DELTA TALE

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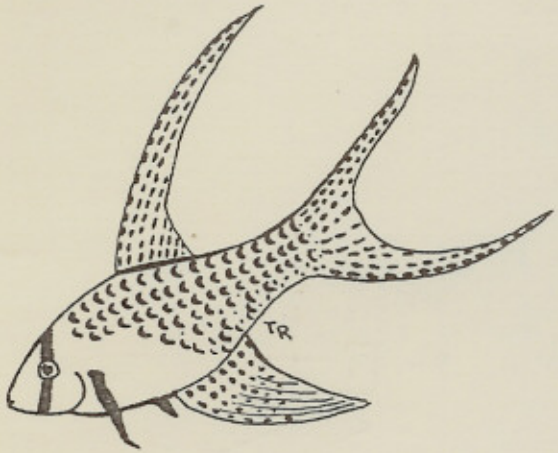
Volume 6

Issue 7



Austrofundulus dolichopterus

DELTA TALE is published for the benefit of the Potomac Valley Aquarium Society (formerly the Potomac Valley Guppy Club), a non-profit organization, established in 1960 for the purpose of furthering the aquarium hobby by disseminating information, encouraging friendly competition, soliciting participation in its show, and promoting good fellowship. Correspondence should be addressed to Secretary, P.V.A.S., P.O. Box 6219, Shirlington Station, Arlington, Virginia, 22206. Original articles and drawings may be reprinted if credit is given the author and DELTA TALE. Two copies of the publication in which the reprint appears should be sent to DELTA TALE which will forward one copy to the author. All materials for inclusion in the DELTA TALE must reach the editor no later than the Saturday after the monthly Monday meeting.

EDITORIAL STAFF

Editor: Susan Sprague
Staff Writers Ruth Brewer, Jerry Meola

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Susan Sprague

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This month's cover is of an Austrofundulus dolichopterus. It is drawn by my friend Tony Rizzuto of York, Pa. I am very pleased that he took the effort to send me a sample of some of his artwork to be used for the Delta Tale.

MINUTES OF THE BOARD OF GOVERNORS' MEETING

The Board of Governors met at the Brewer apartment on June 3 with eight members present. Discussion centered on the Spring Show and various suggestions were made for improvements in handling future shows. Gene Sergent reported that the Spring Show netted a profit of $635.12 and that we now had over $900 in the bank. The following resolutions were moved, seconded and carried: 1) to contribute $20 toward the gift for John Wolcott and, 2) to send checks covering commitments to the judges who made special trips here for the show. The President asked Chuck Story to prepare thank-you letters for his signature to others outside the club who assisted in the judging. Chuck Story reported on negotiations with a new printer for the Delta Tale. Susan Sprague asked for information from the Breeders' Award Committee regarding length of BAP reports submitted for possible publication in the Delta Tale and also asked for commitments for regular articles for the Delta Tale since it now appears that we will be able to expand the size of the bulletin. It was agreed that all who had questions or suggestions about the BAP make written requests to the BAP Committee. It was also agreed that new members might be asked to go along, as trainees, with BAP committee members on verification trips. The President reported on a recent meeting of the Salt Water Group which he and Chuck Story had attended. It was agreed to limit the July mini-auction to three bags (fish or aquarium-related items) and to set the bidding at 25¢ increments. Ginny and Chuck Story volunteered to work on the advertising campaign during the summer. Gene Sergent said that he would not be here for the Fall Show and reminded the Board that a substitute would have to be found. The meeting adjourned at 10:15.

Respectfully submitted,

Ruth Brewer, Recdg. Secy.

MEETING DATES

Board of Governors
Carl & Mary Hardy
5927 N. Kings Hwy.
Alex., Va.
765-1940
July 1 - 8:00p.m.

Saltwater group
Bill & Gay Seamans
7316 Parkwood Court #102
Falls Church, Va.
560-7842
July 20 - 4:00p.m.

July Cichlid Meeting, Barbecue and Pool Party
July 19 Rain date July 20
Jerry Meola
12415 Sandal Lane
Bowie, Md.
464-1520
Meeting 2:00p.m.
Barbecue 3:00p.m. on
Bring your own food & drink
Non-cichlid members welcome
R.S.V.P. please.

FROM THE EDITOR

I want to start by thanking Nancy Kaufman, the Education Coordinator at the National Aquarium in Washington, D.C. I, and I think everyone else who was there on June 9, was delighted with our tour behind the scenes. It gave us all an insight into the work and problems at the Aquarium. Thank you Nancy, for donating so much of your own time to us.

I've also been asked by Ann Garnar, on behalf of the Saltwater group, to announce their plans for a collecting trip for saltwater fish, brackish water fish, and invertebrates. Their plans are set for Sunday, July 6. Nancy Kaufman is helping set it up. For further information contact Ann Garnar.

