AND PONDKEEPER





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Our Cover

Marine set-up with Clown Fish
and Yellow-tailed Damsel Fish

The Editor accepts no responsibility for views expressed by contributors.

The REARING of YOUNG DISCUS

by D. K. Brown

General Introduction

PRIOR to 1967 I had tried to rear Discus but my efforts met with little success; although some survived longer than others all eventually died. I made notes on behaviour patterns, including symptoms of distress and general condition, which later proved invaluable. During the early part of 1967 I also attempted to keep tropical marine fish, initially with disastrous results. I was one of those unfortunate aquarists who, on setting up their first marine tank, used a silicon rubber sealer containing a toxic ingredient. At the time I was employed as a laboratory assistant and with the facilities available to me, proved conclusively that the sealer was responsible. The various tests were supervised by a close friend and colleague, Mr. K. R. Dando, a research and development chemist who, although not an aquarist himself, had shown considerable interest in solving my "fishy problems." With the compensation received from the manufacturer of the sealer we decided to purchase young Discus, various items of equipment, tank, etc., and to then tackle the problems associated with their rearing. We had already devoted much of our spare time to various aquatic tests and therefore had some ideas which we thought needed further investigation. I was personally achieving great success in breeding various soft-water species and combined with some knowledge of chemistry we felt fairly confident to undertake this task. After all, fish in aquariums are not unlike laboratory animals, their food, conditions, etc., being governed by the enthusiast. As neither of us had any specialised knowledge we realised our efforts should be directed to apparent symptoms of ill health rather than a diagnosis of underlying causes. The various tests, the results, and our conclusions are in the form of a report, not only because we feel more competent to write in this form, but also because we hope readers may find this form of presentation a change from the more orthodox. We should explain that although the complete report is written in logical order, the tests were not always carried out in the order reported. This has been done to avoid confusion and to keep the length of the article within reasonable limits. Many readers will be aware that laboratory practice requires a standard or control to the test samples and although difficult, we attempted to maintain this practice by purchasing fish, plants, etc., of similar age and condition.

D.K.B.

MANY aquarists complain of being unable to keep young Discus for more than a short period. These fish are generally available from 1 in. (body length) and are mainly imported from Hong Kong, the Far East and South America; only recently have fish bred in this

country become available. These complaints were from aquarists residing in many different parts of the country including soft and hard water areas. The symptoms preceding death were, in many instances, similar and included loss of appetite followed by rapid debility. Our intention was to examine and test various conditions under which Discus could be satisfactorily reared; before undertaking any tests we decided to study available literature.

The requirements of the adult Discus, the breeding and subsequent raising of the fry to the time of leaving the parents, had already been dealt with many times; the period following the transfer from the parents was referred to briefly. Most authors emphasised the need for soft water, hygienic conditions, live food, vertical growing plants, and regular changes of water. Detailed information of the consequences of *not* providing these conditions appeared almost non-existent. As far as we could determine, it appeared obvious that most of these conditions should also apply to the young, e.g., these fish originate from waters containing low concentrations of calcium and magnesium salts and it would therefore appear provident to provide similar conditions for those in captivity. Lime-free gravel and rocks should also be provided as the effect of lime-rich aggregate in soft water can build up to lethal proportions. The necessity for live food seemed undisputed and together with other evidence we determined our approach and preparations began.

Test 1

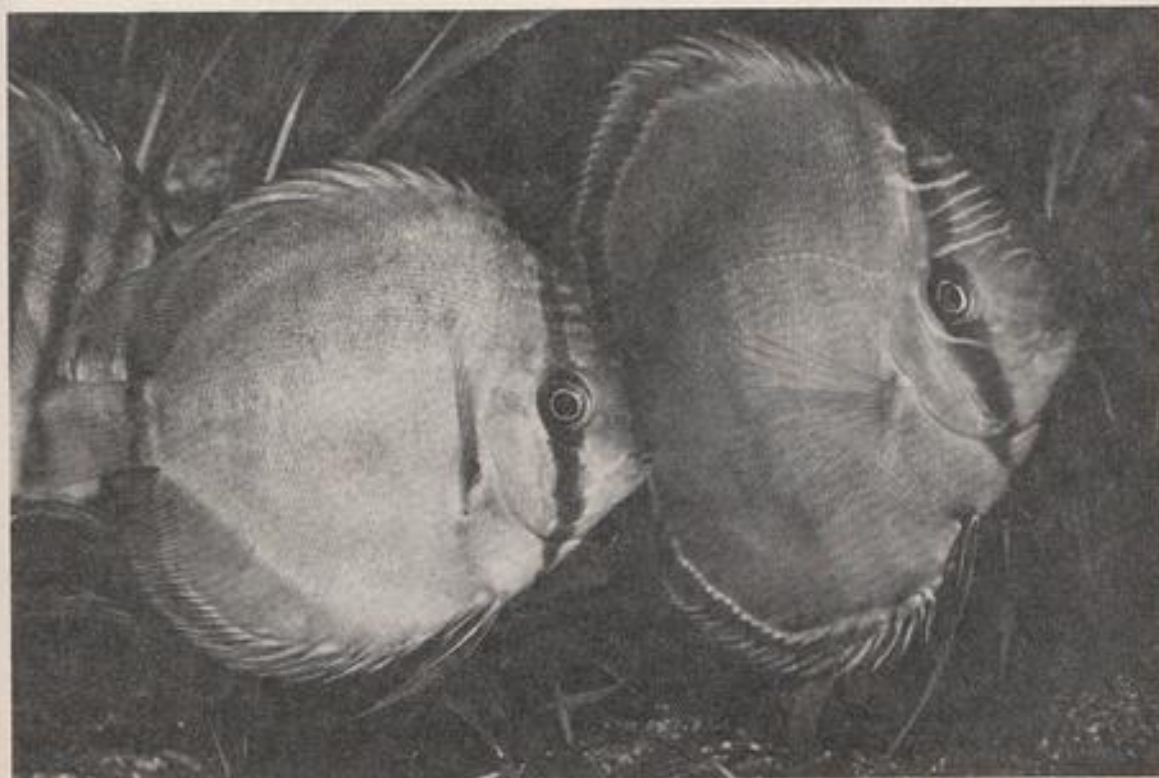
A 36 in. x 15 in. x 15 in. nylon-coated tank, the inside silicon rubber-sealed, was equipped with an aluminium hood, fitted with a 20 watt Gro-Lux tube and two 25 watt tungsten bulbs. A glass cover between the hood and the tank prevented corrosion of fittings and metal contamination of the water. Lime-free gravel and hard red sandstone were selected due to their freedom from soluble salts; Amazon sword plants, *Vallisneria* and various cryptocorynes formed the decoration. Two 100 watt heaters, an outside thermostat and a thermometer were fitted, and as emphasis had been placed on water clarity, a compact Eheim power filter containing an ion-exchange resin designed to eliminate nitrogenous wastes was installed.

Polymer wool acting as a physical filter was placed above and below the resin. The water quality to provide was the next decision and evidence gathered so far indicated that soft water was desirable. As we were starting from first principles we decided to ignore this advice; this decision was based on the fact that aquarists who were able to provide such water had not found this the complete answer. It was realised that although aquarists had complete control over the type and quality of various accessories in their aquariums, the choice of water was usually confined to the quality provided by the local water board; this was in many instances hard. Our tank was therefore filled with tap water and the TDS was measured at 320 PPM. (The hardness measurements were obtained using the Rila test kit, which we found to correlate closely with standard laboratory methods.) The pH reading, taken after the tank had been allowed to stand for a week was 7.4. With everything apparently satisfactory the temperature was set to 80°F, and we were ready to purchase the first fish. However, before this was done we decided to take one further precaution; this was to set up a water-equalising container consisting of a glass vessel containing approximately five gallons of water. This container was used whenever new specimens were introduced; the time taken to equalise was in direct proportion to the difference in hardness between

the water in the test tank and that in which the fish arrived: we include a table for clarity.

Original water PPM	Test tank PPM	Time taken to equalise
340	340	1 hour
340	200	3 hours
340	100	6 "
340	50	24 "
340	Less than 20	36 "

As far as we could determine no harm resulted from the transfers. Four brown discus were purchased and we were told that the fish required plenty of live *tubifex*. It was difficult to gauge what importance the conditions and diet of these fish prior to purchase played in the events to follow. The water in which the fish were purchased was found to contain 200 PPM TDS, pH 7.1. As the water in the dealer's area was known to be over 300 PPM TDS we deduced that soft water had been mixed with the local supply. Later enquiries from dealers indicated that the water in which the fish were imported was usually no higher in TDS than 100 PPM and less in many instances. The fish in the plastic bag were placed in the equalising tank leaving sufficient water to cover them. The water remaining in the bag was slowly topped up with our own supply and the fish released into the container. They were then transferred to the test tank and left.



without food, for 24 hours to acclimatise. Unfortunately this proved a forlorn hope; during the first week the fish were offered a variety of live food including white and grindal worms, *tubifex*, *daphnia* and finely chopped earth worms; all were accepted, the white and grindal worms being favoured. Feeding took place three times daily and during these periods the first signs of a hierarchy appeared, the largest dominating and so on down the size scale. The white, grindal and *tubifex* worms were dispensed through a perforated feeder and as the largest and strongest fish prevented the others from approaching the food this method was discontinued. Thereafter food was scattered on the surface of the tank giving all a fair chance; we realised pollution could occur due to uneaten food and in order to minimise this risk, two small pairs of catfish, *Corydoras paleatus* and *C. melanistius*, were introduced. More plants were added as the weakest fish seemed unable to find sufficient protection from their chasing and bullying neighbours; *Cabomba*, *Hygrophila*, *Ambulia* and water Wistaria were densely planted; this did not appear to worry or hinder the fish. The protection afforded by the plants enabled undisturbed eating and ensured a fair share for all. The fish spent long periods nibbling at the leaves, especially the *cabomba*. The significance of this was not apparent until later. Other behaviour patterns were, unhappily, less encouraging; periodically and more especially after feeding *daphnia* and *tubifex*, the fish scratched against the rocks and plants, this occasionally being accompanied by dark coloration and what can best be described as "trances." We will try to describe this symptom in detail as we subsequently discovered that the "trances" were the first symptoms of distress.

When approached by a comparatively healthy fish, the distressed fish turned dark in colour, became rigid, respiration increased and it seemed to offer itself for "sacrifice." In fact, on many occasions the attacker was seen to pick at the sides of the victim. After these confrontations the fish temporarily resumed their normal colour and behaviour.

Other signs of ill-health appeared after several days; the faeces were stringy, light in colour and interspersed with air bubbles. To try to remedy this, they were offered a balanced flake-food, which was not accepted, and appetites generally declined. The temperature was increased to 85°F with little apparent benefit and on the morning of the eighth day one fish was found dead; the appearance of the remainder also caused concern. The area above the anal vent was "pinched," eyes cloudy and fins closed; the dark coloration and "trances" now occurred frequently, the vertical dark bars of the body contrasting more with the body colour. We assumed the quality of the water was the most likely cause but decided to adopt the course the average aquarist would take under similar circumstances and try medicinal cures. The treatment to be used was then

considered; some white spots were apparent which, on closer examination, appeared to be encysted in the thick body mucus, although this was not thought to be the main cause of distress. The light-coloured faeces previously noted had, in two of the fish, become yellow, heavier, and appeared diseased. We recollected that this species was known to be prone to a form of tuberculosis which, among other things, infected the intestinal passage and stomach. We therefore decided to try antibiotics in the hope that they might cure the disease. Accordingly the three fish were placed in separate 5-gallon containers of water from the test tank; one of the following antibiotics were then added to each of the containers: Streptomycin, Chloro-mycetin and Aureomycin. The dosage followed the advice given in various fish manuals but two days later the fish were dead. The only additional observation was that during the last 24 hours the yellow faeces had increased although post mortems showed that the intestinal passages were swollen and blood-stained.

Test 2

Having no evidence to the contrary, we assumed the water in the previous test was unsuitable and again, ignoring the advice pertaining to soft water, we decided to try to discover the limits of water purity which could be tolerated. The second tank was filled with water containing 150 PPM TDS; this was prepared by mixing tap and de-ionised water. Plants of the previously mentioned varieties were used from the start and four more Discus, two browns and two blues, were purchased, this time from a different source. Fish of 1 in. size were again selected, and the water hardness measured at 100 PPM. They were purchased in a hard water area but we were told by the dealer of the difference. His experience showed that a high loss-rate could be expected if fish were kept in hard local water; their diet had consisted mainly of *tubifex* and *daphnia*. After equalising the fish were released into the main tank and close examination showed two fish were a little "pinched," but not alarmingly so. They settled in quickly and we became more optimistic due to the difference in the condition of these fish compared with the former examples, and after a day or two we started, prematurely, to congratulate ourselves on what seemed to be a simple solution.

After a period of starvation the fish ate ravenously, even flake-food, and we began to believe the advice experts had given, that water was the main problem in keeping Discus. We little realised the amount of work time and study still facing us. The hierarchy tended to become more dominant, probably due to the difference in general fitness, but on this occasion the plants afforded the underlings ample protection, the fish seemed to enjoy swimming among them.

Certain habits still concerned us, but these were thought to be of minor importance. After feeding

live food scratching took place together with dark coloration and "trances" as noted previously; we had yet to fully understand the significance of these actions. Signs of constipation were observed from time to time, but we reasoned that as soon as we were able to get the fish eating flake-food, this would alleviate the problem. This, unfortunately, was not the case, and gradually the symptoms increased in frequency. Pecking of plants again occurred, and when algae began to appear on rocks the fish ate small quantities, usually after feeding. Typical cichlid behaviour was also noticed, mouth to mouth tugging, butting, tail-wagging, accompanied by what can only be described as "going purple in the face." No physical damage occurred as a result of these actions, the bark appearing worse than the bite. After some five or six weeks their diet consisted of flake-food in the morning, meat midday, including diced lightly cooked beef-heart, diced liver, freeze-dried *tubifex* and brine shrimp and an evening meal of white and grindal worms, or our table scraps, chicken, ham, pork, prawns, shrimps, etc.; all were readily accepted.

The feeding of live *tubifex* and *daphnia* was discontinued because scratching was most noticeable after feeding these. Cyclops introduced with the *daphnia* were usually ignored but these crustaceans seemed to irritate the fish. After some weeks, certain distress symptoms became increasingly apparent; although continuing to eat well, growth was slow and indications of emaciation appeared. Constipation increased, pinched areas above the vents were noticed, longer periods of dark coloration and "trances." To combat these symptoms the water was partially changed weekly, together with increased filter cleaning and syphoning of the gravel. Other steps taken included increasing the temperature to 85°F, rationing of white worms to twice weekly, with a proportionate increase in flake-food; these were to no avail and the condition of the fish slowly declined. As they became less active, less eager to eat and more inclined to spend time hidden in corners, the first inkling of what later turned out to be our most important discovery, dawned. Despite being offered live *tubifex* and *daphnia*, these were not accepted; the fish ate less frequently and appeared to compensate by eating more algae. We wondered if this was an instinctive action to overcome a diet deficiency; did they need the iodine contained in it? Or were they in search of roughage to ease their obvious internal trouble? In our search of available literature we could find no references to vegetable matter being a necessary part of their diet and so, more in hope than expectation, we tried various vegetables; these included, crushed, cooked and uncooked peas, finely chopped lettuce and cabbage; these the fish inspected, mouthed and rejected. Over the past few months

D.K.B. had managed to keep alive and well a *Chateodon mesoleucus*, a notoriously "difficult" marine fish and apart from a few white worms its diet consisted solely of chopped spinach, this being purchased in frozen packets. This was offered to the Discus, with immediate if limited, success, the two strongest did eat although not with any enthusiasm but as this was the first food consumed for nearly a fortnight, it was a good sign.

Unfortunately, before any conclusions could be drawn, three of the fish died, internal disease becoming more acute before death. The last fish was obviously doomed and to cut short its misery, was destroyed. We reviewed the evidence so far obtained—the post-mortems indicated diseased intestines although the reasons had yet to be discovered. We also felt we may have contributed to their death by withdrawing *daphnia* from their diet which was known to have laxative properties.

On this question we were faced with a dilemma—although the fish appeared to need this particular live food our experience so far indicated that *daphnia*, or more probably the bacteria introduced with them, gave rise to irritation. Also considered was the water quality and general diet; our opinion at the time was that one or the other, but more likely a combination of the two factors held the answer to the problem. To accelerate progress we decided to set up two more test tanks and run them concurrently.

Tests 3 and 4

Both tanks were filled with water containing 70 PPM TDS and a pH of 7 (neutral). Three pairs of Discus, brown, blue and red, were purchased; the hardness of the water in which they were purchased was measured at 300 PPM. The same equalising procedure was adopted; the length of time in proportion to the difference in hardness. Unfortunately, our judgement of quality had been at fault on this occasion as two of the fish were clearly unwell; they were therefore isolated and an unsuccessful attempt to revive them was made. Replacements were then purchased to maintain numbers. A fish of each variety was placed in each tank and after acclimatising quickly they began to eat well after a day or two. The diet in test tank 3 consisted of flake-food, meat and white worms, with *daphnia* three times weekly when available. The fish in test tank 4 were given the same diet except that spinach replaced *daphnia*. In both tanks fighting occurred for most of the day and when not fighting, the fish toured the tanks continually scavenging for any uneaten food; we had to provide food for the catfish (which by now had grown to a respectable size) during darkness. Occasionally the fish in tank 3 went into "trances," darkened in colour and hid for short periods, this generally occurring after feeding and scratching also occasionally occurred.

For over a month all fish continued to thrive, most of them beginning to colour nicely, particularly the blue coloration over the head and fins. Growth-rate in both tanks appeared to be about equal; the fish in tank 4 having a slight edge in colour and general condition. Over the next two months the initial differences became more obvious and in tank 4 growth rate increased, colours became more distinct and appetites increased. In contrast, those in tank 3 were showing similar symptoms noted in tests 1 and 2; increasing amounts of *daphnia* were given, but this tended to increase the scratching. Growth-rate and appetite diminished and two fish refused to eat after the third month and died. The remaining Discus, the red, survived for a further eight weeks before suffering the same fate. As far as we could determine the three fish in tank 3 had all died from the same intestinal disease that had affected those in our previous tests. Those in tank 4, meanwhile, had matured into beautiful specimens; over three inches in length, well coloured, the best being a brown, which later proved to be a brown-blue hybrid, the blue stripes over its head and upper body showing in contrast to the orange of the rest of the body. Mouth-to-mouth fighting was still a daily occurrence together with violent tail-whipping and it now appeared as though we had come near to solving the problem. Over the last months, as we became more experienced, we had, when thought advisable, slightly altered the diet; whereas at the beginning spinach was given once daily, we now fed this with whatever else they were given; white worms, fed twice weekly, were greedily fought for first and afterwards the spinach. When given with other meat, they would more often than not eat the spinach first. We also found it advisable to reduce the particle size of the spinach by chopping with a razor as some of the pieces tended to be too large; we found, too, that if the spinach was kept in the freezing compartment of the refrigerator a suitably sized piece could be chopped off when necessary. It was placed in a fine mesh tea strainer and after pouring hot water over it, was further shredded.

Eight months after the beginning of these last tests when the fish were clearly reaching maturity, the experiments came to an end. Due to unforeseen circumstances the authors were separated and were obliged to sell the fish.

Conclusions

Very soft water and a diet high in vegetable matter would appear the most important requirement. Of the various vegetables, spinach was most readily acceptable; assuming that both *daphnia* and spinach are partially utilised as roughage, we suggest spinach is a far safer means of providing this part of the diet. Here we would like to mention that we are in agree-

ment with the opinions of Mr. A. Boarder on the dangers of feeding any water-borne live food. Our tests tended to confirm his view that any bacteria introduced with these foods may result in disease. We realise that Discus are probably less resistant to disease than most other species due to the fact that their natural water is known to be almost sterile. As our tests have shown these fish to be more omnivorous than has generally been appreciated we feel these dangers can be eliminated by feeding a balanced diet, excluding such foods as *daphnia* and live *tubifex*. White and grindal worms fed sparingly, most freeze-dried foods, various meat, flake-food and spinach seem to provide all the nourishment essential to their needs. By strictly adhering to this diet we have never since lost discus from intestinal disease.

