

modern AQUARIUM



August 2017
volume XXIV
number 6

Greater City Aquarium Society - New York

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modern AQUARIUM

Series III Vol. XXIV, No. 6 August, 2017

ON THE COVER

The subject of our cover photo this month is *Epiplatys roloffi*, a small but handsome African killifish named for the German aquarist Erhard Roloff. For information on keeping and breeding this little beauty, see Jules Birnbaum's article on page 21.

Photo by Ruben Lugo

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From the Editor

by Dan Radebaugh

In this issue you'll find, in addition to our normal fine selection of articles, photos, and announcements, a couple of items of special interest to our Greater City members. Joe Ferdenzi has been, over his tenure here, our de facto club historian. One of the things that we have not learned—until now—is exactly how the Greater City Aquarium Society came to be. I won't give away the ending here, but be sure and see Joe's article, "The Origin of the Greater City Aquarium Society," on page 5.

The other newsworthy item in this issue is the announcement of award winners from the Federation of American Aquarium Societies (FAAS) 2016 Publication Awards. **Modern Aquarium** and its authors fared quite well. We handed out most of the awards at last month's meeting, so I won't go into details here, other than to extend our congratulations to all our award winners, but check it out. Page 18. Feel free to add your own congratulations to your fellow members!

As I write this I'm trying to filter (I know, I know..) out the sound of the TV playing behind me in the same room. But it may be sending me a subliminal message. The program is **Bull**, and this episode is about hypnotic persuasion, and I may now have a better understanding of Steve Sica's fascination with duckweed. We have some evidence of this from previous articles by Steve in **Modern Aquarium**. I won't cite the issues, in case there are additional subliminal triggers intended for us in his previous writings on the subject. I myself may have been affected; I recently found myself raptly watching a program on duckweed on one of the Hitler & lizard cable channels. Be warned!

Our exchange article this month is about lighting. It seems that there's a new and improved way to evaluate the lighting systems on our tanks. Over the years I've attended more than a couple of talks on lighting systems, and they've mostly left me with a vacant stare after the first fifteen minutes or so. Nonetheless, we are advised, "Know the truth, and the truth shall set you free." Though perhaps in this case the word 'free' may not be the most apt choice. At any rate, the author makes a decent case for this new PAR system. With all the lighting choices now available, it can't hurt to have a more straightforward way to better plan our purchases.



Jules Birnbaum, one of our FAAS honorees this year, presents us with an article on keeping and breeding the very pretty killifish *Epiplatys roloffi*. A photo of his little fish (courtesy of Ruben Lugo) also graces our cover. Jules' article is on page 21, and is immediately followed by "Pictures from our Last Meeting." The Undergravel Reporter this month tells us about "Psychedelic Goldfish," and our Fin Fun puzzle is titled, "AUCTION!" Purely coincidental, I'm sure.

As indicated by the array of awards mentioned earlier, this magazine has for many years now been one of best-regarded aquarium club magazines in the country. Achieving this was, I'm sure, not easy, nor is it an easy status to maintain. On the other hand, it can be easier than you might think. You—our member/authors—are the key. All we really need are a few articles from our members.

Much as I love the contributions from our wonderful core group of writers, I'd love to see more from our newer members. Tell us about what's in your tanks! Those photos on the Facebook page are great, but in an article you can tell us why you chose the fish you chose. Did you get what you expected, or have they surprised you in some way—good or bad? You joined the Greater City because you like fish, right? So tell us what it is about your fish that you especially like (or dislike). Maybe some of us would like to give them a shot too, so tell us what to expect.

You don't have to be an accomplished writer. We have editors and proof readers to help you out and fix inadvertent errors. Try it—you might like it!





GCAS Programs

2017

It is our great fortune to have another admirable cast of speakers who have so graciously accepted our invitation to join us throughout the coming season, bringing us their extensive knowledge and experiences. You certainly won't wish to miss a moment of our prominent guests, not to mention the friends, fish, warmth, and camaraderie that accompany each meeting.

March 1	Joseph Ferdenzi <i>Killifish Demystified</i>
April 5	Michael Marcotrigiano <i>Breeding Show Guppies</i>
May 3	Michael Lucas <i>Butterflies in the Water: Discovering Hydrophlox Shiners</i>
June 7	Joseph Graffagnino <i>My New Fishroom</i>
July 5	Horst Gerber <i>Decorating Your Fish Tank</i>
August 2	A Night at the Auction
September 6	Emily Voigt <i>The Dragon Behind The Glass</i>
October 4	James Perrenod <i>Discus</i>
November 1	Karen Pattist <i>Koi Appreciation – Kohaku</i>
December 6	Holiday Party!

Articles submitted for consideration in *Modern Aquarium* (ISSN 2150-0940) must be received no later than the 10th day of the month prior to the month of publication. Please email submissions to gcas@earthlink.net, or fax to (877) 299-0522. Copyright 2017 by the Greater City Aquarium Society Inc., a not-for-profit New York State corporation. All rights reserved. Not-for-profit aquarium societies are hereby granted permission to reproduce articles and illustrations from this publication, **unless the article indicates that the copyrights have been retained by the author**, and provided reprints indicate source, and that two copies of the publication are sent to the Exchange Editor of this magazine. For online-only publications, copies may be sent via email to donnste@aol.com. Any other reproduction or commercial use of the material in this publication is prohibited without prior express written permission.

The Greater City Aquarium Society meets every month, except January and February. Members receive notice of meetings in the mail. For more information, contact: Dan Radebaugh (718) 458-8437 or email gcas@earthlink.net. Find out more, see previous issues, or leave us a message at our Internet Home Page: <http://www.greatercity.org> or <http://www.greatercity.com>.

President's Message

by Horst Gerber

Watch out, members, we have set our eyes on you! We are hosting our biggest auction in years! We are bringing in a wide variety of items from members. It will be our biggest auction of the year. I can't say of the century, because we are planning an even bigger one for 2018, with plenty of bargains. Get ready to participate in our famous battleground, the Queens Botanical Garden, for choice aquarium and hobby-related items. So, fellow aquarists, put your hands in your pockets, open your wallets—open them wide and let the moths out—you're in for a new experience! Remember, it's for a good cause—your club! There will be bargains galore!