It seems I've been the harbinger of sad tidings a lot lately. First, we lost John Wolcott to an out of town job and in a way that is what is happening to one of my most prolific staff writers. Jerry Meola, has bought into African Fish Imports, and will be leaving the area around August 1. We will be sorry to see him go! Maybe I can convince him to write me something every so often.

My last item is an apology to Fish Limited for not thanking them last month for donating many items to our show raffle. They donated 4 cans of Redi freeze-dried squid, and a spot brand pump-Maxi 2.

P.S. I hope you like the work done by our new printer S & C printing in Alex., Va. It sure is nice to be back to the book style format; at a better price too.

BOWL SHOW JULY 14, 1975

Guppy:	M/F AOC, Female, AOC
Cichlid:	Cent.&S.Am. med., Rift lake br.pr. not Tilapia or Haplochromis Open
Other:	Barbs, Anabantoids, Open

MEETING NOTICE - MINI-AUCTION

For the July 14, 1975 program, we will be trying something new. It will be a MINI-AUCTION. There will be certain rules to follow so everything can run smoothly.

1. Registration is from 7-8:00pm.
2. The limit is 3 aquarium related items (including fish) per membership not per person.
3. The same 75-25 split as our regular show auctions.
4. One can still have a minimum bid.

TRADING POST

Steve Siska 261-7923

Lg. br. pr. Limnotilapia dardenni	$10.00
Br. pr. labido, species.	15.00
Lg. L. joanjohnsonae	8.00
Lamprologus cunningtoni	3.00
Likoma Island elongatus m.	5.00
Ctenopoma oxynkynchus 3"	5.00
Congo tetras	1.75
Petansius rodesianses	3.00

Susan & Mike Sprague 534-7487

Haplochromis compressiceps	$2.50
P. socolofi 4"males	6.00
J. marlieri young	3.50

CHANGES TO FALL SHOW RULES

Bob Smith, the Show Chairman, would like anyone who wants changes to the next show rules to present them now. He plans to have the flyers printed soon.

KILLIES PERMANENT SET-UP

By: Judy Milgram AKA
Reprinted from The Aquarian
Feb. 1975

Being somewhat lazy and a confirmed hater of egg picking, I've always put many of my breeders in a planted "permanent" set-up. I was surprised to learn that few other killie fans use this same technique. Perhaps by sharing my experience with you, I will be able to persuade you to try it.

There are many reasons why I recommend the permanent set-up. Planted tanks are more attractive to look at and you can always drop a mop in if you simply must have a mop in every tank. But I think that the most important reason for using this technique is the great quantity of vigorous fry produced in this way. For example, a quintet of A. australe have produced 12 to 20 fry daily for more than four summer months and did pretty well the rest of the year also. I believe that the tank infusorians give the fry a much better start and perhaps the fry also benefit from the fact that the eggs do not have to be disturbed.

Another plus factor is the ease of maintenance. I find it next to impossible to keep a bare tank looking clean but the permanent set-ups always look good. They allow greater leeway for feeding errors.

During the first few weeks after setting up the tank, usually 5 gallons with one male and 3 or 4 females, I do no maintenance other than feeding; this is possible because of the underground filtration and constant addition of small quantities of water that goes along with the collecting of the fry. Using a one quart juice pitcher (square scoops catch more fry than round ones), I periodically scoop out the water. The scoop should be submerged quickly so that fry will be caught in the rapid influx of water. It's convenient to discard some of this water and replace it with fresh aged tap-water. The tank should need little other maintenance.

At first one gets nothing or only eggs (I throw the eggs back unless there are fry also) but gradually fry begin to show up in greater numbers. Fry can be combined with up to two or three weeks age difference, if the "catches" are small. It's easy to catch fry in an air line within the confines of the scoop so that no more than one quart of tank water per shoe box is used. In this way fresh water can gradually be added and an acclimatization problem will be avoided. My breeding tanks often become very acid with time, but the best results seem to occur at this time so I don't do anything about it.

These set-ups can be left up for two years or more. Every six months or so the gravel should be stirred, and if necessary, some siphoned out, washed and replaced.

As long as you want more fry, the tank should be hunted twice weekly at a minimum. I prefer scooping out and replacing one or two quarts of water daily. If you have as many fry as you want to raise, simply stop scooping and return to standard siphon tube maintenance. In the latter case, five or so fry will soon appear, grow and keep the tank

clear of other fry. Just net these out when you want more young or when they start fighting with the breeders.

Some of the fish successfully bred using this technique are A. australe, A. scheeli, A. mirabile traudeae, A. ciliae, A. bivittatum and A. gardneri. We had some, but less success with A. lineatus and R. geryi. If I had another 5 gallon tank to spare and an underground filter, I would succeed with R.petersi using this method as fry are now appearing in their almost bare tank. I suspect that any fish that requires water incubation only can be bred in this way if the plants are thick enough. The latter point is essential to keep in mind for success.

