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THE **AQUARIST**
AND PONDKEEPER





THE AQUARIST

AND PONDKEEPER

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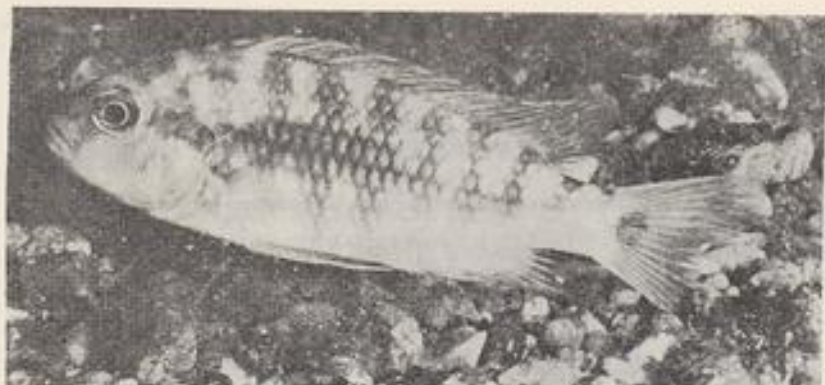
Our Cover:
Pterois species. This specimen
gained a first award for
Heywood & District A.S. at
the British Aquarist Festival,
1975.

	PAGE
Breeding <i>Pseudotropheus williamsii</i>	552
What is Your Opinion?	554
<i>Pterois volitans</i>	560
Herpetologists and the Law	561
Our Readers Write	562
Keeping and Breeding Guppies	564
The First of the Mouthbrooders	566
Our Experts Answer: Tropical Queries	568
Coldwater Queries	570
Viewpoint	572
Product Review	575
Try a Pond Aquarium	576
From a Naturalist's Notebook	579
<i>Phallichthys amates</i>	581
New Water Garden Centre	583
Junior Aquarist: 'Kribs' for Entertainment	585
Beginners' Corner (5) Filters	586
Catproof Aquarium	587
News from Societies	588

The Editor accepts no responsibility for views expressed by Contributors.

February, 1976

551



Female with 27 fry in the mouth which she had borne for 22 days

BREEDING

Pseudotropheus williamsii

A LAKE MALAWI MBUNA

Written and Illustrated by Jorgen and Pamela Hansen

Pseudotropheus williamsii is a mouthbrooding Mbuna group cichlid from Lake Malawi. It was first caught for scientific study by J. A. Williams, after whom the species was named in 1893 by Günther who placed it in the genus *Chromis*. The general name was later changed by Regan to *Pseudotropheus*, so that the fish now came to be called *Pseudotropheus williamsii*.

P. williamsii is a seldom visitor to the rocky coast and keeps instead to quiet pools between rocky areas. This fish is less specialised than the other members of the Mbuna group, and in nature it eats both algae and invertebrates. Its stage of development has been placed between *Gathochromis obliquidens* and *pseudotropheus zebra*, and it has its own nutritional niche.

Both male and female grow to a length of 10 cm. (4 inches) and have an elongated body form with a basic greyish-brown colouring. Down across the body run, according to the fish's state of well-being,

up to eight dark stripes, across the middle of which runs a dark longitudinal band. When the male feels like spawning its basic colouring turns to yellow, the transverse bands turn dark brown, while the upper part of the dorsal fin and the anterior of the ventral fins become radiant blue.

Boulenger describes the fish as follow:

- 1) The body depth is equal to the length of the head, and goes three times into the total length.
- 2) The head is double as long as broad.
- 3) The eye is a little shorter than the snout and divides four times into the length of the head.
- 4) The mouth is broad, threequarters the breadth of the head, with thick lips.
- 5) The teeth are arranged in rows of five or six, the outer row having the biggest teeth. There are 52 teeth in the upper jaw's outermost row.

6)	Spiny ray count	Soft ray count
Dorsal fin	XVII	8
Anal fin	III	7

The pectoral fins are threequarters the length of the head and do not reach the anal opening.

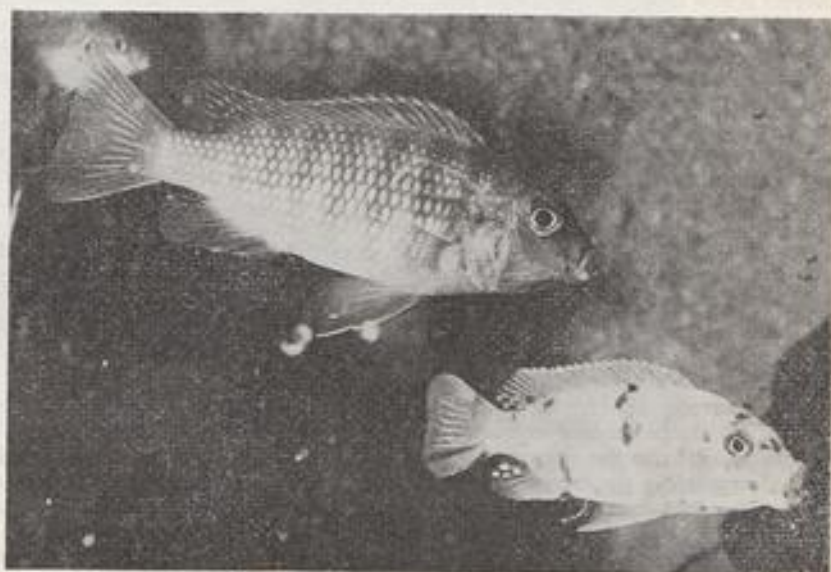
The upper row of the lateral line contains 23 scales while the lower row contains 11 scales.

It can be difficult to distinguish *P. williamsii* from closely related species such as *P. tropheops* and *P. microstoma*. *P. tropheops* generally has, however, a basic yellow colouring which with age darkens and takes on a bluish shimmer. *P. microstoma* has between the eyes a suggestion of a hump, and is a bit more bluish in colour, but otherwise, except when spawning, can be incredibly similar to *P. williamsii*.

We once bought 10 small fish, each measuring about 2.5 cm. (1 inch), as to whose species we were completely ignorant, although we knew it must be a

After especially vigorous feeding and a change of water, the males in one's Mbuna cichlid tank will display their brilliant spawning colours and thus court the females. The morning after such an occasion we discovered two *P. williamsii* females with their mouths so full of eggs that the former could not close properly. The eggs were yellow and about 3 mm. in diameter. We immediately caught up both females and moved them each to a separate aerated and planted 40 litre tank. In the course of a couple of days it became clear that one of the females had eaten her eggs, as she both dug merrily in the gravel and ate a quantity of thread algae. The other females mouth was no longer quite so full up, but her chewing movements indicated that it still contained some eggs. When one gazed at her too much she was capable of making her mouth look as if it didn't contain eggs; we had noticed this behaviour before with other Mbuna.

P. williamsii male above
P. zebra female (orange
blotch variety)



question of a mouthbrooding cichlid from either Malawi or Tanganyika. Eventually when the fish grew larger we determined by the principle of omission that our fish were *P. williamsii*. They grew up in a special tank for Mbuna cichlids, which besides *P. williamsii*, contained *P. elongatus*, *P. auratus*, *P. zebra*, *P. tropheops*, *P. microstoma*, *Labeotropheus trewavasae* and *L. fuelleborni*.

Minor fights occurred continually in the tank but serious injuries occurred only if a newcomer were introduced without the territory boundaries having previously been destroyed by the stones being moved about. If this procedure were neglected the newcomer would have about 24 hours left of life, whereas otherwise no harm would come to him.

After our fish had gone with eggs/fry in the mouth for 22 days we decided to try and take a photo of her. As she hid constantly we were obliged to push her forward with a net. The following day she released her young but continued to take good care of them. At the slightest disturbance they were immediately taken again into the protective mouth. For the first couple of days we fed the fry with micro-worms and thereafter with dry food and small *Daphnia*. The fry were dark-violet with dark transverse stripes, and thus resembled many other Mbuna fry.

P. williamsii is not particularly beautiful in its ordinary colouring but if one has a couple of males to show off to one another and to the female of the species then one will certainly enjoy keeping this fish.

WHAT IS YOUR OPINION?

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

Photographs by the Author



Mr. M. ALLPORT resides at 5 Huntingdon Gardens, Colley Lane, Halesowen, and he has been keeping tropical fish for only nine months. For the first five months he kept only freshwater fish and during that period he lost four of them. Since he started to keep marines he has lost only one fish—and it was already diseased when he obtained it from a dealer. Mr. Allport is now totally involved with marines and wishes that more dealers would stock them as he feels that they would become more popular if they were more commonly available. On another subject Mr. Allport writes: "As far as thermometers are concerned, the submersible type of any good make is recommended as I find that external stick on types tend to be affected by room temperature more than tank temperature." He ends his letter with a request for information about the twin-spot wrasse, *Coris angulata*.

On page 477 of the December 1975 edition of this feature, in a letter from Mr. T. A. Davies of Clwyd, I asked for the word "adsorb" to be italicized to prevent its being confused with "absorb". Unfortunately the person who set up the type must have corrected what he thought was a typing error and not only did the incorrect word appear but it appeared emphasized. No doubt readers interested in physics and chemistry will know the difference between absorption and adsorption: in the former process, substances are taken in; while in the latter case, substances are concentrated on the surface. For example, blotting paper or filter wool will absorb water; whereas activated carbon will adsorb coloured dyes such as methylene blue. A couple of other points about which some beginners may not know: the proper names of fish and plants are written with a capital letter at the first name and a lower case letter at the second name—as in *Coris angulata*, mentioned above; and the singular of "algae" is "alga". These points, although minor ones, are worth remembering.

Mrs. Y. Spalding, of 66 Down Road, Merrow, Guildford, Surrey, has the following to say about one of the more expensive brands of fluorescent tubes. She writes: "... I recently installed one over a 36 in. x 15 in. x 12 in. tank, housing *Lamprologus savoryi* and some young *Pseudotropheus johanni*. The tank is planted with *Cryptocoryne*, wistaria, some *Cabomba* and one of the many varieties of Amazon sword. It is

set up to provide the rocky hiding places and caves beloved of these species. This tank was originally lit with a 20 watt warm white, fluorescent tube and looked quite attractive. Plants flourished, as did fish, but the *Lamprologus* especially were not over much in evidence as the species tends to be shy. The day after I installed the (new) tube I was pleasantly surprised to see several *Lamprologus* swimming in a leisurely fashion in a fairly open part of the tank, their very beautiful finnage fully extended and their delicate and subtle colouring showing as I had never seen it before. Almost immediately two *P. johanni* appeared and both coloration and behaviour pattern were noticeably different from previously, the former greatly enhanced and the fish's behaviour much more natural. None of them took much notice when the tank was approached. Previously there had been a prompt withdrawal to cover. Intrigued, I have since made a few enquiries and discovered that papers have been released—both in the U.S.A. and Russia, where considerable research has been carried out on the effect of the simulated daylight produced by (these tubes) on animal life. Over the past five or six years it has been found that (the use of) this light has resulted in improved health and (has) provided an environment in which the animals used were obviously much happier and secure, (as) demonstrated by their behaviour... this is good enough for me..."

Photograph 1 shows a talking catfish (photograph courtesy of High Street Aquatics). I'd be pleased to hear of your experiences with this peculiar species.

Mr. P. Bent, F.L.S., of *Seedling Succulents*, lives at 336d Kingston Road, Wimbledon Chase, London, S.W. 20. He's been keeping succulent plants for 22 years and fish for several years. Mr. Bent has become "hooked" on marines and at present is constructing a 6 ft. x 2 ft. x 18 in. all-glass tank. Writing of a new type of fluorescent tube, about which there has been a lot of discussion recently, he tells us that the "new" tube has "been around for several years, in America," under a different name. He states that the lamps were "specially intended for plant growth and fish keeping. They were also used in hospitals and other places where an accurate light source was required." Mr. Bent tells us that he contacted the makers of the tubes and was told that

"the reason for their high cost is the fact that the cathodes are specially made to last longer and to give a much reduced blackening of the ends—which normally occurs when the lamp ages. A feature of these is the small amounts of U.V. produced. The U.V. causes plants such as succulents to colour up as if they were grown under sunlight. In theory it should be possible to sun-tan under these and it is perhaps for this reason that they are used in hospitals as U.V. acts as an oxidising agent and sterilizes an area near the tube. However, other tubes give these small amounts of U.V." Mr. Bent goes on to say that his marine fish do very well under the lighting in question and he recommends its use. He states that another very popular type of aquarium lighting "should never be used with marines as it impairs fish's eye-



sight." He continues by giving a few tips applicable to all fluorescent tubes: "(a) Turning on and off shortens their life expectancies, due to particles leaving the cathodes when they heat up, and weakens their heaters. Therefore, keeping switching to a minimum will result in longer tube life. Time switching would be the answer here—say, 7.00 a.m. to 10.00 p.m. (b) Always use the correct control gear for the lamp to be used, and earth whenever possible. Prevent salt water from getting near the gear and tube as this could soon cause a short circuit and blow the lot. Always fuse separately from heaters. (c) Fluorescents may be used on direct current. The choke is replaced with a resistor and a reversing polarity switch is employed to avoid blackening one end of the tube. This blackening can be observed in tubes used on London Transport underground transport The tubes in question are available from good aquarium shops and electrical wholesalers at around £5.00 for any lengths. Twisted models give 10 per cent more light due to an increased surface area."

No. 37 Stokesay Road, Buntingsdale Estate, Market Drayton, Salop, is the address from which Mr. P. J. Farrow writes. "The following is my simple but effective method for hatching and culturing brine shrimps. It has the advantage of needing no filtering of the shrimps. The equipment is simply a small, square, perspex tank. I bought a 7 in. x 4 in. x 5 in. tank, from a pet shop, for only 45p. Into this one fits a piece of perspex 2 in. deep and wide enough to support itself across the middle of the tank at the top. (The water level should be half way up the perspex). One half of the tank is then painted black and the tank is filled up, to the appropriate height, with water to which two level teaspoons of salt, per pint, has been added. Brine shrimps' eggs are then shaken on the surface of the darkened half. The

whole tank is then covered (with a black cover), the water is maintained at 80°F, and a diffuser stone is placed in the light half. When the shrimps are hatched they will automatically swim towards the light. Once under the perspex barrier, which prevents the eggs and shells from entering, the shrimps may be scooped up in a net made from a taut piece of fine mesh material stretched across the frame of an old net. They can be washed in the usual way and introduced into the tank by back-sweeping the net."

Mr. Maxie Burns, of Books Etc., Larne, recently phoned me and invited me to call and see his medium sized pair of angels with their newly hatched fry. He told me to bring my camera as the babies were on an Amazon sword leaf near the front of their aquarium and would have made an interesting photograph. Unfortunately, when I arrived about 1½ hours later the parents had moved their babies to a leaf nearer the back of the tank so I didn't get the desired photograph. Anyway, there were a couple of reasons why I didn't wish to photograph the parent angels and their young

at that particular time: the front of the tank had a slight coating of algae, due to the lights being kept on for the benefit of the fish and their fry, and we didn't want to attempt to clean it in case we frightened the parents into eating their young; also, the use of flash could have annoyed or frightened the parent fish. Mr. Burns tells me that the babies, numbering about 200 now (five days later), are doing well on a liquid fry food; the parents are still looking after them. Mr. Burns has a varied collection of interesting fish, including two large red hooks, *Mylophus rubripinnis*, and a large and somewhat shy scat, *Scatophagus argus*. I attempted to photograph these two species, in colour, but the slides have not yet been returned to me. A number of people have written to me recently asking questions about their problems with fish photography. As an ordinary amateur photographer who develops and prints his own black and white photographs I'm not an expert on aquarium and fish photography; but I'm prepared to give of my limited experience to those who are finding problems. I will make one point: I have found fish to be among the most difficult subjects to photograph—they are continually on the move and one has to use flash and get very close to attempt to get any sort of acceptable result. Another point: before beginning to photograph fish in aquaria make sure that the front glass in the tanks is clean both inside and out. A razor blade can be used to remove algae from the inside; and one of the most popular glass/window cleaning products will leave the outside of a tank spotless. It's amazing how our eyes are able to ignore dirty glass when our attention is focused on the fish and plants in an aquarium; however, the camera lens doesn't miss the dirt; indeed, the flash tends to show up every speck. If you wish to photograph the contents of a given tank, clean the front glass, both inside and outside, about 1 hour beforehand; and leave the filter running to pick up any moving pieces of dirt. Switch the filter off when you are taking the photographs. I've already seen fish photographs taken by a number of readers; I'd be pleased to see, and return, any samples readers might care to send me.

Mr. Burns, mentioned above, has asked me to enquire if readers have any information about the species of scat which he keeps. I'd be pleased to publish readers' experiences in a future feature. Photograph 2, although leaving a lot to be desired technically, shows a sight which before, during and after shocked me a little. It shows a red-breasted piranha, *Serrasalminus natterii*, with part of its evening meal—the second of two goldfish. The fish belongs to Mr. McNaghten, of High Street Aquatics; my thanks to him for allowing me to attempt to photograph his piranha feeding. I had never before seen a piranha eating a live goldfish and was amazed at the speed of the operation. (My amazement and the fish's speed

resulted in the rather poor photograph). When the first goldfish was dropped into the piranha's tank, the lethargic piranha sprang to life and gulped the goldfish into its mouth in a split second. A cloud of bubbles and a few specks of the goldfish's innards were the only pieces of evidence to be seen. When the second goldfish was introduced, the piranha didn't seem to show much interest—until he made a quick rush at the goldfish and snapped at its belly. The goldfish can be seen in this condition in the photograph. However, it didn't have to suffer long as a second or two later the piranha made a sudden dash and chopped the goldfish in two, swallowing the tail end. The front end had hardly time to sink to the gravel before it was gulped down by its predator. The process was



over, and the piranha had retired to a corner to digest its meal, in a matter of seconds, before I had time to get my camera to re-charge. Before and after its meal "Gnasher," as the piranha was christened by Ian and his young assistant Brian Strahan, rested quietly in a corner of its tank. Having seen the piranha in action I can appreciate the stories of shoals of piranhas stripping human bodies, in tropical waters, in only seconds. I would certainly have no desire to keep a piranha myself: the thought of what it could do to a human finger, carelessly introduced into its tank, leaves me feeling rather cold! The activities of "Gnasher" gave me a good idea why the film "Jaws," which I haven't yet seen, has been pulling in the crowds and breaking cinema box office records; and I can see why the paperback version of the story is a best-seller!

Mr. Stanley Fox, one of my most regular contributors over the years, sends the following opinions and comments from his home at 126 West Farm Avenue, Longbenton, Newcastle upon Tyne. Mr. Fox says: "May I express some additional opinions regarding the change of names of the aquatic plants referred to by

Mr. P. J. Brown in his letter published in the November 1975 edition. The plant formerly named *Echinodorus radicans* had its name changed to its present name, *E. cordifolius*, many years ago. Despite the alteration to the plant's specific name, aquarists and dealers continued for some considerable time afterwards to refer to this plant under its old name, whenever the plant was sold or became a subject for discussion; therefore one cannot refer to an alteration to this plant's name as a 'new' classification. To refer to the change of name of the plant known as *Cryptocoryne willisii*, to that of *C. axelrodii*: I would be most interested to read a synopsis of the investigation, undertaken by Karl Ratj, that seeks to justify the alteration to this particular plant's specific name. To digress briefly: some time during the early years of this century another botanist bestowed the name *C. willisii* on the aquatic plant known today as *C. nevillii*.

"Some plants are classified as variants of a species and thereafter are not separately named as it is considered that only very minor morphological differences exist among or between them. It is at this point that some differences of opinion occur. What is considered by one person as a minor variation within a species of plant may be considered by someone else to be to such a degree that the variation is sufficient to merit naming the plant as a separate species within the genus. Superficially, *Aponogeton fenestralis*, *A. henkelianus* and *A. bernerianus* are of similar appearance; however, these three species possess external morphological and anatomical differences. We are informed that these names are, or have been proved to be, synonyms for *A. madagascariensis*, by van Bruggen. Personally, until I read Mr. Brown's most interesting letter I was unaware that the specific name *madagascariensis* existed." (Nor did I). Mr. Fox continues: "To classify these three species of *Aponogeton* under the blanket name of *A. madagascariensis* because the original names are regarded by a single person as synonyms for these plants, or for the apparent reason that these plants are endemic to Madagascar, is not, in my opinion, sufficient justification for the change in names. If there were only one species of this genus native to Madagascar then the alteration of the specific name to *madagascariensis* would at least be understandable, and perhaps acceptable, to the majority of interested persons. As it is, this particular re-classification can only inspire adverse comment.

"While I appreciate that botanists, during the course of their research, may discover much that is new, and so add to our knowledge of the *Plantae* kingdom, and as a result, whenever necessary, the generic and specific names of plants need to be altered—for botany, like other scientific disciplines, cannot remain static in pursuit of knowledge—let us at least hear of not only botanical sense but common sense

being used in the choice of nomenclature that applies, or may be applied, to future research. At the moment there is much that confuses not only the advanced plant enthusiast—amateur, or layman if one prefers the term—but, dare I say it, some botanists also!"