If you're reading this President's Message (and I know all of you read it diligently each and every month), by now you probably understand that this will be no ordinary monthly auction. We are replacing our 'silent auction' with an 'all out' auction. You never know what the cat (I mean our members) will drag in. One thing we do know—there will be something for everyone. Let's make it the biggest ever! So shocking you will drop your coffee cup and your pants for the unbelievably low prices.

This is one of those rare meetings where you can talk during most of the meeting and discuss your strategies for the best buy with your buddies. And I'm not talking about Best Buy electronics store. Any noise level is acceptable until the auction begins. Nobody will whistle or blow the air horn to keep the noise level at a reasonable level, or even ring a bell! (Hmm. I haven't done that yet!) But once the auction begins don't make me need to use any of the above noise reduction schemes. After all, we have to give the auctioneer a chance to squeeze the last dollar out of you and get rid of all the stuff! Nobody wants to schlepp all their stuff back home. Well, maybe some new stuff, but that's another story. Point of interest: we have a divorce attorney on board if needed.

So stay calm, relax, zip it, and pay attention. That way you can determine who outbid you, and deal with it later in the parking lot. Let's make this auction a HUGE success, and turn my fantasy to reality. Remember, you are here for enjoyment and recreation, and to escape the everyday pressures of the turbulent world that surrounds us.

Horst

P.S. Sometimes I surprise myself with how I come up with all these messages.



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The Origin of the Greater City Aquarium Society

by Joseph Ferdenzi

As the unofficial historian of this society, I've always wondered about what led to its formation. In my History of the Greater City Aquarium Society (**Modern Aquarium**, November 2012), I speculated that it had something to do with the demise of the Ridgewood Aquarium Society. Well, a recent event has led me to conclude that my speculation was partially correct: it did have something to do with the Ridgewood Aquarium Society, but not for the reason I believed. What was this recent event?

It starts with a man by the name of Neal Teitler. That name may not be familiar to many of you, but Neal was a member of Greater City in the 1960s. During that time he authored **Know Your Goldfish** for the Pet Library series, which after being published by Tropical Fish Hobbyist Publications, was reprinted under the title, **The ABCs of Goldfish**. Also during

that period Neal became friends with many of the luminaries of the aquarium hobby—William T. Innes and Herbert R. Axelrod, to name two. But Neal also developed friendships with professional “fish people,” such as James Atz and George Myers.

Neal had been out of the US for a long time—he spent 40 years working on various projects in Japan. He only returned within the past five years, and has been living in California. Recently, some family business required his return to the New York City area where he was born and raised. This in turn led him to contact Greater City via our Web site. One thing led to another, and before long Neal had sent me some wonderful archival material, related to the Ridgewood A.S., as well as our own society. I was also pleased to have him as a guest at my home on a pleasant Sunday, where he regaled me with one fascinating story after another. One of those recollections is the subject of this article.

Neal has always had an abiding interest in the history of our hobby, and so it was that one day he was having a conversation with the already-mentioned George Myers, or more properly, Dr. George S. Myers. Dr. Myers may not be well-known to many of you today, but he was one of America's most famous ichthyologists of the 20th century. His accomplishments are far too numerous to list here, but suffice it to note that, in addition to being a distinguished professor at Stanford University for decades, he described

numerous new fishes that are now staples of our hobby—the most prominent being the neon tetra—and was a prolific writer and editor for many landmark hobby publications (such as all the major Innes ones in the 1930s). But long before he became this world-famous ichthyologist, he was a boy growing up in northern New Jersey who was very much fascinated

by aquariums, and he participated in the local hobby scene for all of his life. Doctor Myers passed away in 1985 at the age of 80.

I have given you this very summary background about Dr. Myers and Neal so that you will have some context for the story that is about to unfold. Given Neal's membership in Greater City, it was only natural that one day (decades ago) Neal would broach the subject of Greater City's origin with the very knowledgeable Dr. Myers. And indeed, Dr. Myers was personally familiar with what had occurred. What Neal learned is now presented for the first time in writing.

At the beginning of the 20th century, there were many German immigrants in New York City, and many of them settled in a neighborhood in the southern part of Queens County known as Ridgewood. Quite a few of these immigrants brought with them their love of the aquarium hobby, and subsequently



Neal Teitler (left) with the author

formed the Ridgewood Aquarium Society. In the 1920s this was a very active society—it held shows, and briefly published a top-flight magazine. Despite the presence of English-speaking members, most of the membership of Ridgewood predominantly spoke German. As a consequence, many of the speakers invited to make presentations at the monthly meetings did so in German. This, quite naturally, eventually led to a rift between the German-speaking members and those who did not speak that language.

It was largely as a consequence of this division that some of the Ridgewood members decided to form a new aquarium society where English would be the dominant language. These break-away hobbyists decided to call it the Greater City Aquarium Society, in tribute to what they hoped would be its inclusiveness of hobbyists from throughout New York City. And so there you have it: the reason behind the origin of our club.

Not coincidentally, when Greater City was formed it had its meetings in Brooklyn, though very close to the border with Queens (for example, the Highland Park YMCA), which was not far from the Ridgewood neighborhood. Of course as we all know,

Greater City went on to great accomplishments, and has been in continuous existence since 1922.

The Ridgewood Aquarium Society survived into the 1930s, but as the influx of German immigrants declined, so did the need for an aquarium society catering to those who spoke only German. Its membership finally dwindled to the point of non-existence, and the Ridgewood A.S. faded into the mists of history. This narrative is also something I learned from Neal based on his conversations with Dr. Myers.

To accompany this article I have copied two items that illustrate some of what I have recounted. One illustration (see facing page) is a list of the members of the Ridgewood A.S. from their 1924 show journal. Examining that list will reveal the predominance of German surnames. The other illustration (below) shows a 1932 article from the now-defunct newspaper, the **Brooklyn Daily Eagle**, which reports on the results of an expedition to Mexico by Dr. Myron Gordon that was supported by funds from the Greater City Aquarium Society—a testament to the fact that our society has always been at the forefront of our hobby, and worked together with the prominent ichthyologists of the day, such as Drs. Gordon and Myers.