The other important general requirements are well known and have been confirmed by us, e.g. hygienic conditions, regular partial water-changes and frequent cleaning of filters. We cannot emphasise too strongly that calcareous rocks and gravel must never be used with discus. In fact, we would like to see the sale of sea-washed gravel banned, except for those species known to thrive in hard alkaline conditions. A well-planted tank would also appear to be beneficial especially when fish of various size are kept together; it seems to prevent the smallest being bullied by the larger and stronger members. Fair distribution of food is ensured if a free swimming area is provided into which food is scattered rather than feeding from dispensers. *Corydoras* catfish seem to thrive in these conditions and a pair or two will dispose of any uneaten food. A temperature of 80-85°F seems satisfactory and if the fish scratch, raising the temperature to 90°F for a day or two generally alleviates this, presumably by killing bacteria.

Positive signs of healthy fish are frequent playful fighting, large appetites, clear, erect fins, and convex bodies. Signs of distress are also easily recognised, the first usually being scratching accompanied by a darkening in colour and "trances." These symptoms are usually followed by loss of appetite, constipation and obvious signs of internal disorder. Once the fish contract the intestinal disease it is, to the best of our knowledge, incurable. One authority considers that Discus are born with a tuberculosis bacilli present in their intestines and we consider that if the fish are given the above conditions it prevents disease manifesting itself. We hope now that many other enthusiasts will be able to rear these beautiful fish.

Two questions have been left unanswered; (1) will discus breed, given the above conditions? DKB is attempting to answer this himself as six young Discus purchased some weeks ago are being reared with a view to eventual breeding and (2) is it possible to cure the intestinal disease once it has become apparent? We wish success to anyone who seeks an answer.

THE CONSTRUCTION OF AN ECONOMIC FISH-HOUSE

by David Easingwood
(Coventry Pool & Aquarium Society)

THE SOLE PURPOSE of this article is to show just how cheaply a fish-house can be constructed. I was horrified to read in the Aquarium press recently that a reader was quite happy to pay over £100 for his fish-house, such amounts would put off a lot of aquarists from ever owning their own fish-house. Most of us, after paying the mortgage on the mansion and the H.P. on the Rolls, have only a minimum amount of money to spend on our hobby. So it is imperative that we budget carefully to get full value for the money we spend.

I have always dreamed of owning my own fish-house but it was obvious that if I was to have one, the total cost must be less than £25, most of the money coming from the sale of surplus stock and odds and ends of equipment. A lot of thought went into deciding what type of fish-house to have and I decided to use a garden shed, well insulated, which could be put down at the bottom of the garden well away from all distractions. I soon realised that the cost of new garden sheds was too high and so I hunted in the "For Sale and Wants" columns of the local newspaper. I needed a lot of patience for any sheds that appeared went very quickly and one needed to be around at the right place at the right time to pick up a bargain. Eventually, after waiting a month, I was lucky enough to pick up an 8' x 6' shed in very good condition for £7.50—quite a bargain, as they were selling new for over £35 at the local timber merchants.

To avoid the need of immediate maintenance the inside was given two liberal coats of creosote (two gallons costing 60p) and the outside one coat of "Cuprinol," a timber preservative. The roof needed re-felting and a roll of standard duty roofing felt cost 65p. Second-hand timber bearers for the floor cost £1, so for £11.50 the structure was complete, ready for insulating.

When buying a shed to keep fish in it is vital that the flooring is capable of taking a heavy load from the weight of the tanks. Mine has a ½" T. & G. floor on 3" x 2" joists at 16" centres, which I supported on 4" x 3" timber beams at 3 foot centres which in turn were supported on brick piers. This meant that the whole structure was off the ground but I considered this an advantage because it meant the whole of the underside is well ventilated and therefore the risk

of rotting timbers was minimised. Imagine the trouble you would have if, in five years time, the timbers were to rot; emptying the tanks, lifting the shed to renew the bearers and then filling the tanks again!

Creosoting the inside before erection was another insurance against future trouble. Once the insulation is on you cannot get at the inside of the shed and any dry rot could not be cured. Therefore it is good policy to be wise before the event and do everything possible to prevent trouble. With the inside protected, the outside was given a liberal coat of "Cuprinol." This costs more than creosote, but it is well worth the additional expense. It is more decorative and does not smell like creosote, a big advantage when there are fish around. If the outside was painted with creosote, then any future coats would also have to be with creosote and I'm sure the fish would not take kindly to the odour. Well, the structure was now complete, it had cost me £11.50, leaving me £10 to finish off the shed.

I realised from the beginning that if I was to own my fish-house the cost of running it must be as cheap as possible. I therefore decided that it would be well insulated and heated by a paraffin convector heater—the cheapest form of heating available to the aquarist. Comparable costs of various forms of heating are as follows:—

Electricity: Approximately 15p per useful therm.

Gas: Approximately 10p per useful therm.

Paraffin: Approximately 7½p per useful therm.

So paraffin was chosen purely on economic grounds. The initial outlay of the heating system is cheap and the running costs are reasonable. It is by no means the ideal form of heating for the fish-house. If you do decide to have paraffin then ensure that each tank has adequate aeration. This will prevent a film of oil settling on top of the water. If the film is allowed to form then no oxygen can get into the water and the fish will suffocate. Other disadvantages of paraffin are that you have to keep topping up the heater, a big disadvantage when holidays come around. Another disadvantage is that it is difficult to maintain an even temperature in the fish-house. This can be overcome by having heaters and thermostats in each tank, but I haven't got around to installing these yet.

So at the moment I have to keep a very close watch on the weather forecasts and try and allow in advance for a hot day or a cold night, not an easy thing to judge with our temperamental British weather! My paraffin heater was bought second-hand, following up an advertisement in the paper, for £1.50. It burns with little smoke. I have found that I have been using about 1½ gallons a week which costs me approximately 20p, but these are autumn running costs and will increase as the weather gets colder. I'm certain I would have been using a lot more if I had not insulated the shed adequately. A temperature of at least 75°F must be maintained in the fish-house throughout the year, so before insulating the shed I had a word with a friend of mine who is a heating engineer, and asked him what were the best forms of insulation. Of course, economics again played a big part in what form of insulation to use. "R" values of materials indicate their resistance to heat losses and the higher these values the better they are for use in the fish-house. The following table will give some idea of the "R" values of materials available to the aquarist:—

1" Polystyrene sheeting "R" value of 4.15 ft²h.deg. F/Btu.in.

1" Fibreglass sheeting "R" value of 4.00 ft²h.deg. F/Btu.in.

1" Cork sheeting "R" value of 2.94 ft²h.deg. F/Btu.in.

When working out insulation values of walls and roof, other factors besides the material used have to be taken into account. One should aim for a value of around 6 or 7. The framing, say ½" T. & G. boarding, has a value of 0.25; the air resistance of the outside wall will be approximately 0.3 and a 1½" air gap between the T. & G. and the insulation material will be about 1.0. I decided to use 1" polystyrene sheets or ½" polystyrene + 1" fibreglass. This gave me a total "R" value in the walls of approximately 7.0.

We all know that heat rises and so it is essential that the roof be well insulated to reduce any significant heat losses. In my roof I used 1" fibreglass, ½" insulation board, and 1½" polystyrene giving me a "R" value, including the roof structure and covering of approximately 8.0. Fortunately, I was able to obtain enough fibreglass from a friend free to cover the roof and two walls, so I only had to buy the polystyrene. Off I went down to the local builders' merchants and asked if they had any damaged sheets going cheaply. I was fortunate enough to get three ½" sheets of 8' x 4' for 25p, quite a bargain. Three 1" sheets 8' x 4' cost me £2.60, the full price unfortunately. They were fixed to the frame of the shed with large headed long roofing felt nails. The joints between the sheets were covered and pinned back with masking tape.

A lot of heat can be lost through the windows and it is important that they are double-glazed in some sort of way. There are various ways of doing this; glass, perspex, polythene. I chose polythene; it is cheap, easy to install and works quite adequately. The surrounds of the windows were again sealed with masking tape. The main object of any form of double-glazing is to form a barrier between the hot and cold surface, so my polythene is quite efficient.

Further expenses for the fish-house were:—

5' Fluorescent light (made up from second-hand items) £1.00
Electric cable (from house to the fish-house) £2.00
Screws, nails, etc. 50p.

So the shed was complete. It has cost me under the £25 expected and I was very pleased. A breakdown of the costs were as follows:—

	£
Shed, Bearers and Roof	11.50
Heater	1.50
Polystyrene	2.60
Light	1.00
Cable	2.00
Odds and Ends	1.00

TOTAL COST: £19.60

Any aquarist hoping to own a fish-house should take the trouble to find out beforehand what the running costs of the heating will be. I list below a set of calculations to show how the costs can be estimated. They are not as complicated as they first look and if followed closely can be easily understood.

Computing Heat Losses (Appendix 1)

When computing heat losses we determine the "U" values of the ceiling, floor, walls and windows and multiply them by the respective areas (i.e. multiply the "U" values of the wall by the area of the wall taking into account the exposure of that particular wall (see appendix 3).

The "U" value is computed as follows:—

eg. External resistance (S. wall)	0.57
1 in. polystyrene	4.15
Internal Resistance	0.70
	—
	5.42
	—

The sum of the resistances "R" is 5.42 and the "U" value is the reciprocal of this value, i.e.

$$1/5.42 = 0.192$$

If ½" polystyrene had been used, the "R" value would have been ½ x 4.15 = 2.07.

If 2" polystyrene had been used, the "R" value would have been 2 x 4.15 = 8.3.

For a fish-house one should aim at values for "U"

of about 0.20 or less, i.e. a resistance value of 5.0 or more.

"U" Values in Btu/ft² h.deg.F. (appendix 2)

(a) Walls	
Single glazing	1.0
Double glazing	0.5
1" T. & G. Board	0.5
½" Asbestos sheets	0.8
4½" Brickwork	0.6
(b) Roofs	
Corrugated asbestos	1.4
Corrugated iron	1.5
Single glazing	1.2
(c) Floors	
1" T. & G. Boarding	0.5
Solid Floor	0.2

The above "U" values include for surface resistances.

(Appendix 3)

<i>External Surface Resistance</i>		<i>Internal Surface Resistance</i>	
(ft ² h. deg.F/Btu.)		(ft ² h. deg.F/Btu.)	
Walls S.	0.57	Walls	0.7
W.	0.43	Floors or Ceilings	0.7
N.E.	0.30	Roofs	0.6
Roofs	0.25	Air space between materials	1.0

(Appendix 4)

Calculation of Heat Losses

- (a) Size of the shed = 8' × 6' × 6'
 (b) Area of windows = 2 × (5' × 2') + 3' × 3' = 29 sq. ft.

(c) Consider the roof:

	<i>Resistance</i>
Internal resistance	0.60
External resistance	0.25
½" T. & G. Boarding	0.25
1" Fibreglass	4.00
½" Insulation Board	1.11
½" Polystyrene	2.07
TOTAL	8.28

Therefore $\frac{1}{U} = 1/8.28 = 0.12 \text{ Btu/ft}^2\text{h.F}^\circ$

(d) Consider the walls:

	<i>Resistance</i>
Internal resistance	0.70
External resistance	0.40
½" T. & G. Boarding	0.25
1" Airspace	1.00
1" Polystyrene	4.14
TOTAL	6.49

Therefore $\frac{1}{U} = 1/6.49 = 0.154 \text{ Btu/ft}^2\text{h.F}^\circ$

(e) Consider the windows:

$$\frac{1}{U} = 0.50 \text{ Btu/ft}^2\text{h.F}^\circ$$

(f) Consider the floor:

$$\frac{1}{U} = 0.20 \text{ Btu/ft}^2\text{h.F}^\circ$$

(g) Assume one air change per hour and temperature maintained in the fish-house is 75°F and the outside temperature is a minimum of 25°F. (For heat loss calculations we take the worst winter temperature.)

NOTE: Air change per hour is the number of times the air in the room is changed in an hour.

Area × "U" × Diff. in Temp.

(h) Heat loss through the roof

$$(8' \times 6') \times (0.12) \times (75-25) = 290 \text{ Btu per hr.}$$

$$\text{Heat loss through windows} = 29 \times 0.5 \times 50 = 725 \text{ Btu per hr.}$$

$$\text{Heat loss through walls} = 139 \times 0.154 \times 50 = 1070 \text{ Btu per hr.}$$

$$\text{Heat loss through floor} = 48 \times 0.20 \times 50 = 480 \text{ Btu per hr.}$$

$$\text{Heat loss due to one air change per hour} = \text{volume of the shed} \times 0.20 \times \text{difference in temperature.}$$

$$= 288 \times 0.02 \times 50$$

$$= 288 \text{ Btu per hour.}$$

Therefore the total heat losses =

$$290 \times 725 + 1070 + 480 + 288 = 2853 \text{ Btu per hr.}$$

So the heat emittance of the heater should be equal to or slightly greater than this value. The size and capacity of the heater in the fish-house depends on this value.

A 1-kilowatt fire emits 3412 Btu per hour.

(Appendix 5)

Fuel Consumption

Based on paraffin as the fuel at a cost of 7½p per useful therm. (1 therm = 100,000 Btu).

Heat loss =

$$(\text{Btu/hr.}) \times \text{weather factor} \times \text{hr. per week used} \times \text{weeks.}$$

$$100,000 \times \text{Efficiency}$$

$$\text{Weather factor} = 0.49 \text{ (Birmingham)}$$

$$0.42 \text{ (Kew)}$$

$$0.54 \text{ (Glasgow)}$$

$$\text{Hours per week} = 7 \times 24 = 168 \text{ (Continuous heating)}$$

$$\text{Weeks} = 52 \text{ per year (Continuous heating)}$$

Efficiency = 100 per cent.

Therefore, the Annual Fuel Consumption:

$$\frac{2853 \times 0.49 \times 168 \times 52}{100,000 \times 1.0} = 121 \text{ therms.}$$

Continued on page 61

THE MARINE TOAD

by Jack Hems

Bufo marinus, or if one prefers it, the marine or giant toad, has an interesting history. Originally confined to Mexico and, almost certainly, not a few of the islands of the Lesser and Greater Antilles southwards to Patagonia, it has been intentionally introduced (chiefly between the two World Wars) into many parts of the tropical and sub-tropical world as a natural enemy of the hordes of insect and other pests that mutilate and destroy fruit, tree and plant crops.

There can be no question of the good it has done. Doris M. Cochran, in her *Living Amphibians of the World* (Hamish Hamilton, 1961), records that ". . . it can be found policing the rows of cane and protecting a crop worth perhaps a billion pounds."

But there is another side to the story. The marine toad multiplies enormously where conditions are favourable, and in some of the farming communities where it has become established as, for example, those of north-west Australia, Hawaii, and the south-eastern U.S.A., its rapid increase has been, and still is, viewed with mixed feelings (even though it keeps the indigenous snake population down by preying on their young and poisoning their parents); for it is not every man who can hearten to the sight of a nightly gathering of big and bloated toads on his own doorstep.

B. marinus, when full grown, averages 7 to 8 in. in length (from snout to vent) and 4 in. and more across. The warty back and upper surfaces of the limbs are coloured in broken shades of light to dark olive brown. The underparts are creamy grey to ivory with light brown spots. The eyes are prominent but beautiful: the iris brown flecked with green; the pupil black with a gold margin.

The elongated swelling behind each eye, on the neck—the extraordinarily large parotid gland—contains a milk-like (in appearance) poison which seeps out when the toad is subjected to rough treatment. It is virulent enough to kill a small dog within a few hours; larger animals suffer temporary paralysis at best. (Hans Hwass tells us that South American Indians smear the points of their arrows with this poison.) Its effect on sensitive areas of human skin is to irritate

and inflame. It is hardly necessary to say that after touching these toads, the herpetologist is advised to keep unwashed hands away from his mouth or eyes.

The toad has yet another passive, albeit harmless, weapon of defence: it can discharge a copious stream of clear, non-smelly water from the vent (the toad does not drink but it absorbs water like a sponge through the skin). This nervous reaction is sometimes accompanied by trembling of the body and a trilling sound produced from the vocal sac. Shedding of the skin takes place at irregular intervals. Prior to the old skin peeling off, the toad loses interest in food and becomes bathed in what looks like a heavy sweat.

A vivarium for *B. marinus* should be 20 in. or more in length and at least 15 in. in width and depth. It can be made of any suitable material such as wood or metal or glass or a combination of all three. The floor should be covered with peat or well-weathered sawdust to a depth of about 4 in. There must be water for bathing. A glass casserole will make a suitable bathing trough. The water will need changing every second or third day. There must be air-holes half-way up the sides of the case or at or near the top to provide ventilation.

During the summer months, *B. marinus* is hardy enough to stand ordinary room temperature, but for the rest of the year it needs extra heat. A temperature in the sixties to middle seventies (°F) is suitable. A 40- or 60-watt electric lamp (hung out of reach of the toad) is one way of providing heat, though common sense demands that the lamp should be blacked out (not switched off) last thing at night. Alternatively, a soil heating cable or an aquarium heater placed in a tall jar of water will do. To guard against overheating (and wastage of current) a reliable thermostat (and a thermometer) should be included in the set-up.

My own marine toads are kept warm by bottom heat supplied by a chimney-less greenhouse oil-heater. Their metal-bottomed case rests in a raised metal tray filled with sand. The sand takes up the heat from the heater housed underneath and distributes it satisfactorily enough over the bottom of the case.

The marine toad is no problem to feed because live food of some sort or another (mealworms, say, or flies or maggots) is available at all seasons of the year. It will also flourish well on a diet of chunky pieces of lean red meat or raw white fish (cod or haddock). But almost always one has to trick the amphibian into thinking the pieces of flesh are alive. This deception may be accomplished by joggling the offered food about with the aid of a thin stick.

The reaction of a hungry toad to this performance is, first, a raising of the body to an upright sitting position. (Sometimes the excitement engendered by the sight of the moving food will cause an involuntary twitching of the toes.) Then, suddenly, there is a downward lunge and, lightning fast, the food is caught in the mouth. Immediately the body is raised, and as the food enters the throat the eyes sink for a moment into the head. Should the food be of an awkward shape or size, the front toes are used to push it inside. The toes, and also the pink tongue, are used to cleanse the food of clinging dirt.

If a toad does not feed every time food is offered to it there is no cause for alarm. As I have mentioned above, a toad about to shed its skin loses its appetite, and always after a big meal a day or two may elapse before another is eaten. Again, food is more readily taken at a temperature of 75°F (24°C) than at 63°F (17°C).

Both in nature and in captivity, this toad lives to a good age. Its long life in the vivarium was commented on by a Dr. Stradling, writing in the *Boy's Own Paper*, as long ago as 1892. My own specimens were installed in their case in 1965. They are still in excellent health.

Age for age (in well-developed specimens) the female

is the larger of the two sexes. There are other distinguishing features too. For instance, it is said that the two rows of warts that extend down the middle of the back are more pronounced in the male than in the female. Further, a male in breeding condition develops a number of excrescences or hard (horny) rugosities on the feet.

So far as I know, *B. marinus* has not bred in the vivarium. In the natural state, the female lays long strings of eggs in the water. According to a reliable source of information, the eggs hatch out in three to five days. A. G. Ruthven, an American zoologist writing in the early 1900s, is quoted in Wright and Wright's *Handbook of Frogs and Toads of the United States and Canada* (Comstock Publishing Company, Inc., 1949) as saying that forty-five days elapse before metamorphosis is complete.

As the marine toad has a fairly wide temperature tolerance, the question arises: does it hibernate in the winter in the most southerly and northerly parts of its range? There appears to be no information on this point. But it is well known that the toad burrows under rocks and logs for perhaps weeks on end to escape the rigours of excessive drying heat.