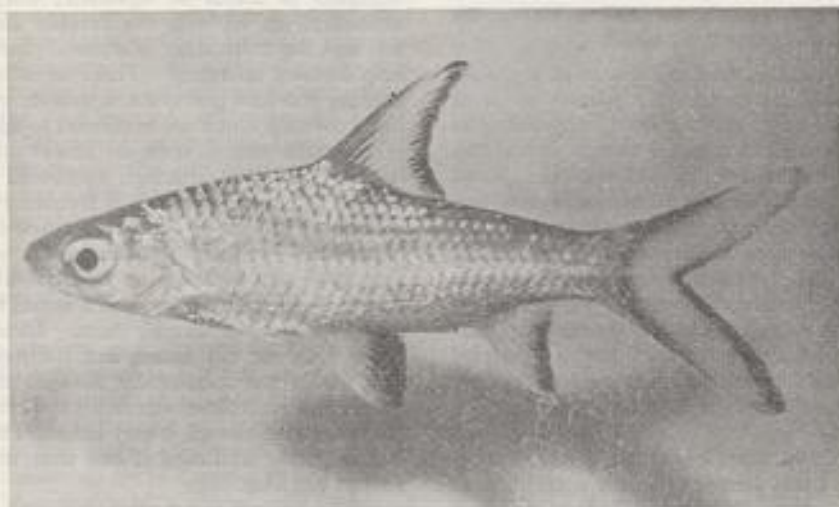
Mr. Fox has made some reasonably fair comments. Some scientists tend to work in cloistered isolation, ignoring the practical people—such as ourselves—why may make use of their findings or decisions. I was interested to hear Mr. David Attenborough, an expert on a variety of wild animals in their natural habitats, say, on a recent T.V. chat show, something to the effect that the real experts on tropical fish are to be found in the concrete streets and roads of our towns and cities. Obviously the information gained by scientists is useful to aquarists; but we could, if necessary, get on with the keeping and breeding of fish and the cultivation of aquatic plants without the help of most scientists. Those of us who have been keeping fish and plants for a quarter of a century or more possibly find it more difficult to adapt to changes of scientific names than do newer converts to the hobby. However, although we should all try to keep abreast of name changes it is frequently easier not to bother. I would be able to form a mental picture immediately I heard someone speak or write about *Pelmatochromis kribensis* or *Echinodorus radicans*. If their current names were used I would have to make a bit of an effort to identify them. Ideally one should know both the old names and the new names—but new names are occasionally changed for even newer names and sometimes one tends to revert to the safe, old name even though it may be out of date. It could become quite confusing if one were to dwell on the subject too long.

On now to a subject which, in the past, has caused some controversy—methods by which one may kill an incurable or deformed fish. Methods mentioned, to date, have included dropping the fish into boiling water; dropping it into cold water; dropping it into cold water and bringing it to the boil; dashing it on a stone floor; placing it in a folded newspaper and hitting it or standing on it; feeding it to larger fish; or, my own suggestion, flushing it down the lavatory. When I suggested the latter method I was given a sharp reprimand by one lady reader; but none of the other methods appeals to me. Today I discussed the problem with a veterinary surgeon who was kind enough to give me his professional advice. Unfortunately professional ethics prevent me from mentioning the gentleman's name; but I would like to thank the vet in question for his advice. When I told him of some of the methods suggested above, he was less than enthusiastic; indeed, he expressed anger at the suggestion of using boiling water. His first suggestion, when I posed the problem out of the blue, was to use lemonade. Of course, he was jesting—but the idea is

not completely absurd when one considers that the substance is, in effect a solution of carbon dioxide, CO_2 , in water. The absence of oxygen could asphyxiate the fish. Better than a solution of CO_2 in H_2O , he said, would be a solution of carbon monoxide, CO , in H_2O . He said that death from carbon monoxide poisoning was very pleasant as one just got weaker and weaker and drifted into oblivion. I asked him about the practical aspects of making a solution of CO in H_2O and he reminded me that it is a main constituent of coal gas. Naturally, one would need to use coal gas and not North Sea gas or bottled gas. (I would remind readers that CO gas is very poisonous to humans. No doubt most of us have read or heard of people committing suicide by breathing in carbon

suicide). The average aquarist would probably find it difficult to obtain either drug for killing a fish. The vet's suggestion of placing the fish in boiled (not boiling) oxygen-free water could also kill it.

Probably the simplest method of killing a fish, suggested by the vet to whom I talked, is to cut off its head. The vet told me that decapitation, if done swiftly and accurately, would be quick and painless. He said that a sharp instrument could be used, e.g. a knife or a razor blade. I asked for suggestions for small fish that would be difficult to hold and he proposed the use of a photographer's guillotine. He stated that a quick snip with a pair of scissors would be an equally appropriate method. Before I left, the gentleman stated that it would be wise to try out each



monoxide in coal gas or car exhaust fumes).

The vet suggested the drug pentobarbitone, used at a strength of 1/5 grain, as a suitable substance for killing a fish. He told me that the drug is very soluble in water; and when I asked in how much water the 1/5 grain should be dissolved, he told me that a suitable quantity would be the minimum amount required to cover a given fish in a small container. In veterinary medicine, he informed me, pentobarbitone is used as an anaesthetic, administered at a dosage of 1/5 grain per lb. body weight of the animal to be anaesthetised. He said that 1/5 grain should be enough, dissolved in a small quantity of water, to kill a fish painlessly. Phenobarbitone is equally soluble in water and, at the same rate of 1/5 grain dissolved in the minimum amount of water required to cover a given fish, could be used to produce euthanasia. Both drugs are available only on prescription as both could be dangerous if misused. (An overdose of either is usually fatal—and a not uncommon way of committing

of the methods he suggested before I told other people to consider their use. I have not tried any of the methods; my reasons are that I don't have access to coal gas or to the drugs suggested; and, at the moment, I don't have any fish which I want to kill.

I am giving the vet's suggestions as just that: suggestions. I cannot comment on the results as I have not tried any of the methods suggested; and I am not suggesting that readers should try any of the methods listed as I will accept no responsibility for the results in their use. However most of the suggestions appear, in theory, to be much superior to, and more humane than, those made in earlier editions of this feature. If I had to use any of the methods suggested I would prefer the use of either pentobarbitone or phenobarbitone. I'd be pleased to hear from anyone who may try any of the vet's suggestions. My thanks to him once again for his professional advice.

Photograph 3 is of a bala shark, *Balantiocheilus melanopterus*, belonging to High Street Aquatics.

I'd be pleased to hear of readers experiences with this beautifully shaped species.

Mr. F. J. Ayres, Chairman of Yorkshire Koi Society, resides at 35 Manor Drive, Hilton-in-Cleveland, Yarm, Cleveland. He was kind enough to send me a copy of his most attractive and interesting booklet, "Koi-Keeping for Beginners." This thoroughly professional publication runs to 20 pages, plus inside and outside back and front covers illustrated with coloured drawings of specific varieties of Koi. The names—Taisho Sanke, Kohaku, Shiro Bekko, Hi-Utsuri, Matsuba, Ogon, Asagi, Shusui, etc.—are as exotic as the fish themselves. Mr. Ayres' booklet is well illustrated with black and white drawings and diagrams and the text deals with such subjects as Brief History of Koi, The Koi Pool, Pool Construction, Quality of Water, Filtration, Types of Koi, Feeding, Recommended Literature and Koi Societies—to mention but some. I would certainly recommend it to anyone interested in keeping these attractive fish. Members joining the Yorkshire Koi Society receive a copy of the booklet. Non-members may obtain a copy of the booklet for 58p, post free, from Mr. Ayres, at his home address. He is to be congratulated on turning out such a valuable little publication. Capable writers in other specialist societies could do well to consider producing something similar. The current subscription for membership of the Y.K.S. is £5.00. (When I first looked at the sum I thought it rather high; however, a quick calculation shows it to be about 10p per week—little more than the cost of posting a letter first class. Other societies with financial problems might consider asking their members to think about fees in the context of 5p-10p per week. Surely it's not too much to pay if a club or society is well run!)

Mr. Charles McNeill is 22 years old and lives at 15 Beechtree Terrace, Milton of Campsie, Stirlingshire, Scotland. He writes: ". . . At the moment I have two 4½ ft. and two 2 ft. tanks in my bedroom and a 3½ ft. tank in the living room. One of the largest tanks contains a breeding pair of orange chromides, a cheeky male convict cichlid for which I've been trying to find a mate for a year now, two medium tinfolys, a trio of jewel cichlids, a male *Tilapia maria* and a solitary 6 in. brown acara. The other 4½ ft. tank contains about 200 jewel cichlid fry which are now about ¼ in. long. The parents have spawned four times in the last month and are preparing for another brood. Unfortunately I don't have the space for any more and so the fry are usually fed to the other fish. One of the 2 ft. tanks contains a mixture of zebra danios and our own native minnows which co-exist splendidly, the minnows forming a shoal in the lower regions, and the zebras on the top. The tank is thickly planted with native *Myriophyllum* which incidentally, runs riot in my tropical tanks at about 78°F. It has a

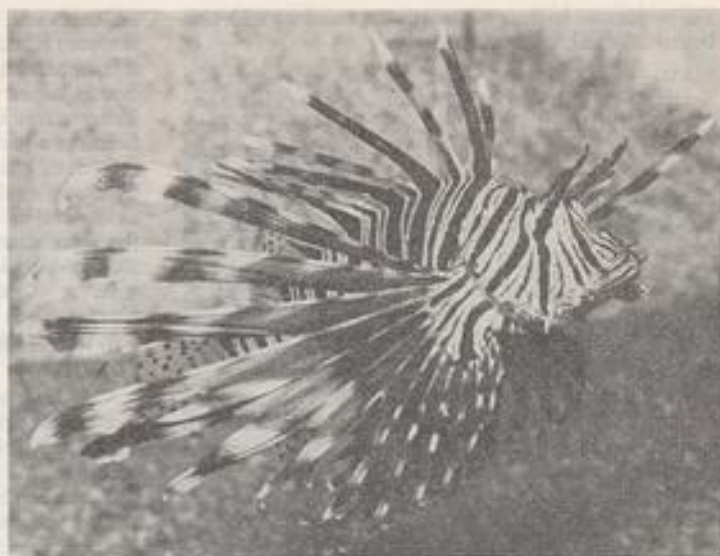
red stem and beautiful green feathery leaves. I have not seen it mentioned in any of the books. The other 2 ft. aquarium is used for spawning and at the moment houses a pair of rosy barbs. The 3½ ft. unit in the living room is a community tank lit by (a popular brand of aquarium lighting) which I find promotes the growth of blue/green algae; but I get rid of the algae by changing the tube for an ordinary warm white tube at the end of each month—which seems to inactivate the algae after about a week, and the original tube is then re-installed. Each of the 4½ ft. tanks is lit by a 4 ft. x 40 watt fluorescent tube, and the minnow/zebra tank is lit by two 40 watt bulbs. The other 2 ft. tank is lighted by two 15 watt bulbs as there is no plant growth.

"My fish are fed on flake foods, *Tubifex*, white worms and occasional *Daphnia* when I can be bothered to collect some; but the main food for all my fish is earthworms. They never seem to tire of them. All fish take earthworms with relish. The worms can be cut up, using a scalpel, to suit the tiniest of mouths; and for my larger fish I just throw in a handful of worms and watch them disappear. The tinfolys barbs, at about 4 in., have enormous appetites. I've seen them eating 20 medium sized worms at a sitting, for breakfast, and the same again for lunch and for supper. I dig my worms at the beginning of the week and when I've got about a pound in weight I put them in a glass dish and cover them with about 3 in. of top soil, slightly dampened. This way I find the worms stay alive for up to two weeks. Incidentally, I don't use filtration in any of my tanks: I merely scrape the front glass of each tank, each week, siphon off the mulm and fish waste, and replace the water with fresh water direct from the tap—unheated! This only drops the temperature a couple of degrees and I think it actually perks up the fish and acts as a tonic. I've not had any disease in my tanks for about five years now so I can't be doing all that much wrong. Finally, I wonder if readers could tell me the best way to grow *Cabomba*?"

For the March, 1976 edition please send me your opinions on the following: (a) What size is the smallest planted tank you keep and what does it house? (b) In which parts of your house and room(s) do you have your aquaria sited? Do any of your tanks receive direct sunlight? If so, how does it affect the tank and its contents? (c) Do you think aeration is essential in an "average" aquarium—if there is such a thing? If so, why? (d) Under what conditions are you able to cultivate the following plants: *Cabomba*; *Myriophyllum*; *Echinodorus*; *Ludwigia*; *Hygrophila* and *Acorus*? (e) What have your experiences been with the keeping and feeding of species of piranhas? (f) What is the rarest species of fish you keep, and how do you cater for its requirements? (g) For how many hours daily do you light your tanks? Good-bye until next month.

Pterois *volitans*

by H. G. B. Gilbert



SEVERAL SPECIES OF lionfish are imported and offered for sale in shops devoted to aquarists' needs, the commonest being *Pterois volitans*, sometimes called the turkey-fish or scorpion fish.

All are strikingly bizarre in appearance, with spectacular, barred bodies and enormously developed, spiny dorsal and pectoral fins, the latter being so expanded as to resemble wings. The hollow, spiny rays on the dorsal, ventral and anal fins are poisonous, particularly those on the dorsal fins. They are dangerous to handle and in aquaria should be kept safely beyond the reach of children. The venom is believed to persist after the death of the fish.

The pain resulting from penetration of these spines into the flesh is said to be intense and may last for as long as four weeks. Although no deaths have been reported from stings, fainting and shock have followed from the almost insupportable suffering. We have had no personal experience of this but understand that immersion of the affected parts in hot water, backed by an injection of novovaine brings relief.

Most species of lionfish are ovoviviparous, the eggs hatching within the body of the female and the young being born alive. Reports are extant of up to 6,000 young being produced by a single female at a time.

We obtained three specimens of *Pterois volitans* early last April, two were in excellent condition but the third was weakly and not expected to survive. It justified our expectations!

On arrival the two healthy fish were placed in a marine aquarium, five feet long by two feet high by fourteen inches deep, floored with a layer of coral

chippings and furnished with large pieces of stagshorn and brain coral, together with some seaweed. The aquarium was illuminated by overhead strip lighting and maintained at a temperature of 70°F. The coral was so arranged as to provide retiring places in case they were needed. In the event, although some books suggest they require such privacy, our fish showed little interest in these retreats and spent almost all their time in the open parts of the aquarium.

On arrival they were one inch in overall length, including the tail. Growth was amazingly rapid and by the end of a month one fish had attained three and a half inches and the other three inches. We felt they were well on the way to reaching the maximum length for the species of fourteen inches, and could achieve it within the eighteen months it normally takes for them to reach maturity. They were a warm, cream colour with vertical, dark brown bars traversing the body and bands of the same colour on the spines of the fins. The two long tentacles, one above each eye, are expected to virtually disappear with maturity.

Our lionfish have proved to be excellent aquarium inmates. They are most interesting and, by reason of their coloration and extravagant fin development, extremely attractive. Both fish invariably swim in the open areas of their aquarium, often remaining poised and stationary, sometimes with heads pointing downwards, for minutes at a time. This period of suspended animation suddenly comes to an abrupt end and the fish dart sharply through the water for a short distance, before "hanging" in splendid immobility once again.

Lionfish cannot be recommended as suitable inhabitants of a community tank as they will eat any fish small enough for them to swallow. They are not aggressive towards fish comparable in size to themselves and are unlikely to initiate an attack, but their habit of suddenly erecting their dorsal spines when startled can accidentally cause poisoning of some innocent fish in the neighbourhood. This apparently does not apply to members of their own species, as ours behave with the utmost placidity towards each other and neither has suffered from living together.

In their native habitat lionfish only eat living prey. They live mainly in deep water at the edges of reefs, often lurking in caves or under rocks, flashing forward as a small fish approaches and, with a sharp inhalation, drawing it into their capacious mouths.

From the beginning our fish fed voraciously on small living shrimps and frozen misa shrimps. Fully grown shrimps at this stage, were ignored and lived undisturbed by the lionfish. We have tended to give them mainly living food, including small surplus fish from the tropical tanks, but lionfish can be accustomed to seizing and eating dead food, such as prawn, earth-

worm and even fragments of beef, as it sinks slowly through the water. In time some will retrieve it from the bottom of the aquarium.

Initially, to teach them to accept it, dead food should be dropped as near the heads of the lionfish as possible. With patience, it is not difficult to persuade them to take morsels from the fingers, care being exercised of course to avoid contact with their spines. They are greedy fish and require ample food if they are to make steady growth towards maturity.

Pterois volitans occurs naturally in the Indo-Pacific region, including the Red Sea. Adults live principally on the coral reefs but young fish inhabit brackish lagoons and estuaries.

Other species which become available from time to time are the White-fin lionfish, *Pterois radiata*, perhaps the most beautiful of the species, with dark narrow bands crossing the reddish-brown body and pectoral rays, varying from pink to white, extending to the end of the tail and the Spot-fin lionfish, *Pterois antennata*, irregularly banded and with feathery tentacles surmounting the eyes. Both species have a maximum length of eight inches.

HERPETOLOGISTS AND THE LAW

by Andrew Allen

FOR THE first time, capture or purchase of certain reptile and amphibian species has passed into the realm of legal control. This departure from the old *laissez-faire* days pleases the conservationist, and should prove of benefit to the serious vivarium keeper.

Formerly controls were solely through minor local regulations. For example: earlier this year two sand lizard hunters were fined £20 each for poaching twenty four animals from the famed beauty spots of Frensham Common in Surrey. Waverley District Council brought the action under National Trust bye-laws. But such legal coverage was inadequate with respect to 'reserves' in general, let alone localities without formal status.

The situation has changed with recent passing of the Wild Creatures and Wild Plant Protection Bill, steered through parliament by Mr. Peter Hardy, and linking into the Washington Convention on international trade in endangered species. It is today illegal to collect Natterjack toad (*Bufo calamita*), Sand lizard (*Lacerta agilis*) or Smooth snake (*Cornella austriaca*) in the field, or to import them from abroad. Authorities are empowered to hold doubtful specimens at the entry point, at importer's expense, until they have been identified by a competent herpe-

tologist. Maximum penalties for each offender are £100 per species.

In a trade where profit margins are thin, amateurs not rich, such fines should prove an adequate deterrent—offenders are more probable among private enthusiasts poaching or smuggling than among dealers who must advertise to sell.

Hopefully the bill foreshadows a day when the entire world herpetofauna will be guarded beneath an umbrella of fluid and flexible controls. Catching and import of rare species would be prohibited, but only regulated for other animals (e.g. import of baby terrapins would be cut to prevent enormous sales in the high street pet store, but a quota of animals for serious hobbyists made available through authorised dealers).

All this bears the odious stench of self-multiplying bureaucracy. But some regulation is imperative if rare species are to be maintained for naturalist and vivarium keeper, and new rarities not generated. The new laws were overdue, but should now provide a backbone to our national conservation programmes. Intelligent voluntary restraint by vivarium enthusiast and dealer would prevent the necessity for further red tape to cover species like Crested newt, of further laws in a country already overburdened with law.



Mbuna as individuals

I would like to endorse a great deal of Bob Purdy's observations in his article on Lake Malawi Cichlids in the December issue, but must take issue on his rather sweeping statements that these Cichlids are amongst the most vicious found in aquariums today. There are Malawi Cichlids which present little problems in the community tank, but possibly Bob Purdy has had little experience of these. The aggressive nature of certain of the Malawi Cichlids does present problems, particularly as some dealers have little knowledge from which to advise prospective customers. We have found that these Cichlids are as individual as the human race, and that some are more pugnacious than others of the same genus. It must be borne in mind that most of these Cichlids are territorial in their habits and at breeding time prepare a selected area in which to entice a female when she is in a breeding state. During this period the male will chase off intruders. When there is only one specific pair of a particular type, and the female is not prepared to breed, a male in breeding mood can get irritated that his advances are not meeting with success and vent his anger on the unfortunate female, yet will pay little attention to fish of other genera providing they don't get too close to his selected breeding area which is generally a radius of 3 or 4 inches or so.

Bob Purdy feels that he has his 6 foot tank well stocked with seven pairs of Mbuna. It is felt that he could well double the number of inhabitants of his 70 gallon tank and enjoy a drop in the aggressive behaviour of his fish. We average seven pairs-plus in 30 gallon tanks which have plenty of rockery and vegetation, undergravel filtration aided by very strong airlifts, plus a bucket or so of water change each week. Great attention is paid to hygiene, and we have had no problems for years, and have been repaid with repeated progeny. We have had the odd rogue fish, but have quickly parted with him; there are always aquarists who like toughies.

Relating to *Pseudotropheus zebra*, which are indeed robust fish, Bob Purdy mentions the BB, B, OB and W variants. These observations are also made by Fryer in one of his latter publications but Neergaard, in his delightful and informative book entitled "Nyassa cichlids," and unfortunately only available in Danish, remarks that Fryer's observations were only based on a

stretch of Lake Malawi limited to the 60 kms between Nkarta and Ruarwe. Bearing in mind that Mbuna occupy rocky outcrops of the Lake which are few and far between, and are not inclined to venture far into the sandy areas which surround each outcrop, Neergaard feels that the development of these Mbuna has been taking place gradually over a very long period, and that the ultimate result has not yet been reached. In his survey of the entire Lake, he lists no less than 13 distinct variants which are not only identifiable by their coloration but by slight behaviour differences which have developed after very long periods of occupancy of isolated geographical locations.