The Brooklyn Daily Eagle (Brooklyn, New York) · Sun, May 29, 1932 · Page 14

Expedition Sends New Tropicals to N. Y. Supporters

Members of the Greater City Aquarium Society aren't getting much sleep these Spring nights. At least 22 of them who contributed \$100 each to the tropical fish expedition conducted in Mexico by Dr. Myron Gordon, Cornell University scientist, aren't.

They are too busy caring for and studying the rare specimens of cold water pygmy live-bearers which Dr. Gordon shipped them from Mexico.

None of the specimens have ever made an appearance in Brooklyn before and none of them are recorded in reliable books dealing with pygmy fishes.

This makes the care of the fish entirely a matter of experimentation and to complicate matters, the greater percentage of the new arrivals have given birth to young during the past week.

Hurry Call

A hurry call has been sent to Dr. Gordon requesting full information as to the exact species to which the fish belong, the proper diet for them and the approximate temperature of the water in their natural habitat.

Among those who contributed to the Mexican expedition and who received fish from Dr. Gordon are:

Harry Plotnick, 1000 Lafayette Ave.
E. C. Graze, 66 Elliott Place, South.
B. A. G. Reuter, 1925 E. 21st St.
Henry J. Hammer, 15 Stanhope St.
H. J. Jacuruso, 60 Bulwer Place
C. D. Williams, 96 Bradford St.
H. J. Ahlers, 9522 80th St. Woodhaven.
Frederick Ahlers, 9748 80th St., Woodhaven.
L. Berkitz, 246 Beach 119th St.
J. W. Briggs, 119-02 91st Ave.
Robert Moran, 106-03 103d Ave., Richmond Hill.
Joseph Appel, 8717 81st Road, Glendale, Long Island.
Henry H. Drucker, 1861 86th St.
George Hergert, 8621 75th St., Woodhaven, L. I.
William H. Meyer, 406 Willoughby Ave.
Stanley N. Walker, 16-15 Putnam Ave.
George Florschutz, 108-18 Jerome Ave., Ozone Park, L. I.
Alois Gross, 5979 Herbert St., Maspeth, Long Island.
George Johnson, 287 Autumn Ave.
Mrs. M. McGee, 282 Hewes St.
Kenneth Schupp, 25 Windsor Parkway, Oceanside, L. I.
Joseph Kemmerer, 18 Sophie St., Maspeth, L. I.
Mrs. E. S. Moodie, 128 Montague St.

The Ridgemoor Aquarium Society

OF GREATER NEW YORK

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Member list from a 1924 show journal





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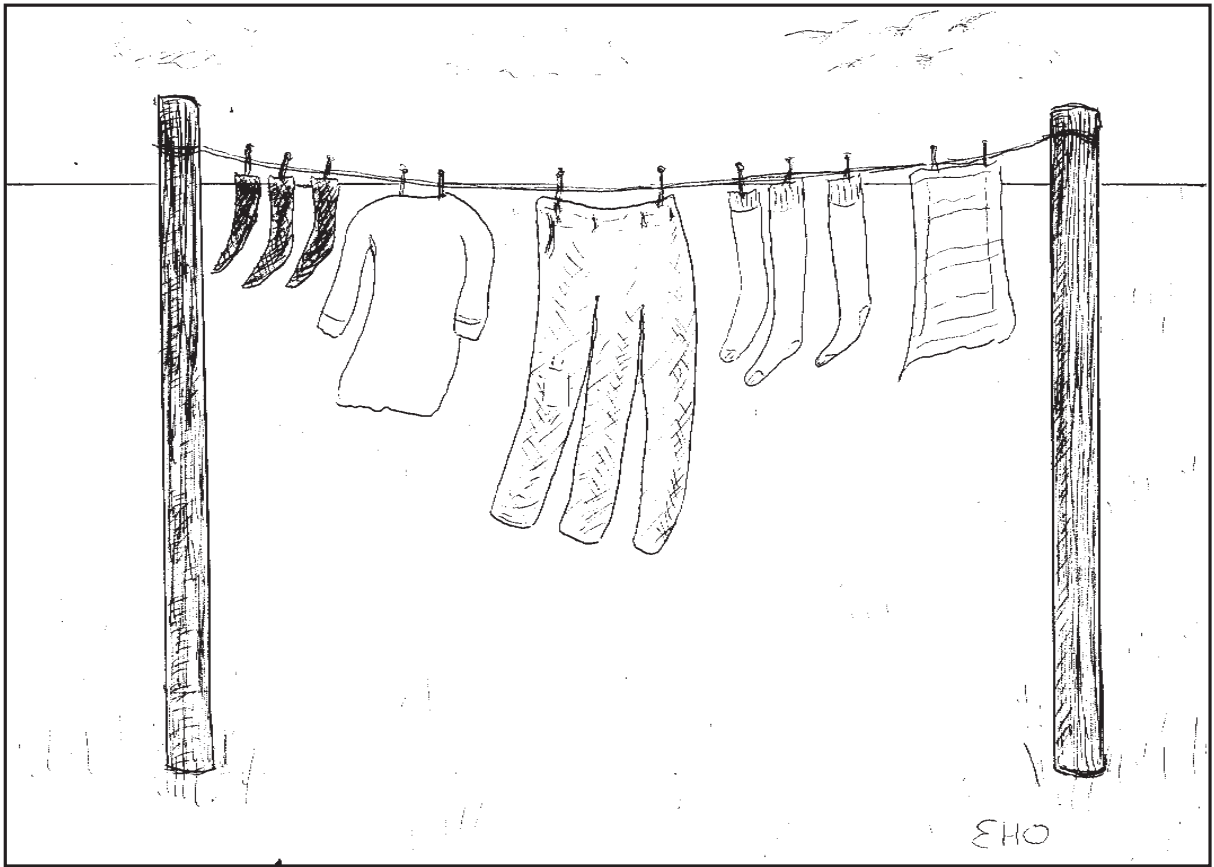
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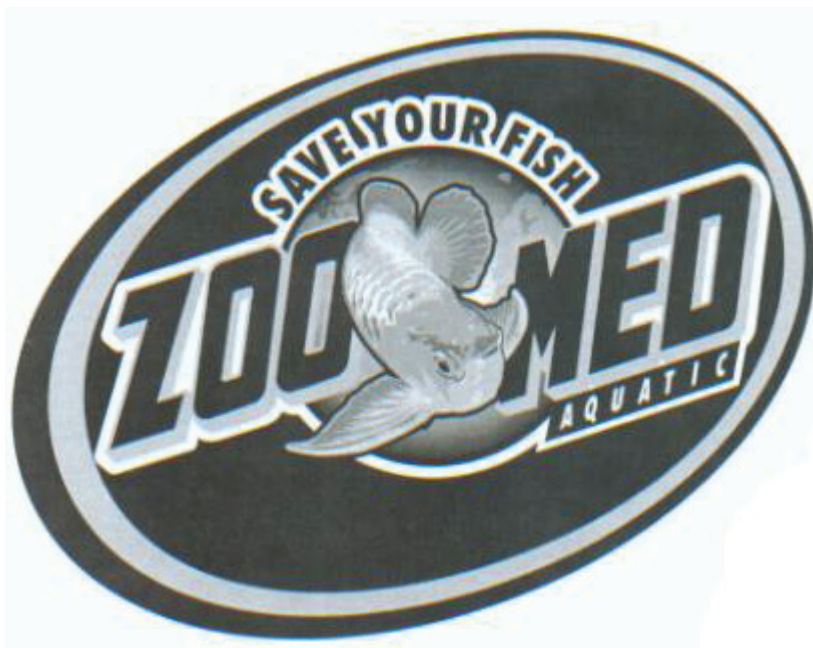
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July's Caption Winner: Denver Lettman