Until quite recently *B. marinus* (so-named, I have read, because early naturalists found the toad in ponds near to the sea) was thought to be the largest of all the true toads. Now, however, serious herpetologists know different. There is an even larger one: *B. blombergi* from Colombia, that attains a length of about a foot. The half-grown Blomberg's toad that I inspected a couple of years ago had a narrower snout than *B. marinus* and was greenish rather than dark brown in colour.

Bufo marinus





PROBLEMS of FEEDING KOI and GOLDFISH

by Lionel Vanderplank

THE BIGGEST problem in fish-keeping, whether it is coldwater, tropical or marine fish, is that of feeding. Without the right kinds of foods and quantities, fish won't grow nor breed; incorrect or overfeeding soon causes water pollution. Some animals and fish have specialised feeding habits and can only digest certain types of foods; in some cases they will eat food they are unable to digest and such foods pass through their bodies undigested or partly digested and this adds to the pollution in a tank or small pond. There are other examples such as fish that will only take certain foods. The best example is that of ant-eaters that will only eat ants, but when animal proteins are treated with formic acid they will eat this and are able to thrive perfectly well on such foods.

Koi and Goldfish are evolved from species of carp that are omnivorous in their feeding habits although they eat almost everything as Mr. Boarder wrote in the December 1970 *Aquarist*, page 311, "that although goldfish will eat anything that a pig will eat and plenty besides", a statement that is presumably written more in jest than as a fact, or perhaps Mr. Boarder has not kept pigs. In the past pigs were fed on almost anything edible and quite a lot that wasn't really edible. During the war they were reared on sheer rubbish, a war-time necessity, but it spelt ruination to the pig

industry and it is only now that the majority of pig-farmers have realised that to produce pig meat economically and up to the standards demanded by the meat and bacon trade that pigs must be fed on a rigid scientific diet. When this is done with the known breeds of pigs the growth rate of the animals and the ratios of lean meat to fat can be predicted.

Although there are more makes and mixtures of fish foods available on the market than any other kind of pet foods, and there are enough makes of these, no one to my knowledge has really worked out what should be a correctly balanced scientific diet for any species of fish. I have seen it stated in books that Koi should be fed a high protein diet when the water temperatures are high and above 70°F and a high carbohydrate when the temperatures are in the 60°F, but these statements appear to be purely based on human diets when diets, high in carbohydrates are unnecessary in hot weather but millions of humans living in the tropics have to be satisfied with such as they cannot afford a protein rich diet. Warm blooded animals use carbohydrates as a fuel to keep their bodies warm, but fish make no attempt at heating their bodies, so have no need for large proportions of carbohydrates. A great deal can be learnt about the food requirements of a species of animal from the presence of various enzymes produced in the

intestinal walls, because before any particular food can be digested it must be broken down by an enzyme which is specific to that particular food substance. Many humans, particularly Asians, are unable to digest milk once they have become adult because they lose the enzyme, lactase, which is necessary to break down the main protein of milk; if such people drink milk or milk products, it passes through them undigested, doing them no good and too much can cause serious illness. Besides the main constituents of foods such as carbohydrates—proteins, fats and oils, vitamins and minerals are necessary for producing a healthy diet. The natural diet of both common and other species of carp gives the key to the ideal diet for their cultivated descendants. This diet in the main consists of crustaceans, insects and insect larvae, molluscs, small fish, worms and plant material. Large koi are very fond of duckweed and other plant material but although they are capable of eating considerable quantities of vegetables, they only digest a small proportion of its contents, in fact some of the oils, starches and sugars they contain, also possibly they are able to extract the vitamin C and other vitamins present. From their natural diet it would appear that koi and goldfish require chiefly proteins, fats and oils found in their natural diet and only very small amounts of carbohydrates.

It is the newly hatched koi and goldfish fry that pose the biggest feeding problem. Mr. Boarder repeatedly advocates a proprietary fry food which is convenient and does all it claims but, like any other non-live food, if too much is given and it falls to the bottom of the tank it soon fouls the water, although not so seriously as some foods, and it breeds some *infusoria* or *protozoa* (whichever name you prefer). However, newly hatched fry require to be fed hourly for 10 to 16 hours a day to get a good start in life and this start is all important because those that feed well in the first few days are the ones that feed and grow well the rest of their lives. Boiled yolk of egg, finely minced liver and similar substances screened through bolting silk or linen also provides excellent food for newly-hatched fry but again the fry need very small quantities hourly and over-feeding is very easy with its pollution of the water.

The alternative is seriously unfeeding the fry. Live foods are the real answer, providing a live food is really capable of living in the tank with the fry. Newly-hatched goldfish fry can devour newly-hatched brine shrimps of the smaller type as soon as they start to feed after absorbing their yolk sacs, but koi are smaller and cannot take brine shrimps for the first day or two of feeding; but brine shrimps only live for a short time in fresh water and so are as bad as non-living foods as far as the dangers of pollution are concerned. When fry are a few days old they can take micro-worms or micro-eels (Vinegar eelworms) but here again there are serious problems because these creatures do not live long in a tank and fall to the bottom and both koi and goldfish

fry do not bottom-feed in their early stages. Later koi do bottom-feed to a large extent and goldfish to a smaller extent. The natural food for newly-hatched koi and goldfish fry is *infusoria* or *protozoa*, names that include many hundreds of different minute species of animals. *Protozoa* such as the larger species of *Paramecium*, *P. caudatum*, are easily bred in a number of different ways such as using rotting lettuce, celery leaves or banana skins or more scientific cultural methods. Such cultures can be supplied continually to the fry as a drip system. With a water temperature of 75-78°F both koi and goldfish fry grow rapidly enough on the *protozoa* drip-feed to be changed to finely screened *daphnia* within a week or ten days. Here again it poses a problem for those who cannot get adequate or safe supplies of *daphnia*. At this stage micro-worm or micro-eels are safer, especially for koi which will start bottom-feeding at ten days onwards, but it is difficult to get sufficient quantities of these worms to feed say 500 or more young fish. If you have only a few fry then the answer is undoubtedly one of the many makes of prepared food or a freeze-dried one, but if you have a lot of fry and haven't got unlimited funds for fish food you will have to find something cheaper yet just as good. Having some thousands of koi and goldfish to rear I have been able to experiment with alternatives to live foods which in my case was chiefly *daphnia* but supplies were insufficient to meet the demands of all my fish. White worms is a good food in small quantities. They have too great a fat content to be fed in large quantities also it is difficult to breed really large quantities of white worms; by large quantities I mean at least a pound of pure worms a day which would be sufficient for 1,000 2 to 3 inch koi or goldfish. This brings us to the question of how much food do young growing koi or goldfish require? This will depend on the temperature of the water, at temperatures below 50°F no food or very little will be needed, between 64-68°F I have found that 400 inches of koi between the sizes of 2 and 5 inches can eat 400 gms. (14½ oz.) of live *daphnia* (*daphnia* weighed wet but free of water). So this works out at one gram per inch (25.4 mm.) of fish. The same fish can eat about twice the weight of duckweed per day, but considerably less of dry or prepared foods can be fed to the fish in the same period. I have little doubt that the fish would eat the same quantity if there was a way of feeding it to them without fouling the water. I found the same "length of fish" were only able to eat about 60 to 70 gms. (2¼ to 3 oz.) of minced sieved liver at any one period; no doubt if one had the time to offer this 5 or 6 times a day they might eat a total of 400 gms., but this would be far too time-consuming. There are many possible foods that can be used but one naturally wants the best for one's money if one is rearing a large number of young fish and costing out all possible foods

Continued on page 47

**THE AQUARIST
& PONDKEEPER
FISHKEEPING
EXHIBITION**

The Fishkeeping event
to be held in London

Sponsored by *The Aquarist & Pondkeeper* and organised
with the co-operation of the Federation of British Aquatic Societies

Schedule of Classes

- | | | | |
|-----|-----------------------------------------------------|--------|-------------------------------------------------------------------------------------------|
| Aa | Society Furnished Aquaria—Tropical. | S | A.V. Molly. |
| Ab | Society Furnished Aquaria—Coldwater. | T | A.O.S. Livebearer. |
| Ad | Individual Furnished Aquaria—Tropical. | | |
| Ae | Individual Furnished Aquaria—Coldwater. | Uad | A.V. Common Goldfish and Comet. |
| Agh | Junior Furnished Aquaria—Coldwater or
Tropical | Ubc | A.V. London Shubunkin and Singletail
(G.S.G.B. Shubunkin). |
| Am | Individual Aquascape. | V(a-g) | A.V. Twintail Goldfish with Dorsals. |
| | | V(h-l) | A.V. Twintail Goldfish without Dorsals. |
| B | A.V. Barb. | Wb | A.V. Centrarchidae. |
| C | A.V. Characin. | W | A.O.S. Coldwater. |
| Da | A.V. Angel. | | |
| Db | A.V. Apistogramma, Pelmatochromis and
Nannacara. | Za | A.V. Rooted Plants (one plant will comprise
an entry). |
| D | A.O.S. Cichlid. | Zb | A.V. Plant Cutting (three cuttings of same
species or variety will comprise an entry). |
| Ea | A.O.S. Betta Splendens. | Zc | A.V. Floating Plants. |
| E | A.O.S. Labyrinths. | NB | A.V. Barb Pairs. |
| F | A.V. Egg-laying Toothcarps. | NC | A.V. Characin Pairs. |
| G | A.O.S. Tropical Catfish. | ND | A.V. Cichlid Pairs. |
| H | A.V. Corydoras and Brochis. | NE | A.V. Labyrinth Pairs. |
| J | A.V. Rasbora. | NF | A.V. Toothcarp Pairs. |
| K | A.V. Danio and W.C.M.M. | NGHL | A.V. Catfish and Loach Pairs. |
| L | A.V. Loach. | NJK | A.V. Rasbora, Danio and W.C.M.M. Pairs. |
| M | A.O.S. Egg-layer. | NM | A.O.S. Tropical Egg-layer Pairs. |
| O | A.V. Guppy, Male. | NOP | A.V. Guppy Pairs. |
| P | A.V. Guppy, Female. | NQR | A.V. Swordtail and Platy Pairs. |
| Q | A.V. Swordtail. | NS | A.V. Molly Pairs |
| R | A.V. Platy. | NT | A.O.S. Livebearer Pairs. |

Show Schedules available from:
G. Greenhalf
Show Secretary,
39 Garth Close,
Morden, Surrey.

Show Organiser,
The Aquarist and Pondkeeper,
The Butts,
Brentford, Middlesex.
Tel: 01-568 8441.

Awards and Trophies

The First, Second, Third and Fourth in each class will receive *The Aquarist and Pondkeeper* Fishkeeping Award Cards. The first three in each class will also receive a souvenir trophy. Challenge trophies are also being donated by leading members of the trade and hobby.

Admission Charge

The charge for adults will be 25p and children under 16 years, 10p (payable at the door). Special concession rates are available, i.e., 20p per head for parties of fifteen and over.

Show Stewards

Some enthusiasts have already offered their services

as stewards; more are needed and the Show Secretary will be pleased to hear from you if you are interested and available.

Publicity Material

Publicity materials is also available and the Show Organiser would be pleased to supply any aquarist willing to display one of these attractive posters or car stickers. The design and shape of the car sticker is shown on page 62.

Technical Advice

Among the many authorities available to supply you with technical advice will be Mr. Arthur Boarder and Mr. Jack Hems. Both will be found on *The Aquarist* Stand.

Make it a date — Alexandra Palace

Friday, 9th July, 10 a.m.—9 p.m.

Saturday, 10th July, 10 a.m.—9 p.m.

Sunday, 11th July, 10 a.m.—6 p.m.

Free parking and plenty of room for the family
in the acres of Alexandra Parkland

Problems of Feeding Koi and Goldfish

Continued from page 45

against their calorific and vitamin content and actual cost. Raw liver is by far the best buy at 25p per pound. This should be chopped up finely or minced and then well washed in water and screened since it is both wasteful and dangerous (due to pollution) to feed particles that are too fine or too large as fish will not eat very fine particles and large pieces cannot be nibbled away by the fish like bread, potatoes, rice, vermicelli and macaroni can. The blood and fine liver particles can be used for breeding *daphnia* in an outside pond so need not be wasted; even if it has to be thrown away raw liver works out far cheaper than any other food, and raw liver has all the essential vitamins and minerals together with some oils and fatty acids that the fish require and which are so often missing from dry foods, in spite of vitamin additives. Heart can be used instead of liver but all fat, sinews and skin must be cut away, a time consuming job which wastes half the heart making it more expensive than liver. So I find to feed

about one gram of raw liver to every 8 inches of fish daily or on alternative days and to make up the balance of the diet with duckweed for koi or bread for either koi or goldfish forms the best mixture to live *daphnia* I have been able to devise to date. I haven't the slightest doubt that freeze-dried *tubifex* and *daphnia* would be a good, or probably better, but at a completely uneconomical cost as far as feeding 100 or more fish is concerned. It would be cheaper to buy large koi at £20 each than attempt to rear them on such foods. On a diet of liver plus bread, potatoes, duckweed I find it costs under 12p per koi to rear them from egg to the 8 inch size, this is purely the cost of food and does not include labour, heating (if any) and overhead costs. Of course, earthworms, mosquito larvae, grubs of various flies and other insects, insects themselves and other natural foods, are first class, better than liver but impossible, in my opinion, to obtain sufficient quantities economically to rear any number of fish.



OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE

All queries **MUST** be accompanied by a stamped addressed envelope.

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

TROPICAL QUERIES

by Jack Hems

Could you please tell me the names of a few catfish that neither stir up the compost nor hide away in the plants all day?

The pygmy catfish (*Corydoras hastatus*), the three-striped African catfish (*Epiplatys debauvi*), and the ghost catfish (*Kryptopterus bicirrhus*) swim in the middle and upper levels of the water and even in a thickly planted aquarium are seldom out of sight. I suggest you bear their names in mind when you next pay a visit to your dealer.

What is a pike minnow? My dealer says it is a livebearer as bloodthirsty as a piranha. Is this true? I should be grateful for any information you can give me on this species.

The pike minnow (*Belonesox belizanus*) is a livebearer that ranges from southern Mexico to Honduras. The female can attain a length of about 8 in., the male about half this size. It is a ruthless hunter of small fishes. Many years ago, when there was a greater demand for unusual livebearers, it turned up quite frequently in the tanks of the dealers. Nowadays it is rare. Feeding it can become a problem, for it needs a steady supply of guppies, earthworms, and similar livefood.

Do you think it is a good plan to filter rainwater through charcoal before introducing it into the aquarium?

Rainwater collected in towns is invariably contaminated by sulphurous and other matter picked up on the way down. In short, rainwater except in areas well away from the rising fumes of busy streets and factories is far from pure. Therefore the answer to your question is: yes, filter it through charcoal first.

Apart from providing shade, shelter, and breeding grounds for fish, what other benefits do plants confer?

A thick growth of plants traps floating sediment and so helps towards keeping the water clear. Further, a large number of plants in an aquarium keeps the water in a healthy condition for the fish by utilizing their waste products as food.

I have a tank measuring 16 in. by 10 in. by 10 in. Could I keep and breed paradise fish (*Macropodus opercularis*) in this tank?

Yes, providing you plant it very thickly to afford hiding places for the female; for most males are spiteful bullies. The fish is a ready breeder; so you must be prepared to dispose of most of the fry of every brood otherwise your tank will soon be overpopulated.

Could you give me a few tips about growing a seedling spatterdock (*Nuphar*) to centrepiece size?

Plant the spatterdock in a well-crooked perforated pot filled with a 50-50 mixture of clay and fine grit. Give the plant a good toplight for at least ten hours a day. Get rid of all snails; for snails are fond of rasping holes in the tender leaves.

To what height will *Cryptocoryne blasi* grow if it is planted in a rich compost and given adequate light?

It is not unusual for this wonderfully coloured plant to attain some 18 to 20 in. in height.

I should be pleased to receive any information you can give me regarding the breeding habits, general care, country of origin, and maximum size of *Botia sidhimunki*.

I do not think this botia has spawned in the aquarium. It usually flourishes well in any thickly planted aquarium stocked with the smaller and peaceful fishes. It is native to Thailand and attains a length

of about 1½ in. Live or dried food is taken freely. It seems to live longest when it can shoal with its own kind. In other words, keep several together.

A fish called *Steatocranus casuaris* has turned up in a local dealer's shop. Can you tell me something about this species?

This African cichlid is popularly known as the lionhead cichlid on account of an extensive protuberance above the eyes. In general this fish is reasonably peaceful and can be kept in a large tank with other fishes of about its own size. It attains a length of about 4 in. It calls for water on the hard and alkaline side and eats almost any food. It has bred in the aquarium, the pair favouring a cavity in rockwork in which to deposit the eggs.

I have a large *Cichlasoma severum* which, although seemingly in good spirits and health, is showing a creamy pimple or bleb just above one eye. This bleb has increased in size over the past fortnight or so. What action should I take?

Remove the fish from the water and place it on a moistened pad of soft cloth. Now, scrape the bleb away with the sterilized point of a sharp needle. After this has been done, swab the area with strong salt solution or 50-50 T.C.P. and water and smear vaseline over the open wound before returning the fish to the aquarium.

I set up my first aquarium (24 in. by 12 in. by 12 in.) last Christmas. It is generously planted at both ends and has tall rock formations along the back and some sea shells in the foreground. The water is filtered and kept well-circulated by a strong upward rush of bubbles from an airstone. Yet for all this, I cannot keep some species of fish for more than a week or two. Where am I going wrong?

The rockwork may be having a harmful effect on the chemistry of the water; sea shells will certainly be dissolving out lime; and the aeration may be too violent for the size of the tank; for few fishes take kindly to being buffeted about in a smallish body of water. Furthermore, some of the fishes you have introduced may be too quarrelsome for a community tank. I suggest you read some of the better books on aquarium management such as *All About Tropical Fish* by D. McInerney.

Would you recommend *Barbus fasciatus* for a community tank stocked with popular live-bearers and some small, good-natured characins?

Indeed I would. *B. fasciatus* minds its own business, swims near the bottom, is always on the go, eats any food, is quite long-lived, and is most handsomely marked into the bargain.

I have just bought some smallish *Alestopetersius caudatus*. At what size will they breed and what distinguishing features must I look for to tell the sexes apart?

So far as I know this African characin has not spawned in captivity. A mature male shows a slight prolongation of the dark middle rays of the caudal fin and his dorsal fin is longer and more pointed than that of the female.

Please give me some information on the general care and maximum size of the pink kissing gourami.

The pink kissing gourami, or *Helostoma rudolphi*, needs plenty of swimming space in well-aerated water maintained at a temperature of about 75°F (24°C). For food give cooked spinach and other mushy table greens, duckweed, flake food, and such things as whiteworms, tubifex, *Daphnia*, and the like. In the natural state this fish reaches almost a foot, but in the ordinary aquarium it stops short of about 6 in.

How many changes of water are necessary before cork bark is safe to place in the aquarium?

Keep changing the water until it stops turning brown. Then, and only then, is the bark safe (free of excessive tannic acid) to introduce into the tropical aquarium.

Prior to siphoning the bottom of my aquarium, I gave the compost a good raking to free it of settled debris. You can imagine my surprise when, about an hour later, I noticed that some of the fish were showing tiny light-coloured spots on their sides. Although the spots had gone by the following morning, I introduced some methylene blue to combat disease. Can you offer any explanation to account for the disease spots?

In all probability what you noticed were tiny particles of sand adhering to the body slime of the fish. This is quite a common occurrence when churned up gritty dust rains down on everything in the aquarium. Fish should not be subjected to too much of this sort of treatment, for the swirling particles of grit sometimes set up an irritation of the skin and tender gill-membranes.

I should like to have some information on a characin called a mourning tetra?