If a set-up is successful it will get clotted with plants and may occasionally need thinning. Be careful about putting these plants with other killies. Fontinalis and Water Sprite make a great combination, eat up leftovers (in chunks, eve) and spread like crazy. Madagascar lace plants do well in this type set-up, but by themselves they will not offer enough shelter.

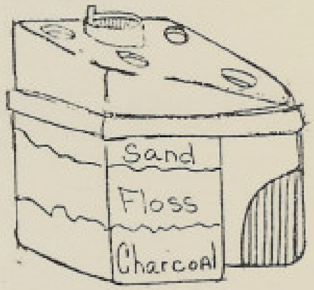
I heartily recommend permanent set-up breeding for everybody. Even if you are not lazy or couldn't care less about plants, this method will give you more and healthier fry when leaving you with more time to fuss over your peat spawners.

To join AKA write to Bev and Jerry Sellers, 1908 Bryan Rd., Brandon, Florida, 33511. Full year dues $8.50, after July 1, $6.00.

A BETTER FRY SAVING FILTER

By: Bob Rubens
Reprinted from Fish Tales, Jan. 1975 via The Filter

A highly efficient fry filter can be made from Metaframe's Bubble-up filter. Drilling four ¼ inch holes in the cap provides the tiny fry a means of escape after entering the filter's intake.



A variation from the standard method of utilizing charcoal and floss must also be adopted. The problem with floss is that fry tend to become trapped in this medium and suffocate. By using aquarium sand as the top filtering medium, the fry do not become entrapped. This is because the sand displaces a vacuum pull evenly across the entire surface. Floss tends to have 2 or 3 high vacuum spots that the fry are unable to swim away from.

This is an extremely effective means of combating fry losses due to toxic wastes building up. The sponge filters on the market now lack the means of detoxifying gas buildup, mainly charcoal.

Although other corner filters can be modified, the Bubble-up air stone aerates the water more effectively--an added plus factor to saving fry.

TELMATOCHROMIS CANINUS

By Jerry Meola, PVAS

The first time I saw Telmatochromis caninus I could not believe the teeth. I had never seen any species with "vampire" fangs. There they were sticking outside the mouth and did they ever look functional! Visions of the tremendous damage they could do danced through my head.

I am not particularly interested in collecting odd fish; anyone who is would have loved this one. I like the bright colorful species that are large enough to see from across a room in a two hundred gallon tank. Yet here I was becoming more and more fascinated with this colorless (unless you count the blushing pink streak on the gill plate), vicious looking specimen that will never get bigger than four to five inches.

I am still not sure what it was that attracted me. Telmatochromis species have three quarters of the body of a Julidochromis (the back three quarters). The head is uniquely their own. There is a slight protrusion on the top of the head, a small depression above the mouth and a tooth and jaw structure made for strong biting. Directly behind the eye back along the gill plate is a series of pink blotches. The ventral fins are very long on the male and shorter on the female (sexing by genital size is possible in this species and more accurate). The scales are accented in a unique manner. One side of the scale is darker causing the fish to be streaked diagonally along its body from the left top to the right bottom. The pattern reverses as we look back along the body breaking up to random changes of direction near the tail.

Two pair were placed in my two hundred gallon tank with some apprehension about the damage they could do. I was shocked to watch them adapt to the tank without any aggressive behavior. They have never attacked another fish. Even when they are attacked, they retreat rather than fight. One female was only one and a half inches and was never in danger despite ten inch Haplochromis dominating the tank.

One pair was sold a short time later and the other pair of a four inch male and a one and a half inch female was left in the tank.

Both fish grew rapidly in the large tank. The female grew almost an inch in six weeks. Her belly has fattened well and she has started digging a cave under the driftwood. She can breed anytime now. I may remove the pair to a twenty gallon tank to allow the spawning. It is not possible to save the fry in the large tank.

The species is a substrate spawner that has been spawned before. The reported breedings have described it as an easy spawning. Usually a small ten or twenty gallon tank is sufficient with natural cave areas or flower pots for the spawning. The species will spawn well even with a large size difference between the pair. A four inch male will spawn well with a two inch female. This is another fact that belies the agressive appearance of the tooth structure.

The teeth are functional. I recently dropped some insects in the tank I had removed from my garden. I do not know the proper name but we called them "roly-polys" when I was a child. When threatened, they roll up into a ball in their very thick shell. I expected the Haplochromis to be able to eat them but doubted that the smaller fish could chew them. The Haplochromis were able to eat them whole but I was surprised to see the Telmatochromis vigorously eating them. Insects probably play a major part in their diet. The teeth are well suited to digging through the hard shell to the inner body of the insect. I will continue to feed insects to them when I place them in a spawning tank. After all, insects are free.

USE AND MIS-USE OF THE DIATOM FILTER

By Jerry Meola, PVAS

The only sure way to keep fish healthy is to maintain the water in the aquarium as nearly pure as possible. Foul water will breed so many diseases that the expense of replacing fish will drive aquarists from the hobby.