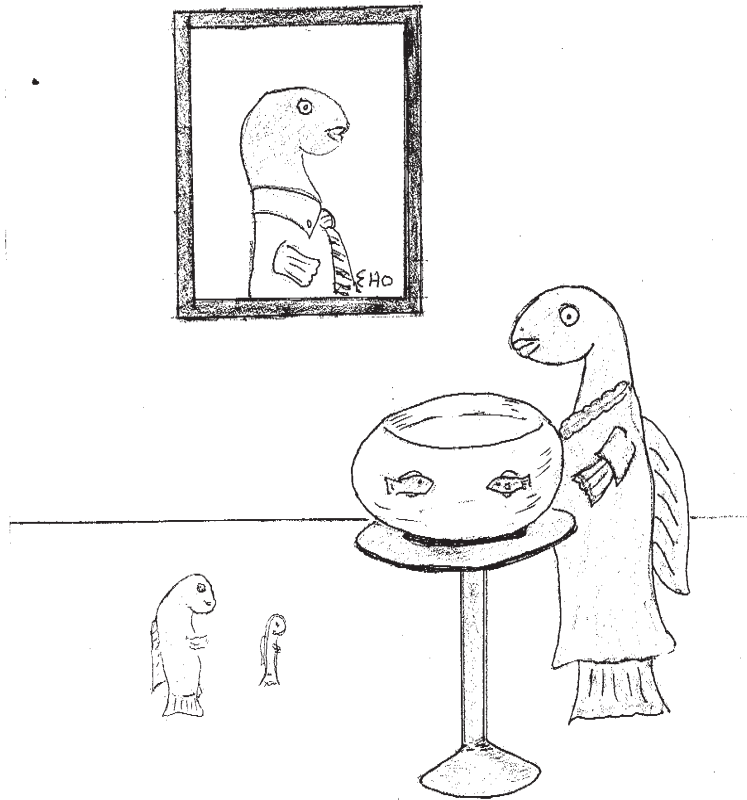


Laundry Day in Fukushima



The Modern Aquarium Cartoon Caption Contest

Modern Aquarium has featured cartoons before. This time though, you, the members of Greater City get to choose the caption! Just think of a good caption, then mail, email, or phone the Editor with your caption (phone: 347-866-1107, fax: 877-299-0522, email: gcas@earthlink.net. Your caption needs to reach the Editor by the third Wednesday of this month. We'll also hand out copies of this page at the meeting, which you can turn in to Marsha before leaving. Winning captions will earn ten points in our Author Awards program, qualifying you for participation in our special "Authors Only" raffle at our Holiday Party and Banquet. Put on your thinking caps!



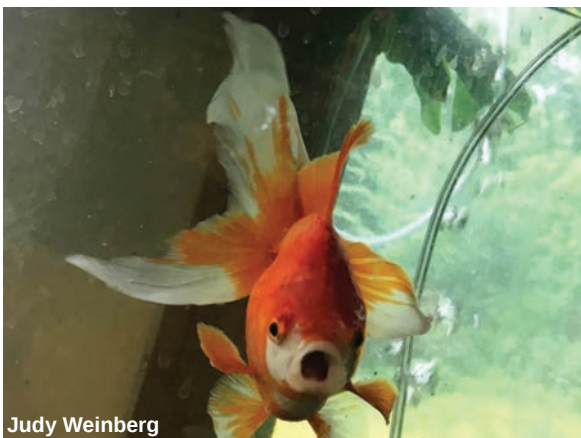
Your Caption:

Your Name:

Fishy Friends' Photos

by Greater City Aquarium Society Fishy Friends

Below are photo submissions to our “Fishy Friends” Facebook group. I’ve left the subjects unnamed, but not the photographer. If you see a shot you like, and want more info, ask the photographer about it! I’m sure he or she will be delighted to tell you!



Duckweed: Still A Delight!

Story and Photos by Stephen Sica

I think that it was at the April auction of the Greater City Aquarium Society's monthly meeting. The final item for sale was a modest bag of duckweed (*Lemna minor*). Knowing his audience, Ed Vukich casually raised the bag and authoritatively stated one dollar. After a second or two, as no one seemed to want the duckweed, I raised my hand and soon became the winning, and might I add, the only bidder for one small bag of duckweed for one dollar American. I'm not sure why I purchased it. I guess the price was right. I thought that I saw Ed give the auction runner who was standing at his right side a look that said, "Who in their right mind would ever pay a dollar for a little bag of duckweed?" Maybe I was being too sensitive, or perhaps my imagination was in under-drive. I mean, it was only one dollar. I proudly took home my duckweed.