However, I concur entirely with Bob Purdy in his remarks about interbreeding. Although variants may not interbreed in their natural habitat, some will under artificial aquarium conditions. When this occurs, my own feelings are similar to those of a possessor of a female *Canis familiaris* of known ancestry who accidentally allows it to stray when on heat.

DOUGLAS BOOKLESS,
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Bristol BS14 9DP.

Things to come?

I have just finished reading an article in the "Sun" newspaper. It was pointing out some of the dangers of natural wild animals being kept as pets, and what would happen if such animals were to get loose.

The article then went on to point out that, unlike a dog, wild animals need not have a licence and that this was all wrong.

At the bottom of this article an example was given which shocked and disgusted me. It was a red snakehead with the heading "Beware of the Fish." Who ever heard such ludicrous nonsense as a licence for keeping fish?

Other examples were of a more understandable nature, such as lions which could survive and even breed in our climate, but to mention a fish, even one as nasty as a snakehead, which could not survive out of water (even though they can survive in oxygen-deficient water) long enough to do any damage to anyone, and even if it were to be placed in a river the cold nights or an English winter would soon kill it.

I don't think that this species or any other species of fish should warrant the necessity of a licence.

G. PAYNE,
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Grove Hill,
Middlesbrough, Cleveland.

From the fountain head

I was a little concerned at what I read in the article entitled "The Affie O'semion Cousins" in the November *Aquarist and Pondkeeper*. Whilst it is enjoyable for me to read killifish articles in your

magazine it is not so enjoyable to find one as misleading as this.

The range of the *Roloffia* genus (which prior to 1966 was a group in the *Aphyosemion* genus) starts at Senegal and Guinea in the West of Africa spreads through the coastal countries and ceases at the Gold Coast area (now Ghana). The most westerly *Aphyosemion*s are found in Ghana and range 1,500 miles eastward and southward to the Gabon and Zaire. This is a much greater range than Mr. Simms suggests.

Aphyosemion animals live for as long as there is water to support them in their wild surroundings, six months more or less as the case may be, but it is well to note that all of them live for two years or more in aquarium conditions.

The fish that is illustrated as *Aphyosemion sjoestedti* is in fact *Roloffia occidentalis occidentalis*, the common name of which is the Golden Pheasant. There is also available *Roloffia occidentalis toddi*, the common name being the Blue Pheasant.

Since the Golden Pheasant is the only true annual *Aphyosemion* mentioned, the newcomer with only this article to go by would be stuck with Mr. Simms' tank space consuming method of raising offspring of his Annual *Aphyosemion*s. Mr. Simms is perfectly entitled to state his methods but should also recognise that there is a far easier method in general use by killifish fanciers. It's simply to do as he suggests up to the end of the two weeks spawning in the breeding tank with the adult pair of Golden Pheasant. Remove the fish back to their normal living quarters and collect the peat in the spawning tank, along with the eggs, with a net. Squeeze out the water by hand, the eggs can withstand the squeezing and place the peat, which has a moisture content perhaps slightly wetter than that of pipe tobacco, in a polythene bag and tie up the neck of the bag. Store for five months on a shelf in the fish house at about 75°F, in my experience with those fish, then place the peat in hatching tank with water (two day old soft tap water is what I use for all my fry hatching) at a depth of about 2 in. and after 24 hours the fry will be swimming in the tank. Obviously there are variations to both our methods but Mr. Simms is the only person I've read about who keeps two tanks bottled up for months waiting for eggs to be ready for hatching.

The fish that is labelled as *Aphyosemion coeruluum*, with a small alteration to the shape of the anal fin, has since 1966 been called *Aphyosemion sjoestedti*, the common name is the Blue Gularis. There is a dwarf red variety of this fish available.

The Blue Gularis is classed as a bottom spawner and what I call a semi-annual i.e. eggs can be water or dry incubated. If the eggs float in water as Mr. Simms says it would be defeating the object of the fish being a bottom spawner. He may have increased the specific gravity of the water he uses by the addition

of salt thus making the normal heavier than water killifish egg more buoyant. I know of three reasons why people use salt for killifish.

1) The fishes natural waters are saline. The Blue Gularis lives in soft fresh water but it gets progressively harder as dessication approaches.

2) Addition of salt to rain water to return some mineral body back to the water.

3) For the prevention of Oodinium (velvet) disease, for which it works extremely well.

What is labelled *Aphyosemion australe australe* should simply be *Aphyosemion australe*. From this wild found chocolate form, a tank bred variety has been derived and is known as the *Aphyosemion australe* (gold form).

What Mr. Simms calls *Aphyosemion calliurum ahli* has for the past four years been known as *Aphyosemion shuli*. Old names for this species are the Burundi-*Aphyosemion* and *Aphyosemion vexillifer*.

The correct useage of these names and the varieties of each species is important. Killifish organisations scientific bodies, concerned individuals etc., the whole world over accept these present day names. Study material received incorrectly labelled leads to considerable confusion later on. The beginner to the killifish would be utterly baffled by the variety of names some of these species are given. The sooner these out-moded names fall into disuse the better.

The July 1975 issue of the *Aquarist and Pondkeeper* gives a good account of annual killifish.

I hope Mr. Simms takes no offence at what I've said because none has been intended. My concern is just to rectify his errors that he is not aware of and to put the beginner onto the right lines before he gives up killifish keeping in disgust.

Mrs. ADDICOTT,

(Secretary)

Sevenside Group of the B.K.A.

A NOTE TO ALL SOCIETIES

THERE is in this country today a number of elderly competent, dedicated aquarists who have supplied knowledge to the hobbyists for very many years with constant electrifying enthusiasm to maintain the increasing interest in Ichthyology. Without such "Knights on their White Horses" the hobby would be stagnant or stultified. These people are not born, they are more of a creation for our benefit. I wonder how many of us really appreciate their patience? That is what it is all about, for there is no motorway in this hobby, no short cuts; it is the most fascinating and sometimes frustrating hobby of them all if we decide to dig into the bowels of all the fishy aspects. We owe them a lot, and cannot possibly repay them in full for their endeavours. I am aware of the self-satisfaction they achieve, but is it justice to let these

(Continued on page 583)

KEEPING & BREEDING GUPPIES

FIRST OF A SERIES OF ARTICLES

by J. C. Hutchings

(Editor of *The Fancy Guppy Association's Journal*)

The guppy is a fine little fish millions of which are imported into the United Kingdom, mainly from Singapore. The majority of aquarists are interested in the male guppy only, as it is usually much more colourful than the female. There is a dozen or so common broadtail colour strains imported including, the snakeskin which may be blue, red, green, or yellow; the half or three-quarter blacks with various coloured caudals; the blonds/reds; straight blues or green and the popular multicolours.

I wonder, when you see a tankful of good guppies, do you look beyond the brightly coloured fish swimming before you and marvel at the way that guppy breeders have developed their chosen fish to produce the gems we see today from a small somewhat insignificant wild fish. How many people know that there are other types of guppies besides the broadtails commonly sold?

In this series of articles I am going to set out some guidelines which the beginner can follow in his efforts to produce good guppies and develop a strain which he can call his own. In this first article I am going to outline the background of the guppy.

The guppy is a member of the group of fishes which produce their young alive, that is, they are viviparous. The male differs from males of the egg-laying group in that at puberty the anal fin becomes thickened and rod-like, forming the gonopodium. This is used to deposit spermatazoa into the vent of the female. It appears that the sperm have a long life as the female will produce three or even four broods from a single mating.

The female is identified by its "gravid spot." This is the clear area of skin showing the body cavity in

front of the anal fin. In this cavity the eggs develop until they form fry about 1cm. in length. Unlike mammals, the eggs are not attached to the mother and fed by her direct but contain a store of nutrients for the developing embryo. Although it is usual for the female to give birth every 28 days, the time period may vary from as short as 21 days to as long as 35 days. Indeed it is possible to control to a certain extent the gestation period.

As the fry develop in the mother she begins to swell and at 14 days it is possible to see the eyes of the fry through the gravid spot.

The young are born, usually tail first, over a period of a few hours. On delivery the fry falls to the bottom of the tank in a ball, and remains apparently helpless, for a few seconds. Unfortunately, in this short time some females will eat their young. This is especially so with a female dropping gold or albino fry and grey fry together; the female often eats the coloured fry. It may well be advisable to use a breeding trap which allows the fry to fall through into the rest of the tank. It is also important that the breeding trap is big enough to allow the female plenty of room to swim around and not feel confined. Confinement often causes problems at birth.

The fry are sufficiently large to take newly-hatched brine shrimp or fry powder immediately. Their capacity is, of course, very limited thus the ideal method of rearing them is to feed small amounts several times a day. The use of live foods will ensure a continuous supply of food through the day which does not go mouldy or cloud the water.

Good feeding and management should ensure rapid growth with the fry doubling in size in the first month.

As some fish will begin to exhibit signs of sexual development at this stage it is necessary to try and separate males and females. This is not an easy task for the novice to undertake but practice will enable a satisfactory rate of successful identification after a while. The object is to identify the gravid spot of the female. This can be done by putting each fish in a small glass container and holding it to a good light. If the gravid spot is obvious then the fish is placed into the female tank. Similarly, any males distinctly identified are placed in the male tank. Any fish which cannot be immediately identified must be put in the male tank to avoid any accidents. Guppies are very active and can easily jump out of a tank if the water level is within an inch of the top of the glass. For this reason if the tanks are in tiers on a stand the females should always be placed above the males and not below. Although the fish do not appear sexually mature at four weeks of age some may possibly mate successfully.

The colours usually start to appear at six to eight weeks of age and the fish will be nearly fully coloured at twelve weeks of age. It is difficult to suggest an age at which the fish is physically fully grown as temperature, feeding, etc., play such an important role in controlling the growth rate.

The wild guppy is a native of Central America and although the male displays many different colours and colour patterns it looks nothing like the big males seen in the aquatic shops. It has a small caudal which may exhibit various shapes and extensions.

The guppy, Latin name *Lebistes reticulatus*, was named after the Rev. Guppy who collected some

specimens whilst on a botanical trip to Trinidad in 1859. Probably the fish owes its popularity as a colourful fish to its ready adaptability to all conditions making it a very good fish for research. Over the last fifty years various research workers have used the guppy to study such topics as the influence of feeding and temperature on fish growth, fish genetics, growth inhibiting substances produced by fish, and hormone use in determining colour. The guppy's genetics are such that they exhibit various constant traits enabling planned experimentation to be carried out. Being hardy the guppy will stand up to the rigours of experiments and will also allow results to be found fairly rapidly as three or four generations can be bred in a year.

Guppy development has taken two forms. In Great Britain and Europe enthusiasts developed the caudal extensions exhibited by some wild guppies and the multicolours in the body to produce standard fish such as doubleswords, topswords, pintails, cofertails and original veils. In America the enthusiasts developed the various broadtails, with breeders such as Hanhal becoming world famous for strain of guppies and the fish have become extremely popular throughout the aquatic world. The latest trend seems to be an attempt to produce a male with an even-wider caudal and a coloured female.

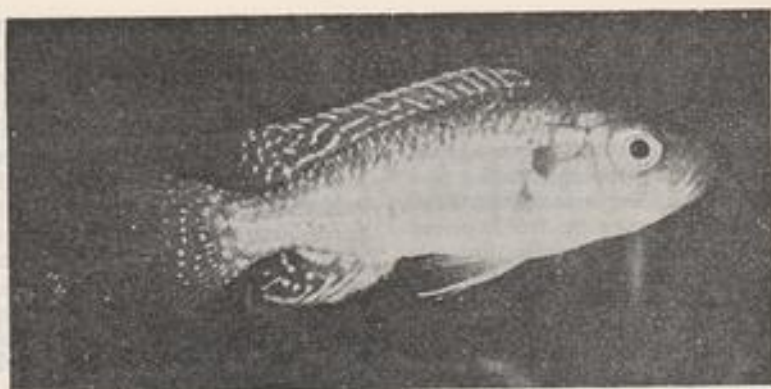
This then is a brief introduction to the world of the guppy and the guppy breeder and over the next few issues I will develop the topics I have mentioned in this article starting with the conditions influencing the guppy's development.

AQUA

I am Aqua, keeper of the waters
That are wafted by the winds;
I am the breeze that shakes
The willow trees
By the brook's edge;
I am the golden light that glints
On the silver sea at dawn;
I am the phantom that flits
On the pool's surface at noon;
I am the mist that drifts
In copper clouds at dusk;
I am the spirit of the waters
That ebb and flow
At my calling;
I am the noise of the rains
As they swell
The rushing midnight floods;
I am Aqua, keeper of the waters

And guardian of the gate, who stands
Where the trout jump,
And the salmon leap,
And the giant whales die.
My tears are the sea's pearls,
My sighs the ripples on the silent pond
When the sun and moon merge,
When the stars fade,
And the cycle slows,
And the waters dry up.
I am the drought and the flood
The three states of matter, that matter:
I am the ice,
The water,
The vapour.
I am Aqua, keeper of the waters,
Womb of all life.

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



THE FIRST OF THE MOUTHBROODERS

by Jorgen & Pamela Hansen

Pseudocrenilabrus multicolor won acceptance with aquarists almost 70 years ago, and was the first mouthbrooder known to European aquarists. Few, if any, aquarists at that time had an idea of what was to come in the way of colourful mouthbrooders, but despite the advent of these, *P. multicolor* has not lost in popularity.

The name of this little mouthbrooder has through the years undergone several changes. It was first described by Hilgendorf in 1903 under the name of *Haplochromis multicolor*, and has also been called *H. strigigena* and, *Hemihaplochromis multicolor*. It has now been classified by Professor Trewavas as belonging to the genus *Pseudocrenilabrus*.

The fish is stated to be spread over most of East Africa and is found in the following lakes and rivers: Victoria, Kioga, Edward, George, Albert, Nabugabo, Kijanebaldas, Mubasi, and the Kohi lakes, as well as in various areas of Tanganyika. It is also found in the Nile, hence the term "Egyptian mouthbrooder."

The female grows to 5 cm. (2 inches), and the male to 7 cm. If males and females are of equal size one can easily distinguish the females by their slightly plumper body-form. Both sexes have a black spot on the gill covering. The male's ventral fins have a light edge. Its anal fin has some pale blue and red colouring but no egg spots, as for example in *Haplo-*

chromis burtoni. When the fish spawn the male compresses the anal fin so that the red areas come together and form a red spot, slightly reminiscent of an egg spot. The dorsal fin is edged with black, and below this rim is a narrow band of light blue and red. In the male the rest of the dorsal fin is almost completely red. The basic body colouring is light brown, but most of the scales have a bluish-red shimmer at spawning time. With older males these colours are often permanent. The female is not so strongly coloured and the skin of the throat as a rule hangs down a little. The eyes are large in relation to the fish's size.

For a long period we kept up to 40 Egyptian mouth-brooders in a 100 litre's (25 gallon) tank. At the back half of the tank was a dense growth of *Vallisneria spiralis* and swordplants (*Echinodorus brevipedicellatus*) while large stones divided the front half into four sections, each of about 20 + 20 cm. Sword plant leaves hung over these areas to provide shade. The largest and strongest of the males each took over a territory, which they guarded with great ferocity without, however, any fish coming to harm. These males dug superficial hollows in their territories, but no plants were ever uprooted.

At the back of the tank dwelt the females and weak males. It was clear when a female was ready to spawn as she took on an increasingly rounded appearance and swam out to the front where the eager males would each try to lure her to their respective hollows. On such occasions the males generally followed a specific behavioural pattern, which can be divided into three stages:

- 1) He assumes an impressive posture, in which he turns on his side towards his potential love, and spreads out the fins, showing off his glowing colours. The whole body shimmers black, red, and pale blue.
- 2) He thereafter swims rapidly over to his hollow and displays his eagerness by an extra little dig.
- 3) He assumes the so-called S-posture, where the whole body forms an S, often interrupted by a jerky swimming movement, whereafter the S-posture is again assumed.

If the female, despite all this, does not show signs of interest, she is brutally chased away. If, however, she responds, he will perhaps repeat the ritual several times, and thus lure the female nearer; when they reach the hollow, the real spawning takes place.

Male and female circle slowly around each other, head towards each other's tail, at the same time taking turns in lying almost sideways. After some trial runs the eggs begin to come. The male appears to push at the female's belly with his snout, as she lies sideways; up to eight eggs are produced at a time. The egg diameter is about 2 mm. and the colour is pale yellow. As soon as the eggs are spawned the male swims slowly over them, and the female then collects

them up into her mouth. The eggs are thus apparently fertilised before collection by the female. This is to be regarded as an earlier stage of development than in the Mbuna group from lake Malawi, where the eggs are fertilised after being taken into the mouth. Spawning continues until the female, if large, has produced from 50-60 eggs. One would not think that there were room for so many eggs in her mouth, but when the skin of the throat is greatly extended there is in fact a lot of room. We have had females with so many eggs in the mouth that it could not close completely.

Females with eggs in the mouth always kept to the back half of the tank, where they hid in the dense vegetation. When we desired a large brood we caught a couple of females with eggs and placed them each in a tank of their own, filled with plants. It is seldom that the female spits out the eggs, but if it happens they can be hatched artificially.

13-16 days, according to the prevailing temperature, will pass before the fry are released, and during this period the female does not eat, but performs chewing movements as if to turn or clean the eggs. Six days after spawning you can see the eye pigment of the embryos as small dark spots through the skin of the mother's throat. As a result of the long enforced fast the female is quite emaciated by the time the young are released, and so thin that one can clearly see the inward curve of the belly. When she feels the time is right and the surroundings acceptable, she releases the young. If she does not like the surroundings e.g. a completely bare strongly lighted tank, she will eat the young instead.

In the beginning the fry are allowed only in the mother's immediate vicinity. If one ventures further afield it is taken into the mouth, where it spends some time in house arrest before being allowed out again. At the slightest sign of danger or disturbance, the fry are immediately engulfed again. As with most other mouthbrooders the mother on such occasions backs obliquely upwards in the water, and the young then swim towards the black points on her head: eyes, gills, and mouth.

The mother stops looking after the young after a few days or so, and she can then be removed, preferably to a tank of her own for reconditioning. The fry can be fed from the beginning with micro-worms, Cyclops, and *Artemia*. It can be difficult to feed up a brood of *P. multicolor* into large well-grown individuals. A weekly change of half the water and a varied diet of, for example, Cyclops, *Daphnia*, mosquito-larvae, and dried *tubifex* are advisable.

These fish mature from the age of three months, and spawning often takes place in the "feeding-up" tank. There are generally several females with eggs in the mouth at one particular time, but with up to 150 growing fish in the tank, these fry when released are quickly devoured.



OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE

All queries MUST be accompanied by a stamped addressed envelope.

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

TROPICAL QUERIES

by Jack Hems

Please find enclosed a sketch and description of a tropical fish I bought under the name of Indian tiger fish. Can you tell me its scientific name and general requirements and behaviour in the aquarium?

Your sketch helped me enormously to identify your fish. It is *Datnioides quadrifasciatus* which is distributed over large areas of India, Thailand, Burma and thereabouts. It reaches quite a size in the aquarium and at least 15 in. in the natural state. It can, and will, make a meal from fishes much smaller than itself but is not, strictly speaking, a pugnacious or dangerous fish to have around. Put in another way, it may be kept with other species of about its own build and size. It flourishes well on the bulkier live foods, unwanted young livebearers, and meat. A temperature in the middle to upper seventies (°F) suits it well.

I have two *Pangasius* catfish which have hardly increased in size since I bought them several weeks ago. What do you think is wrong with them?

Catfishes of the genus *Pangasius* often make a slow start. Just keep supplying them with plenty of whiteworms, well-washed tubifex and other live foods and I feel certain you will see a marked increase in their size before long.

I have some large pieces of used 3/8 in. window glass. Do you think it would be safe to use this used glass for glazing angle-iron frames no larger than 24 in. by 15 in. by 12 in?

Provided your glass is not many years old and is not deeply scratched, then it should stand water pressure without cracking in the regular two-foot frames.

What is the difference between *Haplochromis multicolor* and *Hemihaplochromis multicolor*?

Hemihaplochromis multicolor is the up-dated formal name of the ordinary Egyptian mouthbreeder (brooder). All the same, some writers still prefer to use the old name of *Haplochromis multicolor*. In very old books,

you will find the fish described as *Haplochromis strigigena*.

I have an under-gravel filter which I installed several months ago. I was under the impression that this type of filter removed all sediment from the aquarium. Now, however, a cloud of mud arises whenever I disturb the compost with my planting sticks. Please can you give me a reason for all this dirt?

An under-gravel filter does not clear sediment right out of the aquarium. It sucks it into the compost and there renders it harmless by bacterial action. After several months, however, a gentle stirring of the compost followed by siphoning is advised. This action will result in the removal of a great deal of the harmless but unwanted silt.