Fish are far and away the most expensive portion of an aquarium, yet hobbyists will often spend considerable amounts of money on fish and then endanger them by "putting off awhile" the purchase of necessary support systems. Filtration is second only to water changes in importance for maintaining a healthy aquarium.

One of the most useful tools available to the aquarist is the diatom filter. Unfortunately, it is often overlooked by the beginning hobbyist and misused by others.

I will not take the position that you cannot maintain healthy fish without the diatom, but you will make it more difficult. I did not own a diatom for over a year and did OK but since I purchased one I have not shut it off, moving it from tank to tank.

The filter itself uses diatomaceous earth. Water is siphoned into a sealed jar and pumped out by a high speed pump. Filtration is effected by placing a specially designed bag between the intake and the exhaust and drawing the water through it. The bag is covered with the diatomaceous

earth which acts as the filtering medium. Diatomaceous earth is the skeletons of millions of minute organisms so small they can filter microscopic particles. There is not another filter on the market that is capable of removing particles this small.

This ability to filter microscopic particles enables the filter to remove ich and similar small parasites which is its most common use and misuse. Regular filtration is excellent for preventing the outbreak of ich and improperly moving the filter from a sick tank to a healthy one is the surest way to spread a disease. Whenever you move a diatom from a sick tank, purify the filter. You should run the diatom in a gallon of medicated water to purify it. The medication can be at super concentrated amounts since no fish are present. Pure chlorine is also useful to purify the filter. The chlorine will also dissolve the slime that builds up on the bag and improve performance. Be sure to run the filter through clear water after this treatment.

The diatom pumps water at the rate of two hundred gallons an hour. The high rate is useful to clean a tank rapidly, but at the same time the rapid water change has a tendency to remove some of the natural body slime from the fish which is necessary for their natural protection. This should be kept in mind when filtering small tanks.

There are some tricks to make the use of the filter easier. Do not use too much powder. The directions call for a cup, but I find six ounces to be more than sufficient. Too much earth only restricts water flow and requires more frequent cleanings.

The powderized carbon "SuperChar" made for the filter by Vortex is indispensible. Activated carbon is the best filtering material available for gases and bacteria. The powder is so small that it has tremendous amounts of surface area to absorb impurities. I use it after every medication of a tank before a second treatment of medication. This assures me that I will not have residual medication added to a second treatment to accidently reach toxic proportions. The biggest problem with the carbon is that it clogs the filter much faster. I have solved this problem by reducing the amount of earth to five ounces and using only two teaspoons of carbon on top of that. I also never use the carbon in the filter until I have used the diatom on the tank at least once to remove most of the impurities. If the water is reasonably clean, I can run the carbonized diatom a full day.

The filter will not work if it remains in the closet like many I have seen -- use it. The most common complaint is that the filter is too much trouble. Here are my best tips for making it easier.

If you are using the filter on a lot of tanks, buy the holder that hangs on the side of the tank. It makes life so much easier.

The pump will not work if it gets air trapped in it. Make sure the hoses are always slanting upward. Cut shorter hoses if necessary.

To load the filter easily, ignore the instructions that come with it. Get a large plastic bucket and place it in your sink. Fill it with water and run the empty diatom through it as you would filter any tank. Add the powder to the water after it is running and the filter will load itself in about ten minutes. This basic setup of a bucket and filter is adaptable to many timesaving techniques. When purifying the filter as mentioned earlier, simply add the medicine or pure chlorine to the bucket of water in extreme concentrations before adding the diatom powder. Let the filter purify itself and then rerun with clean water again with the pump doing the work. After adding the powder, if you are going to use carbon, just put it in the bucket. The filter will evenly coat itself without any effort on your part.

The best time saver is the garden hose adapter supplied by Vortex. I would never have the ambition to clean the filter without it. The adapter is threaded to fit the male thread of an outdoor faucet and has a tube extending from it to go inside the plastic tubing of the exhaust hose. Allow half the water to drain from the filter (if you do not, the water will hold the earth and sediment in place) and shake the filter vigorously. Connect the exhaust hose to the garden faucet and turn the water on. The filter should clear in less than a minute. Repeat the cycle once or twice and you are ready to reload the filter; nothing could be easier. The entire time necessary to clean and reload the filter should be less than ten minutes.

One new product from Vortex is the baby saver. All it is is a plastic mesh that fits over the intake tube to make the openings smaller. It is cheap but still over-priced. The concept is important. The flow rate is too great and will kill small babies. I used the baby saver on a tank of one half inch fry and had excellent results. I warn you that they are poorly made and break easily if you use too much force in putting them on. You would be better to wet them first. I am sure that with a little thought you can design your own. A plastic tube closed on the end by squeezing it after it is heated and then opened along its length by drilling small holes should work well.