On the drive home I was recalling to Donna that I had written an article about duckweed two or three years ago when I bid on a fish that came in a bag with some duckweed. Earlier this year, Dan Radebaugh forwarded an e-mail to inform me that my article about duckweed originally published in **Modern Aquarium** in 2015 was being reprinted in an out of town publication. I believe that it was only the second article that I have written that was ever republished. Talk about getting a big head! I think that the bigness of my rather small head had increased by at least half a hat size. I was quite pleased.



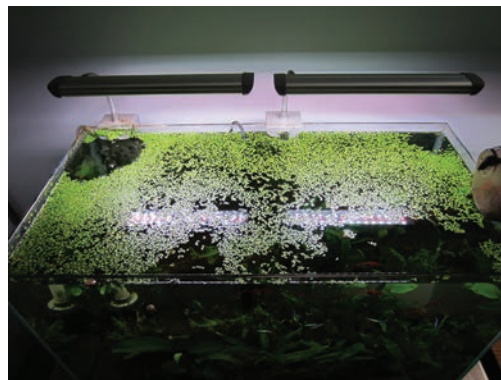
From this angle it seems that the fish are quite pleased with their "leafy" canopy. The Duckweed helps deflect the bright lights of the twin LED fixtures.

It is true that I was searching for a new subject at the time, but I was truly flattered that my article about duckweed had been reprinted. I mean no slight to the society that republished it. It made me very proud, but after all, when all is said and done, duckweed is still duckweed, if you know what I mean. It is difficult to come up with original ideas that might interest a few readers. Plus, I often like to add my idea of subtle humor to some of my articles, especially when I get carried away. Donna describes my writing as whimsical. I would assume that anyone who seriously

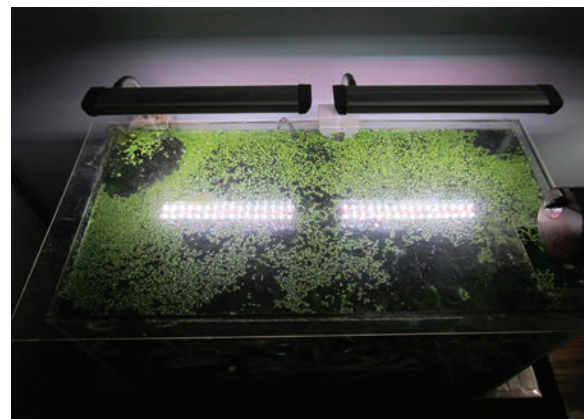
writes about duckweed needs to be fanciful, or at the very least a little quirky, or as my wife would say to me, "You put a lot of whimsy into that article." Thank you Donna.

Anyway, I know that the illustrious editor of this prestigious publication does an incredibly amazing and fantastic job, if I may borrow a few profound thoughts and favorite adjectives from our recently elected president (not Horst; the other one). Dan can downright make duckweed into a masterpiece! Now let's get back to our subject.

In a quote from Peter Hiscock's *Miniencyclopedia of Aquarium Plants*, "Duckweed is adaptable, fast growing, hardy, and has no specific requirements, but is often considered a pest. In good conditions it spreads rapidly..." I borrow this quote from my original article. I believe that when you have difficulty growing live plants, which I plainly admit, duckweed



A dollar's worth of Duckweed floats upon surface of my seventeen gallon open top aquarium.



A thin sheet of clear Plexiglass covers the top of aquarium. An open top disadvantage is rapid evaporation and an occasional fish suicide. It greatly disturbs me to lose fish in this manner.

is not a pest whether it grows slowly or quickly, as long as it grows.

When we arrived home after the meeting I put the duckweed, still inside its little bag, into a clear plastic container next to my aquarium. I wanted it to receive light from the aquarium's LED system. I left the duckweed in place for almost a week. I think that I was too lazy to do anything, but I am unsure. At Donna's prompting, I finally poured all of the duckweed into the tank, after checking that it was still in good condition. It spread out and covered most of the surface of my modest seventeen gallon tank.

In an article that was published in the June **Modern Aquarium**, I had mentioned that in May we had visited several wineries on the shores of Cayuga Lake. Early one morning we drove to Cornell University in Ithaca, New York, and took a walk through a woodsy bird sanctuary on Cornell's property. The woman in charge said that we could take our dog Cordelia on the walk. She warned us that a school group was arriving soon, so immediately we went off walking through a small woods. We soon came upon a

succession of informational road map signs. All stated that dogs were not allowed, so armed with the nice lady's permission, we decided to walk with dispatch.

There were several ponds on the perimeter of the woods. One small pond was particularly well-hidden. Upon reaching its bank and gazing down upon it, I was amazed that its entire surface was covered by duckweed. We walked a little further and discovered another pond half covered by duckweed. For a fleeting moment I thought that I had struck gold! But it was only duckweed. I kept thinking about a dollar a bag. If I was able to scoop some of it up, would it be stealing? Is it even possible to steal something like duckweed? Either way, I didn't have a bucket or net handy, so I'll never know. Soon afterward, I began experiencing duckweed withdrawal. But I'm already beginning to feel better.

PS: Donna has told me that I no longer talk about Ed Vukich in my sleep.



An underneath view of the duckweed floating on the surface



While walking through a woods on the campus of Cornell University in Ithaca, NY we came upon a small pond. The surface was covered with duckweed! Recalling my duckweed purchase at the GCAS auction a few weeks earlier, visions of dollar bills began cascading into my head.



Soon we came across another pond with duckweed. I almost blurted out, "My dog (since I am not the owner of a kingdom) for a bucket and a net!" but caught myself. I did entertain for a moment, "or maybe my wife?" but I knew that neither offer could be formulated into a viable plan, so I wisely kept my thoughts to myself. Besides, you all know that I really wouldn't trade my wife or my dog for a bucket of duckweed.



Family = Duckweed? NOT!