Should the peat used for storing the eggs of killifishes be dripping wet or dry? Furthermore, should the peat be kept at the same temperature as the water in which the eggs were laid?

The peat should be kept really moist but not, as you put it, dripping wet. A temperature about the same as that of the spawning tank is advised.

Kindly give me the temperature requirements, preferred food and maximum length of *Misgurnus fossilis*.

M. fossilis attains a length of about a foot. It will eat all sorts of worms, pieces of raw red meat, narrow strips of raw cod, fresh haddock, and the like, and is quite comfortable at ordinary room temperature.

Would it be all right to introduce a pair of Siamese fighting fish into my community tank?

I do not advise it. The moment the fish think about raising a family, if not before, the male will turn spiteful towards his mate and the other fishes. The small and timid ones will have a rough time.

Is it true that peat softens as well as acidifies water?

Aquarium water passed repeatedly through peat

(the right sort of peat is sold by reputable dealers) will result in a low pH value and fewer dissolved minerals in the water. For all that, do not expect a really soft water if you live in a markedly hard water area. If you do live in such an area, then add small quantities of distilled water or clean rain water to your aquarium every so often followed by a check of the DH with a water hardness testing kit.

Do you think it would be a good plan to fix my air pump outside the window in order to reduce the level of noise and, at the same time, fill my aquarium with purer air?

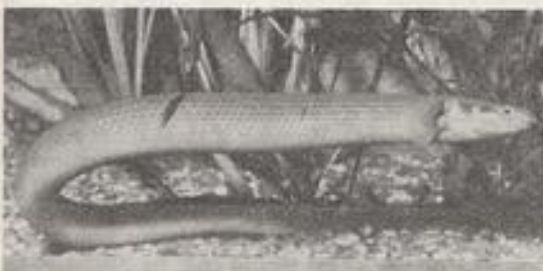
The plan is quite a good one provided you bear in mind that during freezing weather the air pumped into your aquarium water will be very cold. Also, there is no guarantee that the air sucked into the pump will be so very much purer than the air indoors. Then again, you will have to protect the pump itself against extremes of weather. Excessive sunlight or excessive cold or too much wet will not do a pump much good. That is an ordinary aquarium pump.

I have been informed by two dealers that plants are easy to grow. I have never had any success with the plants I have bought. Do you think dealers reiterate this story just to sell the plants they hold in stock?

Reputable dealers do not tell stupid lies. If you have not been successful with plants, then all I can say is that you have gone wrong somewhere along the line. In all probability, you have not given the plants enough light or have chosen the wrong plants for your aquarium.

My oscar has developed holes in its head. Can you suggest a treatment that will clear up this trouble?

A drug called Hexa-Ex is obtainable from some specialist aquarium dealers. It has proved efficacious in the treatment of this nasty disease. If you cannot obtain Hexa-Ex locally, let me know and I will send you the name of a dealer who stocks it.



Calamoichthys calabaricus

I have bought a fish which looks like a young snake and which swims languidly in all levels of the water. It is coloured greenish olive with lighter underparts, has no ventral fins and seems

inoffensive. Can you identify this fish for me and tell me its general requirements?

I think the fish you have is *Calamoichthys calabaricus* from West Africa. In the wild state it reaches about 3 ft. It flourishes well at the regular range of temperature (for tropical freshwater fishes) and eats all the usual live foods, meat, and other flesh foods. It does best on its own or with inoffensive fishes that will not worry it.

I am about to buy an aquarium and take up fishkeeping. Therefore I should appreciate some hints and tips on furnishing the tank and stocking it with fish.

I strongly recommend that you obtain a copy of *A Beginner's Guide to Fishkeeping* which we will be pleased to send you for 18p post paid. This booklet will give you all the information necessary to set up and stock a coldwater or tropical freshwater aquarium.

I have planted my tropical aquarium with plants of the genera *Acorus*, *Cryptocoryne* and *Echinodorus*. All have deteriorated within a few months except the species of *Cryptocoryne*. Can you offer any explanation?

I suspect the trouble stems from inadequate light. Apart from plants of the genus *Cryptocoryne* which, in general, do not demand a great deal of light, the other plants mentioned do. Furthermore, the rush (*Acorus*) is not long-lasting when anchored in deep warm water. It flourishes best in very shallow water under a good top light and not too high a temperature.

I have a large piece of dark green basalt rock. Would this be safe to use as a decorative feature in my tropical aquarium?

Basalt has little or no effect on the pH or DH of water. Moreover, it does not dissolve out any toxic properties. Therefore, in a word, it is quite suited to decorating the aquarium.

I have some flame fish of both sexes. That is I have some rather small and laterally compressed ones and some slightly larger and heavier bodied ones. Do you think they will breed if I feed them up and raise the temperature to about 80°F (26°C)?

The flame fish is quite easy to spawn in any tank holding more than a gallon or two of clear and fairly new water. Yes, feed the fish well on live food and tiny pieces of raw red meat and when they are showing brighter colours and increased interest in one another introduce them into the tank set aside for spawning last thing at night. Cram the ends of the tank with plant life such as milfoil, hornwort or Indian fern. There should be a grand chase and plenty of eggs scattered among the plants. Remove the parent fish as soon as spawning is over. The eggs incubate and the fry are free-swimming within the space of a week. Give the tank a good light and feed the tiny fry on a proprietary fry food or freshly cultured infusorians.

GOLDWATER QUERIES

by Arthur Boarder

I have a tank, 40 × 12 × 15 inches and would like to know how many fishes I can keep in it? Also I have bought some Sun Bass, Bitterling and Medakas and wish to know how large they grow and how to feed them?

Your tank will hold approximately 20 inches of body length of fish. The size to which your Sun Bass will grow depends on the species. The Pygmy Sun Bass, *Elassoma evergladei*, will reach about 5 cm., but the larger species can reach 30 cm. A popular one, the Peacock-eyed Bass, *Centrarchus macropterus*, can attain a length of 18 cm., but is not likely to reach that size in a tank. The Bitterling, *Rhodeus sericeus*, will reach a length of about 8 cm., and is a nice fish for the tank. This species was formerly only found on the Continent but has been introduced to several waters in this country and appears to breed well in them.

The Medaka is sometimes known as the Japanese Ricefish and its Latin name is, *Oryzias latipes*. It is a small fish of about 4 cm., and very suitable for the tank. However you have been sold fishes which do not mix and I am surprised that the dealer did not warn you about the danger of keeping Sun Bass with smaller fishes. The Sun Bass are mostly from North America and are carnivorous fishes, eating any fish small enough to get into their mouths. In feeding habits they resemble our native Perch, *Perca fluviatilis*, and so you are asking for trouble in trying to keep the Bass with your smaller fishes. If you are not already too late to save the smaller ones, you can fit a partition into your tank to keep the Sun Bass by themselves. Get a sheet of glass slightly narrower than your tank and with small strips of split rubber tubing, fix the partition about a third of the length of the tank to keep the Sun Bass away from the other two species.

The Bass may only eat live foods, such as garden worms, maggots, white worms, etc., but strips of raw meat and fish may also be taken. Some have been educated to take flake foods if introduced gradually mixed with chopped worms. The Medakas and Bitterling will eat most foods as taken by goldfish as they are omnivorous.

I have a tank, 24 × 12 × 12 in., in which I keep eight large goldfish, some about six inches long. I have been cleaning out the tank every week and washing the gravel. To save work I have now fitted a filter but I find that the water does not remain as sparkingly clear as when I changed it every week. What can I do to cut down the chore?

You have been giving yourself a lot of unnecessary work and also have tried to keep too many or too large fish in your tank. It also appears that you have had no growing water plants in the tank. Your tank should only hold twelve inches of body length of fish and so you appear to have been over-stocked and only by the constant changing of all the water every week have you been able to keep the fish alive. If your tank is set up properly with base compost, water plants and the suitable number and size of fish, then it could remain for very many years without having to empty it completely or change the plants. All that is necessary is to give the tank a weekly servicing, which should not take more than half an hour. First clean the inside of the front glass only, with a razor blade on a holder. Then siphon out most of the mulm from the front half of the tank. Prune any water plants which have become too rampant and replace the water thrown away with fresh, poured from a water-can fitted with a fine rose. You will find that up to a third of the water is removed at this cleaning and if this is carried out weekly and the fish are not over-fed, the tank could function quite well for the next twenty years or so.

I have a tank, 24 × 12 × 12 in., and wish to set it up for coldwater fishes, other than any variety of goldfish. Which fishes do you recommend? Also which plants shall I use and is it possible to place any substance under the gravel to provide some nourishment for the plants?

You can have twelve inches of body length of fish in your tank and stock with Minnows, *Phoxinus phoxinus*, Bitterling, *Rhodeus sericeus*, or and Medakas, *Oryzias latipes*. These fishes will remain fairly small, especially the last named. If you would like to try some other coldwater fishes you could use small Tench, *Tinca tinca*, either green or the golden variety. Rudd, *Scardinius erythrophthalmus*, either the silver or the golden variety. However if these fishes are used you may find that in a year or two they have grown too large for your tank and may have to be exchanged for smaller specimens. It is possible to place some potting compost under the gravel in your tank as food for your plants. This should only be placed at the back half of the tank where it can be well covered with gravel. This gravel should slope down from about three inches deep at the back to the level of the top of the front base frame. This ensures that most of the waste matter from the fish will move to the front of the tank where it can be siphoned out easily. For plants

you have a good choice, but I do not think that there is any advantage in trying to grow too many species together. Some may not thrive whilst others can choke out the weaker growing ones. You can use some *Vallisneria spiralis*, Hornwort, *Ceratophyllum demersum*, or *Lagarosiphon major*, and *Hygrophila polysperma*. With just three kinds of plants it is possible to furnish a tank such as yours very attractively and such plants will last for many years, needing only occasional pruning. I have set up tanks with such plants which have lasted seventeen years without having to make any changings or removals. I have a small tank before me now which has some plants of *Vallisneria spiralis* and they are from plants I used in another tank nearly thirty years ago.

I have a coldwater tank which I cannot keep in good order. There is a lot of bluey-green Algae all over the bottom of the tank and on rocks and plants. Also the water smells badly. I give the tank a weekly clean up but it soon goes back to the bad condition of before. What is the reason?

I suspect that your trouble is caused by over-feeding. This is the usual cause of smelly water and abnormal growth of Algae, especially the bluey type. However it is not possible for me to diagnose your trouble correctly with the information you have given me. I do not know the size of your tank nor the type and sizes of the fishes in it. Neither do I know on which food you have been feeding the fish nor how often or how much. If only enquirers would give me some information on these points it would not only make my task easier but it might ensure that I was able to give the correct answers to the problems. I suggest that you check up on the size and number of fish you have in the tank and make sure that you have no more than an inch of body length of fish for each 24 square inches of surface area of water. Then clean the tank of as much of the Algae as possible and then do not feed the fish at all for at least a fortnight. More tanks are upset by over-feeding than from any other cause. It is surprising how little food will keep a number of goldfish healthy. Still I know that many people just cannot resist feeding their fish every time they go near the tank, no matter if the fish are hungry or not. You will find that after a fortnight your tank will be nice and clear and then you can keep it this way by feeding very little, especially whilst the water may be cool.

I am enquiring about the breeding of goldfish and would like to know what temperature of the water they need. I breed tropicals but would like to breed goldfish as I have plenty of tanks in an outhouse.

I do not think that the temperature of the water for breeding goldfish is very important. I have found that they will spawn at temperatures as far apart as

50°F, to 78°F. Over many years experience I have found that there have been more spawnings at 61°F, than any other range. I am sure that the more important factor is the condition of the water. It must be well oxygenated and this seems to bring on the fish to a spawning condition more surely than the temperature of the water. I have proved this on more than one occasion by removing some of the warm water in a pond and running in very cold water straight from the tap. This has, on many occasions, encouraged the fish to spawn when they have been very reluctant to do so. I have come to the conclusion that unless the water is pure and is well oxygenated the fish are unlikely to spawn. You appear to have no pond in which to spawn your fish and so the numerous tanks will come in very handy as it is not possible to rear many fish unless they can be spread out to grow on once they are a month or two old.

Set up a tank, about 24 x 12 x 12 inch, with some fine leaved water plants. Hornwort is a very good plant for this purpose as it has many fine leaves to make a good receptacle for the eggs. Pick out a plump female fish and one or two active males. If the male fish show the prominent white tubercles on their gill plates it will indicate that they are in breeding condition. Place the fish in the tank overnight and provide some aeration. The idea of this is to ensure that the water remains well oxygenated as it is necessary to realise that if the tank is well planted, then oxygen is not given off by the plants at night and so the fish could die instead of breed if the oxygen content became dangerously low. Although I have recommended to use two males, this is not essential as one male could fertilise the eggs laid by many females, but the two males will ensure that the chasing is vigorous to encourage the female to lay.

I have a small pond in the garden and am not able to keep the water clean. How often should the pond be cleaned out and when?

I consider that any small pond requires cleaning out once a year and it is best done in late autumn or early winter when any leaves from surrounding trees or shrubs have fallen. The state of the water in a small pond can be influenced strongly by the way the fishes are fed. Too much dried foods will tend to pollute the water. Fishes in a pond do not need feeding as often as those in a tank as there is usually plenty of soft vegetation, etc., on which the fishes can feed. If a small pond is cleaned out at the time stated it is probable that the water will remain clear all through the winter especially if the fishes are not fed at all. Many pondkeepers go wrong by continuing to feed their pond fishes once the temperature of the water has dropped considerably at the approach of winter. The fishes are then very sluggish and need little if any food.

VIEWPOINT

by A. Jenno

SINCE my outside fish-house became operational most of my aquatic activities have been devoted to breeding livebearers in reasonable quantities. The results and experiences are interesting and may be useful to others attempting to establish a similar facility. It is unlikely that anything has been done or has occurred which has not happened previously elsewhere, so there is nothing to get wildly excited about, but the steady accumulation of small bits of knowledge and the apparent proof or otherwise of theories tried out is beneficial, and in the end will lead to a more complete understanding of the subject.

The fish-house was initially fitted out with aquaria of all kinds and sizes, mostly obtained secondhand, and anything available was used. This led to a great complication of electrical wiring, air supply tubing, stand space, etc., and of course also did not make for a very efficient breeding system. Most of the tanks were too small for growing-up quantities of baby livebearers in reasonably short times, and several were of the wrong proportions, having been originally intended for use as decorative aquaria. These were the popular 24 in. \times 15 in. \times 12 in. and 36 in. \times 15 in. \times 12 in. sizes, which look very nice when set up in someone's lounge with successful plant growth and a few fishes, but which can be very inefficient in a fish-house because they do not provide the best surface areas and tend to waste valuable space. The smaller popular sizes are useful in some respects, but generally again waste space in a breeding facility. Experiences so far show that the common livebearers, i.e., Guppies, Platies, Mollies and Swordtails, all grow better and faster in very much larger containers and especially when greater surface areas are present.

In view of this then I am currently re-equipping with growing-on aquaria which are 54 in. long, 18 in. wide, and 12 in. deep, of all-glass construction. These dimensions are the largest which can be installed on the existing three-tier stands, but have also turned out to be rather economical in that they can be quite safely made with a $\frac{1}{4}$ in. thick base and $\frac{1}{4}$ in. sides if a central bracing strap is put across at the top. Any aquarium made in $\frac{1}{4}$ in. glass completely is nowadays very expensive, so these are a good buy. Each is set up with a three inch gravel bed laid over three 17 in. \times 11 in. undergravel filters to give a biological system covering a base area of about

36 in. \times 18 in., and the remaining bottom section is left bare for feeding and siphoning (Viewpoint—June, 1974). Results to date are very encouraging. I have not yet arrived at a figure for the maximum possible population, but these tanks will certainly manage two hundred fishes easily. The previous largest available surface areas, with the exception of one 72 in. \times 18 in. tank, were 48 in. \times 15 in. and 48 in. \times 12 in., and were not bad, but the new ones are a definite improvement. It may be that when we assume fish densities in an aquarium in terms of so many fish-inches per unit of surface area we are not really describing the whole picture, because if this were entirely the case then tank size would be unimportant and we could keep as many fishes in an equivalent area made up of numerous small containers. As it is, the fact that each fish in a large tank has a comparatively enormous water volume to move around in, even though shared with many other fishes, seems to be a great advantage. Fishes which are under the average size, or way down the "pecking order" for some other reason, can move well away from a temporary bullying and the whole population is less nervous than when kept in smaller aquaria. In my case Platies are always the most jittery of the livebearers so the bigger tanks have given them much more confidence. Feeding is easier, the electricity and air supply connections are less complicated, and maintenance is more straightforward. The all-glass/silicone rubber construction should mean that the aquaria last practically forever without repairs.

The 72 in. tank mentioned above is 24 in. deep and 18 in. wide. It is used exclusively for Guppies, again with a biological filter as the main cleansing system. In such a large volume (approx. 100 galls.), the fishes grow at a tremendous rate with good feeding and as they do not eat many of their young a proportion of those raised up will have been born in there. The added depth may help the Guppies to develop good-sized bodies and fins, although this is by no means proven.

The other adult livebearers, particularly Swordtails which eat all or most of their young if they can, are now kept in the aquaria with the nylon mesh dividers (Viewpoint—September, 1975). The fry are left in the empty end of these for a few days after birth and can then be transferred to one of the large tanks for growing up. Thus they only suffer

one move during their early life. Usually there are enough fry available to populate the large environment all at once so that there are no subsequent disturbances. Inevitably some grow faster than others, but once these reach a saleable size they are removed and the remainder then benefit from less crowding.

Maintenance in large tanks is fairly easy. In a properly insulated fish-house one 100 watt heater is more than adequate. Nowadays I use the combined heater-thermostat units to save making additional wiring connections. The three filter lift-tubes provide plenty of oxygenation and water movement and allow a simple piping layout. The room is still generally illuminated by a central five-foot fluorescent fixture so individual tank lighting is not needed where there is no plant growth. Water changing is carried out weekly, usually the removal and replacement of about 10 per cent with fresh straight from the cold tap. Following the disposal of a batch of fishes completely the tank is drained and refilled, but the biological filter is not disturbed unless it has accumulated a lot of dirt (always due to overfeeding on my part) in which event the gravel is thoroughly stirred up while the water is draining out. Over the last twelve months many hundreds of livebearers have passed through this system and very similar ones and, barring the few inevitable exceptions, have made nice healthy colourful fishes. Not necessarily show-winners, of course, as there is no intensive selective breeding nor any desire to achieve quite that standard.

With regard to future breeding stock, a good method is to grow up all one's own females and then to bring in new blood via unrelated males for each female used. This prevents inbreeding and its sometimes disastrous results. While the males of most species are the more colourful, the females tend to be the most delicate, so it makes sense to use females of assured condition which have not been shuffled about, and to take any unavoidable risks on the male side of the pairing.

Mr. Phillip S. Clark's letter in the November issue was really good, and right to the point. I always read the letter page first and enjoy such well-aimed missiles. I agree completely with his complaints and know many others who have expressed the same opinions. The point of it all is that under this system show organisers no longer have to provide aquaria for all the entries, nor staging to put them on. When used at annual shows all these had to be stored through the rest of the year, and in the days of puttied aquaria a big repairing session was always needed before the show. By a clever move then (i.e., having entries built into club stands), much labour has been saved, or transferred, and the whole

event is very much easier to put on. The main complaint comes from people who wish to compare the prize winners in a class with each other and find themselves playing Hunt-the-Thimble to do so. Try it on the Sunday afternoon at Belle Vue with your wife and two children following. A wonderful exercise in indoor geography and domestic relationships. I wonder how often the judges get lost on the way round and what their opinions are. At any rate this configuration is probably too firmly entrenched now for anything to be done about it, so we shall have to lump it, or stay away until the organisers consider the wishes of the visiting public.

I have just tried out (November) Matlock Waterlife Centre's new "Rail-a-Marine" service. From my own experience, I would thoroughly recommend the service to other aquarists. My selection of invertebrates, fish and "living rock" all arrived safely and in excellent condition, and settled into the aquarium as easily as do other specimens obtained elsewhere. The system is as follows: after receipt of an order, the customer will be contacted by telephone and informed of the date and time when the consignment will arrive at his nearest railway station. He is then expected to collect it as soon after its arrival as possible, the box being marked "to be called for" together with the appropriate name, address and telephone number(s). Orders are dealt with within seven to ten days, with despatch by B.R. Parcels Express, and all stock is guaranteed to be alive on arrival and to have been quarantined for a minimum of five days beforehand. Handling and unpacking advice is given and there is a procedure for making a dead-on-arrival claim should this occur. Mr. John Tarbatt, who is organising the service, tells me that so far he has sent out many orders to all parts of the country and has not yet had one claim for loss.

The packaging around my small collection was very adequate. Aquarists may be interested in a list I made as it was sorted out. The outer was a strong, white cardboard box which was clearly labelled and also marked with cautionary instructions for the railway staffs' attention. Inside was a half-inch polystyrene lining, a newspaper lining, and a large thick plastic bag. Inside this the specimens were individually packed in doubled plastic bags and surrounded by crumpled newspaper. The living rock came in trebled bags with additional heavy-plastic reinforcements. Water temperature on opening in my fish-house, about 20 minutes after the train came in, was 71°F. All the water (six bags) was sampled for nitrite-testing and all gave results which were colourless, i.e., on the test kit in use this represents a value of less than 0.1 milligrams per litre.