My favorite trick is to put a long plastic tube to almost reach the bottom of the tank on the intake hose. I can then filter a tank that is not full. Whenever I change water I run the filter this way on the half full tank and filter the water twice as fast. It also removes heavier particles that would not float to the normal height of the intake hose. I also add a plastic tube to the exhaust of the filter longer then the height of the tank. I can then use the exhaust to stir the gravel by running the clean water through it. When I am not ambitious enough to do all the gravel I just stick the tube under the gravel and leave it. I can then get some under gravel flushing.

Many types of gravel, particularly the dolomite I use, will trap waste and act like a septic tank. It is necessary to stir it up and flush out the bacteria. The diatom is excellent for removing these impurities.

Fish are too expensive to let die off. The diatom when properly used is an excellent aid in maintaining a healthy environment.

DIARY OF A MAD FISHWIFE

By Susan P. Sprague, PVAS

March 2 - The pair of silver veil angels had spawned on January 18, 1975 in a ten gallon tank. The approximately 50 babies are doing fine, but the father has really been picking on the female. I finally removed her and put her with another pair of silver angels.

March 9 - I take the father angel away from his young since the ten gallon tank is quite crowded. I put him in another ten gallon tank that has lots of algae. I put the mother angel back with the father since the pair she is with keep picking on her when they spawn. Mama is certainly being kicked around!

In the breeding tank there is a 12-inch plastic Amazon sword plant and a 1/4 inch layer of white gravel. The tank temperature generally fluctuates between 76-80° F.

March 14 - I go down into the fish room in the afternoon and I see that the pair has spawned on the plastic plant. I would guess there are approximately 150 eggs. I don't add fungicide since I already know the parents take such good care of the eggs that acriflavin is unnecessary.

March 16 - I notice that the fry are at the wiggling stage. They are attached to another leaf of the plastic plant by filament-like threads on their heads. The parents mouth the fry and transfer them to other parts of the plant to keep the babies clean.

March 22 - The angel young are free-swimming. I start them on newly hatched baby brine shrimp. I feed three times a day and no more. I feel that overfeeding leads to an overabundance of bacteria which thrive on uneaten food. I feel this is one reason for mass death among young angels.

March 22-April 19 - Whenever I have no baby brine ready, I feed Tetramin E for egglayers and finely ground flake food. I also think the algae comes in handy 1) as a grazing ground for minute organisms I can see hopping about in the algae and 2) as a food source itself.

Once the fry become free swimming, I use a box filter filled with fluff and a layer of sand on top of that and no cover. This way the young angels don't seem to become entrapped in the fluff.

I try to change about 25% of the water every three days since the water does tend to foul even though I try not to overfeed. As the fry get older and bigger, I realize a ten gallon tank is not making it for mom, dad and the kids.

April 19 - I decide to test this angel pair's parental instincts. I catch both parents and put them in one bucket, then put all the fry in another bucket. I then acclimate both buckets to a newly cleared 29-gallon tank. I put two plastic 12-inch plants in and change to a Dyna-Flow filter.

I release the young into the tank first and then the parents. The mother and father check the babies over and then go about their business of checking out their new home. I guess I can say the experiment is a success.

May 22 - I finally move the 60 young angels to another 29-gallon tank so the parents can have a rest from them. The babies have a habit of picking on the parents bodies and fins to the extent that the adults have ripped fins and little sores on their bodies. I'm surprised the parents don't retaliate.

June 1 - The young are now dime-sized and ready for sale to a store or any hobbyist that wants them.

BUILDING AN UNDERGRAVEL FILTER

By Larry Wilson, PVAS

In a salt water aquarium the undergravel filter is used to both biologically and mechanically filter the water. The filter, to have maximum effectiveness, should utilize to the maximum the entire gravel bed with no spots where filter action is not possible. One of the most effective for the home aquarist (if not the most effective) can be built with a minimum of tools and expertise. You will need the following material: (1) plastic egg crating; (2) 1-1/2 inch PVC pipe; and (3) fiber glass window screen. The egg crating can be found at some hardware stores and is used primarily in fluorescent fixtures. The 1-1/2 inch PVC pipe is also found at most hardware stores. The screen can be found many places but at all hardware stores. You will need the following tools: (1) soldering iron/gun; (2) hot glue gun; (3) saw; (4) wire cutters or tin snips; (5) scissors; and (6) file or sandpaper.

First, cut a piece of egg crating as large as possible that will fit inside your tank. From scraps of egg crating make a number of sections of about four squares. These are to be the legs of the filter. The number is not critical but should be enough so that they will be about eight (8) inches apart. Lay them out on the large piece of egg crating as you want them to be when finished. With a hot soldering iron melt notches all around one side of each leg. This is so there will be no interference with the flow of the water. This doesn't have to be neat as no one will ever see it once it is installed. Heat up the glue gun and glue each leg in place. It is best if no leg is even with the edge but needs to be no further than one-half (1/2) inch from it. After you have glued all of the legs on and the glue has cooled so it is strong, turn it over. Place the fiber glass screen on top so there is at least a one (1) inch lap-over on all sides. With the soldering iron, tack the screen to the egg crating several times along each edge. This is done by pressing the tip of the iron on the screen until the plastic of the egg crate just starts to melt. I tack mine down at one (1) inch intervals and find it works very well. After the screen is tacked on the top, trim the screen with scissors so that there is a one (1) inch overlap on all sides.