BOWL SHOW RULES

There is a Bowl Show at every GCAS meeting, except our Night at the Auction meeting (August) and our Holiday Party and Awards Banquet meeting (December). These shows are open to all members of GCAS. Rules are as follows:

- Only current GCAS members may enter fish in the Bowl Show.
- There is a limit of 2 entries per member per meeting.
- Unlike some other clubs, every month is an “open” Bowl Show at the GCAS (i.e., there is no “theme,” such that one month cichlids are judged, the next livebearers, the next anabantoids, etc.).
- Any fish that wins any prize (1st, 2nd, or 3rd) may not be entered again in the same meeting year.
- The current Bowl Show Coordinator is Leonard Ramroop, who usually also serves as judge (although guest speakers are often asked to do the judging honors).
- 2.5 gallon containers are available for use (brought to the meetings by the Bowl Show Coordinator), but entrants are responsible for providing enough (and suitable) water for their fish.
- For a fish too large (or too small) for those containers, entrants must supply a suitable container, which must be clear on at least three sides.
- Only one fish per container (i.e., no “pairs”).
- No plants, ornaments, or equipment (filters, airstone, etc.) are allowed in the judging tank (an external mirror, or opaque cards between containers is acceptable, as is a cover that does not obstruct side viewing).
- Points are awarded: 5 points for 1st Place, 3 for 2nd Place, and 1 for 3rd Place.
- Ribbons are awarded: blue for 1st Place, red for 2nd Place, and green for 3rd Place.
- The person with the most points at the end of the meeting season receives the Walter Hubel “Bowl Show Champion” trophy at the Awards Banquet.
- The decision of the judge(s) is final.
- A running UNOFFICIAL total of the points awarded is printed in **Modern Aquarium**. Only the tally of points maintained by the Bowl Show Coordinator is official.
- **In case of ties:**
 - 1st Tiebreaker – most 1st Places
 - 2nd Tiebreaker – most 2nd Places
 - 3rd Tiebreaker – most entries

Lighting an Aquarium with PAR instead of Watts

by forum member Hoppy
at The Planted Tank.net

Before any discussion of aquarium lighting can proceed, we have to first debunk the myth about “watts per gallon” being a measurement of light intensity.

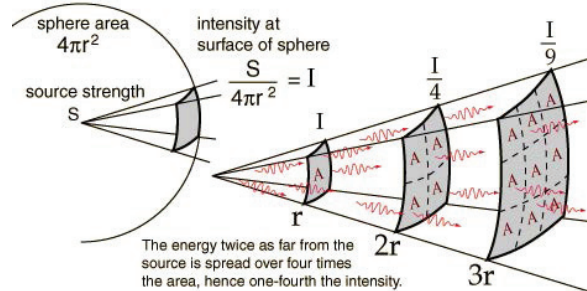
When the only practical source of light for a planted tank was T12 fluorescent tubes, someone decided that the way to pick out the best lighting was to figure out the “watts per gallon” that were needed to grow various types of plants. This would make sense if we could pour a teaspoon of watts of light into a tank and get a light concentration of X watts per gallon of water, just as we pour a teaspoon of potassium nitrate into the tank to get a nitrate concentration of Y mg per liter of water. But light is nothing like a chemical—you can’t pour it anywhere, you can only shine it on something. That alone should debunk “watts per gallon” as a measure of light intensity.

But there is more. Let us assume that we have two 20 gallon tanks, each with 40 watts of T12 fluorescent light—2 watts per gallon. One tank is a 20L and one is a 20H. The 20L tank is 12 inches high, and the 20H tank is 16 inches high. If the fluorescent light sits right on top of each of the tanks, the light on the 20H tank is 4 inches farther from the substrate—33% farther. Because light intensity drops approximately proportional to 1 divided by the distance squared, the intensity at the substrate in the 20H tank has to be about 56% of that at the substrate in the 20L tank. That alone *also* should debunk “watts per gallon” as a measure of light intensity.

Still more! Let us assume that we have two 20H tanks, one with a 40 watt T12 light sitting on top of the tank, and the other with the same light hanging 12 inches above the top of the tank. Again, because light intensity drops approximately proportional to 1 divided by the distance squared, the intensity at the substrate for the tank with the light hanging 12 inches above the top of the tank must be about 32% of the light intensity of the tank with the light sitting on top of the tank. So that is three strikes against “watts per gallon.” But it goes on! Assume that we have two 20H tanks, one with 40 watts of T5HO light from a Tek light fixture, the other with 40 watts of T12 light. Anyone who has looked at both a T5HO bulb and a T12 bulb when they are lit up knows that the T12 bulb can be stared at without distress, but the T5HO bulb causes some temporary blindness if you look at it for more than a few seconds. The

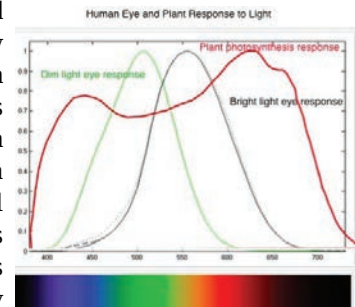
T5HO bulb is much, much brighter, and so has to give much more light at a given distance than the T12 bulb. “Watts per gallon” is dead!

PAR: Light intensity can be measured in lux, which is the intensity as perceived by human eyes. Or it can be measured in PAR units, which is the intensity as perceived by plants. PAR is an acronym for “photosynthetically active radiation”—the radiation



(light) that is used by plants for photosynthesis. The units of PAR are micromols of photons per square meter per second. So a PAR of 1 is one millionth of a mole of photons striking a one square meter area every second. Human eyes see the yellow-green area of the spectrum of light very well; our eyes are very sensitive to yellows and greens, but we see reds and blues much less well. Plants are very sensitive to reds and blues, absorbing most of the light in those colors, but are less sensitive to yellows and greens, reflecting a lot of the light in those colors. That is why most plants look green or yellow to us.