The service obviously recommends itself to aquarists living away from a decent source of marine specimens of where a local shop does not have much variety. The current list (November again), shows 135 varieties and adds that other unlisted species are also available in small quantities. A standard charge of £2.50 is made for packing, transport and telephone calls and there is a minimum order charge of £10 which is exclusive of the administrative charge. Aquarists using the service will obviously need to be near a telephone and able to meet the train carrying their delivery, or at least able to get there shortly afterwards. The full address is Matlock Waterlife

Centre, Nottingham Road, Tansley, Matlock, Derbyshire. Telephone Matlock 4221 or 4699. I was able to visit there on a day out last summer and can assure readers that the fish stocks were being kept in really good conditions in large, well-lit aquaria. It was very impressive. The sales staff present on that day were most helpful, considering I only bought some brine shrimp eggs, and ice cream for the children, and I would recommend anyone who is in the area to go in for a look around. There is also an interesting small public aquarium at Matlock Bath just down road in the gorge, as well as other things to do in the area, so a whole day is not wasted.



THE POWER AQUARIUM

The Power Equipment Company Limited of Kingsbury, London announces additions to their Showdome range of display aids and furnishings, designed by Peter Wells, F.I.E.D.

Amongst the new units is the Powquip Aquarium, which should delight the discriminating aquarist. It

consists of two attractively shaped clear domes joined together by a stainless steel trim and mounted horizontally on a bright plated pedestal with a cruciform base with hard rubber feet. The 22 in. spread of the base ensures stability.

The Powquip Aquarium has a capacity of 5 gallons (22.7 litres). All angle viewing is possible, including novel views from below (fish-eye views?) not normally possible with conventional aquaria.

For further information please contact:—The Power Equipment Company Limited, Kingsbury Works, Kingsbury Road, London NW9 8UU. Tel: 01-205-0033/36. Telex: 922871.

UNO EARTHED TYPE HEATERS

receive approval from H.M. Factory Inspectorate

Mr. Conrad Ellson of UNO Aquatic Products has advised us that they have received approval from H.M. Factory Inspectorate (Health and Safety at Work Executive) for their Earthed Type Heaters to be used for industrial applications, particularly in plating.

A report from H.M. Factory Inspectorate quotes:—"the use of the spirally wound earth conductor should be quite effective in cutting off the supply in the case of a broken envelope (particularly in plating of course) and I would see no objection to the use of this method of protection."

Mr. Ellson confirms that H.M. Electrical Inspector of Factories is absolutely correct in his assessment of their earthed heaters and thermostats range, and also that Greater London Council have recommended them for use in schools.

We are pleased to point out that this safer type of heater/thermostat is patented (No. 1373093).

Supplies are available from most Wholesale stockists of UNO Products.

Further information and illustrated brochure direct from UNO Aquatic Products, UNO House, Arnold Street, Nantwich, Cheshire.

PRODUCT REVIEW

The Interpet C.V. Sub-gravel Filter

Aquarists who fully appreciate the principles of biological filtration will recognise that the introduction of this new under-gravel system is a definite step forward in the field of aquarium technology. The C.V. filter is the result of serious development work and reflects a thorough understanding of the needs of such equipment on the part of the designers. The letters "C.V." stand for "constant velocity," this designation being given to indicate that the design of the under-gravel plate is such that in optimum conditions, i.e., equal bed depth over the filtered area and equal grain size throughout the bed, the water is expected to flow through at the same rate at all distances from the lift tube position. This being the case, then obviously the efficiency and nitrifying potential of the biological function should be the same everywhere in the bed. An unusually large diameter lift tube is provided to allow a greater water circulation rate than is common with this type of filter. All in all a very significant improvement which should really benefit those aquarists who will use it at its full potential.

In order to achieve the constant velocity the filter-plate is wedge-shaped. It is a white plastic sheet moulded in such a way that one end stands approximately twice as high above the aquarium floor as the other, thus giving a tapered profile along its length so that the working surface does not lie parallel with the aquarium floor. In other filters where the plate is parallel, the resulting effect is that the water flow rates through a bed of constant depth and particle size are greater near the lift mechanism and reduce with distance away from it. The C.V. construction is designed to eliminate this disadvantage and so in this case the suction value of the lift mechanism will have an increasing effect as the height of the filter plate above the aquarium floor reduces. Hence a more linear action should be obtained along the filter-plate length. Whether this is actually constant will depend on how the aquarist arranges the bed material, but under the optimum conditions given above it should be much nearer the ideal that would be the case with a parallel filter-plate.

A second novel innovation in the design of this filter is that the usual slotted perforations of the plate area are not used. Instead, large round holes are moulded in the plate and their inside edges are turned down to touch the aquarium floor. These internal walls then have small arches formed round their perimeters so that the water flow through the plate turns through a right angle in the hole area to enter

the undergravel space horizontally. This clever construction enables the whole filter-plate to be held at the correct height above the aquarium floor by these numerous supports and so it will not sag under the weight of the bed or of rocks placed upon it. Thus the constant velocity profile is maintained even under load.

Two sockets are provided for the lift tube, to allow corner installation at either end of the aquarium where two filters are fitted, or to permit two lifts to be used on one plate where a really large water circulation rate is required. A blanking plate is supplied for the unused socket. The sockets have a bayonet fitting to ensure stable positioning of the lift tubes and the top end of each tube has a splash deflector to return the output water horizontally. Air is fed into the base of the lift mechanism by standard air tubing and is spread around an internal circumferential ring to give good mixing with the water. Interpet state that the large lift tube diameter makes a circulation rate of 100 gallons per hour possible. This naturally assumes the use of an air supply of sufficient capacity to work the filter at such a high rate. Two or more filters can be joined to cover non-standard base areas by cutting along a line of hole centres and then butting the pieces together. Sizes supplied have 23 in. x 11 in. and 17 in. x 11 in. plate areas. They can be reduced in size by similar cutting. The lift tube length provided is suited to aquaria 18 in. deep. It can be cut off easily for shallower containers or added to by available extensions for deeper ones.

As a test, two 23 in. x 11 in. units were installed in a new marine aquarium in my fish-house. The tank size is 48 in. x 15 in. x 20 in. deep. No alterations or additions were made to the filters; they were fitted exactly as supplied and were provided with the total output of a Rena 301R air pump, shared equally between them. A parallel three-inch layer of coral sand was laid over the filters and the various dead coral pieces and ornamental rocks were arranged on top of this. Now Interpet state in their advertising literature that the filters are suitable for use with "even quite fine sand," and advance an analogy derived between the arched perforations at the bottom of the holes in the filter-plate and the sand, and the ability of boulders to block a cave mouth without filling the cave (by supporting each other across the entrance). Unfortunately this did not occur in my aquarium and the result was that the lift tubes constantly threw out showers of coral sand grains with the return water. It was therefore necessary to strip the tank down again to place a layer of plastic "sponge" material between the filters and the coral sand. After this modification the filters worked really well. The filter bed matured to give a reading of less than 0.1 mg/litre Nitrite in exactly three weeks. Peak

Continued on page 582

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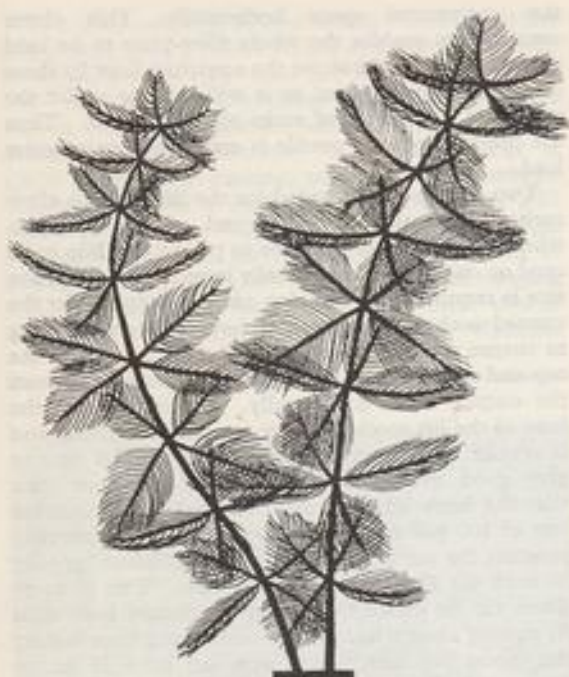
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Continued on page 582



Myriophyllum verticillatum

ONE OF THE most fascinating types of aquarium for anyone is a freshwater one, furnished with native plants and pond life from anywhere in Britain. The only expense when starting one is the tank (which should be as large as possible to give the best results) because all the plants and live stock can be collected from ponds and slow-running streams. So long as it is kept in a really light place, and is not allowed to get too warm, it can remain clear and balanced for years.

First of all collect a good supply of river gravel (wash away most of its mud) in sufficient quantity to give a 2 in. depth. Spread this out with some larger pebbles in groups on its surface, to provide hiding places for crawling water life. Then search for plants, preferably from still pools or slowly running streams, because these will grow best in the aquarium. Do not clear them of life, and see that you bring back some of the water in which they were growing, to add to the water you have in the aquarium. This will help to invest it with the correct sorts of bacteria and microscopic creatures to keep the water in good order.

Many of the plants will grow from cuttings, so it is not necessary to search for specially short plants with roots. *Myriophyllum verticillatum* can be found in many areas, and will develop into nice plants from 6 in. long cuttings. Cut off two or three dozen tops, and insert these about an inch deep into the gravel—in clumps of a dozen or so. They will soon reach the

TRY A POND AQUARIUM

Written & illustrated by Bill Simms

water surface and form a dense fine-leaved background.



Hornwort

THE AQUARIST

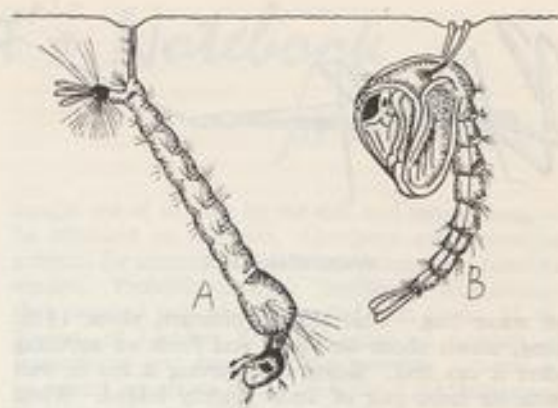
Hornwort, another feathery plant, can be dealt with in the same way as *myriophyllum*. Its clumps do not mass so tightly, and therefore leave a little more room for creatures to crawl about in. As a contrast to these two plants you could use *Potamogeton crispus*, which has long brown-green wavy leaves on each side of a main stem. It is better to obtain a root of this plant, if possible, and then cut off any too-long stems. The drawing shows what an effective plant this is.

Willow moss is usually found in streams, not ponds, but if you can obtain a small clump, already anchored to a small stone, it will transfer well to the aquarium. Good aeration helps it. See that half the tank area is filled with plants, and give them plenty of light. The sun must shine on them for only an hour or so each day.

The kinds of creature you keep in this aquarium are so numerous that it is easy to be spoiled for choice. Provided that there are plenty of plants growing well, it is easy to instal almost anything. If your mind runs mainly to fish, then pick small ones only, such as sticklebacks. Minnows are not very successful in an aquarium for they prefer running water.

Various forms of water insects and their larvae are simple to catch and keep, and generally provide more long-term interest. For instance, the larvae of mosquitos are easy to find in summer. A fine mesh net swept along just under the surface of a healthy pond is almost certain to catch some in one of their two water stages. It is best to start off with the stage shown at A in the drawing.

Many water insects go through the same four stages as do butterflies: egg, caterpillar, pupa, and perfect insect. A in the drawing is the equivalent of the caterpillar stage, and B is the pupa. When B is fully developed the next stage is the actual mosquito, so be prepared for a minor nuisance if you allow these



Mosquito larvae at water surface

in a living room. However, the average family is unlikely to connect a few mosquitos in the house with your "funny" aquarium, so don't worry unduly.

A water boatman may get caught in your net, too, but it is so quick-moving that you may have to chase it. Transfer it quickly to a jar of pond water for transport, and put a lid on the jar for it can fly away if displeased with its surroundings. For this same reason keep a cover glass on the aquarium.

Usually the boatman swims upside down in the water—not as shown in the drawing which is a top view. It floats up to the surface, upside down, and pierces the water surface with its rear to take in a supply of air. Then it swims down to the bottom in search of its food, which is smaller creatures such as water insects and their eggs. An aquarium has to be fairly large and well stocked with many kinds of water creatures to support a water boatman.

When sweeping the net into and through water plants it is possible to find a water stick-insect, a form



Potamogeton crispus



Water boatman



Water stick-insect

of water bug. This slender creature, about $1\frac{1}{2}$ in. long, crawls about on plants and feeds on anything alive it can find. Being slow-moving it lies in wait with its front pair of limbs slightly folded. When any creature comes within reach those caliper-like arms flash out to grasp the victim, which is then drawn back onto the extremely sharp beak. Through this the water stick insect sucks all the juices out of its prey. This insect, and the boatman, can pierce your skin, and cause inflammation.

With the net sweeping along the bottom of a stream or pond many more and different kinds of insect can be found. The "caseless" caddis fly larvae, for instance, is a grub-like creature that lives on the bottom, and forms nets of webbing to collect food swept into it by the slight current. It does not have a casing of stones or sticks to protect its body like other species, but lurks about among the pebbles.

A dragonfly larva is such a fierce and predatory creature that not many other forms of water life of its own or a smaller size can be kept with it, but in a large aquarium its feeding habits can be studied easily. Each kind of dragonfly has a differently shaped larval form, and the one shown here is that of the Emperor dragonfly.

To catch their prey all dragonfly larvae have a specially shaped lower "lip," called a mask. This shoots out to grasp anything that comes within reach, has fangs that grip the victim, and is then withdrawn to bring the prey within reach of the jaws. Large larvae (they can be as much as $2\frac{1}{2}$ in. long) sometimes



Dragonfly larva



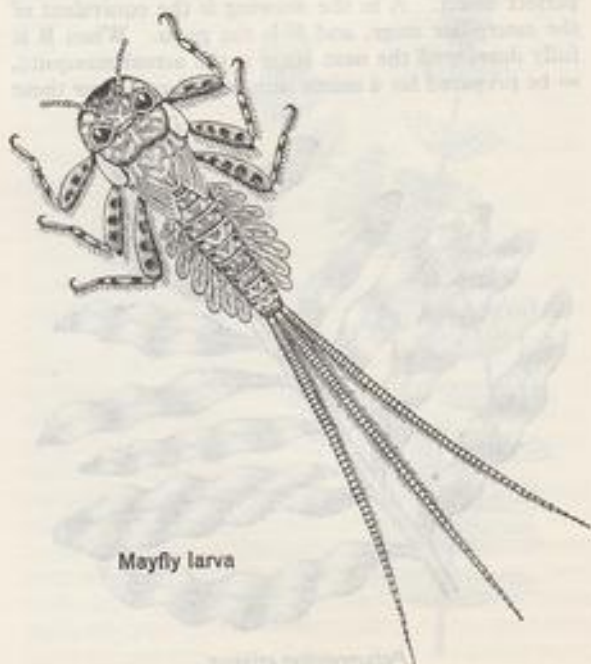
Caseless caddis fly larva

attack small fish and tadpoles. If you wish to keep one of these fierce underwater dragons until it develops into a dragonfly it is best to give it a small tank of its own.

Include plants and gravel to provide suitable conditions, and see that it has lots of living water creatures to eat. I have found that some of them will eat scraps of raw fish—at times—but it is far easier to go out netting for live supplies about twice a week.

A much smaller water dragon, up to $\frac{3}{4}$ in. long including its graceful tri-trail, is the mayfly larva. Most mayfly larvae feed on the algae coating stones and plants, and thrive in an old tank. They are safer to keep with other creatures but themselves form some of the food of carnivorous water life so must be expected to vanish from time to time.

I have always found it best with a pond aquarium to bring home anything that is alive, to try it. From the results it is easy to find out which can live together, and then the only problem is to find more live creatures to act as food for the ones you wish to keep.



Mayfly larva

From a Naturalist's Notebook

by Eric Hardy

WRITING from Hunstanton on the north Norfolk coast in November, a reader kindly informed us of a common octopus stranded alive on the beach at that part of the Wash. He wondered how frequent are these molluscs so late in the year, when the water in the channel would be about 46°F. A smaller specimen was found three days later at Snettisham beach.

Weighing up to 1 kg with a body some 6 inches long, and with tentacles spanning 50 cm. or 4 ft., the common octopus is more frequent along British coasts (especially Channel shores) than many people assume. But I've not had much success keeping one long in an aquarium.

caught out of its hole by the tide and swept along, to be stranded on the ebb. Octopods are interesting subjects for courtship behaviour, learning and memory studies. Probably the most "intelligent" of molluscs, they respond best when rewarded with food. H. G. Vevers, of London Zoo, published an account of maintaining and breeding the common octopus in an inland aquarium in the *Bulletin of the Institute of Oceanography*, special No 1A, in 1962.

In the Irish Sea the lesser octopus is the commoner, but though looking very similar, this is in a separate genus, *Bledone* and not zoologically a true octopus,



Common octopus

It dies, like our correspondent's, after filling the tank with sepia "ink". It is sometimes shown in Plymouth, Jersey and Port Erin aquaria. It is identified from the common squid, which is often used for bait, by possessing only eight arms without long swimming tentacles, for it crawls more about the seabed. The common octopus has two rows of suckers on its arms, the squid or cuttlefish has four, and the paler lesser octopus has one.

Distribution depends upon more rocky shores than The Wash, where this voracious little creature hides in holes to surprise its chief prey, crabs and crayfish, which it attacks with its parrot-like beak. Old wrecks off-shore (which harbour lobsters) would be equally suitable. Keeping it in an aquarium depends upon avoiding alarming it by sudden movements or vibration, which make it turn warty, discoloured and to eject its ink. The Hunstanton visitor was probably

though still a Cephalopod. There's a more pelagic octopus of the Atlantic and Mediterranean. *Tremoctopus* attaining a length of 3 to 6 ft. This retains fragments of the stringy tentacles of the Portuguese Man o'War to paralyse plankton caught in its arm-web, and in defence against predators. We have, however, had the common octopus stranded at the Mersey mouth and in a Liverpool dock. There is some migratory movement, spending the colder months in more southern waters when more are taken off Spain and Portugal for food; but the sea is still much warmer than the land in November, compared with February.

Attending a committee meeting at the Council for Nature recently, I learned that, like so many societies, its finances are in a parlous position. With an estimated income in 1976 of £9,500 and estimated expenses of £17,528 it has to bridge the gap if it is to

survive. About £10,000 goes to staff salaries and over £400 in rent for its HQ at London Zoo. A staff reduction might save £2,000, but it already had a deficit of £3,500 on its 1975 balance. Though not all Britain's amateur natural history societies belong to it, by a long way, it is the major representative body for them. It lost money on its recent national conference at Lancaster, but plans for another at York next autumn.

Speaking to the flourishing Sandgrounders (Southport) Aquatic Society recently, I was told by a member of blue perch still found regularly in a dam at Knott End, in the Lancashire Fylde. These would be a colour variety, though he wondered if a dye in the water marked them. Old books on British fishes claimed the azure or blue perch a separate species from Knowsley in Lancashire, but this is no longer upheld. Another member told me of a local pond which persistently produced toads with only 3 digits to the hind foot. Another member wished to know of food for two river crayfish she had, one of which had cast its skin. Snails form a major part of their diet, if small enough. But they take a wide variety of small animals, even scavenging dead flesh as well as living insects, tadpoles, small worms, occasionally even their spouse, or fine plant food. I suggested finely macerated meat.

The water hog-louse, *Asellus aquaticus*, is not only a devourer of plant debris, but of algae too. But even though *Cladophora* algae have been found to form 30 per cent of its diet when living among it, and 14 per cent otherwise, compared to only 3 per cent and 6 per cent with freshwater shrimps, *Gammarus pulex*, this grazing has little effect upon the total quantity of algae.

Few people keep better furnished tanks of saltwater tropicals than 82 years old Vivian Pedlar who, at his Uplands Newburgh (Lancashire) home, showed me a colourful tank of only a few gallons with a dozen different brilliantly coloured species of coral fish, plus living corals, sea-anemones, sea-fans etc., which he had maintained for six months. He doesn't use natural sea water for fear of introducing troubles and his frozen fish-food is sterilized with gamma rays. The water is filtered from the bottom through a deep bed of coral sand lasting several years without clean-outs owing to the sand depth. He also feeds with daphnia and white worms, and is building an even larger 120 gallons tank with about 200 cwt. of rocks. He already has 3 tanks. He had no sign of the algal problems many marine tanks develop. Coral-fish are much more active than freshwater tropicals, and equally colourful. He has toplight (Trulight) illumination.