Starting with any side, bend the one (1) inch overlap down tightly and tack it to the egg crating with the soldering iron. After all four sides have been tacked, bend the "ears" at each corner to the side and tack them down.

Next, cut the desired pieces of 1-1/2 inch PVC pipe. As a minimum, you should have two for up to 30 gallon tanks, three for 40 or 55 gallons and if you are lucky enough to have a 150, you should use six. The length of these tubes is dependent upon where you want to keep your water level. Generally the water level should be at least one inch below the glass cover and I now prefer something closer to two inches because it cuts down considerably on the algae growth below the lights on the glass cover. To determine the tube length, mark your desired water level and measure the distance from the bottom of the tank and subtract 7/8 inch from that distance. Cut your pipes as square as possible using a mitre box if one is available. Clean up the cut ends with sand paper or a file. Although not necessary, I then use sandpaper to remove any marks that are on the tube even though they will eventually become covered by algae.

Now, determine where you want the lift tubes to stand. This is entirely personal but I offer the following suggestions. One inch from the rear of the tank. To find the distance between the lift tubes, multiply the number of tubes by two and divide that number into the length of the tank. The result will be the distance from the ends to a tube and twice that will be the distance between the tubes. For example: three tubes are to be used for a 55 gallon tank, which is about 48 inches long. Two times three is six. Six divided into 48 is eight. The tubes would be eight inches from each end and sixteen inches from each other. This spacing will give you the most balanced coverage of your filter bed.

Mark a circle around a tube placed over each spot marked for the lift tube. Cut a hole about half as big as the one marked in the screen. Clip from the hole to just beyond the circle marked around the tube. I cut mine in eight places evenly spaced around the hole. Place the tube over the hole and pull the cut flaps from under the tube so they rest against the tube. Using the hot glue gun while holding the tube steady, glue the tube to the screen and egg crate. Use plenty of glue and see that it goes through the screen to the egg crate. Hold the tube steady for a few seconds while it cools a little, then do the next tube. After they are all done, let them cool some more, at least ten or fifteen minutes. Gently turn the whole thing over and glue the tubes to the egg crate and screen from the underside. Let cool for five or ten minutes more and the job is done. With reasonable care, the filter can now be moved about with no danger of it coming apart.

MARINE MADNESS

By: Judy Cartwright
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Working in a fish shop you hear everyday of problems that people think just appeared by magic and which can be cured by some 'chemical'. After some investigation, it's obvious that 90% of these problems arose as a result of either neglect or misunderstanding, or both, of that 'other animal' in the tank, the filter. I call it an animal because it gets better treatment when people think of it in terms of 'keeping it alive' than just installing it and expecting it to keep the tank clean. Their idea of clean, of course, translates 'clear'. By the way, you freshwater fans may stick around if you'd like because your filters work the same way marine filters do. Your animals are just less apt to suffer from the effects of impaired biological filtration. However, unless you're prepared to do massive water changes every couple days, you're going to need biological filtration. Biological filtration, briefly, means the conversion of the toxic waste products of the fishes and/or invertebrates into non-toxic forms. This is accomplished by a 'nitrogen cycle'. Very often people will call the running-in process whereby a marine tank is made safe for fishes and invertebrates the 'nitrogen cycle'. This is a misnomer. A cycle implies a process that begins and ends at the same point. The running-in process certainly does not, thank heavens. Rather, the running-in process has as an object the establishment of a 'nitrogen cycle', which then, we hope, continues to function throughout the life of the tank. Ideally, this cycle begins and ends with the fish in that the waste products of the fish are eventually converted into plant nutrients, which plants are, again, ideally, consumed by the fish, either directly (he eats plants) or indirectly (he eats a fish that eats plants). A balanced fresh water aquarium comes very close to this ideal when it contains many plants and relatively few fishes. Marine tanks depend largely upon algae as the only plant source and, obviously, considering the amount of algae grown in most marine tanks, it is a very weak link in the cycle. Here is where your biological filter comes in, although in the end it is the aquarist who must give the wheel an extra push to keep the tank safe for his fishes. He does this by way of a water exchange. But in the meantime the filter itself uses up the waste products of the fishes as its own food thereby keeping the most toxic products of elimination, ammonia and nitrite, within tolerable limits. It does this through the metabolic processes of two types of bacteria which live in the biological filter material, be it gravel or, in the case of an outside filter, the floss and carbon or charcoal. To put it simply, the urine breaks down and forms ammonia. (Anyone who has been around diapers or barns won't argue this.) One of the types of bacteria I mentioned consumes the ammonia (there's no accounting for taste), and then 'excretes' (to keep it simple) nitrite. The other type of bacteria I mentioned consumes the nitrite and produces nitrate. Ammonia and nitrite are toxic to fishes, and nitrate is not, in moderate amounts. Nitrate, the theory continues, is used by algae as a food; the algae is consumed by the fishes; and voila!, we have a cycle, a nitrogen cycle. Or so it would seem. The theory is fine and to a great extent, valid. However, like