The mourning tetra or *Holobrycon pinnatus* is native to Brazil and the Guianas. It reaches a length of about 3½ to 4 in. and is quite inoffensive. In colour it is silver overlaid with a shimmering sheen of blue to wine red. The adipose fin and posterior margins of the caudal fin are jet black, hence the popular name.

When were discus fish first introduced into this country?

Symphysodon discus first appeared in this country about 1935, which was some fourteen years after it reached tropical aquarium keepers in Hamburg, Germany.

I should like to know the basic requirements of *Exodon paradoxus* and, given these, what would be its life-span?

This characin demands plenty of swimming space in well-aerated water, daily feeding of live food, or a substitute for live food such as meat or freeze-dried worms or crustaceans. Given good conditions, a life-span of ten years is not uncommon.

What sort of conditions suit the Indian glass perch best?

If you mean the 2 in. *Chanda ranga*, then a well-lighted aquarium, filled with slightly brackish water kept at about 75°F (24°C) is advised.

Why do some dealers and writers refer to *Trichogaster trichopterus* as the three-spot gourami when everybody can see the fish has no more than two spots on the sides?

Because some silly person (many years ago) included the dark eye as an extra spot.

As piranhas are so fond of killing one another and other fishes how have they managed to survive for so long in the wild? In brief, why

have they not by now become extinct?

Most bloodthirsty fishes swim in huge shoals. While they keep together in a pack their chief concern is to find and hunt down prey. But separated from the group and placed in an aquarium, individual specimens appear to lose their sense of belonging and attack one another (not always, but usually) without much, if any, provocation.

I have been told that vinegar eels make a good live food. What, I ask you, are vinegar eels?

The vinegar eel is a tiny nematode worm found in musty vinegar casks. It is known to science as *Anguillula aceti*. Of recent years special strains have been developed to serve as a food for small aquarium fish.

I am in urgent need of some information about freshwater stingray. What should I give it to eat, has it a genuine sting in its tail, and can it be kept with other fishes in a three-foot tank?

The freshwater stingray flourishes well on various worms and, seemingly, tiny slivers of red meat. The spines in the tail are its defence against molestation and actual attack. They can inject a potent poison into the wound they make. So handle with care. A small stingray appears to leave other fishes alone. The aquarium in which one is kept must be well-covered; for all stingrays are adept at climbing and jumping. A very fine sand as a floor-covering is advised.

Trichogaster trichopterus.
Three spots counting
the eye



GOLDWATER QUERIES

by Arthur Boarder

I have five fantail goldfish in an indoor tank and have found *Lernea* on them. I have pulled them off but it seems that more keep cropping up. What can I do to clear the tank?

Lernea, or Anchor worm as they are called, are not often found in an indoor tank. I am wondering what you have brought into the tank in the form of live foods or water plants. If you had any new fish lately they could have been infested. The tank should be emptied of fish and thoroughly sterilised with some household ammonia. Any water plants required to be kept must also be removed and soaked in a fairly strong solution of permanganate of potash. Examine the fish before they are returned to the tank and remove any parasites seen. The eggs are carried by the females which are the pests you catch and so if these are all killed you should have no further trouble with them as long as you do not bring into the tank any fresh infested subjects from the wild.

I am hoping to breed from a pair of veiltail goldfish. Can you tell me if I have more chance in an outdoor pond than in an indoor tank, three footer with lighting, heating and filtration?

I think that your chances will be better if you breed in the tank. The trouble with pond breeding is that you must not have any other fish of the Carp family in the pond or the youngsters may not be pure veiltails. Also it is difficult to get most of the eggs laid to transfer to a hatching tank. If the eggs are not collected then many will be eaten and if any survive the attentions of the parents then the fry could be eaten by them. The tank will give you a better chance of observation and protection. Be careful with the heating though, as I have found that most goldfish spawn better with a temperature of just over 60°F. Use no heat at all for a week or two before trying to spawn the fish and a short separation by a sheet of glass may help to get the fish ready. Feed with garden worms if possible. Raise the temperature to about 62°F, and see that the water is very well oxygenated as goldfish are not likely to spawn in indifferent water. Once the fish have spawned they should be removed so that the eggs are not interfered with.

Is it possible to keep fresh water Crayfish in a tank with other occupants? Do they require live food?

Crayfish would eat many of the occupants of the usual coldwater tank. They are carnivorous and so need a mainly meaty or live food diet. The Crayfish (*Potamobius pallipes*) requires a very well oxygenated water as it likes fresh running streams or rivers. A

limy type of water suits them best as this helps the formation of shell. It is not always easy to keep these creatures together as when hungry they are inclined to be cannibalistic.

My tank 48 x 12 x 15 in. holds shubunkins, fantails, goldfish and a moor. The total length being about 22 in. Green Algae grows quickly on the glass, how can I get rid of it? The tank gets indirect light but has tungsten lighting every evening.

The green Algae should not present much of a problem. Leave the back and ends untouched so that a nice growth of Algae cuts out anything seen through the tank. The front glass only should be cleaned once a week when servicing the tank. A razor blade on a stick or a piece of soft plastic wrapping material can be used. If the fish are hungry they will eat the Algae as it is scraped off with the blade.

Can you suggest a range of suitable plants for this tank, 48 x 12 x 15 in., as there appears to be a wide range of plants for the tropical tank but not so many for the cold one?

You will find that you do better without trying to grow too many different species of plants. You can use *Sagittaria* for the back corners, some *Vallisneria spiralis* for mid-distance or centre back. Ends can be liberally planted with *Egeria densa* or *Lagarosiphon major*. Some *Hygrophila polysperma* is a very useful and decorative plant for such a tank as yours. I know that the use of this plant in coldwater furnished tanks was not allowed by the Federation, but I never knew why as it grew excellently in coldwater tanks. It serves the same purpose for decoration as does *Ludwigia* in a tropical tank. You can use some Hair grass; *Eleocharis acicularis* may be set near the front but this is not always a success unless watched as it can collect blanket weed on its tiny leaves.

Having recently retired and having bred ordinary goldfish I now wish to try my hand at breeding a good strain of Shubunkins. However I cannot get any which appear to me to be worth breeding from. I have a greenhouse with small pond at floor level. Will this be all right for breeding and where can I get some decent Shubunkins?

A pond on the floor of a greenhouse is an ideal position for breeding fancy goldfish. You will find that they will breed earlier in the year than if they were in an outdoor pond. I suggest that you extend the pool under the staging. You could make a division of two

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A SHOW TANK in the HOME?

by R. C. Mills

WITH the resumption of the Open Show season it is the aim of the organising Society to attract not only as many entries as possible, but also new members from amongst the visiting, curious public. Many of these "unconverted" visitors, apart from being bewildered by the array of so many specimens of fish on show, are usually drawn to the Furnished Aquaria Class and can be seen imagining such a thing of beauty in their own homes; "Oh Bert! Wouldn't one of those look lovely in the front room, under that picture of the Chinese Girl with the blue face . . .", you can picture the scene.

Whilst any new member to the hobby is to be welcomed with open arms, it must be realised that should these tyros try to set up such an aquarium at the outset of their fishkeeping careers and *fail* in the attempt, then the hobby may well have lost a supporter. Of course, such an aquarium can be set up but is it a practical scheme, or even desirable as a long-term proposition? Let us examine a "Show Tank" and see where it stands or falls on both the day-to-day and the long-term basis.

Although outwardly the Show tank is just the thing to have in the home, and a much admired addition to the decor, there is a difference between this type of set-up and the usually met with planted aquarium in which we keep our fish, in sickness and in health; each is designed and set up with a different purpose in mind. The Show tank is an exhibition piece, an example of what can be done, showing off the degree to which the aquarist has progressed, everything being chosen for its nearness to perfection—all geared up for a few minutes perusal by the judge on Show day. The tank in our home, on the other hand, has to be the living quarters for all our fish for a long period of time whilst we experiment with feeding, growing on, breeding and all the other chores of fishkeeping—including changing our minds over different species and how to keep them!

At first sight the Show tank appears to be a beautiful, complete aquarium. However, we may discount the first adjective as we all know that "beauty is in the eye of the beholder." What about "complete?" This is probably true (except for the electrical hardware, about which more later), but here one can find fault because of this very "completeness." Think about it—the word itself surely means whole, finished, lacking nothing, ended; this is an excellent goal to strive for, as a reward at the end of some period of time, not by taking all the short cuts to perfection at once.

It is analogous to only buying adult fish—the aquarist learns nothing of the practicalities involved in the keeping of the fish or of tank management, and if this system is adopted at the beginning of a career in fishkeeping then the aquarist may never acquire that valuable commodity, experience.

In the Show tank we see abundance of plants, every inch of space utilised, a shoal of perfectly matched (or as near as we can get to it) fish, landscaped gravel—in short, the utmost limit has been reached, and to my mind it's all too complete!

Take the plants: not a leaf out of place, not a root showing nor crown buried, as it all should be, of course. But where is there the room in this planned perfection for the plants to multiply, or even grow, without crowding out their neighbours? We all like vigorous plant growth with attractive clumps and thickets, but isn't it more natural for the plants (and perhaps cheaper too!) to develop by themselves and landscape them by pruning? Besides, a Show tank may look excellent "on the day," but give that self-same tank a few weeks and the picture may have changed drastically with plants growing at different rates all over the place. Another important factor—the plants may have been chosen for their pictorial effect to please the judge, the various species may not be compatible together over a long period of time, some thriving at the expense of others.

So, plants need to be chosen with care, with a view to their growing rates, living requirements and practicabilities. For instance, those beautiful clumps of bright green *cabomba*, *myriophyllum*, *ambulia* and, for the coldwater enthusiast, hornwort or *elodea*—all these present a wonderful sight, yet in the hurly-burly of our community tank such plants soon become choked with mulm, churned up by fish such as barbs, or covered with *algae* due to insufficient light control. These plants are therefore not a wise choice, unless more attention is paid to the plants than to the fish! Arthur Boarder, in his series "Breeding Goldfish"—Setting up a Tank (*Aquarist*, February 1971) gives some good advice on planting a furnished tank for the home, "Do not be tempted to use as many kinds as you can get. Remember that you are not setting up a tank for exhibition purposes. You could use a different technique for that but all you are concerned with is to create an attractive tank which can last for many years without having to be disturbed."

That perfect shoal of fish, to play their part in gaining points for their owner, must be matched and, being selected for show potential, are probably of adult size. Bearing this in mind, the home tank won't hold many adult fish without becoming overcrowded, and whilst most young fish get on all right with each other the same cannot be said for adults of differing species! The exhibition tank is usually a "one species" tank and the aquarist may be loath to devote (or lose!) valuable tank space to only one species of fish. Again, the "interesting" species may not be suitable for a furnished tank anyway; the cichlids would soon dig it up and the dwarf cichlids would soon be lost to view amid the luxuriant plant growth! Barbs might be suitable but what a job to catch—another point to consider. Some of the catfish and other bottom-dwellers would soon distribute a layer of mulm over the plants. Most of the smaller characins seem to fit the bill as perhaps do the livebearers and labyrinths, but the fact remains that the show tank is just that—an exhibition piece rather than a functioning aquarium.

Completing the scene, and indeed, contributing a great deal to the sense of perspective and "depth" of the tank is the arrangement of the rockwork and gravel. Usually it is banked up and channels formed, but it does take up a lot of valuable swimming space, and I don't know that I would feel safe with some of those sizeable monoliths I've seen in furnished tanks recently! I suppose they're O.K. if they are firmly on the tank floor, but perched up on the gravel, with a few bottom feeders grubbing about disturbing them, it all looks a bit dodgy to me!

If the rocks and gravel have been chosen for their pictorial effect (similar to the plants) and too little attention paid to their chemical content then the large rocks can alter the water conditions very quickly, although being quite artistically suitable for the one day affair.

It has always been a source of surprise to me how quickly a pre-arranged, banked-up gravel layout can revert to an ordinary, almost level plain with the odd rock poking up; this is due to the movements of the fish and water over a period of time. Obviously a certain amount of undergravel "architecture" is necessary to prevent this—how about a fibreglass, pre-formed tank base to build up from? This brings us on to another point—experience, and here we turn from the theoretical to the practical side of things.

There are quite a few "behind-the-scenes" tricks that go unobserved in the setting up of a Show tank that would be impractical, or even dangerous, to be utilised in a long-term tank.

It is nice to suppose that the plants, for instance, have come from a similarly set up tank in the aquarist's home; more likely they have come from a fish-house and tanks kept specially for growing plants, away from nibbling fish! Again, these plants are probably in pots

in their normal growing positions to avoid being disturbed by the move to the show tank.

That beautiful rockwork or underwater root system may be prefabricated and glued together onto a backing plate; the glue may prove toxic over a long period. Sunken logs may look attractive—they are probably held down by a length of wire-don, lead piping or a milk bottle full of gravel similarly attached.

Continuing the practical aspects for a moment, beware those rocky grottoes! It is the universal rule in the aquarium that any fish about to die shall, with its last ounce of energy, make it sway underneath that archway that you are so proud of! Worse still, in the well-planted tank, is when you *know* you're "one short," can't see it anywhere and have to dismantle your masterpiece to find the corpse!

As mentioned earlier, the obvious difference between the Show tank and the home aquarium is that provision for the heater has to be made; this can prove a trifle difficult with an aquascaped tank. The best place theoretically, for a heater is at the lowest part of the tank, so that the cooling water falls and is available for re-heating, setting up a circulation and avoiding cold pockets. Suppose you have built up a beautiful terrain of gravel and rocks on a terrace pattern: the only place for the heater is then up on a shelf or, at the lowest place, up against the front glass! In the first instance, a pocket of cold water is formed *below* the heater and, in the second place the heater is a bit obvious to say the least! "Ah!" you say, "there's an answer to this—a filtration system." Fair enough, but again thought is called for, as similar problems can arise. If the normal filtration system is employed, with external filter boxes (either air or power operated) any rocks between the return pipe and the outlet siphon will trap dirt, so careful siting of the siphon and return tubes is necessary. There is too, the matter of accessibility to all the "hardware" items and in our attempts to emulate the show tank the inside box filters would hardly be practicable. Undergravel filters seem to be a logical answer to the problem, being completely invisible and maintenance free, but site these under a fair depth of *open* gravel—underneath one of those "tombstones" wouldn't do much good!

I like to be able to visually check whether the heaters are working by observing the water currents around them; hiding them behind low rocks facilitates this, whilst at the same time making them as unobtrusive as possible.

From all this, you would be inclined to assume that my fish all swim in bare tanks, but whilst I strive to give my tanks a pleasing appearance with rocks and plants and try to design a furnished layout, practicality is uppermost in my mind—it's bad enough trying to net a fish in my orthodox, planted tanks without attempting to do the same in a densely planted aquascene!

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BREEDING GOLDFISH

by A. Boarder

HAVING described what to look for in some of the more usual varieties of goldfish in previous articles I will now deal with the more specialised types. The veiltail is the fish most prized by the exhibitor of coldwater fishes. There is no doubt that this variety is a very attractive one and one which is by no means easy to breed to a high standard. So few have been appearing on the show benches of recent years that it emphasises the difficulty in obtaining fish of a high quality. During the years just after the last war there were many fine specimens to be seen but during the last twenty years the good veiltails appear to have been conspicuous by their absence.

The last time I saw a team of good young veiltails was about ten years ago when I judged a show for the London Transport Aquarist Society at Westminster. In the breeder's class a team of six fish caught my eye as they were certainly very promising but I cannot remember seeing anything as good after that date, but few, if any, adult veiltails of good quality for some time before that. I know how scarce they must be from the letters of enquiry I get from many readers. I sincerely hope that we shall soon see once again the fine specimens like those which once graced the show benches.

I do not think that the standards for the veiltail have helped the situation as I consider that the rule that the show fish can be scaled or calico was not a good one and would prefer to see the veiltail allowed, to be only calico. The caudal fin of the veiltail should fall in graceful folds, like a curtain, and I consider that this is not possible in a scaled fish which has stouter finnage than the calico type.

The main shape of the body of the veiltail should be approaching a sphere with an unbroken curve over the top of the body with no humps or irregularities. The lower curve should also be in one sweep. This body-shape is much deeper than that of the fantail. The head is short and must join to the body without a break in the upper curve. The nasal flaps should be pronounced. The dorsal fin should be very well developed, in height about the same as the depth of the body. It should have a curve back to the front part and the back of the fin should be concave at first then go into a convex towards the base. The pectoral and pelvic fins should be pointed and about as long as the dorsal is high. The anal fins are double. The caudal fin is the main feature of this fish and should be completely divided. It should be broad and as long as the body of the fish. The ends of



Orandas and Lionheads should have a Bison-like hood



Celestial with spherical eye sockets



Bubble-eye

Veiltail



the lobes should be straight and not forked as in the fantail.

The veiltail can be exhibited with telescopic eyes or normal. The colour of a good calico veiltail should be as for that of the shubunkin, that is a blue ground with markings of violet, red, yellow and brown, the whole speckled with black. The scaled type should be self red or chrome yellow, with all the scales visible. The calico type should have soft gill-plates. The minimum length of body of this fish for exhibition purposes is two inches.

As a fish for the furnished tank I prefer the fantail as it is usually more active. However, young veiltails are very nice for a tank until they are over two years old when, if they have been well reared, they become large and sluggish. There is nothing very attractive in a large veiltail sitting on the bottom of a tank, when its caudal fin can hardly be seen in completeness. As a fish for the garden pond it is not the best type as the extra developed finnage is very liable to fin-rot and congestion. If they are housed in the garden pond it would be a safe course to take them under cover for the winter months. When veiltails are

kept in an indoor tank I suggest that the tank should be not less than 15 in., in depth, so that the tail or caudal can have plenty of space.

The next variety to describe will be the oranda. This should have the over-all shape of the veiltail and conform to it in all details except that the head must bear a bison-like hood. This hood should be of a raspberry-like growth and cover the head and gill plates. Orandas may be shown in either the scaled or calico types, but here again I would prefer to see the rule changed to exclude the scaled type. In colour the fish should be as for the veiltail and all finnage should also be as for that variety. The difficulty in breeding good orandas is experienced by breeders during the early months of rearing as the hood, the distinguishing feature, does not develop until the fish is getting mature and may be at least two years before being properly formed. This means that it is not possible to sort out all the youngsters at an early age. However it is possible to sort out the fish with regards to the other requirements at a much earlier age so that no fish which are never likely to make the grade are kept to eat food more usefully

employed for better fish.

The remarks about the use of the veiltail in garden ponds apply equally for the oranda, as the flowing finnage is the risk in cold weather. Also adult fish do not move around very well in a furnished tank.

The lionhead is another fancy goldfish with the hood as for the oranda but the shape of the fish is as for the fantail. Therefore if the descriptions given in previous articles for the fantail are studied they can be applied to the lionhead. There is one real difference, however, in finnage and that is, the dorsal fin is missing. The standards used after 1947, required the body shape to be as for the veiltail but later standards published altered this to conforming roughly to the shape of the fantail. When breeding lionheads one of the main problems is to obtain good specimens which have no irregularities on the back. These often appear where the dorsal is normally seen, and its absence is very often the place for small bumps or protrusions. This fish can be exhibited either scaled or calico, but I do not remember seeing any other than scaled. Several are imported as are the orandas but it is very noticeable that these latter fish have forked caudals, a bad fault. Another fault often found in imported veiltail types of fancy goldfish is a flat back. This may be an advantage for a cow but veiltails should have well rounded backs. Sometimes an oranda or lionhead may show some white extrusions on the hood. This is not necessarily a sign of fungus disease but is just an excess amount of mucus coming from the peculiarly formed cells of the structure.

There are three more varieties of fancy goldfish which are not quite as often found as the preceding kinds. They are the Celestial, Bubble-eye and Pearl scale. The celestial has a general body shape as for the fantail but the dorsal fin is absent as in the lionhead. The body is oval in shape with a clean curve over the back. No humps or irregularities should be seen on the back of this fish. The eyes should have protuberent sockets spherical in shape. The eyeballs should be facing upwards. The pectoral and pelvic fins should be half the depth of the body and the anal fins completely divided. The caudal fin or tail should be completely divided and be well forked. It should be carried held well out from the body in a horizontal plane. A scaled and a calico



Fish showing pronounced nasal flaps. This specimen is a "Pom-Pom."

type is recognised by the Federation. The minimum length for exhibition purposes is two inches excluding the tail.