What should you do in a case of snake-bite? The recent inquest on the death of a 5 years old Scottish boy after being bitten by an adder was marked by an

outburst from a parent. The boy was bitten by an adder in the Trossachs. His father sucked the wound and spat out what he could. Medical assurance did not turn out as he expected.

Such cases are rare among native British adders and most deaths are from more dangerous serpents at zoos. As I mentioned before, injection of anti-venom serum should only be given on medical advice after assurance that the bite was from a known venomous species, not just a harmless grass-snake. Dr. N. L. Corkill's *Snakes and Snake Bite in Iraq*, a Royal College of Medicine of Iraq book which I used in the Middle East in the last war, has a full chapter on the subject. It pointed out that though half a drop of normal cobra venom is lethal for a man (less for a young boy), and a cobra's glands may contain 20 such doses, only about 30 per cent of those bitten die. It depends on the snake getting its bite well home and "worrying" the limb. Treatment other than the specific antivenene plays only a minor part; but it mentions ligaturing off the bitten area within two minutes, but not for more than half an hour; chemical destruction of venom still in the bite (e.g. with 1 per cent pot. permanganate or its crystals) and incising the affected area to drain off the blood with its venom. However, much depends upon the venom containing thrombase, which imbalises the venom by clotting, for chemical destruction.

Except for research at Lake Bala, Wales lags far behind Lakeland in recording its water life. I was thus interested to see in the wildlife survey of the upper Towy valley in the new edition of the *Dinas Conference Report* (Ministry of Agr., Fish & Food, 68 pp., £2.50) that a light-trap at Gwenffrwd in the upper Cothi tributary caught 1,355 caddis-flies of 32 species, all common widely distributed kinds. Nearly half were *Agapetus delicatulus*, 16 per cent were *Glossosoma confinis* and 13 per cent *Hydropsyche pellucidula*. I was surprised that the 10 listed fish did not include the 10-spined stickleback, probably because of the hilly country, though the 3-spined is there, along with bullhead, eel, pike, minnow, brook- and sea-lamprey, salmon and sea-trout. It will help to allay the general idea of Welsh scarcity of coarse fish. Palmated and smooth newts, but not the great crested, were listed, grass-snake but not the adder. The conference discussed mutual relations between naturalists, hill-farmers and afforestation and the report details the plant, insect and bird ecology of mainly the Dinas reserve above Rhandirmwyn.

An important new 162 page publication *The Natural Environment of Orkney*, edited by R. Goodier and published by the Nature Conservancy Council (Edinburgh) at £2, forms the proceedings of a recent symposium on the subject. It follows a similar publication on Shetland in 1974. Waterlife receives little mention because little field work has been done on

it there, though the large joint sea Lochs of Harray and Stenness, which almost bisect the mainland, and Loch of Isbister, are areas of special scientific interest for their fen communities. Muckle Water (133 acres) is one of the few examples of a large, deep loch with steep, rocky shores and scanty littoral vegetation. Harray and Stenness have a complete gradient through salt and brackish conditions to freshwater, unique in Britain, with *Ruppia maritima*, the rather scarce tassel pondweed in the former. Spiral *Ruppia* is also an Orkney plant. Some of the richer semi-aquatic fen-vegetation is at the Loons, north of Isbister, and Loch of Banks on the west Mainland, with an abundance of alpine meadow-rue on their wet heaths. A dwarf form of the common clam, *Mya arenaria* is widespread at Stenness. *Neritina arenaria*, a small univalve shell fish, has its only Scottish haunts in Harray and Stenness.

With only "burns," straightened artificially, Orkney lacks a river but 15 species or hybrids of *Potamogeton* have been listed in lochs. England's ubiquitous *Elodea canadensis* is known only from Rousay, and water-lobelia, floating bur-reed and quillwort are

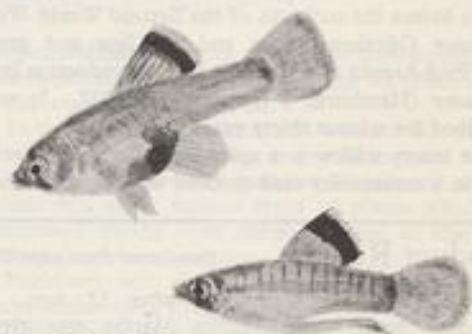
confined to the hill-lochs of Rousay and Hoy. Bladderwort has never been found to flower there.

Returning on the inter-city from London, I read in their local evening paper that the chairman of London Anglers' Association was warning about the dangers from predatory "zander" among Thames fish, unless it is declared a prohibited species and killed on sight. It was described as a cross between pike and perch. Zander is a nickname for the East European pike-perch, a species in its own right introduced to Bedfordshire nearly 200 years ago. In July, 1934 I wrote a column article in the *Sunday Observer* about "Britain's New Fish," the American pike-perch (*vitea*) or wall-eye, just found in the Ouse Basin, and I had an illustrated article on it in the *Anglers News* that year. In a paper on "New British Freshwater Fishes" in the now defunct journal *Discovery*, in 1946, I related how the European pike-perch (*lucio-perca*), introduced in 1878 to Woburn Park, had been distributed to many angling waters when the ponds were cleaned out. Modern recorders of British fish-distribution accept only the latter species on the current British list.

Phalichthys

amates

Written & Illustrated by Jack Hems



THE MOST distinctive feature of this uncommon livebearer, of the New World family *Poeciliidae*, is the well-developed and invariably well-spread dorsal fin coloured white along the top margin, dense black across the middle and grey or grey suffused with yellow in the base. This, and its perky movements, accounts for its popular name of merry widow. The appellation suits it well. All the same it is not perfectly apt; for the body colours are far from funereal in hue.

The back is olive-green, shading to translucent silver interspersed with splashes of shining gold. The belly is silvery white. A dusky band, that is not particularly evident at all times, extends from the gill-covers to the tail. In the main, this horizontal

marking is crossed, in the male, by about a dozen narrow black bars. A black stripe passes downwards from above to below the eye. The flanks and head reflect a metallic blue to blue-green sheen. These colours, however, change and come and go according to the mood of the fish and the quality and source of the light.

The male is the smaller of the two. Another sexual distinction of the male is the unusually long anal fin. This rod-like fin has its origin at a point in line with the leading ray of the dorsal fin and terminates at the posterior end of the caudal peduncle. Curiously the tip of this spermatazoa-conveying fin is turned downwards. The female does not exceed a length of 2 in. The male attains about 1 in. Exceptionally a full 1½ in.

P. amates is found in still and slow-moving fresh waters on the eastern side of Guatemala and Honduras. According to the books, there seem to be a few distinct species and geographical races of the genus *Phallichthys* distributed in Central America as far south as Panama.

Kurt Jacobs, a German aquarist of renown, describes four species and sub-species of *Phallichthys* in his well-documented *Livebearing Aquarium Fishes*. It is interesting to note that a species he describes under the formal name of *P. fairweatheri* appears to be distributed over the same territory as *P. amates* of the reputable books. This is a matter of some interest to the tropical aquarist. For sensibly enough the question we would like to ask is: does hybridization take place?

The Dutch aquarist J. J. Hoedeman, in his huge book, *The Naturalist's Guide to Fresh-Water Aquarium Fish*, says not more than two varieties (sic) belong to the genus. He mentions *P. amates* from the territorial range mentioned above, that is Guatemala and Honduras, and *P. pittieri* from Costa Rica and beyond. Clearly, we must leave it to the professionals to sort the nomenclature and distribution of the genus *Phallichthys* out.

But to return to the merry widow. It was certainly known in this country (in London, at any rate) a year or two before the outbreak of the Second World War. Professor Günther Sterba and the late and great John Paul Arnold give the date of its introduction into Germany (Hamburg, I presume) as 1937. It was described for science thirty years earlier.

The merry widow is a splendid little livebearer to keep in a community tank stocked with equally small

fishes. It is, however, best kept on its own if fry are to be saved. A tank about 18 in. by 12 in. by 12 in. is large enough for a pair but more spacious quarters are better.

Fry are produced about every four to six weeks. The number of fry in a brood varies from as few as a dozen or less, to as many as forty or more. The young are dropped at close intervals over a period of a few hours. A female near "her time" develops the typical bloated look and blackish abdomen.

To protect the fry from the cannibalistic parent fish—an inadequately fed female is a more avid fry-eater than an inadequately fed male—it is of supreme importance to fill about three-quarters of the tank with plants. Of the plants most suited to baby-saving are those with feathery or thread-like foliage such as the pygmy bladderworts, nitella, Java moss, the milfoils and the rooted form of *Ceratopteris* fern. The plants should afford good cover in all levels of the water. It is among surface plants that the fry are usually found. They will forge ahead on such things as powder-fine dried food, micro eels, micro worms, and the like. There is no difficulty in feeding them for, like their parents, they will eat anything swallowable, dried or alive, and mossy algae.

The fry of *P. amates* do not attain sexual maturity quite so rapidly as, say, the young of the guppy or genera of *Limia*, but before six months are out they are usually parents themselves. Temperature is of no great importance provided it is kept within a range of the upper sixties to the upper seventies (°F). Fry-bearing is, however, more frequent at the higher end of the range.

Product Review (continued from page 575)

reading was about 4 mg/litre after 12 days. A generous "squirt" of Liquifry Marine was given every evening during the maturation period and this was sufficient to encourage the growth of the nitrifying bacteria population. The only inhabitants through this period were some Beadlet and Snakelocks anemones. The aquarium has since been further stocked with other invertebrates, small fish and algae and continues in good condition.

With regard to the sand finding its way through the filter-plate, this is quite common in my experience with every kind of under-gravel filter construction. The sand I have has an average grain size of less than $\frac{1}{32}$ in., which is far too small but is all that is available in my area. This grade has penetrated other makes used with it before so Interpet are not really to blame, except that their advertising claims could perhaps be more carefully written. I expect that a larger size i.e. $\frac{1}{16}$ in. and above would act as they indicate, and would, of course, also be better for circulatory reasons. Experienced aquarists will no

doubt be familiar with this problem anyway. In the absence of poly-foam or similar cellular material some employ a covering layer of nylon filter wool.

Other than the above comment I have nothing but praise for this new system. The larger diameter lift mechanism and the independence from blockable airstones, together with the constant velocity principle, are very real improvements in filter design and show that at last someone in the manufacturing area has recognised that progressive aquarists are now using larger aquaria and has developed a product to suit.

Prices (at time of writing):—

17 in. × 11 in. complete (code 0840)—£1.41.

23 in. × 11 in. complete (code 0841)—£1.52.

15 in. extension and coupling (code 0842)—

33p.

Spare airlift and splash deflector (code 0843)—

55p.

All above include V.A.T.

Distributed by Interpet, Curtis Road, Dorking, Surrey. Telephone Dorking 3202. Leaflets available or see the advertisement in this magazine November, 1975 (p. xxi).
A. JENNO.

OUR READERS WRITE

(continued from page 563)

people continue without our recognition? Certainly not. We should show our appreciation with results, and that is what I should call "ringing the bell." There are enough enthusiasts thumbing through these pages of our golden magazine with the various associations and societies of which there are many (and very capable incidentally), to organize a presentation award meeting, or if you prefer, "Seminar" in Birmingham or London.

This "show" would be a little reversed; we would be giving our degree to them in the form of a respectable plaque suitably inscribed for them to know we *do* think an awful lot about them. I'll get to the point now (well, I did say there are no short cuts in this hobby). A fund could be organised to run for a period of some months to obtain an amount

sufficient to hire a large hall with all the mod. cons. available.

Initially, I should like to hear from any association or society who would be inclined to think this proposal a worthy one for an exceptional cause. If this idea materialises, perhaps we can approach our respected genius, Mr. Graham Cox, to assist as the treasurer, being able to look after anything from money spiders to money boxes. An item for your next agenda?

For the benefit of those who just look at the pictures in the magazine, I would ask our friendly Editor to publish the aforesaid in the largest print possible.

Thanking you so much.

F. W. ASHWORTH,
41 PENGWERN, LLANGOLLEN,
CLWYD, LL20 8AT.

NEW WATER GARDEN CENTRE

by *Sonia Roberts*

WHAT is believed to be Britain's largest garden centre exclusively devoted to the interests of the water gardener and pondsman will be open to the public from May, 1976.

The proprietors, Highland Water Gardens Ltd., have been using the site at Rickmansworth as fish and aquatic plant nurseries for some years.

However, now convinced that soaring postal charges will switch the emphasis in plant, pond and fish sales from mail order to cash and carry, the company have decided to play host to their customers on a lavish scale.

At the peak of the fish selling season there will be more than 200,000 fancy fish on view at the Centre.

Imported fish are acclimatised in races and keep tanks fed by the river Chess—reputed to be one of the most pollution free streams of its size in the U.K.

Before being taken over by Highland the premises were used as a trout farm.

Today the old hatchery buildings have been adapted as fancy fish showrooms holding stocks at prices which range from 25p to £45 per fish.

Large size koi retailing at up to £100 per fish will be available for connoisseurs to special order.

The replanned 14 acre site also includes 1,800 square feet of covered shopping area—a water gardening supermarket where more than 500 different types of pool accessory are displayed.

From this building sales staff using a console control panel can give working demonstrations of any or all of the fountain units on outdoor display.

A special dark room area meanwhile allows customers contemplating pool lighting to judge its effectiveness under night-time conditions.

In the outdoor plant nurseries a choice 200 aquatic plants all raised on the site is available.

For the novice water gardener illuminated display panels will show various types of plants which are purchased during their dormant stage as they will look in the flowering season.

Beginners will also be offered water garden kit packs which solve the problem of working out correct fish/plant/pond-size ratios.

The group's general manager, Mr. Brian Salisbury, believes that in summer 1976 such kits will retail from about £25.00.

For the established pool enthusiast the grounds which are now being extensively landscaped will demonstrate the various ways in which water can be blended into the general garden picture.

All plants and accessories used on the site will be available for immediate takeaway.

The provision of a playground for the under-fives and vending machines offering tea and coffee for adults encourage the notion of making a visit to the centre an afternoon outing for the whole family.

The motorway which bisects the site makes the Centre almost as accessible from a driving time point of view to visitors from the Midlands, or even the north, as Londoners and home counties residents.

Free parking for more than fifty customers' cars is available on the site.

D.I.Y. FILTER

by Mrs. J. H. Wilson

IF YOU ARE an aquarist on a tight budget or prefer to make equipment rather than buy, I discovered a way of making an excellent Box Filter from waste plastic squeeze bottles. I have named the ones I use but any two squeeze bottles, one larger than the other, would do. The filter I made keeps my goldfish tank as clear as the professional ones, as long as it is cleaned out every two or three days, a simple five-minute job. I was amazed at the amount of waste matter it fetched out.

Materials required:

Infacare Baby Bath Routine bottle or similar.

Large size Fairy Washing-up Liquid bottle.

4 in. piece $\frac{1}{2}$ in. polythene tube (slightly curved).

5 $\frac{1}{2}$ in. piece Rigid Plastic Tube (to fit on airline).

Fine bradawl or nail.

Roll plastic insulation tape.

1. Take baby bath care bottle, discard screw-on top, and cut in half, about 1 in. from the shoulder, then in bottom half cut a slit down the side about $\frac{1}{2}$ in. long.
2. With bradawl or nail, pierce holes in top half on the shoulder (the flat piece between neck and rim) till it resembles a colander. (This is for the water/dirt intake).
3. Take washing-up liquid bottle, discard nozzle piece and cut the top off $\frac{1}{2}$ in. below rim to make a cone shape. Discard bottom piece and with bradawl or nail pierce holes in the shoulder of washing up bottle top in the same fashion as for the other top.
4. Take 4 in. piece of $\frac{1}{2}$ in. polythene tube and wrap tape around bottom $\frac{1}{2}$ in. until it fits tightly into the washing-up liquid top (this is to make the up tube and inner base grid of the filter).
5. Put $\frac{1}{2}$ in. of gravel in bottom piece of bath care bottle and stand the washing-up liquid top-and-tube on this.
6. Loosely pack round the tube with filter wool. Push bath care top over tube and down over bath care base, the split will cross allowing top to fit over.
7. Push the rigid plastic tube down the polythene tube nearly to the gravel and leaving $\frac{1}{2}$ in. out of the top to connect the airline to. The curve in the polythene tube will stop it slipping. (You will find that if your $\frac{1}{2}$ in. tubing has been coiled it will be curved sufficiently for use on this filter). Finally connect airline to top of plastic tube and the filter is now complete!

BOOK REVIEW

Mass Cultivation of Invertebrates, Biology and Methods. *Ioleva, I. V., Academy of Sciences of the U.S.S.R.—All Union Hydrobiological Society, translated from the Russian by Israel Program for Scientific Translations, Jerusalem, 1973, 148 pp, £6.70.*

This monograph contains general facts and figures about the biology and culture methods of some invertebrate species which are mass-cultivated in the U.S.S.R. for fish-breeding food. Species discussed include the *daphnia* and brine shrimp that are familiar to aquarists who grow their own fish food, as well as other species including soil oligochaetes, free-living nematodes and chironomid larvae.

Citing published works in English and other languages as well as the results of his original experiments, the author outlines the biological features of these species, including their reproduction, growth and development. The description of culture methods includes details of culture densities, growth periods, maintenance of optimal conditions, diet and yield.

This book is written on a technical level for professional fish raising and will be of real interest to the serious amateur aquarist who wishes to become more expert in this field. It is a well-illustrated reference, with 58 line drawings and 25 tables.

BRITAIN GETTING HOOKED ON FISH ?

BRITAIN could be about to become a nation of fish devotees, not dog lovers.

Certainly Britain's vets are going to have to become fish doctors to a far greater extent than before, a leading expert on fish diseases has said.

Dr. Ron Roberts, director of the Nuffield Unit of Aquatic Pathobiology at Stirling University, said that in the United States people already spend more on fish than photography—until recently America's No. 1 money-spinning hobby.

The signs are that Britain is about to follow suit.

But Dr. Roberts said British vets received relatively little training in fish diseases. People spend up to £70 on a tropical marine fish and find when it falls ill within a few weeks, that they have no one to turn to.

His unit, which has trained some vets in fish diseases, will be training more to form a nucleus of fish specialists.

But with the aquarium trade booming and fish farming beginning to take off commercially, many vets are going to have to learn to deal with their problems on fin as well as on foot.

Extract from *Grimsby Evening Telegraph, Lincs.*

Junior Aquarist

'KRIBS' FOR ENTERTAINMENT

by N. Ellis

As I AM limited to three small tanks to keep my tropicals in, it is impossible for me to keep large cichlids, but one small species I have found to be very interesting is *Pelmatochromis kribensis*.

Two large females and an adult male were kept together with two catfish, two angel fish and a large *P. thomasi* in a 24 in. x 8 in. x 8 in. community tank where they lived quite happily until one day the male *kribensis* started chasing one of the females around the tank, causing quite a disturbance. Having seen this happen before with other egg-laying species, I placed a small flower pot in the tank on its side. Apart from a few "peeps" inside the *kribensis* did nothing until I turned the pot upside down (having first cut a large notch out of the side). Immediately the female swam into the pot and a short while later began to dig the gravel out from the inside. She did this for about ten minutes at a time and then came out of the pot to "show off" to her mate. And show off she did; she went bright red around her sides and the black lines on her fins and body became more pronounced. She danced around bending her body in an arch. At first her mate did not take any notice but soon after, his colours became brighter and the yellow dorsal fin became really vivid. This went on for the next two weeks and the pile of gravel was so high that the female had to go on her side to enter the flower pot. After some time the activity stopped and the female remained in the pot only emerging to take small quantities of dry food and then the male chased her back in, afterwards standing guard at the doorway, allowing nothing to enter.

By this time I had realised that they must have

spawned but I did not want them to be disturbed and so I decided to chance that the eggs might be eaten. And I am glad I did for one Sunday lunchtime the female proudly displayed a mass of tiny babies as she came out of the flower pot. She swam around the pot with her brood who followed her in a tight cluster while the male swam behind them, daring any fish to come near. They settled in a corner until nightfall where the babies searched for food along the bottom, never straying from their ever-attentive parents.

At about 8 o'clock in the evening I was alarmed by cries from my mother who said that the female was eating her babies. I rushed in and watched her pick them up in her mouth and eat them. But then I noticed something—she always returned to the flower pot after eating one and then came back and ate another. Then I realised she was picking up her babies in her mouth and chewing them, then returning to the flower pot where she would put them inside, as my mum remarked, "all washed and ready for bed." After all the fry were in she would sit half in half out of the flower pot to stop anything getting in or out. The male would then swim around the flower pot until it was completely dark and then he, too, would "sit" near the entrance. The fry grew remarkably fast on their Brine Shrimp/small dry food diet and when they were big enough they would take flaked dry food from the surface. Recently their tank was cleared out and I counted no less than 44 healthy baby *kribensis* approx. $\frac{1}{2}$ in. long. In my opinion *Pelmatochromis kribensis* is one of the most colourful and "friendly" dwarf cichlids which, if you can get a good pair, will supply you with hours of entertainment.