all theories, they seem to fragment in practice. What happens with t[illegible] is that this cycle does not function completely at any one point (except, perhaps, where the fish urinates), and we are left with a circle which has a lot of loose ends spinning off it which the aquarist has to pick [illegible] somehow or his fishes will suffer.

This brings us to the point. We must understand what the filter will [illegible], and what it will not do, and what we must do to help it do it's job, and what we must do for it that it cannot do entirely alone. And we must understand that the filter is a living organism and should be dealt with as such. It must be fed. It must have oxygen. It must not be subjected to the effects of any medications we use on our fish. To paraphrase, the tank must have some animal in it at all times or the filter will starve for lack of food. The filter must have a constant supply of oxygenated water which it gets as the water is circulated through it. If the filter is turned off for any length of time, it will die from lack of oxygen. Heating tanks to 100 degrees to kill disease organisms will damage the filter as well. I can't think of any way the filter could get too cold. Any medication designed to kill parasites or bacteria will kill your filter too.

I would like to dispose of the discussion of the outside filter before we go any further. The sole function of an outside filter in my opinion, is the removal of particulate matter from the aquarium, and/or it's use as a vehicle for exposing the tank water to activated carbon. It's design procludes it from being an effective biological filter because of it's small size in relation to an undergravel filter bed; and the predisposition of it's common filter material, floss, to rot, necessitates removing the material and the bacteria living therein periodically thus interrupting the biological filtration of the tank. If you must use an outside filter instead of, rather than in addition to, an undergravel filter, the following method should be used. When you set the filter up, sandwich activated carbon, if you wish to use it constantly (and if there are invertebrates present you probably shouldn't because of it's ability to remove trace elements) between two layers of filter floss, and when cleaning the filter, replace only one of the layers at a time. Change the dirtiest one as long as it isn't the layer that comes into contact with the unfiltered water first. This is the layer containing most of the bacteria.

From here on it may be assumed that we are discussing an undergravel filter.

Now that we know we must keep the filter alive, let's see what it will and won't do, and what we can do to help it and to supplement it's activity. If it is mature, let's say a couple of months old, it will convert the most toxic products of elimination into relatively harmless forms. The presence of algae is beneficial as algae will use all stages in the breakdown of the waste products as a food source, thereby lightening the load on the filter. However, a young filter cannot take care of uneaten food or incompletely digested food. Protein breakdown (decomposing food) presents another problem - the presence of toxic substances in the water which are completely unrelated to the nitrogen

cycle we are concerned with here. to be sure, there is protein breakdown associated with elimination but this can't be avoided. Uneaten food should, therefore, always be removed from a young filter. Older filters, around one year old, seem better able to cope with reasonable amounts of uneaten food, perhaps because by now other bacteria have established themselves in the tank which can feed on the by-products of protein breakdown. These bacteria are found in the ocean and it seems possible that they might find their way into our tanks and gain a foothold there. By the way, the presence of uneaten and/or incompletely digested food (excessively large or loose feces) in the tank is the best way I know of to kill algae.

Although the filter does a tolerable job of removing ammonia and nitrite from the water, it's ability to remove nitrate is debatable. It has been reported that a bacteria that consumes nitrate exists. However, apparently even if it does exist, the job that it does in most tanks is practically unnoticeable. Nitrate in small amounts is not detrimental to the health of the animals and is of no concern in a young tank. However, after some time, the nitrate in the tank can approach levels that are debilitating to some fishes, especially in the absence of good algal growth.

The only way to remedy this situation is a water exchange. Remove some of the water in the tank and throw it away (or start another tank with it). Replace this water with freshly mixed saltwater. The amount to remove depends entirely upon the delicacy of the animals in the tank. This is something you will have to experiment with. Twenty-five percent should be safe for anything and 50% is not too much for most fishes. This is apt to depend more on the state of your finances than anything else.

The filter's ability to remove ammonia and nitrite from the tank is directly proportionate to the number of animals living in the tank. That is, the number of bacteria living in the filter is governed by the available food (ammonia) supply. If you remove one animal from the tank, theoretically some bacteria will die. This brings to mind the competition for the available food supply that goes on at all levels of existence. The importance of this situation gains impact when you lose the last animal in the tank or when you introduce additional animals to an existing system. When the last animal is gone from the tank, the bacteria can die out altogether. When you add an animal to an existing system, there will be a lag in the effective biological filtration until the bacteria have multiplied to the point where they can effectively carry the new load of animals. Minute amounts of ammonia and nitrite will be present in the tank, unmeasurable with any kits commonly available to the hobbyist, but be sure these toxic substances will be there until the filter catches up with them. Ergo--do not add too many fishes to your tank at one time.