The bubble-eye is one of the later varieties to be introduced into this country but it has been here I think since the early nineteen fifties. The first I saw were brought to the Olympia Aquarist Exhibition by Mr. T. Horman. This fish has a very grotesque appearance as under the eyes there are huge bubbles, or bladders. These look as if they will burst at any moment, but the fish does not appear to be distressed in any way and the variety appears to be as hardy as a fantail. The general shape of this fish is as for the celestial, no dorsal fin and an oval-shaped body. The caudal fin is also similar to that of the fantail and celestial. As the bubble-eyes are the distinguishing feature of this fish it is important that these should be very well developed and be up to half the width of the head. For exhibition purposes the larger the bubble the better. This fish is recognised in both scaled and calico.

The pearl-scaled goldfish is usually seen in the form of a fantail but in my opinion it is possible for this curved scale feature to occur in any variety of scaled goldfish. The fantail type should approximate the fantail in all features and the only difference will be that the scales, instead of lying flat on the body, are cup-shaped, and so stand out as rounded protuberences the more distinct the better. Again a two inch limit should be the minimum for exhibition purposes.

A SHOW TANK in the HOME?

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As I see it, the Show tank type of aquarium is exactly suited to fulfilling a decorative purpose as an adult and mature aquarium; but for the average aquarist who likes to potter and experiment with various species and conditions it seems to be a waste of obvious talents to expect a beautiful tank to survive over a long

period of *interesting* fishkeeping. The first thing to ask yourself is what your aim is going to be and set the tank up accordingly; you'll save yourself a lot of work (and a lot of grief) should you change your mind after a few months.

A final confession—what attracts me most at fish Shows? You're right! The Furnished Aquaria!

WHAT IS YOUR OPINION?

by B. Whiteside



"I HAVE BEEN intending to write in for two years, but have only now got round to it," writes 15 years old Robert Keen, of 20 Rydal Bank, Bebington, Wirral L63 7LL, Cheshire. Robert began fishkeeping after winning a couple of sad looking goldfish at a fair. Later he got more goldfish which he kept for about two years. On taking a trip to the local library for a book on goldfish, he found that they had none—so he took one out on tropical fish. The book was McInerney's "All About Tropical Fish"—"a splendid work" which he has had out again and again. His desire for tropical fish grew and he and his father finally set up a 24 in. stainless steel tank in his bedroom. Later a small plastic tank was added. His tanks are lit by strip lights which give a fairly even illumination. He would like to try "Gro-Lux" but cannot really afford it at the moment. He asks if any readers have noticed if the effects of this type of illumination differ in water of varying pH and DH. (Any opinions?) He thinks that this may be why some readers have not found "Gro-Lux" to be very successful. He uses aeration in his tanks and has a "Uno Poly-filter" in his smaller tank. He finds that it works well. Every few weeks he cleans out the mulm from his tanks using a "Windmill" air-operated cleaner. He considers this a wonderful piece of apparatus. Most of his plants are bought from his local dealer or from the Kidderminster firm. He finds that both firms supply good quality plants at reasonable prices. He uses Welsh slate to decorate his tanks, together with Vallisneria, Hygrophila, Ludwigia, Elodea, Ambulia and Amazon swords. He has a few Cryptocorynes as well, but they do not seem to do very well. His main tank is a community aquarium which houses a collection of the smaller tropicals, together with a pair of angels. Most of his fish will feed from his hand. He finds that many of his fish—not only smaller ones—have character, and some have a sort of personality. To catch the more awkward fish he uses two nets—an almost invisible green nylon catching net, and a more obvious white net. With luck, the fish swims away from the white net, into the green one.

Robert's favourite individual fish is a Corydoras, which has the pet name of "Horace" or "Julius"—why, he does not know! It does stir up the mulm but Robert is very attached to this fish. He also has a male fighter which is now quite bedraggled but which once had the most superb finnage which he has ever seen on

a fighter. His black neon is about three-years-old, and blind in one eye. He was given to Robert by his dealer. This fish is respected by the other occupants of the tank as it takes no nonsense, and gets its full share of food. This black neon is called "Nelson," for obvious reasons. His favourite group of fish are platies—especially red waltails, of which he has quite a few. His fish are very tame and always on the "go." To keep his wiring tidy, Robert has been using, for two years, a gadget made from an ordinary junction box and a couple of switches. It cost about 45p and keeps all the wires neat and tidy. Robert has also made a special snail trap which is extremely effective. Without exaggeration, he caught, in four days, 243 snails. The trap is made out of the top of a dried fish food container. Three holes are bored in the plastic rim and string or nylon fishing line tied on. The strings are about 16 in. long. The trap is weighted, with a stone, and lowered to the bottom of the tank, the ends of the strings being allowed to dangle outside the aquarium. Fine dried food, which sinks fairly quickly, is used as bait. A feeding ring, with a rubber sucker, is useful here, as it can be positioned above the trap and the food sinks—mainly into the trap. That food which does not, acts as "ground bait." The snails, in their travels, come across the food, and eventually come to the container lid. This they enter, and find an abundance of food, which causes them to remain. In about half an hour the trap is covered with snails and can be carefully lifted out of the tank. The trap is placed in a strong salt solution which quickly kills the snails and makes them fall off. The trap is washed, replaced, and re-baited. The trap has a few problems: if fish are present they may eat the bait (food), the string will soon rot unless nylon is used, and some snails are bound to miss being caught in the trap. However, it will trap a lot of snails—from the size of a pin-head to the size of a penny, and no harmful chemicals are introduced. Robert has tried breeding a couple of species. Unfortunately most of the fry died during the power cuts when the temperature of the smaller tank fell quite rapidly. He has now only two young fish left. He has a fine pair of young serpaes tetras which he hopes to try to breed, in the near future. (Sorry I had to shorten your letter, Robert, but there are a lot this month. For the same reason, I had to omit your excellent diagrams).

Mr. R. Mousley lives at 11 Townshend Avenue, Irby, Wirral, Cheshire L61 2XN. He has made an aquarium hood from 18 SWG aluminium sheet, pop riveted together. It has a sloping front, with a 12 in. x 3 in. cut-out in it. This cut-out is covered by green, translucent perspex sheet, which is held by four spigots at the corners. This serves as a quick access to the aquarium for feeding etc. The hood has a lip at the bottom, which retains the self-contained perspex cover-glass. At the front of the cover-glass there is a 1 in. diameter hole into which fits a home-made worm feeder. The fish can thus be fed without moving the hood. This is handy when two tanks are used on the one stand, the lower one being awkward to get at. Mr. Mousley fits standard fluorescent light units, incorporating two 2 ft. x 20 watt tubes—daylight type. He has also constructed a power filter—using a washing machine pump as the basic element, but he had made a new pump body out of 1 in. thick perspex, and fitted a 1/2 in. stainless steel tube to it, as an outlet. The filter body is a 1/2 in. thick perspex box on to which the pump is bolted. A perforated tray lies in the box and the filter medium is packed on top of this. As the pump is not self-priming, a siphon takes water from the aquarium into the box. His pump will cope with any size of tank. (He will supply further details upon request). The most useful gadget which he has made is to replace gravel, sucked out of the aquarium when a siphon is used for cleaning. He has a 2 in. diameter perspex tube which is about 2 in. deeper than his deepest aquarium. The other half of the gadget uses the conical top of a washing-up liquid bottle, and a piece of 1/2 in. diameter steel rod, longer than the perspex tube. The rod is fixed to the apex of the conical section and the tube fitted over the rod. By pulling on the rod a seal will be made between the cone and the bore of the tube. This enables a charge of gravel to be fed into the tube. The tube is then lowered into the aquarium until the cone is close to the gravel bed. By allowing the cone to drop, the gravel falls out of the tube. Mr. Mousley finds this is an ideal way to top up the gravel, without showering the fish or covering the plants with gravel.

John Watson is 14, and lives at 6 Randolph Close, Blundel Lane, Cobham, Surrey. He would like to plant a tank entirely with *Cryptocorynes* because he has found, during his short time as an aquarist, that other fine-leaved species, such as *Cabomba*, become breeding grounds for snails. He has found that with *Cabomba* the leaves break off and float all over the aquarium. He has also kept *Ludwigia* and *Wisteria* but both have ended up as a few algae-clogged leaves at the end of a bare stalk. He has got *Sagittaria* plants and Amazon swords in his breeding tanks but he finds these too light in colour for a decorative aquarium. In the proposed 24 in. tank, John would have four *C. cordata* across the back, and several *C. latifolia* (can't say I know the plant!) around the front. John thinks that

having only two species in the tank would give it a sort of symmetry—something which John likes. His method of separating white worms from their culture medium is quite simple. He feeds the worms on dog biscuits—the square, red kind—which he presses into the top of the peat. He places the culture in a dark place and the worms crawl all over the biscuit, to eat it, in a white, wriggling mass. The worms are removed with tweezers and placed in a worm feeder. Unfortunately, quite recently, the biscuits have gone mouldy in a couple of days. John asks if any others have had problems with mouldy worms and asks for suggested cures.

Master Watson informs us that one of his *Cryptocoryne cordata* flowers regularly by sending up thick stalks with cone-shaped buds at the end. Unfortunately none of these has reached the surface because of his ever-hungry mollies. He once kept a community tank at an average temperature of 72°F, because of a fault in the thermostat. The fish remained in this temperature for about two months, during which time there was an epidemic of incurable fungus amongst the mollies, two of which died, as did a dwarf Gourami. When the thermostat was corrected the remaining mollies recovered without any treatment. The aluminium hood on John's community tank he finds to be satisfactory. It is painted with a tough, white paint which does not scratch easily. At one time he spilled some methylene blue on the white paint and has never been able to get the stain off. The hood has ventilation holes and John considers that these prolong the life of light-bulbs. One disadvantage is that the hood has sharp edges and he has cut himself once or twice. He says that a metal file would easily remedy this. John has a "Gem" aquarium which he finds satisfactory but he dislikes the hood. He says that the lips at the side are too small and the hood is too narrow. His is always falling in and the plastic sides often come off. Recently John's father made him a giant pair of wooden forceps, for removing snails, and his community tank is now free from snails. He has a pair of *Pelmatochromis kribensis* and asks if these fish make good parents. (I would say so. What have you found?)

Mr. N. Rowe resides at 10 Wickham Road, Colchester, Essex, and he has used a wooden hood for a number of years. It was made out of 1/2 in. thick door panels. Holes were drilled in the back for two light sockets, and for sockets for heater and thermostat. The front was hinged for access. Two small angles of aluminium on each end hold a sheet of glass, keeping moisture away from the bulbs etc. Inside the hood, above the bulbs, were fixed two 4 in. squares of aluminium, and a good clearance for the bulbs was left. The hood was painted well inside and out.

42 Lordsmead, Cranfield, Beds., is the home of Mr. R. J. Nicholls who, being an engineer in the aircraft field, has access to a reasonably plentiful supply of

"off cuts" of aluminium and light-alloy sheet, and to the machinery necessary for cutting and bending it. (Mr. Nicholls includes a diagram of his aquarium hood—which looks as if it should do an excellent job, but, as I've said before, lack of space prevents the inclusion of the diagram). Mr. Nicholls poses a problem. When he set up his 36 in. x 15 in. x 12 in. tank, about a year ago, he put a layer of peat beneath the non-too-thick layer of gravel, and planted it with a few Vallis plants. These plants have grown and multiplied to a great extent, necessitating the removal and re-arrangement of some of them. He now has more peat showing than gravel. He has noted that the tank with the peat grows more and better plants than the one without peat. He asks how he can refurbish the tank, retaining the peat below the gravel, and if there is an optimum peat/gravel depth ratio. (I would suggest that the peat be kept for the rear half of the aquarium, under normal condition with, say, $\frac{1}{2}$ in. of peat to $2\frac{1}{2}$ in.-3 in. of gravel. An old nylon stocking can be packed with peat, and the open end tied. Nylon material, stitched with nylon thread—not cotton—can be made into a flat "bag," and filled with a suitable depth of peat. There may still be problems! The nylon may, possibly, decompose, releasing the peat, as both peat and cloth break down. A good layer of gravel is essential but, even then, peat will almost certainly, at some later date, be released into the aquarium water. The other problem with peat, when enclosed in a nylon "bag", is that plants will root freely into the peat "bag". If, at a later date, one wants to, or needs to, remove excess plants, it is quite likely that the whole base of the aquarium, peat bag and its mass of roots, will lift up together. Do other readers have any opinions?) Mr. Nicholls and his wife soon hope to have an addition to their family. One of his tanks is situated on a low frame in the lounge and he is worried, possibly very far ahead, of the possibility of the expected infant smashing the glass, with a well aimed throw of a heavy object. He asks if there is any unobtrusively way in which he could protect the tank, preventing the possibility of his arriving home from work to find his wife, in gumboots, teaching the new child how to swim. (Any opinions, please?)

Mr. W. Cowell writes from 50 Newlyn Drive, Sale, Cheshire, on the subject of aquarium photography, enclosing some reasonably good examples. The equipment was set up as described by Mr. J. Dunbar, in a previous issue, but it was not until Mr. Cowell came to carry out the exposures that he realised that he did not have an extension lead for his flash gun. He decided to go ahead lighting the fish from the front. The prints which he sent to me were from this original test strip film. His shots of an angel fish and a black widow were very acceptable, the exposure being reasonably good. He started keeping fish only a couple of months ago and had not thought of trying to

photograph them until he read the items in *The Aquarist*. His success with front lighting may encourage myself, and other readers, to try this further technique. His method was to take two or three shots of each fish, at different exposure. He took no special precautions about developing, printing etc., and reaches the conclusion that the light source need not be above the aquarium—"thus saving badly paid people such as myself (confirmed!) from the expense of an extension lead." His main points are: flash unit mounted on camera, and shots taken directly through front glass of tank; prints and film developed in Johnson's "Universal"; extension tubes No. 1 and No. 2; exposure f8 or f11; film FP4.

The final letter comes from Mr. J. D. Beeton, 34 Walker Street, Cowdenbeath, Fife, Scotland, and with it comes copies of two newsletters which Mr Beeton edits (quite a feat!). The first is that of the Dunfermline & District Aquarist Society. It contains a host of information about the club's activities, including a very long and interesting poem, called "The Big Do!", written by Mr. Beeton. It concerns the club's third annual dance. It sounds like a very successful club! One interesting feature was a "for sale" advertisement by a club member who had an interesting variety of the larger tropicals for sale. The prices seemed reasonable! The second newsletter is that of the Federation of Scottish Aquarist Societies. It contains a lot of information of general interest, including breeding notes on several types of fishes, but I am unable to quote from it for copyright reasons. In his letter Mr. Beeton tells us that fishkeeping is now a major hobby in Scotland, and the Scots follow, with interest, anything that happens in the hobby, anywhere in the world—especially "over the border." He has followed my articles, with interest, for some time and there are times when he disagrees with me (Thank goodness!), but most of the time he finds them very interesting and would like to write in about specific subjects, but he doesn't have much time (no wonder, with two magazines to edit!). I look forward to receiving further editions of Mr. Beeton's newsletters.

I received two other newsletters. One is from the Ealing & District Aquarist Society. Amongst the items of interest was one on colour testing female guppies with a hormone solution. (I gave an account of my experiences of this several years ago, in *The Aquarist*. All my tested females ended up sterile, despite great care). The last one, which I look forward to each month now, is "Toras Topics," edited by Mr. Mike Poole, of the Torbay Aquarist Society. One interesting feature was a letter in it from a Mr. Noel Grey, now living in the Solomon Isles. I wonder if he was the same aquarist who used to send his opinions to this column? If so, it would be interesting to hear from him again. Perhaps Mr. Poole

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Freshwater Fishes

From a coloured lithograph by A. F. Lydon from Houghton's "British Freshwater Fishes" 1879

THE CHUB

(*Leuciscus cephalus*)

by A. Boarder

THE CHUB is found in many waters of Europe and in several waters of Great Britain. However, it appears to be very frequent in some of our southern rivers but absent from others not very far away. For instance, this fish is quite common in Hampshire, and the River Avon is a favourite one for the Chub. It is only found in the more southern parts of Scotland and is absent from West Wales. It is not found in Cornwall and Devon, although these counties are not so far from Hampshire where the fish abounds. I have seen some very fine specimens in the River Avon near Christchurch, and many large fish may be seen in certain parts of the river, one spot in the River Avon where visitors feed the fish with bread, large fish can be seen rolling over in the water in shoals.

The Chub is one of the sturdiest fishes of Great Britain, being very thick in the body, so unlike the flattish shapes of the Bream, Roach, Rudd, Dace and Bleak. The body is long and takes the general shape of the Dace. However, the Chub grows to a much larger fish than the Dace but small specimens can be distinguished quite easily by the shape of the anal fin. In the Chub this is distinctly convex whilst that of the Dace is concave. The caudal fin of the latter is more forked than that of the Chub. The scales of the Chub are large and dark at the base.

The upper parts of the fish are a greenish-grey with shades of brown. The under parts are pale and silver in colour. The fins are rather red, more so than those of the Dace. The mouth is large, protruding forward. The fish will sometimes be found in water which the Barbel favours but it can be easily distinguished from this fish by the narrow head and mouth, with barbels, of the Barbel while the scales of the latter fish are much smaller than those of the Chub.

The Chub prefers running waters and appears to like to swim in the upper sections of the water except in very cold weather when it spends much of the time in deeper water. This fish is favoured by many anglers as it is a very sporting fish. It can reach a size of over seven pounds and several of such a weight have been caught in the River Avon in Hampshire. The record for rod fishing is, up to the time of writing, 10 lb. 8 oz. This weight is rather unusual in this country but on the Continent one of 12 lb. has been recorded and several over 10 lb. have been taken.

The fish is gregarious when young but will often become solitary in certain rivers although at favourite feeding grounds several larger fish may be found together. The food of the Chub varies somewhat according to the water in which it lives. It is omnivorous and feeds on frogs, young fish, insects, their larvae and worms. Vegetable matter is also taken in

the form of leaves and roots of water plants. In certain waters the favourite bait used by anglers is a ripe cherry. Although the Chub is favoured by some anglers as a fighting fish when hooked it is not appreciated very much as food. The flesh is coarse and rather muddy, and resembles that of Roach and Rudd.

The fish spawn in May and June when several may congregate in fast running water. The female shows the fattened body and the male has the white tubercles on the head as is found on many of the *Cyprinidae*. The female lays thousands of small eggs, rather smaller than those of Carp. The eggs adhere to stones and water plants and take about a week to hatch out in fair weather. The young fish congregate in shallow water and feed mostly on tiny water creatures such as *Daphnia*, *Tubifex* and the larvae of insects. With plenty of food the youngsters grow fairly rapidly and when adult can reach a length of about two feet.

The River Avon near Christchurch appears to be the venue for most anglers who are after Chub, and

most of the larger specimens recorded have come from this region. In June, 1970, at Christchurch, I saw two men obviously Chub-fishing, but I am certain that they were not true anglers. They had a punt anchored across the stream just below the bridge, and were sitting in canvas folding chairs. This alone gave me the impression that they were not very dedicated anglers but when they packed up, I was shocked to see that they threw their empty bottles in the river together with a lot of paper which had no doubt held their sandwiches. Such filthy behaviour would never be used by any true angler as he likes to leave the river in the condition he found it.

The Chub is not a suitable fish for an aquarium. When very small, no doubt these fish would prove interesting but as they grow fairly fast they are likely to outgrow any except the very large tank. In captivity these fish are not difficult to feed as they will take the usual foods as given to other members of the Carp family. In public aquaria they would make handsome fish as their size would make them an attractive inhabitant for a very large tank.