JUST A LITTLE LATER THIS YEAR
THE FEDERATION OF NORTHERN AQUARIUM SOCIETIES
proudly announce

THE 25th BRITISH AQUARISTS' FESTIVAL

EUROPE'S BIGGEST AND BEST AQUARISTS' SHOW
CELEBRATES ITS SILVER JUBILEE

at

BELLE VUE ZOOLOGICAL GARDENS, MANCHESTER

on

SATURDAY AND SUNDAY 23rd 24th OCTOBER 1976
FURTHER DETAILS SHORTLY

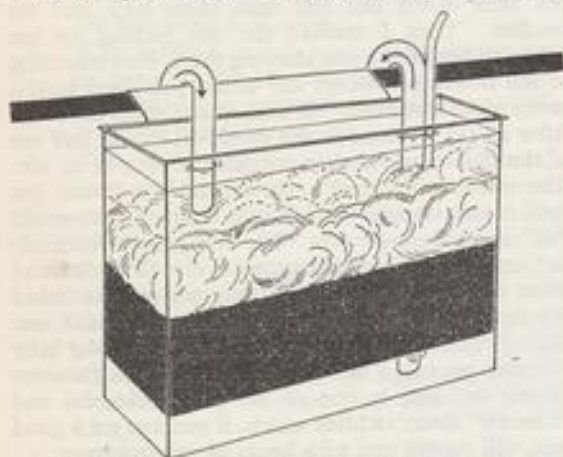
BEGINNERS' CORNER

(5) FILTERS

by Bill Simms

WHEN THE water in an aquarium becomes cloudy, whether it is from too much food (cloudy grey) or too much light (cloudy green), one of the first thoughts is to use a filter. In many cases this will help, but it should be realised that the first thought should be about the cause of the cloudiness, and steps taken to correct that.

A filter is a means of directing the water in a tank through a layer of filter wool (where pieces of sediment are trapped) and then through carbon granules (which extract foul gases). It does that, but does not trap microscopic particles, nor any minerals dissolved in the water. For instance: salt dissolved in water is not removed by a filter. Therefore a filter should be



used only for the removal of larger particles, at which it is most efficient.

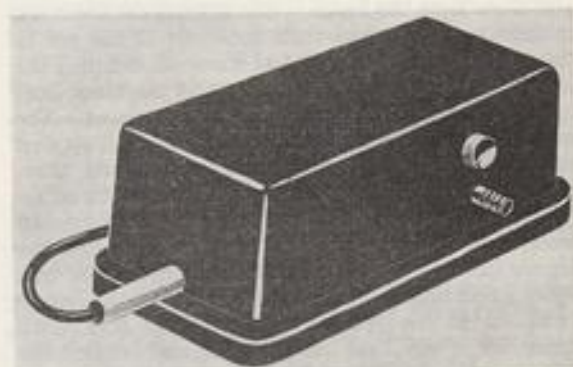
Generally the filtering is through a small plastic tank fitted to the outside of the tank (drawing A), with the aid of a small electric pump, called an aerator (B). An air pipe is connected to the smallest upright tube of the filter (top right in the drawing), and air is released in the bottom of the adjoining bent-over tube.

As the air rises up that larger tube it lifts a column of water with it, and this tumbles over the bend into the main tank. This lowers the level of water in the filter, and to replace this loss a J-shaped syphon tube is used to carry water from the aquarium to the filter (on the left of the drawing).

To start the filter working, first fill it with an inch

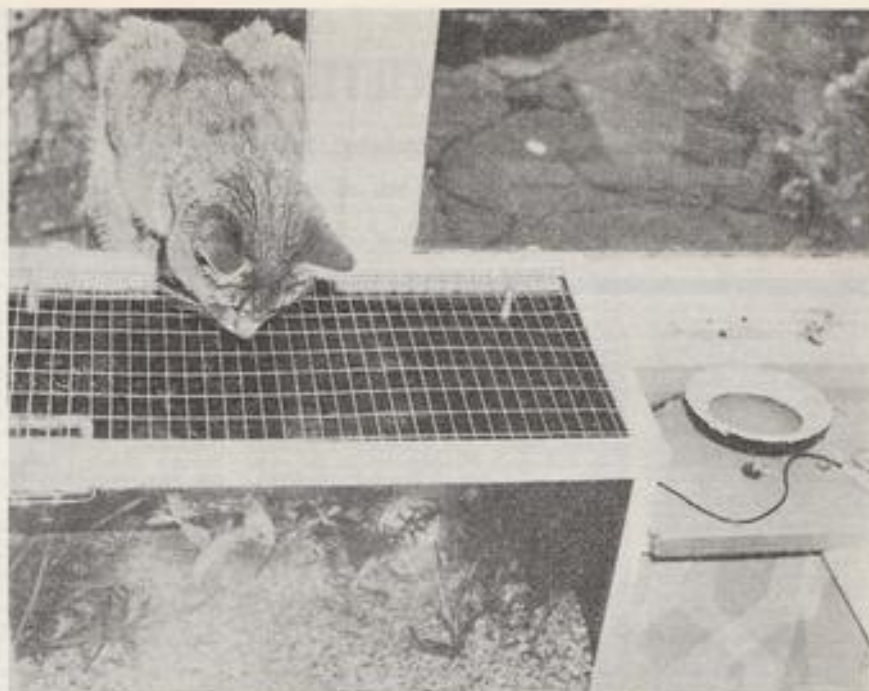
layer of carbon, and then an inch of filter wool. Take the J-shaped syphon tube, immerse it in the aquarium to fill it, and cover the short end with one finger. Keeping the long end in the aquarium water place the syphon tube in position, and release your finger from the short end. If the level of water in the aquarium is high enough the syphon will begin to fill the filter tank with water, until the water levels are equal.

Thereafter, any lowering of water level in the filter—as the air lift works—will cause the syphon to transfer more water to the filter. As the filter wool becomes dirty with trapped sediment it is taken out, and replaced with new wool. This may need doing twice a week, but the carbon should work well for a month or more.



Left: (A) Filter
Above: (B) Pump

There is a most important safety point about the aerating pump that must never be forgotten. It is worked by a small electric motor, connected to the mains. It is also attached to the filter top by a thin flexible plastic or rubber tube, which carries the air that is pumped. If for any reason the electric current is switched off at any time it is possible for water to flood back (syphoned) along that thin air pipe, and if the aerator is stood anywhere below the level of the water top the water can flood into the electric motor. Then, when the electricity is switched on once more the water will cause a short—with a blown fuse at the very least. So the firm rule about all aerators is that the electric motor **MUST** be placed somewhere that is above the water surface level.



CATPROOF AQUARIUM

by Susan Platter

A year and a half ago, I had five common goldfish in an uncovered moulded plastic tank. Fish and tank had all arrived at my door in return for 16 jelly packet tops. What an introduction to coldwater fishkeeping! I learned much later that the tank, 14 in. \times 9 in. \times 8 in., was far too small for five fishes.

My cat had a close relationship with the fish because she was constantly up at their tank—drinking. She must have shared their preference for chlorine-free water. All was peaceful, until a newcomer kitten arrived, grew, and began to notice the fish. One dreadful morning, I found the tank empty, water everywhere and, horror of horrors, one pathetic goldfish head on the floor. This was the end—I could keep no more fish after that and could not bear to touch the tank for weeks.

Six months ago, a local second-hand shop bought in a number of 18 in. \times 10 in. \times 10 in. all-glass tanks, with plastic frame edging. At last, I succumbed. I bought two and furnished them. Next, I purchased some $\frac{1}{2}$ in. \times 1 in. wire mesh and two lengths of plastic frame edging, 1 in. deep. I cut the plastic so that it made a snug-fitting frame round the top of each tank, then used a contact glue to form the framework, leaving the pieces to firm up overnight. To make

sure they were right, I had a trial fitting session of framework alone. The mesh had to be cut very carefully, with wirecutters, to fit into the framework in such a way that it did not need anything extra to hold it in place—mainly because I could not imagine how I would attach wire mesh to plastic! As you see from the photo, the result is highly satisfactory. Thus, both of us—the kitten and I—could watch fish in comfort! Needless to say, I do not encourage this, as it alarms the fish; although the pearlscale in photo does not seem worried at being the object of feline scrutiny.

My lid allows easy access for plastic tubing attached to filters, etc., and is removed by sliding it down the tubing to lie on the ledge behind the tank. As well as keeping the cat out and the fish from leaping too far, the cover looks neat and attractive. Also, of course, it allows the passage of light, and need not be taken off at feeding time, or for the weekly partial water-change.

The plastic edging comes in lengths of about 6 ft 25p or so, and the mesh costs 30p a foot, 36 in. wide.

A similar lid could be used on any tank where a usually advised sheet of glass might be knocked off by children, animals, or one's own unseeing elbow.



from AQUARISTS' SOCIETIES

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

EARLY in December, the annual general meeting of the **Great Yarmouth and District A.S.** was held and the following officers and committee were elected for this year: chairman, A. Kirby; vice-chairman, H. Brundish; secretary, E. Weekley, 22 Arundel Road, Great Yarmouth, NR30 4JY; treasurer, D. Lacey; P.R.O., R. Andrews; show secretary, Mrs. J. Rumby; assistant show secretary, R. Stearne; magazine editor, Mrs. L. Durrant. Committee, P. Watson, P. Jacobs, C. Rumby, G. Drewry, Junior committee member, Miss C. Durrant.

The evening was completed by a tape and slide show entitled "The Birth of Aquarian" by Dr. D. Ford and the society would like to wish all its friends in societies throughout the country a prosperous New Year.

OFFICERS elected at the recent annual general meeting of the **Medway A.S.** were as follows: chairman, C. Elliott; secretary, A. Woodcock, 42 Tennyson Road, Gillingham, tel. Medway 56624. Meetings are held at Dame Court School, Watling Street, Gillingham, on the second and fourth Wednesday each month. New members always welcome.

THE Association of Midland Goldfish Keepers held their annual general meeting on 1 November, when the secretary announced that he would not be available to serve a further term in the same capacity. The chairman, "Tony" Roberts, who was also retiring, paid tribute to the work which Mr. Orme had put into the A.M.G.K. during the two years he had acted as secretary, since he founded the Association.

In order, as one member put it, to make sure that neither of these officials "ran away" the positions of president and vice-president were created. Mr. Orme was elected president and Mr. Roberts, vice-president. It was further decided that these positions would require both to serve on the committee.

Other members elected to the committee were as follows: chairman, M. Mason; vice-chairman, D. Basingwood; secretary, D. Denny; treasurer, R. Hancox; committeemen, N. Giles and D. Hancox. In addition, Messrs. Orme, Giles and D. Hancox were elected to serve for a term of two years as delegates to the Associated Goldfish Societies (the National Association).

After the business of the meeting was concluded an auction sale of fish and aquaria was held when some nice young Bristol shubunkins, moors and macerous veiltails, together with some useful tanks found new owners. New members and visitors will be welcomed and details can be obtained by writing to the secretary at 71, Moorfield, Stoke Alderman, Coventry.

THE SAFE CURE FOR FUNGUS
is **halamid**
Hillside Aquatics London N12

RESULTS of the league final between **Darlington A.S.** and **Wednesbury A.S.**, also league open show held in November were: A.V. Anabantid: 1, Mr. and Mrs. Smith; 2, A. Smith; 3, Mrs. Whitehouse. A.V. Cichlids: 1 and 2, S. Whitehouse; 3, D. Rickless. A.V. Livebearer: 1, J. Taylor; 2, M. Green; 3, Mr. and Mrs. Smith. A.V. Characins: 1, K. Hall; 2, D. Rickless; 3, Mr. and Mrs. Smith. A.V. Rasbora: 1, T. Lowe; 2, Mr. and Mrs. Smith; 3, Mrs. Whitehouse. A.V. Barbs: 1, 2 and 3, Mr. and Mrs. Smith. A.V. Barbs: 1 and 2, Mr. and Mrs. Smith; 3, S. Whitehouse. A.V. Catfish: 1, A. Dowry; 2, H. Taylor; 3, Mr. and Mrs. Smith. Four classes, open show: A.V. Cichlids: 1, J. Smith; 2, J. T. Edmonds; 3, B. and S. Worton; 4, N. Morris. A.D.V.: 1, 2 and 3, B. and S. Worton. Anabantid: 1, B. F. Smith; 2, C. Smith; 3, J. Flavell. Livebearer: 1, G. Hengough; 2, B. F. Smith; 3 and 4, B. and S. Worton. Wednesbury won the final with 32 pts. against Darlington 24 pts. and West Midland A.S. wish to thank all judges and show secretaries.

RECENTLY the **Dunlop Aquarium Keepers Society** held their first Champion Fish Show, which was known as "The All Winners Show" consisting of class and section winners from the table shows and open show in 1975. The standards were fairly high, and 44 entries competed for a "Best Fish Trophy" plus plaque. P. Whelan judged the show and F. Mulla, chairman, F.N.A.S. management committee also chairman M.A.S., presented certificates to all exhibitors for reaching this particular show and also the trophies and plaques. The results were as follows: Best Fish in Show competition: 1, T. Hampton; 2, A. Roche; 3, T. Clays. Highest Pointed Junior: Master D. Shaw. Highest Pointed Lady: Mrs. J. Rosche.

HAVING completed their term of office, all the officials of the **Welwyn Garden City A.S.** retired at the recent annual general meeting, and the new committee is as follows: chairman, P. Balgoin; secretary, E. Swift, 8, Millwards, Hatfield, AL10 8UX; publicity officer, E. P. Videan. Club nights are held at the Scout Hut, Great Dell, Welwyn Garden City, on the first and third Mondays of each month when all visitors will be most welcome.

RECENTLY, **Thurrock A.S.** held their annual general meeting when the following officers were elected for the forthcoming year: chairman, K. Appleyard; secretary, G. Prescott, 14, Stephenson Avenue, Tilbury; treasurer, D. Strudwick.

THE Alfreton A.S. held their annual general meeting in December last, when the following officers were elected: president, S. Hill; chairman, M. Merry; secretary, S. Hill; treasurer, B. Hickling; show secretary, K. Dean; assistant show secretary, P. Bousner. In addition there were six committee members: M. Darrington, J. Lamb, Mrs. G. E. Wray, T. Woolley, J. Wright and M. Smedley. All members would like to thank S. Dooley for his past hard work in the society as treasurer and also Mrs. Dooley for work on the catering side.

RESULTS of the **Bradford and District A.S.** Open Show held in November were:—Section A: Class 1: 1, Stanhill and Ramsey (Castleford);

2, Poulton Bros. (Southport); 3, G. Imbleton (Stanley). Class 2: 1, J. Buckley (Northwich); 2, Mr. and Mrs. Roberts (Doncaster); 3, Mr. and Mrs. Tyson (South Humberside). Class 3: 1 and 3, Mr. and Mrs. Muckle (Sandgrounders) (section winner); 2, D. Sugden (Bradford). Class 4: 1, N. Blenkin (Bridlington); 2, Master S. Green (Castleford); 3, K. Horton (Southport). Class 5: 1, Mr. and Mrs. Richardson (Scarborough); 2, L. Gatenby (Bradford); 3, N. Blenkin (Bridlington). Section B: Class 6: 1, Master G. Parkin (Keighley); 2, Mr. and Mrs. Emerson (Castleford); 3, Mr. and Mrs. Roberts (Doncaster). Class 7: 1, Mr. and Mrs. Holmes (Castleford) (section winner); 2, S. White (Southport); 3, Mr. and Mrs. Tyson (South Humberside). Section C: Class 8: 1, A. Chadwick (Oldham) (section winner); 2, Mr. and Mrs. Newton (Blackburn); 3, Mr. and Mrs. Muckle (Sandgrounders). Class 9: 1, Poulton Bros. (Southport); 2, A. Frisby (Hull); 3, L. Gatenby (Bradford). Section D: Class 10: 1, Mr. Watts (South Humberside); 2, Master A. Fisher (Bradford); 3, R. J. Stephens (Blackburn). Class 11: 1, B. Dawson (Heywood) (section winner); 2, Mr. and Mrs. Horton (Southport); 3, Mr. and Mrs. Fenney (Doncaster). Section E: Class 12: 1, Mr. Howgate (Stanley) (section winner); 2, Mr. and Mrs. Richardson (Scarborough); 3, N. Lynch (Stanley). Section F: Class 13: 1, Poulton Bros. (Southport); 2, Master G. Wild and P. Topley (Aireborough); 3, Mr. and Mrs. Richardson (Scarborough). Class 14: 1, M. Lister (Jun.) (Stanley); 2, Mr. and Mrs. Newton (Blackburn); 3, T. Holmes (Castleford). Class 15: 1 and 3, Mr. and Mrs. Holmes (Castleford) (section winner); 2, Mr. and Mrs. Roberts (Doncaster). Section G: Class 16: 1, J. Middlemass (Stanley); 2, Master A. Shepherd (Bradford); 3, N. Lynch (Stanley). Class 17: 1, Mr. Crabtree (Sandgrounders) (section winner); 2, A. Frisby (Hull); 3, Mr. and Mrs. Tyson (South Humberside). Class 18: 1 and 3, N. Blenkin (Bridlington); 2, Mr. and Mrs. Muckle (Sandgrounders). Section H: Class 19: 1, W. Blundell (Doncaster); 2, Mr. and Mrs. Holmes (Castleford); 3, Mr. and Mrs. J. Taylor (Merseyside). Class 20: 1, J. Robertson (Northumbria); 2, Mr. and Mrs. Holmes (Castleford); 3, S. White (Southport). Class 21: 1, J. Cornforth (Bradford) (section winner); 2, Master J. Emerson (Castleford); 3, J. Irwin (Stanley). Section I: Class 22: 1, Mr. and Mrs. Newton (Blackburn) (section winner); 2, Master J. Emerson (Castleford); 3, T. Holmes (Castleford). Section J: Class 23: 1, R. Hainsworth (Bradford); 2, P. Northrop (Bridlington); 3, J. Abbott (Aireborough). Class 24: 1, M. Walker (Swillington); 2, Mr. and Mrs. Richardson (Scarborough); 3, J. Abbott (Aireborough). Class 25: 1, J. Buckley (Northwich); 2, G. Brown (Independent); 3, P. Northrop (Bridlington). Class 26: 1, Master I. Parkin (Keighley) (section winner); 2, Mr. and Mrs. Taylor (Merseyside); 3, Poulton Bros. (Southport). Section K: Class 27: 1, J. Robertson (Northumbria); 2, J. Wood (Aireborough); 3, L. Barrett (Castleford). Class 28: 1, M. Hay (Oldham) (section winner); 2, A. Chadwick (Oldham); 3, Mr. and Mrs. Taylor (Merseyside). Section L: Class 29: 1, Miss M. Houghton (Southport); 2 and 3, Mr. and Mrs. Wolstenholme (Blackburn). Class 30: 1 and 2, J. S. Hall (Aireborough) (section winner); 3, Mr. and Mrs. Wolstenholme (Blackburn). Class 31: 1, W. Blundell (Doncaster); 2, Mr. and Mrs. Newton (Blackburn); 3, B. Dawson (Heywood). Novice Section: 1, D. Woodcock (Bradford) (section winner); 2, A. Cramshaw (Sandgrounders); 3, Master I. Colley (Oldham). Best Fish in Show was a Climbing Perch entered by Mr. and Mrs. Newton of Blackburn.

Anyone wishing to join Bradford A.S. can be assured of a warm welcome. The Society meets on the second and fourth Thursday of each month in Room 5, at the Textile Hall, Westgate, Bradford, at 7.30 p.m.

THE British Cichlid Association year end is now 1st July, all subscriptions running from that date. The annual fee is now £3.50, and persons joining after 1st January may do so at half price. In addition to the quarterly

Journal and monthly Newsletter, a monthly information sheet is published, a sample copy of which may be obtained by sending a stamped addressed envelope to Ian Sellick, 88 King's Drive, Bishopston, Bristol BS7 8JH. All membership enquiries are now being dealt with by the treasurer, H. Parrish, 18 The Bacons, Twickenham, Middx, TW1 2AP.

The first meeting of the Bristol Area Cichlid Group was held in December, with seventeen members present. The group will now meet on the second Wednesday of every month at 88 King's Drive, Bishopston, Bristol, at 8.00 p.m. Further details may be obtained from the secretary, Mrs. J. Redcliffe, 67 Westward Drive, Pill, near Bristol. Although the group was formed under the auspices of the British Cichlid Association, anyone interested in cichlids is welcome to attend.

Issue No. 1 of volume two of the British Cichlid Association Journal, "Cichlidae," will be entirely concerned with *Discus*, containing much useful material including a literature review of the genus *Symphysodon*. Non-members of the Association may purchase this issue at a cost of 65p, including postage and packing, from Ian Sellick, 88 King's Drive, Bristol BS7 8JH.

OFFICERS elected at the annual general meeting of the Oldham and District A.S. were:—chairman, J. Brankin; vice-chairman, C. Beckenham; secretary, Eric Birchwood; 4 Hill Top, Head Green, Chadderton, Oldham; treasurer, E. J. Brunt; show secretary, A. Chadwick, 341 Broadway, Chadderton, Oldham, 061-652 0809; publicity officer, M. Hay.