If you lose or otherwise have cause to remove the last animal from a tank, promptly, like the same day, put something alive in there - an anemone, a crab, or some mollies. Even a pinch of dry flake food is better than nothing. During decomposition the food will form some amm-

...(It has been suggested that mischievous little boys might provide a heretofore untapped source of ammonia for tanks in limbo or running-in, but as of this writing I have not read of any such experiment along these lines. But it sounds promising, from a purely scientific point of view, of course, and off-hand I can't think of any reason why it wouldn't work.) If, however, you are dealing with an older tank that has good algae growth, this is less critical. Some of the algae will always be in a state of decomposition thus providing a source of ammonia for the bacteria and when a fish or fishes are introduced into the heretofore empty tank, the algae will aid in removing toxic waste products until the filter has caught up. In the meantime, the fish may be seen to have a fuzzy coating on their skin. This is the result of exposure to higher than normal ammonia and nitrite levels. These levels are not measurable on most kits by the way. This fuzziness is not accompanied by abnormally rapid respiration and will disappear as the filter bacteria multiply. This, however, is not a desirable situation to which to expose your prized animals and can be avoided altogether by keeping life in the tank at all times.

The oxygen supply to the filter must not be impaired at any time. Increased oxygenation of the tank water itself is beneficial, and is accomplished by agitation of the water surface however you may choose to do it. The advantage of small bubbles over large ones in the airlift of the undergravel filter is a controversy that will continue as long as both types of filters exist. I have yet to prove to myself that either has any advantage over the other. The filter material should not become so compacted that water flow through it is impossible. This water flow through the filter is the means by which the filter gets it's oxygen. Loosening the compacted areas gently is all that is necessary.

A wholesale stirring of the entire filter bed although it looks awful until it settles again is the only way I would 'clean' the filter (use a diatom filter during this). But it really isn't necessary assuming that the fish and other animals are happy otherwise. It is generally agreed that most of the bacteria live in the top inch of the filter bed. And although a tank containing few fishes in relation to the water volume will not experience any bacterial problem if the stratification of the gravel is upset, a tank with a critically heavy animal load just might. No other cleaning procedures are necessary except scraping the front glass to remove algal growth.

Your biological filter will not keep your tank water crystal clear either. Some yellowing will occur with age. Filtration over activated carbon will eliminate this. However, it may also eliminate some vital trace elements. A safer procedure would be to fill an inside box filter with a nylon stocking foot filled with activated carbon and operate it in the tank for a day or two just prior to a water exchange which will replace trace elements. It has been written that sudden carbon filtration of an old tank will cause the inhabitants to drop dead. I have never seen this happen; however, in view of this my suggestion is always that you operate this filter for only one hour the first day, two hours the second day, four hours the third day, or whatever your patience will bear. By the way, activated carbon filtration will also correct

the conditions leading to the presence of a stable foam on the water surface. A more ideal way of keeping the water from yellowing is frequent water exchanges, but depending upon the size of the tank, this is not always financially feasible.

Cloudy tanks are nearly always due to complete changing of outside filter material in a system filtered entirely with an outside filter or to overfeeding a young system (uneaten food in or on the gravel filter bed). This cloudiness will clear up by itself in time, usually a week to ten days, and the tank inhabitants may or may not suffer, depending upon their hardiness.

Injudiciousness in adding fishes to existing systems is a fine way to invite ammonia and/or nitrite toxication. Ammonia production if it is proportionate to the number of fishes in a system, is also proportionate to the size of the fishes in the system. Here is an excellent case in point. Visualize three fishes in one tank. Two of these fishes are in a process of rapid growth. The bacteria are multiplying at all times to meet the increasing load of ammonia and nitrite. This implies a constant lag in waste conversion to non-toxic forms. Now, remove the fish that is not growing and substitute one that is three times bigger. If we assume that the original fishes were all the same size, we come up with the fact that in addition to playing catch-up with the two growing fishes, the filter is now expected to process the waste of a fish three times the size of the ones that are already in the tank, an increased load of 40%! The importance of the amounts of ammonia and nitrite that will be present as a result of this is not direct, but indirect. Exposure to these substances decreases the fish's resistance to disease for the period during which the increased levels are present. The consequences are obvious.

Hopefully, it is clear by now that your filter is not an inert layer of gravel, but the home of millions of tiny, invisible bacteria that have form and substance, however small they are, and who are subject to the same laws of nature as any other living thing. They don't appear by magic, they don't live by magic, they don't reproduce by magic, and they don't die by magic, but by simple, immutable, natural laws. And the life of your tanks' inhabitants depends on them.