The Construction of an Economic Fish House

Continued from page 41

Cost at 7½p per therm: $\frac{1.5 \times 121}{20} = \text{£}9.1$

(But, add 30 per cent because of no thermostat control.)

TOTAL HEATING COST PER YEAR FOR MY FISH HOUSE: £11.80

My fish are now settled in and I am extremely happy with the way the fish-house is functioning.

It is somewhere where I hope some ambitions will be fulfilled—to breed top class Cobra Guppies and Barbs and keep a selection of good quality show fish.

Remember one thing, please. I make no pretence that mine is the IDEAL fish-house, just functional and economical. Indeed, my ideal fish-house would be a three-bedroom, semi-detached with 50 tanks in each room, everywhere insulated and the whole heated by electric storage heaters!

WHAT IS YOUR OPINION?

Continued from page 59

would let us know. In all, a most impressive newsletter, very professionally turned out!

For next month let me have your opinions on the questions posed in the main body of the text, and on the following:—(1) Have you found that cigarette smoke affects your fishes? (I've been off cigarettes for nearly four weeks now, and smoking my pipe. I don't know how it has affected my fish but my friends don't seem to be any keener on the change than I am!). (2) Have you made any further progress with aquarium

photography? (3) Which is the simplest of the egg-layers to breed, and what have been your experiences? (4) What is the main problem associated with keeping marine fishes? (5) What do you think of the tropical marine aquarium which is decorative, but cannot grow the greenery found in freshwater aquaria? Have you been able to grow marine algae? (6) How do you grow water Wisteria? (7) What are the attractions of a garden pond in the small garden? Please print your name and address clearly—and don't make the letter too long. I look forward to hearing from you.

COLDWATER QUERIES

Continued from page 51

so that each pool is about three feet long. This will enable you to separate the parents from the eggs once they have spawned. You should be far more successful at breeding under these conditions than if you used an outdoor pond only. Having the eggs and fry under

closer scrutiny you will be able to sort out the youngsters at an earlier date. This is most important as then you can concentrate on the better fish and grow them on far more quickly by giving them more space. Dealer's name enclosed.

OUR READERS WRITE

The IMSS—Correction of an Indictment

In the last few editions of your magazine readers have been treated to the views of several very disgruntled members of the International Marine Study Society. Although I am loathe to do so I cannot but concur that their basic observations are correct, although the implication of my participation in this matter is totally inaccurate.

Since its inception in 1965, my name has been closely linked with the above Society, and it seems is still being linked incorrectly with that organisation, from which I resigned office in October 1968. To my knowledge the General Secretary of the I.M.S.S. is Mr. T. R. Hall of 49 Broadhurst Gardens, London, N.W.6.

Until early in 1970 I had been receiving membership fees and requests for information from persons who did not read of the Change of Officers, which I believe I am correct in saying, was published in this magazine early in 1969. Amongst these was an enquiry from Mr. Gifford, and a membership application plus fee from Mr. Helm (*Aquarist*, January). All of these fees and enquiries were passed to the I.M.S.S. General Secretary, and I therefore refute the politely phrased implication against myself which appeared in Mr. Helm's letter. It is just not factual. As Mr. Helm admits in his letter, in his case, after several reminders to the I.M.S.S. I wrote back to him and again stated that the information had been passed on. The fact that he has had no communications from the Society

cannot be attributed to my lack of action in this matter, neither can the fact that Mr. Gifford and others have also not received any acknowledgements to their forwarded enquiries. I myself have had no material from the Society since April 1969. I too have paid a £1.50 Membership fee.

A similar letter to the above has been forwarded to Mr. Collingbourne's British Marinists' Association, and Huw has assured me that it is to be published in their current issue. I feel sorry for the B.M.A.A. in respect that the malfunctioning of the I.M.S.S. organisation—as Huw states in his letter—may deter prospective B.M.A.A. Members, and as a keen marine aquarist I feel that such an organisation as the B.M.A.A. is and the I.M.S.S. was (?) is desperately needed on the British marine scene.

May I publicly reiterate the request of many parties, as a former officer of that Society and ask "What has happened to the I.M.S.S., Mr. General Secretary?"

GERALD JENNINGS,
London, N.19.

N.B.—A copy of this letter has also been forwarded to the I.M.S.S.

Notice to Secretaries of Local Clubs and Societies

In the interest of your activity and to help the residents of your area to get the maximum pleasure from their leisure time, I request you to notify me of your club's name, the address of your meeting place, and your own name and address. Required for inclusion in a combined Leisure Pleasure guide.

Please write to:—

A. DIXON,
(Business Manager),
Dixon Know Limited,
3 St. Andrews Road,
Coulston, Surrey.



The design of the Aquarist Fishkeeping Exhibition car sticker (in Red and Black). Obtainable from

The Show Organiser (car sticker)
The Aquarist & Pondkeeper,
The Butts, Brentford, Middlesex
Tel: 01-568 8441



from AQUARISTS' SOCIETIES

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

THE Grimsby and Cleethorpes A.S. is now to publish a monthly booklet. The Secretary would be pleased to receive other Society publications on an exchange basis. Anyone interested please write to L. A. Dearden, 165 Welholme Road, Grimsby.

ONE of the largest and best attended meetings Brighton & Southern A.S. have had for some time, was in March when Roy Skipper, the pioneer of European Discus breeding and prominent figure in the world of aquarists, visited the Society and gave his excellent, comprehensive slide lecture on the Discus. It is true to say that not one aspect of the keeping and breeding of this magnificent fish was forgotten by Mr. Skipper in his talk.

On the same evening the Society were visited by club members from Mid-Sussex, Portsmouth, Hastings and Reigate and Redhill Societies who had come, not only to see the slide show but to take part in an inter-club table show which was judged by Dave Ellis. This show, being one of seven classes, was won by Mid-Sussex A.S. with 505 points, second being Brighton with 482 points. The third place was taken by Portsmouth with 432 points and Hastings A.S. came fourth with 212 points.

MEMBERS of the Tonbridge and District A.S. were given a talk in March by Mr. A. Vickers on aquarium plants. He also invited questions from the members, which brought out some interesting facts on lighting conditions most suitable for various plants. The results of the table show: A.O.S. Egg-layers: 1, R. Taylor; 2, J. Bellingham; 3, T. Hine. A.O.S. Coldwater: 1, 2 and 3, Mrs. S. W. Jones. Sexed Pairs Livebearers: 1, R. Baker; 2, Mrs. A. Calver; 3, I. Matheson.

ARRANGEMENTS for the golden open show were completed at the March meeting of the **Tottenham and District A.S.** and it was agreed to start filming the actual setting up of a show which may eventually prove useful to other clubs. Many of the members took part in the Kings Hall Open Show of the East London and North London Area Group in March, and Tottenham were pleased to have a good share of the first four places. New members are still welcome. Anyone interested should seek further information from the Secretary, K. Massey, 71 Westward Road, Chingford, E.4. Telephone 01-527 7851.

THE Thurrock A.S. began their new year with a business meeting and Sale and Exchange conducted by Mr. R. Nicholls.

Following the meetings there was a talk by Ron Nicholls on setting up aquaria basins and a slide show by Jack Hadden. Table Show results: Plates: 1 and 2, H. Tuson; 3, P. Hinchley. Barb: 1 and 3, P. Croot; 2, E. Nicol. B.L.T.C.: 1 and 3, K. Appleyard; 2, E. Nicol.

IN March the **Medway A.S.** held their Inter-Club Show at Dame Court School, Watling Street, Gillingham (where meetings are held on the second and fourth Wednesday of each month, at 8 p.m.).

Six clubs competed with North Kent winning the most points, second being Tonbridge, third Medway and fourth Brith. The best fish in the show was won by I. T. Mathison (Ton-

bridge). Awards were as follows:—Barbs: 1, J. Parker (N. Kent); 2, J. Marshall (Medway); 3, J. Bellingham (Tonbridge). Anabantids: 1, C. Hunter (N. Kent); 2, M. Golding (Tonbridge); 3, J. Martin (N. Kent); 4, J. Marshall (Medway). Cichlids: 1, P. Robinson (N. Kent); 2, P. Wills (N. Kent); 3, T. Hine (Tonbridge); 4, P. Squires (Brith). Livebearers: 1, I. Mathison (Tonbridge); 2, D. Gleadall (Medway); 3, D. Simpson (Medway); 4, K. Heywood (Brith). Characins: 1, T. Hine (Tonbridge); 2, K. Saxby (N. Kent); 3, L. Getley (Tonbridge); 4, W. Rood (Tonbridge).

THE Grimsby & Cleethorpes A.S. held their second annual general meeting recently when the following officers were elected. Chairman, P. A. Jensen; secretary, L. A. Dearden; treasurer, L. Evans; show secretary, A. Metcalf. Committee: R. Cullum, C. Easton, J. P. Hawdon, D. Hawthorne, Mrs. O. Jennings, M. F. Robinson, T. Walker. The first annual dinner-dance of the Society was held in March when the following awards were presented: Aquarist of the Year: L. Stones Trophy; 1, C. Easton; 2, R. Jennings; 3, L. A. Dearden. Matheson Trophy—breeders section: P. A. Jensen. Junior Cup—G. Dixon Trophy: D. Kirk. Champion of Champions—J. Cullum Trophy: E. Kirk.

MEETINGS at Ealing and District A.S. have been brightened by the number of new members coming along. It is true to say that at each meeting so far this year has brought at least a couple of new faces. A recent speaker was Colin Rainbow—the Society's Secretary—who gave a very able talk on Cichlids. Apart from the information he put over, he also provided excellent illustrations to his talk using both slide projector and epidiascope, often simultaneously! Various fish-houses are springing up in different members' gardens and it is hoped to feature a slide show of these at a later date. John Batts—the Society's aquascaper expert—recently travelled to Bracknell A.S. and gave them a talk on this aspect of the hobby; he built an aquascope as he spoke, pointing out the pitfalls and recommending ideas for the benefit of the audience.

At the last meeting, the Show Secretary, Bob Sellers, arranged a brain-teasing quiz and Dick Mills, the chairman, displayed his home-made power filter describing its construction and attractively low cost.

DURING recent meetings of the **Chingford and District A.S.** the members have enjoyed a very interesting slide show and lecture from Roy Skipper of the House of Fishes on the keeping and breeding of Discus fish. Also a tape and slide show on the keeping of tropical fish in prison. New members are welcome any second or fourth Wednesday of the month at the Recreational Centre, Chingford Road, London, E.4.

THE Castleford and District A.S. recently enjoyed a film show, given by R. Hampson of Horsforth. Mr. Clowes (chairman) extended congratulations on behalf of all members to one of the junior members Ian Hepinstall on winning the Best in Show Award at Rotherham Open Show in February with his "Weather Loach," and noted that this is Ian's third best in seven months. Mr. and Mrs. D. Cohen were

also congratulated on winning Best in Show at the "Top Ten" Show.

Results of the Table Show judged by Mr. Hampson were as follows: Sharks and Foxes: D. Stevens. Characins: 1, K. Frew; 2, K. Vause; 3, Mr. Kear. Fancy Goldfish: 1 and 2, Mrs. Asquith. The next meeting will be held on 26th May. Anyone wishing to join will be very welcome.

THE Great Yarmouth and District A.S. has over these past five months attained an encouraging membership exceeding 110 persons but lately the attendance of monthly meetings has been falling.

Two monthly Table Shows have been held and judged by Society officials and it is hoped to obtain more entries at future shows. A quit was compiled and chaired by the vice-chairman, Mr. K. Lister, at the February meeting, and this was thoroughly enjoyed by all.

Meetings are held on the first Monday of each month, and newcomers are most welcome. Secretary is Mrs. J. Middleton, 38 Brooke Avenue, Caister-on-Sea.

THE Independent A.S. held its annual general meeting at the end of March when the following officers were elected: Chairman, S. Applin; secretary, M. Harth; assist. secretary, T. Laughlin; treasurer and vice-chairman, J. Kettle; show secretary, E. Islip; assist. show secretary, R. Bowes; P.R.O., Mrs. I. Applin; librarian, P. Goode.

The chairman stated that although the Society had not done so well in the inter-club competitions the efforts were commendable. He also expressed his thanks to the outgoing members of the committee and welcomed those newly elected. The president said he was greatly impressed with the improvement shown during the past few months in the quality of the fish on the bench and that this would enable the club to make progress during the coming year and the hopes of regaining the Six Club Trophy were extremely high. He also commended the committee and all those involved in having the courage to stage the club's first open show and wished it every success.

The following awards were presented by the president, F. Tomkins: Desborough Trophy, T. Kinsey; Best Breeders Team, M. Harth; Best Egg-layers—jointly held by T. Kinsey and E. Islip; Best Livebearers, R. Mason; Best Coldwater, J. Kettle; Best Angel, Fighter and The John Kettle Trophy, R. Bowes.

A **FILM** show formed the main attraction at the first March meeting of the **Hull A.S.** This was given by R. Rodfern, in which a Spanish film was shown called "The Silent World." At the second meeting the Scarborough A.S. were entertained in an inter-Society "Ingamells Cup" match in which Hull A.S. won by 89 pts to 8 pts. The best fish in show award was won by R. Buksh with a Scissor Tail. The Society is now going ahead with arrangements for the Open Show to be held on 16th May, and for the display at the Hull Show held on 30th and 31st July in the East Park.

THE following officers were elected at the annual general meeting of the **Halifax and District A.S.**, held in January: Chairman, D. Taylor; vice-chairman, D. Shields; secretary, M. Fletcher; assistant secretary/show secretary/guest officer, J. Grundy; treasurer, N. Sudd. The new committee would like to extend an invitation for any interested aquarist to attend meetings held every other Wednesday, at the Forest Cottage Community Centre, Cousin Lane, Halifax.

THE March meeting of the **Hyde A.S.** was held at their new venue, "The Boar's Head." The guest speaker was Ron Lench, who spoke on "Club Methods and Organisation," and a lively discussion followed. The new committee was elected as follows: Chairman, P. Bailey; secretary, A. Harst; treasurer, I. Rowbotham. The Table Show results were: 1, G. Wilkinson; 2, I. Rowbotham; joint 3, P. Bailey and I. Rowbotham. New members are welcome, and anyone interested in joining, please contact the secretary at 159 George Street, Hyde. Tel. 061-368 2389.

QUEST speaker at the March meeting of the East Kilbridge A.C. was J. Young, who gave a talk on Characins. The result of the Table Show was as follows: Characins (A): 1, A. Lyons; 2 and 3, B. Merckel. (B) 1, J. Finlay; 2 and 3, J. Bwing. (C) 1, A. Wilson; 2, J. McLaughlin; 3, T. Wilson.

A VERY successful sale of plants and fish was conducted by Eric Wilson, chairman for the evening, at the quarterly Table Show of Bristol A.S. The class winners were: Goldfish: H. Ball; Characins: B. Bowden; Cichlids: E. Wilson; Guppies: H. Ball.

THE Rotherham and District second Open Show, despite frost and snow, was a great success. Entries totalled 680 benches by 157 exhibitors and 30 societies were represented. Best fish in the show was a Weather Loach entered by I. Hepinstall of Castleford Society. He won the Aquarist Gold Pin. Results were: Plants: 1 and 3, R. Senise (Sheffield); 2, L. Worthington (Ind.). Mollies: 1, D. Airton (Rotherham); 2, M. Smedley (Alfreton); 3, D. Stephens (Castleford). Swordtails: 1, N. R. Gibson (Huddersfield); 2 and 3, J. Igoe (Sherwood). Guppies: 1, M. Denkin (Nuneaton); 2, T. Westley (Four Star); 3, L. Stevenson (York). A.O.V. Livebearers: 1, Miss D. Stephens (Castleford); 2, Mr. Hall (Aireton); 3, D. and D. Sharp (Castleford). Small Barbs: 1, Master Kaye (Top Ten); 2, G. Thickbroom (Castleford); 3, A. Thomas (Bedworth). L. Barbs: 1, Mr. Cobens (Castleford); 2, Mr. Snowden (Ind.); 3, N. R. Gibson (Huddersfield). Small Characins: 1, J. Tunney (Ind.); 2, P. Reynolds (Swillington); 3, I. Hepinstall (Castleford). Large Characins: 1 and 3, J. Thickbroom (Castleford); 2, J. Sullivan (Four Star). Tooth Carps: 1, Mrs. Gear (Keighley); 2, P. Carey (York); 3, E. Hooper (Sherwood). Sharks and Foxes: 1, H. Harlow (Derby Regent); 2, Mr. McFater (Rotherham); 3, B. Lancaster (Rotherham). Rainbow, Minnows and Danios: 1, I. Hepinstall (Castleford); 2, A. Thomas (Bedworth); 3, R. Senior (Sheffield). Catfish (Corydoras): 1, N. Jackson (Workop); 2, D. Sewell (Sherwood); 3, E. Well (Doncaster). Catfish, A.O.V.: 1, P. Carey (York); 2, A. Thomas (Bedworth); 3, E. Smith (Sheffield). Loaches: 1, I. Hepinstall (Castleford); 2, N. R. Gibson (Huddersfield); 3, D. Sewell (Sherwood). Dwarf Cichlid: 1, D. Stead (Swillington); 2, Mr. Thickbroom (Castleford); 3, P. Martin (Alfreton). Large Cichlid: 1, E. Hooper (Sherwood); 2, R. G. Muggletons (Workop); 3, D. and D. Sharp (Castleford). Angel Fish: 1, J. Jones (Grantham & Dist.); 2, D. Sewell (Sherwood); 3, M. White (Wombwell). Pighans: 1, R. Rhodes (Scunthorpe); 2, Mr. Cobens (Castleford); 3, S. Clowes (Castleford). A.O.V. Anabantids: 1, J. Stevenson (York); 2, K. Fries (Castleford); 3, N. Jackson (Workop). A.O.V. Tropicals: 1, D. Clay (Rotherham); 2, Mrs. Howard (Castleford); 3, H. Harlow (Derby Regent). Breeders (Six Livebearers): 1, A. Freeman (Sheffield); 2, P. Danielson (Huddersfield); 3, J. Thickbroom (Castleford). Breeders (Six Egglayers): 1, Master Clowes (Castleford); 2, M. Smedley (Alfreton); 3, E. Well (Doncaster). Pairs (Livebearers): 1, R. Hislop (Swillington); 2, J. Igoe (Sherwood); 3, Mr. and Mrs. Cohen (Castleford). Pairs (Egglayers): 1, D. Jackson (Dukeries); 2, Miss Lindley (Alfreton); 3, I. Hepinstall (Castleford). Goldfish and Cornets: 1 and 2, Mr. Hall (Aireton); 3, J. Eddington (Rotherham). Shubunkins and Fancy Goldfish: 1, Mr. Hall (Aireton); 2, G. Thickbroom (Castleford); 3, Master Kaye (Top Ten). A.O.V. Coldwater: 1 and 2, N. Jackson (Workop); 3, P. Carey (York). Mini-Jars: 1 and 2, P. Reynolds (Swillington); 3, D. Jones (Rotherham). Plants: 1, Mr. and Mrs. Cohen (Castleford); 2, D. Jackson (Dukeries); 3, N. R. Gibson (Huddersfield). Would Mr. A. S. and J. M. Allinson of York please return Best Fish in the Show Cup from last year to Rotherham Society as soon as possible please.

At the end of March Rotherham and District A.S. held a friendly Table Show with Workop. The response was excellent with 55 entries from both clubs. A heater and stat. combined was

won by G. Sibson of Workop for Best Fish in Show.

THE March meeting of the Suffolk Aquarist and Pondkeepers Association was devoted to a general discussion and a demonstration by the President, W. Card, on the making of all glass tanks. Our Secretary, Mr. K. Fellingham, also showed how to make a cheap and reliable undergravel filter. Two changes in the committee were announced with K. Coker taking over as show secretary and L. Jermy as P.R.O. The Table Show results for Danios were 1 Mr. Coker; 2 and 4, Mr. Jermy; 3, Mr. Crown.