MEASURING PAR: The best way to find out how much light intensity we have in our planted tanks is to measure it. To do that we must use a PAR meter. A few years ago the only available PAR meters cost a few thousand dollars apiece. Now there are much cheaper PAR meters available. You can buy a Quantum PAR meter, Model MQ, for \$329 plus shipping. That is a near laboratory quality meter, with a guaranteed calibration, which can be recalibrated at the factory when needed. It is the Cadillac of hobbyist PAR meters, usually bought only by clubs,



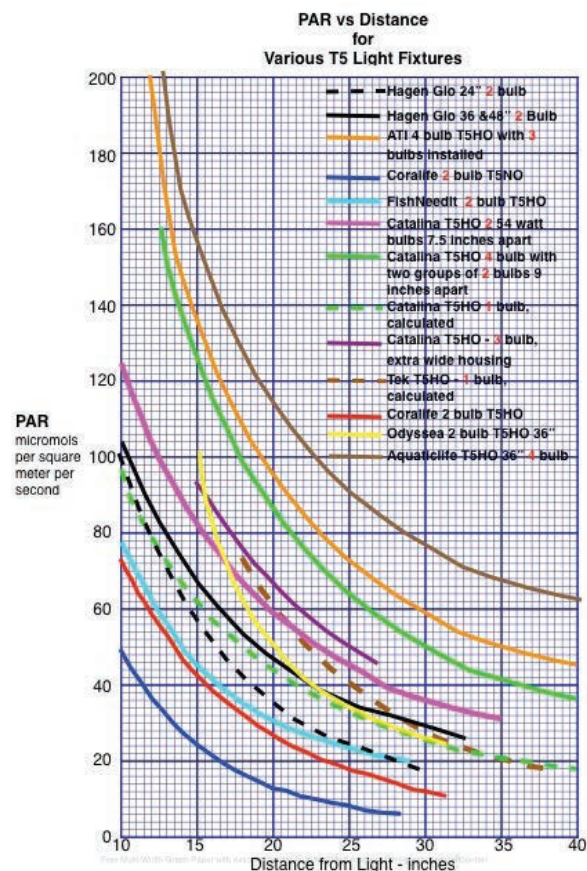
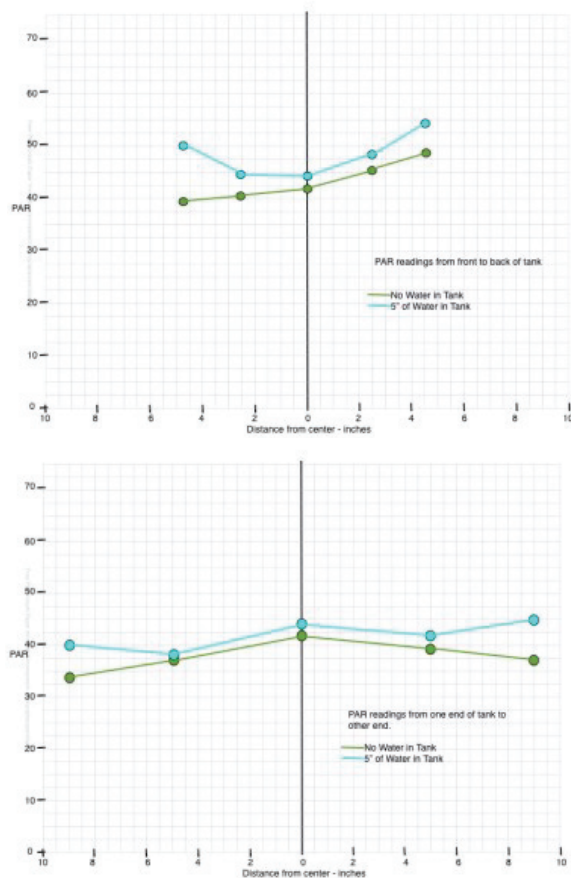
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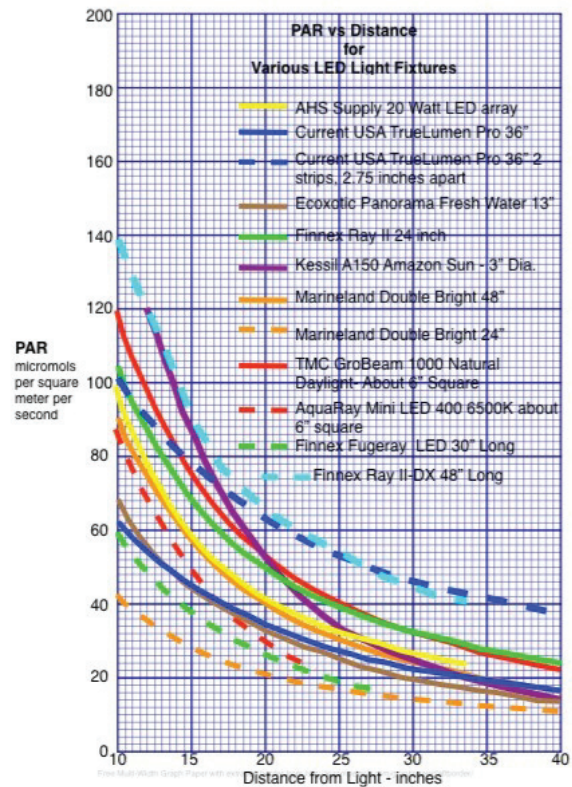
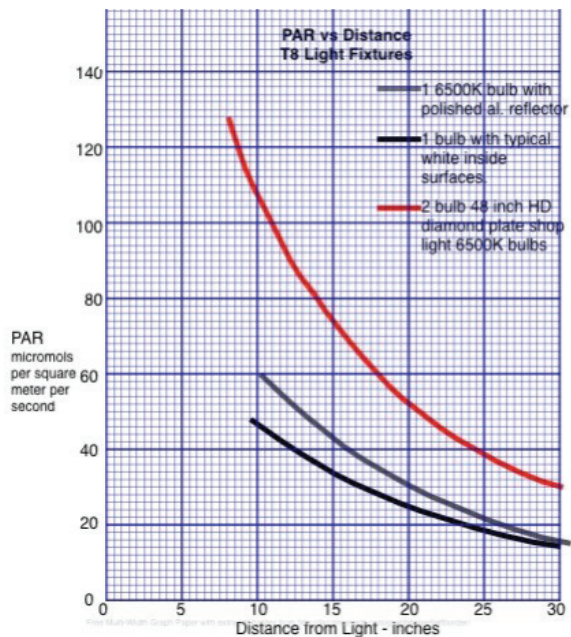
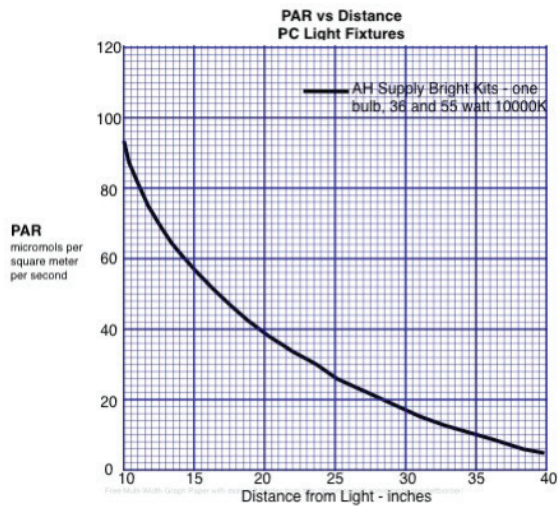
where many members can use it. A lower priced version of the Quantum PAR meter is just the sensor, Model SQ, for \$139 plus shipping. To use this you need to either have a good millivolt meter, which gives the best accuracy, or a cheap lux meter, like the Mastech LX1010BS, from Amazon.com, at about \$20 plus shipping. Used with the lux meter, you need to do your own calibration. You can use your digital multi meter, with a millivolt scale and the sensor, to determine the PAR from a light at a fixed distance, then connect the Mastech lux meter to the sensor to see what the meter reads at that PAR. This gives you a calibration constant for that combination of sensor and meter to convert lux to PAR. Still cheaper is to buy one of the DIY PAR meters made by Mistergreen and/or O2 surplus, for about \$60. These are calibrated, and the meter reads in PAR units, but they may not be available when you want to obtain one. Cheapest is to buy a Mastech LX1010BS, at \$20 plus shipping, and modify it yourself per Convert Lux meter to PAR meter. You have to calibrate this yourself, but the total cost should be \$35 or less. If the Quantum PAR meter is the Cadillac of PAR meters, this unit is the refurbished Volkswagon bug of PAR meters.