IN the last few months Ealing and District A.S. have enjoyed table shows in classes M.Q.R.S.T. and a two-way friendly with Rochampton. Classes H.J.X.W. were competed for at a later date. Members of Reigate and Redhill, Caterham Nomads, Sudbury, Riverside, B.K.A. and Hounslow were the other competitors. In the same period, John Higher gave a talk on plants. The last meeting of 1975 saw the Irving and Mills Trophies Finals judged by H. Towell, and an F.B.A.S. tape-side show, Aquastalk No. 11, The Birth of Aquarism, by Dr. D. M. Ford who is a leading B.M.A.A. member. This was an informative and enlightening talk, and was particularly interesting.

OWING to illness the speaker for the December meeting of the Stroud and District A.S. was unable to attend, but members still enjoyed their meeting by making up a meeting as the evening went on. The Table Show was for A.V. Carfish and the result was: 1, G. King; 2, C. Whitaker; 3, C. Hodges; 4, N. Hyett.

TROPHY winners of Hull A.S. for last year were as follows: Furnished Aquaria; Mr. Drinkall. Table Breeders: Master A. Young. Most points table show: Master A. Young. Home Breeders: T. and K. Douglas. Fish of the year (Snakehead): I. Bellard. Junior Aquarist of the year: Master D. Fitzby. Senior Aquarist of the year: Mrs. G. Frisby. Statesman League: Winners for Hull were: A.O.V. Livebearers: T. and K. Douglas. Pairs Livebearers: G. Andrews. A.O.V.: I. Bellard. Tooth Carps: R. Willerton. Breeders Livebearers: G. Andrews. The Statesman League Champions for 1975 were Bridlington.

AT their December meeting Barry A.S. had an interclub match with their neighbouring club Dow Corning A.S. Barry won the contest 25 points to 17 points. The winners for Barry were M. C. Guthrie, C. J. Webber, J. Webber and A. Wallace. Winners for Dow Corning were P. Stansley, C. Webb, A. Parker, H. Ruck and T. Seymour. The Barry A.S. member M. C. Guthrie won the trophy as the highest pointed exhibitor, and the night was rounded off with a quiz, the quizmasters being C. J. Webber and A. Parker.

RESULTS of the table show for the Fish of the Year at the December meeting of the Brighton and Southern A.S. were as follows: 1, Mr. and Mrs. Houghton; 2, Mr. and Mrs.

Rooney; 3, P. Chapman; 4, T. Ramshaw. Mr. P. Ginger, a vice-president of Brighton and Southern A.S., who judged this table show for the last time was presented with a bouquet of flowers. Mr. Ginger has presented the club with a rose-bowl and it is to be a Society trophy. The class to which the trophy goes will be decided at a later date.

AT the December meeting of the Mid-Sussex A.S. the chairman welcomed the lecturer, J. Bellingham, of Tonbridge A.S., who gave a very interesting lecture and slide show on the Barb family of fish. The show secretary then presented the awards for the Home Aquaria and Furnished Aquaria competitions. The Home Aquaria competition produced some encouraging comments from the judges, and also one of the most popular decisions of the year, in N. Short winning the senior class. Second was Mrs. Ancombe, and third D. Soper. D. listed was first and second in the junior class, with D. Ancombe third. There were only two entries for the Furnished Aquaria class; the results were as follows: 1, J. and R. Burtles; 2, D. listed. Further details regarding the Society may be obtained from the secretary, B. Slade, "Sundown," Bolney Road, Anstey, (H. Heath 53747).

THE Ealing and District A.S. committee for this year is as follows: chairman, T. A. Cruickshank; vice-chairman, J. Healey; secretary, Jon Myrtle, 8 Westworth Road, Southall, Middlesex, phone 571 3592; show secretary, C. Chesney; assistant show secretary, Mrs. D. Cruickshank; treasurer, K. Scrase; social secretary, J. Irvine; floor members, R. Sellers, D. Carver; press officer, ex-committee, L. Sandfield; F.R.A.S. delegate, T. A. Cruickshank. Meetings on first and third Tuesdays.

EARLY in September members of High Wycombe A.S. listened to an interesting talk on South American Cichlids by Bernard Mosold. Also in September there was an eight-a-side match against Uxbridge which resulted in a close win for High Wycombe with 76 points to their opponents' 75 points. While the fish were judged, A. Harmsworth gave a short talk on keeping marines using the living system. In October there was a news and discussion evening and an eight-a-side match against Amersham which resulted in a win for High Wycombe with 81 points to Amersham's 55 points. The judge was A. Gibson of Reading. On the last day in October there was a quiz by J. Bushby and club business. An eight-a-side match in November at Aylesbury was won by High Wycombe's 725 points to 769 points to High Wycombe of Dunstable. Also in November there was a very interesting talk on marines by A. Harmsworth incorporating slides of invertebrates, anemones, plants and fish. There Counties news, a short discussion on changing from the dead system to the living system for marines and nominations for the club's 1976 officers.

The annual general meeting was held in December when the officers for the club were elected and these were as follows:—chairman, R. Leslie; vice-chairman, I. Pierce; treasurer, T. Wilkinson; secretary, J. Bushby; Three Counties delegate, R. Cox; committee members, M. Lancaster, J. Hobbs and P. Foyle; table show secretary, M. Lancaster; librarian, D. Schlamn; equipment officer, R. Cox; publicity officer, S. Friend; catering officer, S. Lancaster. A social evening incorporating a darts match which was won by M. Lancaster was also held just before Christmas. New members will be welcome at the club's meetings which start at 8 p.m. at The White Horse, West Wycombe Road, High Wycombe. Further details can be obtained from the secretary, J. Bushby, 3 Hazeborne Walk, Hazlemere, Bucks. Tel: Penn 3825.

THE Taunton and District A.S. heard a talk by S. Parsley on the breeding of Siamese Fighters at their December meeting. He substituted, when the booked speaker was

unable to attend due to personal commitments, and his talk was very interesting and made the breeding of these fish sound almost easy. There were also three table shows, one being for rare and unusual fishes which only had one entry, being a Blue Lamiis owned by Mrs. C. Vellacott. In the Champion of Champions this class is intended to include all fishes which have been placed first in the year's table shows but owing to many reasons this is never the case. Fishes which were entered however, were placed as follows: 1 and 2, Mrs. C. Vellacott; 3 and 4, D. Curry. The third class was for plants and this was won by Mrs. C. Vellacott.

IN DECEMBER the Huddersfield Tropical Fish Society held their annual awards dinner dance and the evening was a great success, both as an official function and a pleasant social event. The awards are for results gained at the table shows, and this year there were 355 entries at the eight shows held during the year. The winners were: Livebearers: Mrs. S. Huntington. Barbs: R. Jenkinson. Cats and Loaches: H. J. Brown. Juniors: Master P. L. Gill. Ladies: Mrs. V. Hough. A.O.V. Novice: K. L. Gill. Characins: J. S. Gilpin. Danios and Rasboras: Mrs. S. Huntington. Pairs: Mrs. S. Huntington. Furnished Jar: K. L. Gill. Cichlids: K. L. Gill. A.O.V. Tropical: Master P. L. Gill. Anabantids: F. Huntington. Breeders: E. J. Brown. Toothcarps: Mrs. C. Gill. Coldwater: E. J. Brown. Trophy (for most points at table show): K. L. Gill. Most points gained at open shows: R. Jenkinson. Novice Trophy for open shows: E. Myatt. Furnished Aquarium Trophy: F. Huntington. Junior Furnished Aquarium Trophy: Master C. Harrop. Best Plant Trophy: D. L. Harrop. Writer of the Year Trophy: D. L. Harrop. Fish of the Year Trophy: J. Cartwright.

On 7th February the Society are once again scheduled to hold one of their new famous auctions. It will once again be held at the Invalid Car Club, Mill Street, Crossland Moor, and will commence at 2.00 p.m. with booking in from 12.30. There will be raffles, and refreshments on sale. Visitors are invited to bring along their surplus fish, plants and equipment.

MORE than eighty members and friends of the Whiteway and District Fishkeepers Society spent a very enjoyable evening at their Christmas social. There was a carol film show and other attractions with an excellent buffet and the juniors were also well catered for during the evening.

BLAKEBOROUGH A.S. OWING to recent changes in the Blakeborough Club policy, of which Blakeborough A.S. is part, it will not be necessary for members of the society to be employees of Blakeborough's. Anyone wishing for further information should contact the secretary, Mr. Martyn Garvey at 37 James Street, Brighouse, Yorks.

BRITISH KILLIFISH ASSOCIATION THE South Yorkshire Group of the British Killifish Association has now been formed, and meetings are held in the Ball Inn, Crookes, Sheffield on the first Monday in each month. For further details please contact: chairman, M. Hovsfield, 13 St. Leonards Way, Ardsley, Barnsley, or secretary, G. Hoyland, 36 Hazeborne Road, Oughtibridge, Sheffield.

OBITUARY IT is with deep regret that the East London Aquarist and Pondkeepers' Association

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records the death of one of its leading and most respected members, Mr. "Bill" Corby.

Bill died in September, 1975, at the age of 55, a time when he was looking forward to spending many more years in the hobby he loved so much.

Besides being a member of East London for over twenty years he was also on the Federation's List of Speakers, visiting not only local societies but many farther afield where he proved a popular speaker.

Bill entered many open shows and met with much success, but for Bill the show he always supported was the East London Annual Open Breeders' Show, where he consistently gained many awards with entries of a very high standard. Two of the fish which became synonymous with his name were the Leeri Gourami and a strain of Red-Eyed Red Swordtails to which he dedicated many years.

In addition to many other varieties of fish that he bred over the years, he always had a keen interest in the Killifish side of the hobby and at the time of his death was a member of both the British Killifish Association and the German Killifish Association.

During his years with East London, Bill held the positions of chairman, show secretary, show organiser, programme secretary (a position he held when he died).

More words can never do justice to this popular and likeable man who was always ready with words of encouragement to beginner and old-hand alike.

The hobby in general, and East London in particular, can ill-afford to lose the likes of Bill Corby, an extremely knowledgeable aquarist who would impart his vast experience to anyone who cared to listen.

To Bill's wife Jean, and their two sons, we again through these columns express our deepest sympathy.

HENDON CONGRESS 1976

ONCE again the highly successful Hendon Annual Congress will be held on Saturday, 27th March, at Whitfields Secondary School, Clarendon Road, London, N.W.2, commencing at 6 p.m.

In the past the Hendon & District A.S. have been fortunate to obtain the services of the most eminent speakers the Continent has to offer. Previously they have acted as hosts to Herr. Vogt of Germany, H. C. De Wier, Aend Van den Neuenhuizen and W. Tomey, all of Holland, Colonel Jorgen Scheel and Lief Christensen of Denmark to name but a few.

This year the services of one of the most notable personalities of France, namely Professor B. Conde, have been obtained. Professor Conde is associated with both the University and Aquarium at Nancy. The Congress will take the accepted form of previous years. Professor Conde's subjects, synchronized with colour slides, will be keeping and breeding of freshwater and Marine fishes, and of course the general hobby of fish and plants. Thus there will be an evening that will appeal to all.

Refreshments are available for early arrivals and once again during the long intervals, so there is every excuse to make this occasion a day out in London. The price of admission is Adults 75p, Children 40p.

SECRETARY CHANGES

Welwyn Garden City A.S.: E. Swift, 8 Millwards, Hatfield AL10 8UX.
Association of Midland Goldfish Keepers: D. Denny, 71 Moorfield, Stoke Alderman, Coventry.

Stanley and Consett A.S.: J. Middlemast, 96 Westfields, Stanley, Co. Durham.

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Dunlop Aquarium Keepers Society: T. Griffiths, c/o 19 Belper Street, Garston, Liverpool L19 1RG. Tel: 427 6852.

SHOW SECRETARY CHANGE

Lincoln and District A.S.: D. Driver, 6 Hawthorn Chase, Bunkers Hill, Lincoln.

AQUARIST CALENDAR

15th February: Sheaf Valley A.S. Third Open Show at the Sheffield Twist Drill Centre, Summerfield Street, Sheffield. Show Secretary, P. Stanforth, 47 Whitelorna Drive, Sheffield 5. Tel.: 662382.

22nd February: Retford and District A.S. Annual Open Show at the Market Hall, Town Hall, Market Square, Retford, Notts. Schedules from Show Secretary, B. D. Chester, 7 Rose Lea, Ordahall, Retford, Notts.

10th March: Don Valley A.S. Open Show in the Staff Dining Rooms of the British Steel Corporation, Stocksbridge, nr. Sheffield. For details please contact show secretary, C. Beomhead, 5 Broomfield Road, Stocksbridge, nr. Sheffield.

27-28th March: Federation of Scottish Aquarists' Festival, Civic Centre, Motherwell. Full details and schedules from D. Fotheringham, 23 Royal Park Terrace, Edinburgh, EH8.

3rd April: Corringham and District A.S. Open Show to be held at The Red Cross Hall, Corringham Road, Stanford-Le-Hope, Essex. Further details from D. C. North, 198 Southend Road, Stanford-Le-Hope, 77311, and B. Smith, 240 Abbotts Drive, Stanford-Le-Hope, 3768. (Schedules ready March).

10th April: Catfish Association of G.B., Annual Open Show at St. Saviour's Church Hall, Cobbold Road, London, W.12. Schedules and further details from Show Secretary, D. Lamborne, 7 Wheeler Court, Plough Road, London, S.W.11. Tel.: 01-223 2030.

10th April: Yate & District A.S. Open Show at King Edmunds School, Stanbawes Yate in Bristol. Schedules from Mr. C. Suckland, 20, Burgage Close, Clipping Sodbury nr. Bristol. (Schedules from 10th March).

11th April: Coventry Pool and Aquarium Society Open Show, Templars Junior School, The Hill Lane, Coventry. Large S.A.E. for schedule and entry form to Mr. T. Emms, 79 Edward Road, Coventry CV6 2QS.

11th April: Taurton A.S. annual open show. 11th April: Stanley and Consett A.S. Annual Show at the Stanley Community Centre, Stanley, Co. Durham. Schedules available later.

11th April: Sheffield and District A.S. Open Show, Granville College, Sheffield. Enquiries to: Mr. E. Stanton, 57 Medlock Crescent, Hansweeth, Sheffield, 13.

24th April: Chingford and District A.S. Open Show to commemorate 25th anniversary at St. Edmund's Church Hall, Chingford Mount Road, London, E.4. Schedules from Mrs. S. Harvey, 54 Kenilworth Avenue, Walthamstow, London, E.17. Available end of February.

24th April: Rhondda A.S. Open Show to be held at the Y.M.C.A., Porth, under F.B.A.S.-J.C.N.A.A. rules. Postal entries 5p per entry. On day of show 10p. For further information please contact: Show Secretary, A. Smith, 12, Glanant Street, Penygraig, Rhondda.

24th April: Bristol Tropical Fish Club Open Show at the Congregational Church Hall, Newton Street, Stapleton Road, Bristol. Tropical and Coldwater classes. Schedules and further details from show secretary, Mrs. M. C. Graham, 24, Romney Avenue, Lockleaze, Bristol BS7 9TW. Phone Bristol 695998.

25th April: Reigate and Redhill A.S. Open Show at the Village Hall, Blotchingley, Surrey. Further details later.

25th April: Yeovil and District A.S. Open Show at the School Hall, Martock, near Yeovil, Somerset.

25th April: Stockton-on-Tees A.S. are staging their eleventh Annual Open Show at Kia Ora Hall, Community Centre, Stockton-on-Tees. Details obtainable from Mr. R. Wood, 67 Victor Way, Thornaby-on-Tees, Cleveland.

2nd May: Medway A.S. Open Show at Medway and Maidstone College of Technology, Oak-

wood Park, Tunbridge Road, Maidstone, Kent. Schedules and details from Mr. C. A. Elliott, Beechwood, 72, Dargers Road, Walserslade, Chatham, Kent ME5 5BL.

2nd May: Oram A.S.

2nd May: Hull A.S. Open Show will be held at The Blind Institute, Beverley Road, Hull. Schedules from show secretary, G. Andrews, 4 Church Mount, Sproatley, Nr. Hull, North Humberside, tel: 0482 811334.

8th May: Southend-Leigh and District A.S. Open Show, St. Clement's Hall, Leigh-on-Sea, Essex. Club and individual furnished aquaria, aquascapes, marine, tropical, coldwater and junior classes included. Details from Show Secretary, D. C. M. Durrant, 172 Trinity Road, Southend-on-Sea, Essex. Tel.: 0702 610576.

9th May: Bournemouth Annual Open Show to be held on Sunday at Kinson Community Centre, Pelhams Park, Kinson, Bournemouth. Show secretary, J. V. Jeffery, 30, Braemar Avenue, Southbourne, Bournemouth BH6 HJP.

9th May: Thorne A.S. Annual Show at Grammar School, St. Nicholas Road, Thorne. All details from E. Breakwell, 12 Churchhill Avenue, Hatfield, Doncaster, S. Yorks.

10th May: Gloucester A.S. Open Show. Stainless steel tankards for 1st, trophy for 2nd, and cash prizes for 3rd in all classes. Schedules available in March from K. Taylor, 69 St. John's Avenue, Churchdown, Gloucester. S.A.E. please.

10th May: Gooles and District A.S. Third Open Show at Gooles High School. Show secretary, J. Scutli, 41 Carter Street, Gooles, North Humberside.

22nd May: Merthyr A.S. First Open Show will be held at St. Davids Hall, Church Street, Merthyr Tydfil, Glam., S. Wales. Schedules for all four places plus usual awards. Schedules available from show secretary, P. R. Stonebrow, 22 Vernon Close, Penyard, Merthyr Tydfil, Glam., S. Wales.

22nd May: Middleton and District A.S. Fifth Open Show to be held in the new Civic Hall, Middleton. Further details from Show Secretary, L. Dean, 24 Richmond Avenue, Chadderton, Oldham.

23rd May: Lincoln and District A.S. Annual Open Show will take place at the Drill Hall, Broadgate, Lincoln. Show secretary, D. Driver, 6 Hawthorn Chase, Bunkers Hill, Lincoln.

23rd May: Goodyear End A.S. Third Open Show at Newdigate School, Anderton Road,

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off Smoerall Lane, Bedworth, Nr. Nuneaton. Schedules from G. Horton, 13, Rayner Crescent, Goodyear End Estate, Bedworth, Nr. Nuneaton, Warwick. Phone Rahall 2193.

30th May: Corby and District A.S. Open Show. Sunday, at the Corby Civic Centre. F.B.A.S. rules. Details and schedules from the Show Secretary, C. McInnes, 18 Westminster Walk, Corby, Northants. Mid-March.

30th May: Bridlington and District A.S. Annual Open Show, will be held at 168derthorpe Junior School, Shaftesbury Road, Bridlington. Schedules available in March. Secretary, P. Robson, 47 Matson Road, West Hill Estate, Bridlington, N. Humberside YO16 4SZ.

12th June: Llanrwst Major A.S. Annual Open Show to be held at The Town Hall, Llanrwst Major. Plaques awarded to first in every class, and medallions to all runners-up. Schedules available April onwards from J. J. Edwards,

"Glasafon", Mill Park, Llanblethian, Cowbridge, South Glamorgan CF7 7BG.

29th June: Alfreton and District A.S. Annual Open Show at the Adult Education Centre, Alfreton Hall, Alfreton. Details from the show secretary, K. Dean, 22 Fletchers Row, Nottingham Road, Ripley, Derby DE5 3BA. Phone Ripley 3902.

27th June: Dunlop Aquarium Keepers Society Open Show will be held at the Dunlop Factory, Spoke, Liverpool. Schedules are available from show secretary, T. Hampson, 3 Madelaine Street, Liverpool, 8, tel: 051-709 5509.

3rd July: Cardiff A.S. Open Show, St. Margaret's Church Hall, Routh, Cardiff. Details later.

4th July: Grantham and District A.S. seventh annual open show.

18th July: Provisional date for Sandgrounders Annual Show at Meols Cop School, Meols Cop Road Southport. Further details when avail-

able from Hon. Show Secretary, G. A. Waterhouse, at 23 Moss Lane, Southport, Merseyside PR9 7QR. or phone Southport 24743, S. Hooton.

25th July: South Humberside A.S. First Open Show, Memorial Hall, Cleethorpes. Schedules available from G. Wilson, 100 Guildford Street, Grimsby.

15th August: Stroud A.S. Open Show at the Subscription Rooms, Stroud. Show Secretary, J. Cole, 13 The Hill, Randwick, Stroud, Gloucestershire. Tel.: Stroud 4504.

21-22nd August: Yorkshire Aquarists Festival. 22nd August: Long Eaton A.S. First Open Show. Details to follow.

29th August: The third Welsh National open show to be held at the Sophia Gardens Pavilion, Cardiff. Further details available from: C. Turner, 146 Arran Street, Routh, Cardiff. Tel.: Cardiff 498982. M. Guthrie, 4 Nurnton Close, Rhosse, Glamorgan. Tel.: Rhosse 710649.

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(Societies from outside the Scottish area are also invited to participate and are assured of a warm welcome)

ADMISSION 30p CHILDREN 10p

Entries—Society Tableaux * Trade Stands * Refreshments—Solid & Liquid

Full details and schedules from:—

D. Fotheringham Esq., 23 Royal Park Terrace, Edinburgh EH8 (Please enclose S.A.E.)