THE February meeting of the Cambridge & District A.S. was the Annual General Meeting when the following officers and members of the Committee were elected for the year—Chairman: Mr. Elkerton; Vice-Chairman: Mr. Yates; Secretary: Mr. Mann, 30 Cheney Way, Cambridge CB4 1UD; Asst. Secretary: Mr. Sanderson; Treasurer: Mr. Smith; Show Secretary: Mr. Phillips, 143 Water Street, Cambridge; Table Secretary: Mr. Startup, Jr.; Publicity Officer: Mr. Ward; Committee Members: Messrs. Freeman, Hills, Radford, Russell, Smith Junior and Startup Senior. The membership was up to the 60 mark and the average attendance at meetings was some 24 members. The Society meets on the first Tuesday in every month at the Working Men's Club, Fitzroy Street, Cambridge. New members and visitors are always welcome.

THE Annual General Meeting of Salisbury & District A.S. was held recently with many new ideas for 1971. The following Officers were elected—Chairman: T. Blanchard; Vice-Chairman: C. Lennox; Secretary: I. Goddard, 106 Carmelite Way, Salisbury, Wilts.; Treasurer: Mrs. J. Hargrave; Show Secretary: D. Hargrave, 1 The Cottages, Lower St., W. Hamham, Salisbury, Wilts.; Editor: B. Ashton; Librarian: R. F. Adams; Committee Members: B. Fritzell and J. West.

THE following officers were elected at the Annual General Meeting of the Witham and District A.S.—President: D. Maiton; Chairman: D. Willett; Vice-Chairman: B. Baldwin; Secretary: M. J. Smith, 80 Howbridge Rd., Witham, Essex; Treasurer: Miss M. Brown; Committee: M. Jones; M. Foster, J. Watson, L. Cole, R. Chamberlin. The meetings are held at The Albert, Witham, opp. the railway station, on the second Wednesday of each month. All new members welcome, information from the Secretary.

MEMBERS of Corby and District A.S. were treated to an extremely entertaining evening when Roy Skipper, from the "House of Fishes," was guest speaker. Everyone present was enthralled by the wondrous visions of the S. Discus shown on 35 mm. colour transparencies.

Afterwards Mr. Skipper gave an excellent and most memorable account of his experiences in the Rearing and Breeding of the S. Discus. The members were sincerely appreciative to Mr. Skipper for such an excellent insight of this wonderful subject.

THE President's Night of the Blackpool and Flyde Aquarium Society (note change of name) was held at its new headquarters, The Kings Arms Hotel, Talbot Rd., Blackpool.

Accrington and Lynde Clubs joined in a social evening to welcome the new President, C. F. Grace, Director of the Blackpool Zoo. Mr. Grace had in previous years been President of Dudley Aquarists Society whilst at Dudley Zoo, so their loss is Blackpool's gain.

Mr. Grace in his inaugural address said, that he was looking forward to participating in activities of a Club that has the conservation of nature, that is in the aquatic field, at heart. Of his travels in Africa and his time spent at Dudley Zoo, Mr. Grace said that he would be looking forward to giving members an evenings talk on 10th May.

Mrs. Grace accompanied her husband for this first meeting and 93 members and guests showed their appreciation when he presented the "Eddie Crowther Memorial Trophy" to

Mrs. Crowther, to be held until the Annual Show on 1st August. Also presented was the Home Furnished Trophy to Messrs. Howarth and Wright for a cold water marine aquarium.

An illustrated lecture on "Livebearers" from Ray Hampson, Leeds, took place during the early part of the evening, slides showing some unusual and interesting fish showed how the variety of livebearers is increasing.

AT the annual general meeting in January of the newly formed Chelmsford A.S. K. Turner was elected: Chairman; Vice-Chairman: T. Gee; Secretary: Mrs. B. Turner; Treasurer: L. Norris; Show Secretary: R. Horne; Committee: J. Newiss, T. Askew, Mrs. H. Brown, R. Inbourne.

A tape on White Spot was hired and winners of the Table Show of Gouramis were: 1 and 3, R. Horne; 2, T. Askew. At the February meeting some members of the Witham Club attended and a quiz on tape was run by R. Warran. Winners of the Table Show of Barbs were: 1 and 2, members of Witham Club; 3, R. Horne. In March, members were shown how to set up a Mini Tank by T. Gee which was most interesting. Members also judged the Table Show and awarded points. This was checked by T. Gee. Winners of the Table Show of Danios, W.C.M.M. and Harbors were R. Horne and M. Drake.

New members would be welcome and are invited to come along to the Civic Centre on the first Tuesday in each month. Further details may be obtained from the Secretary, Mrs. B. Turner, 63 Archers Way, Gallewood, Chelmsford, Essex.

THE Basingstoke A.S. at their meeting in February welcomed Jack Stillwell of Portsmouth who gave a talk on "Quality" and his ideas on breeding. He combines wit with his experience to make the type of evening the members enjoy, and was accompanied by P. Atkinson who ably judged the table show. In March the President, Dick Ridley gave a demonstration/talk on the subject of building tanks of various kinds. The table show was judged by T. Duffy of Bracknell A.S. Results were: Barbors: 1 and 2, A. Blake; 3, Ben Bissoun, A.O.V.; 1, H. Gough; 2, A. Blake; 3, R. Weston. Novice: 1 and 2, R. Cook; 3, H. Rolfe and P. Hubbard.

AT the annual general meeting of Stone A.S. the following Committee members were elected: Chairman: A. Smith; Vice-Chairman: J. Sanders; Hon. Secretary: B. Hughes; Treasurer: I. Brough; Vice-treasurer: A. Pelli; Show Secretary: N. W. Plant; Vice-Show Secretary: K. Evans; Social Secretary: C. Brindley; Vice-Social Secretary: A. Morrey; Minutes Secretary: D. Plant.

New members are most welcome. Meetings are held on the first and third Wednesday of each month at the Swan Inn, Stafford Street, Stone.

A MOST informative talk on the Care and Breeding of Angel Fish was given by B. Baker at the monthly meeting of the Mid Sussex A.S. He commenced his talk by explaining to the members, where Angel Fish can be found and how it lives in its natural surroundings. If one can simulate these conditions in the aquarium, then the Angel fish will live quite happily and should grow to 10 in. across from fin to fin. This fish likes slow moving water, plenty of aquatic plant and live food, such as brine shrimp, white worm, etc. It does not like to much light. He suggested that either distilled or de-ionised water be used. Kept under these conditions, the Angel fish will breed at about 5-6 months old. This fish is

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capable of producing up to 700 young from one spawning. B. Baker judged the Goldwater class and C. West judged the Livebearers class in the evenings Table Show. The awards were presented viz:—Goldwater: 1 and 4, N. Short; 2 and 3, A. Jackson. Livebearers: 1, N. Short; 2, S. Cauderbank; 3 and 4, C. Corbin; 5, D. Ransom.

The Chairman announced that the Society now had a membership of 150 and is one of the largest Aquarists' Society affiliated to the Federation of British Aquatic Societies. Any further information may be obtained from the Society Secretary J. Reeve, 36 Rumbolds Lane, Haywards Heath. Telephone 3702 (Evenings).

AT the monthly meeting of the **Central Sussex Fancy Guppy Association (F.G.A.)** on 21st March. Mr. Soper, the Chairman awarded the prizes as follows:—Best in Show: R. Elmes, Superba female; Colour male: 1, F. Stringer; 2, R. Elmes, Natural female; R. Elmes, Wedge female; M. Allam, Junior male: 1, J. McNab; 2, B. Soper; 3, R. Soper. Junior female: 1, J. McNab; 2, D. Ransom; 3, B. Soper, Short Dorsal Veiltail; D. Soper. Delta: D. Soper. Original Veiltail: D. Soper. Matched Pairs: D. Soper, Pantail; D. Soper. Long Dorsal Veiltail: 1, R. Elmes; 2, D. Soper; 3, F. Stringer. Superba Female: 1, R. Elmes; 2 and 3, D. Soper.

The meeting began with an announcement by the Chairman that the Head Office in Manchester has now approved the Central Sussex Section. T. Croucher a "B" class judge (F.G.A.) began his talk on General Care and Breeding of Guppies, which proved to be of great interest to the members. He expressed the need for absolute cleanliness when keeping Guppies. Bacteria can weaken the fish and attack the fins and suggested that no gravel or plants be kept in the aquaria with Guppies as this will only aid the life of bacteria. Brine Shrimp should be fed to the young on day one with a little beef heart added to the diet as the fish grows. He also suggested that some dried baby foods are a good food as they are high in protein and ended his talk with a slide show of his fish house and Guppies. Further information may be obtained from Mr. Soper at B. Hill 2251 or Mr. Elmes at Peacohaven 2534.

THE results of **Swillington A.S.** first quart members show are as follows: Guppies: 1, R. Stringer; 2 and 3, M. M. and A. Crouther. Mollies: 1, R. Hislop; 2, S. Castake; 3, M. Hislop. Swordtails: 1, M. Hislop; 2, R. Hislop; 3, P. Reynolds. Best in Show went to M. Hislop, who received the Swillington A.S. Swordtail Trophy. Mr. Stringer received the Harry Spruce Trophy for Guppies, and R. Hislop received the Swillington Mollie Trophy. The entertainment at recent meetings has included a talk on fish diseases by Peter Reynolds, and a quiz, which was compiled by C. Gascoigne and D. Stead.

AT the annual general meeting of the **M.A.A.S.** the following officers were elected: President: L. Male; Chairman: S. Croft; Secretary: R. Roberts; Treasurer: R. Tedds; Services Secretary: G. Parker; Judges/Speakers Convener: D. Bennett; Editor/Press Officer: M. H. Carter. The following six members were elected to serve on the committee: A. Skinner, C. Skidmore, R. Shakespeare, M. Walker, L. Beale, Mrs. A. Walker.

The date and venues of the Midland Aquarist League Shows are as follows: 5th Sept.: Foleshill Community Centre, Foleshill, Coventry. Open classes: A.V. Cichlid, A.V. Characina. 3rd Oct.: Camphill Youth Centre,

Camphill Rd., Nunaton. Open classes: A.V. Anabantid, A.V. Killie.

THERE was a good attendance at the **Warrington A.S.** annual general meeting. The president, A. Higham, presented Fish of the Month trophies to:—1, S. Ellis; 2, L. Crawford; 3, M. Millman; 4, J. Alcock; 5, B. Philcock; 6, R. Tench. Junior Trophy: Master M. Pritchard; Endeavour Trophy: J. Higham.

Officers elected for the next twelve months were:—president, A. Higham; chairman, J. Alcock; secretary, B. Nelson, 35 Kingsway, North Warrington; treasurer, W. Foxhall; show secretary, J. Higham; publicity, Mrs. P. Alcock; committee: Mr. and Mrs. Clark, Mrs. E. Foxhall, Messrs. W. Parton, G. Cook and R. Smith. Visitors and new members are most welcome at the Club meetings held every fourth Tuesday at the Royal Oak Hotel, Bridge Street, Warrington, to commence at 8 p.m.

WITHIN **Bedworth A.P.S.** held their February meeting, over fifty members and friends from other societies listened to a most interesting talk that was given by John Edwards of Cannock Society. His talk was called "Marine Land, Florida, U.S.A.," and was illustrated with some wonderful slides.

Most of the slides were of the famous Miami Seaquarium. Mr. Edwards spoke of the internationally famous performing dolphins, and of the beautiful tropical marine tanks for which this aquatic zoo is famous. The second half of his talk was given over to his visit to the West Indies in particular the island of Bermuda.

AT the March meeting the Table Show was the first in the eliminators for the **Midland Aquarist League Show**, and 11-year-old Colin Pratt showed many of the adult members the way to win, by taking first and second in the Anabantid class, also the Best Fish in the Show Award. Another success for the Pratt family was when Kevin Pratt won first and second in the A.V. Livebearer class.

Mr. and Mrs. Carter took first and second in the A.V. Barb class. Whilst Mrs. Walker of M.A.A.S. judged the Table Show, her husband, Mick Walker, gave a very interesting talk on the construction of a fish-house, giving particular emphasis to the danger of condensation, also to the electrical side of the construction.

THE host society at the first meeting of the **Midland Aquarist League** was the **Bedworth Aquarist and Pool Society**. A total of 136 fish were benched in the show, there being 59 in the M.A.L. classes and 77 in the two open classes; amongst the many visitors were two American aquarists, Tech. Sgt. Jack Hunsinger and Sgt. Bob Soon, both stationed with the U.S.A.F. at Upper Heyford, Oxfordshire. Lezghborough A.S. won the first round and went into the lead with a total of 26 points.

AT the March meeting of the **Coventry Pool and A.S.**, Mrs. Joan Halling kept 31 members and guests extremely interested as she told of her personal experiences with marine tropical fish. Her talk was amply illustrated with her own collection of colour slides, and the meeting was enjoyed by all concerned. The best fish in the Table Show was a Cornball, owned by E. Sheehy. Other results:—Pairs (Livebearers): M. Lewis. A.V. Barbs: D. Eastingwood. A.V. Anabantid: E. Sheehy.

THE **Amersham and District A.S.** held their annual general meeting in March. The new officers elected were as follows:—chairman, K. North; vice-chairman, L. Brinklow; secretary, J. S. Thompson, 8 Windmill Wood, Amersham. Tel. 6977; assistant secretary and publicity officer, Mrs. W. Thompson; show secretary, B. Jessop, 22 Okley Lane, Tring; assistant show secretary, G. Rudland; treasurer, M. Waumsley; librarian, Miss N. Thompson; committee members: G. Fairburn, J. Selby, J. Stratfull.

An interesting programme of meetings is being arranged by the committee. New members, beginners or experienced aquarists, will receive a warm welcome at 8 p.m. on first and

third Wednesdays of each month at the Community Centre, Amersham.

THE main item at the March meeting of the **New Forest A.S.** was a quiz prepared by D. Harding, covering a wide range of topics. The arrangements for the furnished aquaria competition were made during the evening. Details of the marking system were also given.

The results of the Table Show were as follows:—A.V. Cichlids: 1 and 2, D. Lane; 3, B. Higginson; 4, R. Moseley. A.V. Danio: 1 and 2, B. Higginson; 3 and 4, M. Aust. Results from the February meeting were:—A.O.V. Tropical: 1, Mr. Moseley; 2 and 4, A. Williamson; 3, R. Moseley. White Cloud Mountain Minnows and Rasboras: 1, B. Higginson; 2, D. Lane; 3 and 4, A. Williamson.

THE following officers were elected at the annual general meeting of the **Wolverhampton A.S.**: chairman, R. Short; secretary, R. Bateman. The annual awards and prizes were presented and the members are looking forward to another year of lectures, film-shows and table shows which are already planned for the coming year. New members are always welcome at the once-monthly meetings held on the third Tuesday evening of each month at 7.30 p.m. in St. Peter's & Paul's School, Red Cross Street, Wolverhampton.

THE **Bristol Tropical Fish Club** were pleased to welcome a considerable number of new faces to the last two monthly meetings. February's speaker was John Wheeler from Trowbridge, a familiar figure among Bristol aquarists. His talk contained many helpful tips of particular value to the newer members on the dietary aspects of keeping tropical fish. The speaker for March was Tony Powell from Keynsham T.F.C., whose topic "Aquarium Balance or Un-Balance" prompted a good response from club members with a fair exchange of ideas and views. During the interval a Table Show was held with the following results:—Loach Open Class: 1 and 2, G. Furber; 3, R. Day. Corydoras Open Class: 1, G. Furber; 2, Mrs. Purnford; 3, M. Taylor. Loach Novice Class: 1, T. Munk; 2 and 3, R. Lawrence. Novice Corydoras Class: 1, T. Brankin; 2 and 3, R. Lawrence.

Members are now actively engaged in the arrangements for the June three-day annual Open Show which always proves to be so popular. This show is considerably demanding in its organisation, since it remains unique in club shows not only because of the duration but also in the feature that all exhibits are presented in identical fully-benched tanks. Entry schedules may now be obtained from E. Newman (show secretary), 71 Somerdale Avenue, Knowle, Bristol.

THE **Ilford and District Aquarist & Pond-keepers' Society** meeting early in March was split into two parts, the first half being dedicated to a visual quiz arranged by Noel Reade and comprising of thirty questions. Members were asked to write down the missing words or "Ban Names" of well-known products that are familiar to the aquatic hobbyist. The second half of the evening was devoted to "Members Questions" especially for beginners. A Panel of the more experienced aquarists attempted to answer any questions that other members had brought along with them and all in all it ended as a very excellent debate on the arts of managing aquaria.

The Monthly Table Show (the first this year) was a well-supported venture and attracted sixteen entries in both classes. The results were as follows: A.V. Tropical Livebearer: 1, D. Seaman; 2, Mrs. P. Reade; 3, C. Ollie; 4, J. Hartam. A.V. Tropical Egglayer: 1, Mrs. Rose; 2, Mrs. Reade; 3, J. Hartam; 4, Mrs. Rose. Anyone interested in fishkeeping can obtain more information from the Secretary Mr. Ron Rush, 103 Heath Road, Chadwell Heath, Roonford, Essex.

THE **King's Lynn and District A.S.** decided that all future meetings will be held at the Eagle, Norfolk Street, King's Lynn, on the first Tuesday of each month starting at 7.30 p.m.

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Each month the meeting will include a Table Show and an extra, the extras being quizzes, slide shows, talks, etc.

The Society would be interested in hearing from other clubs with a view to exchange visits and inter-club shows. If any clubs are interested would they please contact the Show Secretary, Mr. B. Copper, 11 Marsh Lane, Gaywood, King's Lynn, Norfolk.

The Club continue to prove that although small in number they are big in will-power and endeavour by taking a tableaux at the forthcoming show at the King's Lynn Corn Exchange on 13th March for local societies.

Following the success of their first Marine Life Exhibition last September the Society has plans for a bigger and better exhibition incorporating an Open Show and would be pleased to hear from Clubs and Companies willing to exhibit. The probable date is Saturday, 11th September.

THE members of the Hounslow and District A.S. had a very interesting and instructive evening at their February meeting. The Chairman, Mr. Ray Scurry, demonstrated the setting up of a furnished Aquarium, using a 24x15x12 in. stainless steel aquarium and a selection of Aquatic plants and Rockwork and proceeded to explain in detail each stage as he went along. Mr. Scurry has for many years travelled to Open Shows competing and taking awards in the furnished Aquaria classes and is well known for his skill and artistry in this field. The Table Show for the evening was for Pairs and was well supported. The following members received card awards: 1 and 2, R. Spencer; 2 and 3, L. Mathews.

Visitors are always welcome to the meetings which are held at 8 p.m. on alternate Wednesdays, at the Public Hall, Isleworth. All enquiries to the Secretary, Mr. D. J. Woodward, 34 Unbridge Road, Hamworth. Tel.: 01-895 2456.

THE Sixth International Guppy Show staged by the **Fancy Guppy Association** will be held at the Glebe Farm Community Centre, Stockford, Birmingham (approximately two miles N.W. of Birmingham Airport) will welcome entries from non-F.G.A. members in all classes except the Master Breeders Class. Benching of entries will be from 10 a.m. to 10 p.m. on Saturday, 29th May, and from 9 a.m. to 1 p.m. on Sunday, 30th May. Judging will be from 1 p.m. until 3 p.m. Sunday, and the fish will be on view to the public from 3 p.m. onwards. Awards will be given out at 5.30 p.m. Entries are expected from all over the world, Singapore, America and Europe, all the "experts" will have their entries there, and this is your chance to put your Guppies on the bench, and have them judged to F.G.A. standards. Classes are available for all standard-shaped fish, entered as single fish, or four matched males, or four matched females, or two matched males and two matched females. Full details can be obtained from D. Beacham, Show Secretary, 17 Pedmore Close, Woodrow, South, Redditch, Wores.

AT the annual general meeting of the Harwich and District A.S. the following officers were elected. Chairman, J. Baker; secretary, M. Bird, 8 Macdonough Cottages, Harwich, Essex; treasurer, M. Manton; librarian, P. Halgard; Committee, Mr. Moulder, T. Franklyn, Mrs. Mills, S. Carter, to represent the junior members. Meeting place for the coming year is at the "Alma Inn," Harwich, on the first Monday and third Tuesday of each month. New members welcome.

OFFICERS appointed to serve the **Bradford and District A.S.** for this year are as follows: President, A. Firth; vice-president, J. P. Chorley; secretary, A. Daugherty, "Parkfield," 60 Moore Avenue, Witney, Bradford, BD6 3HU; treasurer, J. E. Cawthra; social and publicity officer, W. Holmes; equipment officer, G. Fairclough.

THE March meeting of the Carshalton and District A.S. took the form of a slide and tape quiz show on tropical fish. This was won by a junior lady, Miss Jackie Wilshire, who received

a medalion. The judge for the evening was B. Baker of the F.B.A.S., who knowledge made him a valuable mediator in the quiz. The table show classes were: Barbis: 1, J. Lucy; 2 and 3, C. Lamb, Junior; 1, K. Haysworth; Dario and W.C.M.M.: 1 and 2, T. Barr; 3, C. Wilson. Characin: 1, T. Barr; 2, L. Davis; 3, J. Begbie. The new committee for 1971 is Chairman, J. Lucy; secretary, C. Lamb; treasurer, R. Wilshire; show secretary, E. Housley.

THE January meeting of the Hastings and St. Leonards A.S. was an illustrated talk on Cichlids given by B. Funnell who also made most of the slides used. These covered the range from the largest to the newest.

The second January meeting was an informal discussion on aquarium plants. This was a little lively with dealing with under-gravel filters and lighting in relation to plant growth.

The first meeting in February was unusual inasmuch as the last time this lecture was given to the club was 8th September, 1938. On both occasions the lecturer was J. Manwaring-Haines and on both occasions he used the same notes, the lecture being on the Biology of Fishes—Fins.

The end of February meeting was a discussion on fish foods and the foods and recipes were many and varied. Many foods which can be found in the home were mentioned and it became obvious that with careful use of these, costs can be cut considerably. At this meeting it was announced that for the first time in the Club's history the paid up membership had topped the 100 mark.

The highlight of the past two months was the Do-it-Yourself Exhibition which was held in Hastings from 30th January to 6th February. Some 25,000 persons saw the exhibition and the Club passed out 400 leaflets explaining the Club's interests and aims.

The table show results were as follows: January (Dwarf Cichlids): 1 and 2, L. Reider; 3, J. Watson. January (Cichlids): 1, C. Mechen; 2, B. Reed; 3, P. Stapley. February (Platics): 1, T. Chalcraft; 2, A. McCormick; 3, C. Chalcraft. February (Own Breeding-Livebearers): 1, A. Martin; 2, T. Chalcraft; 3, T. Elliot.

THE inter-club show results between Border A.S. and the Whitehaven A.S. were as follows: A.O.V.: 1 and 2, G. Burton (Border); 3, R. Hall (Whitehaven); 4, R. Woodward (Whitehaven). Cichlids A.O.V.: 1, R. Woodward (Whitehaven); 2, D. Robinson (Border); 3, A. Hunt (Border); 4, J. Collier (Border). Dwarf Cichlids: 1, G. Robinson (Border); 2 and 4, R. Jones (Border); 3, R. Slade (Border). Sharks: 1 and 3, R. Bray (Whitehaven); 2, R. Woodward (Whitehaven); 4, R. Hayer (Border). Rasboras Danios, Minnows: 1, Mr. Strand (Whitehaven); 2, A. Hunt (Border); 3, G. Robinson (Border); 4, Mr. Morgan (Whitehaven). Barbis: 1, E. Hodson (Border); 2, R. Woodward (Whitehaven); 3, G. Robinson (Border); 4, J. Parker (Whitehaven). Characins: 1 and 3, G. Burton (Border); 2, E. Hodgson (Border); 4, S. Martin (Whitehaven). Swords: 1, F. Roberts (Border); 2, W. Riddle (Whitehaven); 3, A. Slade (Border); 4, M. Ward (Whitehaven). Catfish other than Corydoras: 1, G. Burton (Border); 2, A. Hunt (Border); 3, W. Fraim (Whitehaven); 4, D. Robinson (Border). The result was a win for the Border A.S. by 58 points to 32 points.

Membership of the Border A.S. has now exceeded the fifty mark, and the meetings are held at the Morton Youth and Community Centre, Wigton Road, Carlisle, at 8 p.m. The Secretaries are Mr. and Mrs. R. Jones.

MONTHLY meetings of the Bristol Aero A.S. are held on the third Tuesday of the month at the National Dock Labour Board Social Centre, Welsh Back, Bristol, where the Society have recently set up and maintained a community tank. There has been a recent revival of interest and inter-club shows with Yare A.S. have been arranged. A monthly club sheet, "Aqua News," is also issued.

THE annual general meeting of the Hull A.S. resulted in the following officials being elected. President, A. Douglas; chairman, T. Douglas;

secretary, E. Storey, 141 College Grove, Preston Road, Hull, HU9 5SG.

A very successful year has been enjoyed and the Society has a membership of 124. The Secretary requests any information on speakers, etc., which would be gratefully accepted and used.

THE following officials were appointed at the annual general meeting of the Privateers A.S.: President, L. Taylor; vice-president, C. Holdsworth; publicity officer, E. Bowers; equipment officer, R. Whitaker; secretary, F. W. Coles, 18 South Hill Drive, Bingley; treasurer, B. Cooper; committee: Mesdames Holdsworth, Towrias, Whitaker; Messrs. Cox, Morrell, Stein, Towrias. Monthly meetings are held, on the second Monday in each month, at Northcliffe Secondary School, Osley Road, Shipley, and anyone interested is invited to attend. These meetings consist of a Table Show and Film Show or Lecture.

SHOW POSTPONEMENT

The Catford A.S. regret that their show which was to have been held in June, has been postponed to September owing to the difficulty in obtaining a hall.

OBITUARY

The death is announced of J. A. J. (Tony) Claxton of King's Lynn and District A.S.

He was one of the pioneer Marine keepers in East Anglia, and had kept Marines for ten years. His collection included five tropical marine and one coldwater marine tanks, housing such specimens as a magnificent lobster, eel, crabs, shrimps, etc. His tropical marines included many anemones and crabs collected on his holiday last year. He not only excelled as an aquarist, for his collection of reptiles and pheasants were admired by one and all.

NEW SECRETARIES

Thurrock A.S.: J. Furber, 19 Chapel Close, Stanford-le-Hope, Essex.

Doncaster and District A.S.: G. Kilvington, 51 Ancley Road, Balby, Doncaster.

Barnsley Tropical F.S.: L. J. Barraclough, 73 Station Road, Wombwell, Barnsley.

Stone A.S.: B. Hughes, 4 Arbour Street, Hanley, Stoke-on-Trent, Staffs., ST1 2HF.

York and District A.S.: Mrs. H. Simons, 28 Abbottsford Road, Hull Road, York, YO1 3EE.

Leamington and District A.S.: S. M. Cleary, 19 Mossput Close, Leamington Spa, CV31 2JG.

Priory A.S.: M. McCrystal, 67 South Terrace, Willensand, Northumberland.

Privateers A.S.: F. W. Coles, 18 South Hill Drive, Gilstead, Bingley, Yorkshire, BD16 3NR.

Cambridge A.S.: F. S. Mann, 30 Cheney Way, Cambridge, Cambridgeshire, CB4 1UD. Tel. Cambridge 64939.

Cambridge A.S.: Show Secretary: R. Phillips, 143 Water Street, Cambridge, Cambridgeshire.

Canberra Aquarium Society: K. C. McPherson, librarian, c/o 22 Blackman Crescent, Macquarie, A.C.T., 2614, Australia.

SOCIETY RE-FORMED

The Pontefract and District A.S. has been re-formed. Meetings are held on the fourth Tuesday of the month and the next meeting which is on the 11th May, will be held at the Willow Park Hotel, Willow Park Estate, Pontefract. All aquarists in the area are invited to attend or get in touch with the hon. secretary, I. E. Wootton, Eastwell Lodge, Carleton, Pontefract.

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NEW SOCIETIES

A NEW aquarist society has been formed in the Skelmersdale New Town area. The name of the society is the "Grimwood Aquarist Society." It was formed by a few employees of a local factory, hence the name, but it has been decided to throw open the membership to anyone with an interest in the keeping of tropical fish.

Meetings are held in the Quarry Bank Community Centre on the first Sunday of each month, starting at 7 p.m.

Newport, Essex Area: The Newport and District A.S. meet fortnightly on the second and fourth Monday evenings in the month, at 8 p.m. to 10 p.m. at the Newport Junior School. So far great interest has been shown to the speakers, and all new members will be most welcome. Mrs. M. S. Kimbley, secretary, "Cornerways," Seward's End, Saffron Walden, Essex.

CHANGE OF NAME

The Blackpool and Fylde A.S. is now more known as the Blackpool and Fylde Aquarium Society.

CHANGE OF MEETING VENUE

The Blackpool and Fylde Aquarium Society have now moved to the Kings Arms Hotel, Talbot Road, Blackpool, just 100 yds. past the Bus Station. Meeting nights have also changed to every second and fourth Monday in the month. New members always welcome or contact secretary, G. Howard, 56 Stamford Avenue, Blackpool. Tel. 42676.

CHANGE OF VENUE

The venue of Loyne A.S. open show to be held on the 23rd May has been altered to Assistant Staff House, Lancaster University, Lancaster.

AQUARIST CALENDAR 1971

9th May: North Warwick A.S. Open Show. Schedules from T. Saunders, 101 Goose Farm Road, Great Barr, Birmingham.

15th May: Cardiff A.S. Open Show, G.K.N. Sports Club, Slopers Road (near Cardiff City A.F.C. Ground).

15th May: Uxbridge A.S. Open Show, Meadow School, Royal Lane, Hillingdon, Uxbridge. Details from N. V. Lee, 46 Airedale Road, Ealing, W5 4SD.

16th May: Hull A.S. Open Show.

16th May: Merseyside A.S. Open Show.

16th May: Nuneaton A.S. Open Show (Benching 11.30-1.40) at the Camp Hill Youth Centre, Camp Hill Drive, Nuneaton.

16th May: Mid-Sussex A.S. Second Annual Fish Exhibition at the Park Centre, Burgess Hill.

22nd May: Yeovil A.S. Open Show at Grass Royal School. Schedules available from A. R. Rendell, 77 Freedom Avenue, Yeovil.

22nd May: Southend, Leigh and District A.S. Open Show will be held at the Liberal Hall, Clarence Road, Southend. Details from the Open Show Secretary, R. D. Orford, 8 Blenheim Chase, Leigh-on-Sea.

23rd May: Corby and District A.S. Open Show. Schedules from D. A. Page, 78 Crispin Street, Rothwell, Northants.

23rd May: Loyne A.S. First Open Show, Assistant Staff House, Lancaster University, Lancaster. Schedules from Mrs. M. Norris, 70 Wyresdale Road, Lancaster.

23rd May: Coventry Open Show at the Poleshill Community Centre, Poleshill Road, Coventry. Details from S. Woodbridge, 32 Edgeway Ave., Coventry.

23rd May: Northwich and District A.S. Open Show at Cuddington Scout Hall, Neeley Road, Cuddington, nr. Northwich. Benchling 12 noon to 2 p.m. Schedules and further details from show secretary, Mrs. D. Thorne, 28 Whitegate Road, Winsford, Cheshire.

29th-30th May: The F.G.A. International Guppy Show, Gleebe Farm Community Centre, Steadford, Birmingham.

30th May: Portsmouth's Inter-Club Show. Information is being sent to Clubs round the South, but if it doesn't arrive, information may be had from W. T. Ryder, 493 Commercial Rd., Mile End, Portsmouth, PO2 7AB.

5th June: Bristol Aero A.S. Open Show at the Wesleyan Church Hall, Bryants Hill, Bristol, 5. Details from the Show Secretary, L. Rowe, 34 Church View, Filton, Bristol.

6th June: Bishops Cleeve A.S. Second Open Show at the Tythe Barn, Bishops Cleeve on the Cheltenham to Ivesham Road (A435). Schedules from the Show Secretary, Mrs. C. F. Scrivins, 27 Warden Hill Road, Cheltenham, Glos.

6th June: Bournemouth Aquarists Society. Annual Open Show will be held at Kinson Community Centre, Felthams Park, Kinson. Show schedules and entry forms available from Show Secretary, Jack V. Jeffery, 30 Braemar Avenue, Southbourne, Bournemouth, BH6 4JF, after 1st April.

6th June: Accrington A.S. Open Show.

6th June: Lincoln and District Open Show, Drill Hall, Broadgate, Lincoln.

6th June: Hyde A.S. Open Show, Hyde Lads Club, Hyde, Cheshire.

6th June: Priory A.S. Annual Open Show at the Boys' Club, Mariners Lane, Tynemouth.

12th June: Catford A.S. Open Show. Show secretary, J. D. Wilson, 130 Paston Crescent, Lee, London, S.E.12. Phone: 01-857 491

12th June: Lisnaw Major A.S. Open Show at the Town Hall, Lisnaw Major. Show secretary, A. Ibberton, 84 St. Marys Ave., Barry, Glam.

13th June: Leighton and District A.S. Open Show, The Sports Centre, Granby Street, Leighton.

13th June: Skipton and District A.S. Open Show at Ambulance Hall, Ermystrad St. Schedules and further details from Secretary, B. Heald, 19 Ramshaw Drive, Skipton, BD23 2QN. Tel: 4835.

13th June: Bishop Auckland A.S. Third Annual Open Show at Y.M.C.A. Hall, Woodhouse Close Estate, Bishop Auckland. Schedules available from R. N. Gough, 6 Langley Drive, Bessemer Park Estate, Spennymoor, Co. Durham.

15th June: High Wycombe A.S. (F.B.A.S.) Open Show, West Wycombe Hall, Nr. High Wycombe. All schedules and details from Show Secretary, Bob Leslie, 29 Meadow Walk, Tylers Green, Penn, Bucks.

15th June: Thorne A.S., Thorne Grammar School. Show Secretary, H. G. Jewison, 94 Hawthorne Road, Thorne, Nr. Doncaster, Yorks.

20th June: W.K.F.B.A.S. (Colshill) Inter-society Open Show, Town Hall, Colshill. Schedules and information from Show Secretary, R. Tromans, 27 Mexhall Road, Birmingham, 34.

20th June: Swillington A.S. Sixth Open Show at Swillington County Primary School, Swillington, Nr. Leeds, Yorkshire. Schedules are now available from P. Reynolds, 60 Lawrence Rd., Leeds, LS8 3HS, Yorkshire.

20th June: Salisbury and District A.S. Seventh Annual Open Show at City Hall, Salisbury. Show schedules and entry forms available from D. Hargrave, 1 The Cottages, Lower St., West Harnham, Salisbury, Wilts.

20th June: Glossop A.S. Open Show, Venue Glossop Centre, Talbot Street, Glossop, Derbyshire. Schedules from Secretary, Miss M. D. Smith, 3 Chapel Lane, Hadfield, via Hyde, Cheshire. This is an A.M.D.A.S. Show.

24th/25th/26th June: Bristol Tropical Fish Club Open Show, Congregational Church Hall, Newton Street (off Stapleton Road), Bristol 5. Details and schedules from E. Newman (Show Secretary), 71 Somerdale Avenue, Knowle, Bristol 4.

26th June: Chingford and District A.S. Open Show, Methodist Church Hall, New Road, Chingford. Show Secretary, A. Pannel, 9 Pembur Ave., Walthamstow, London, E.17.

27th June: Alfreton and District A.S. Annual Open Show at the Adult Education Centre, Alfreton Hall, Alfreton. Details from the Show Secretary, B. Hickling, 15 Meadow Close, Eastwood, Nottingham, NG16 3DQ.

27th June: Mount Pleasant A.S. First Open Show at T.A. Drill Hall, Elm Grove Terrace, Gateshead. Show schedules from W. A. Jackson, 81 Staneway, Gateshead, Co. Durham, NE10 8LS.

27th June: Wednesbury and District A.S. First Open Show at Boys' High School, St. Paul's Road, Wednesbury. Schedules from T. Shipton, 9 Gloucester Road, Wednesbury.

4th July: Gosport and District A.S. Fifth Open Show, Fareham Community Centre, Kings Road, Fareham, Hants. Show schedules from K. Clough, 16 Newport Road, Gosport, Hants.

4th July: Lytham A.S. Open Show at the Lowther Gardens Pavilion, Lytham. Show Secretary, E. Thompson, 85 Alexandra Road, St. Annas, Lancs.

9th-11th July: Aquarist and Pondkeeper Fish-keeping Exhibition, Alexandra Palace, Wood Green, London, N.22.

10th July: Port Talbot and District A.S. to be held at the Y.M.C.A. Port Talbot, Shields, cups and plaques in all classes. Show schedules from the Show Secretary, D. Couch, 18 Cefn Don, Cwmavon, Port Talbot.

10th-11th July: Romford and Bescontee A.S. Dagenham Town Show, Central Park, Dagenham, Essex. Schedules as soon as available. Show Secretary, D. G. Kent, 74 Lynwood Drive, Collier Row, Romford. Tel: 70 67804.

11th July: Grantham and District A.S. Second Open Show at the Guildhall, St. Peter's Hill, Grantham. Schedules available mid-March from Show Secretary M. Pattison, 8 Witham Terrace, East Street, Grantham.

11th July: Tadcaster A.S. Annual Open Show, Collingham Memorial Hall, Collingham, Wetherby, Yorks. Schedules from H. Truwell, 43 The Fairway, Strassen Rd., Tadcaster.

17th July: Basingstoke A.S. Open Show, Carnival Hall, Basingstoke. Schedules from M. Strange, 10 Loddon Court, Neville Close, Basingstoke.

18th July: Runcorn A.S. First Open Show. Secretary, Mrs. V. Skill, 26 Gregson Road, Widnes, Lancs.

30th-31st July: Exhibition and Open Show by Hull A.S. at East Park.

1st August: Blackpool and Fylde A.S. Twenty-first Open Show, Raikes Parade Annex (Old Grammar School), Church St., Blackpool. Souvenir programmes available from G. Howard, 56 Stamford Ave. Blackpool. Tel: 42676 from mid-June.

7th-14th August: Portsmouth and District A.S. Open Show, 47 classes. Show schedules from K. A. Johnson, 7A Hillsley Road, Portsmouth, PO6 4LE.

8th August: Stroud and District Open Show, Mid-Glostershire Technical College, Stratford Rd., Stroud, Glos. For details, Show Secretary, M. S. Jones, 46 Hillcrest Rd., Cashes Green, Stroud, Glos.

14th August: Weston-super-Mare and District T.P.C. Second Open Show, St. John's Hall, Oxford Street, Weston-super-Mare. Show Secretary, J. Clark, St. Jude's, North Street, Cheddar, Somerset.

14th August: Harlow A.S. Open Show at Moot Hall, The Stow, Harlow. Schedules from P. Murdoch, 21 Brooklane Field, Harlow.

15th August: North Staffs A.S. Third Open Show at Meir Community Centre, M.A.A.S. Rules. Schedules available from Secretary, K. Balch, 78 Courtway Drive, Stoke-on-Trent, ST1 6DU.

15th August: Oldham and District A.S. Annual Open Show at Werneth Park, Oldham. Further information and show schedules from E. Birchwood, 30 Inverness Avenue, Blackley, Manchester, 9.

21st August: Weymouth and District A.S. (proposed date).

22nd August: Bedworth A. and P.S., Nicholas Chamberlain School, Bulkington Lane, Bedworth. Schedules from K. Edkins, 72 Lister St., Arleborough, Nuneaton.

We regret that due to pressure on space later show dates have been held over from this issue. The Keighley A.S. Show Results will be published in June.