SELECTING A LIGHT: Before we can even start to measure the light intensity, or PAR, that a given light will provide on our tank we first have to obtain the light. It may seem that we have to be working blind when we make this selection, given that knowing the “watts per gallon” won’t tell us anything about

the intensity we will get. But because there are now many PAR meters in hobbyists’ hands, we currently have a lot of data on how much PAR we can get from several different lights, made by several different manufacturers. More data becomes available every month. Today we can choose one of several different types of lights: T5HO fluorescent lights with 1,2,3,4, etc. bulbs, T5NO fluorescent lights, T8 fluorescent lights with 1,2,3,4, etc. bulbs, PC power compact fluorescent lights with 1 or 2 bulbs, LED lights of many configurations: DIY or ready-made CFL screw-in fluorescent lights. For each of those types of lights a chart can be made showing the PAR produced by the light versus the distance from the light. These charts show the light intensity as measured without a tank of water being involved, just the intensity as measured in air. This is necessary to avoid the many variations in intensity caused by the tank dimensions and the cleanliness of the tank glass, both of which can have about a 10-20% effect on that intensity.

LOW LIGHT, MEDIUM LIGHT, HIGH LIGHT: I don’t believe there is any consensus about the definitions of low, medium and high light. But here is my definition, subject to (and almost certain to) change: Low light: 15-30 micromols of PAR. CO2 is not needed, but is helpful to the plants. Medium light: 35-50 micromols of PAR. CO2 may be needed to avoid too many nuisance algae problems. High light: more than 50 micromols of PAR. Pressurized CO2 is essential to avoid *major* algae problems. The following charts show the data that I now have for various lights.





As I gather more data I will keep updating these charts and adding new ones. If you want a light that isn't included in the charts you can study the reflectors used in the light you want, and compare them to the photos following the charts to see which charted light is closest to the one you want. Fluorescent tube lights produce about the same light intensity for any length of tube, from about 24 inches to at least 60 inches. The longer bulbs are proportionally higher in wattage, so that the bulb wattage is mostly a measure of the

bulb length, not the bulb brightness. For bulbs shorter than 24 inches this may not be true.

CAUTION: Not all lights use a true, full power HO ballast. Some cheaper models use lower power ballasts, and will not produce as much PAR as those with good ballasts. an example. One layer of window screen over the bottom half of each bulb, right on the bulb, drops the PAR by about 30%





2016 FAAS Publication Awards



The Federation of American Aquarium Societies (FAAS), formed in 1973, is a service organization of and for aquarium societies of North, Central, and South America.. FAAS has a publication awards program to recognize the efforts and contributions made by aquarium societies and their members to promote interest in the tropical fish hobby by sharing information and encouraging communication by way of a hobby publication. The results of the 2016 judging are below.

Best Editor/Publication >6 issues a year

- | | |
|------------------------------|-------------|
| 1) Karen Murray | KWAS |
| 2) Dan Radebaugh | GCAS |
| 3) Karen Haas, Kurt Johnston | ACLC |

Best Editor/Publication <6 issues a year

- | | |
|---|-------|
| 1) Cheryl Rogers, Karen Randall,
Jennifer Williams | AGA |
| 2) Gerald Griffin | FOTAS |
| 3) Chris Eichrodt | CCAC |

Best Changing Cover - Original Art

- | | |
|------------------------------|-------|
| 1) Karen Haas, Kurt Johnston | ACLC |
| 2) Jennifer Williams | AGA |
| 3) Gerald Griffin | FOTAS |
| HM) Karen Murray | KWAS |

Best FAAS Related Article

- | | |
|-------------------|-------|
| 1) Gerald Griffin | FOTAS |
| 2) Chris Eichrodt | CCAC |

Best Exchange Column

- | | |
|------------------|------|
| 1) Kurt Johnston | ACLC |
| 2) Kurt Johnston | ACLC |
| 3) Kurt Johnston | ACLC |

Best Review Article

- | | |
|--------------------------|-------------|
| 1) Susan Priest | GCAS |
| 2) Jules Birnbaum | GCAS |
| 3) Susan Priest | GCAS |

Best Spawning Article, under 500 words

- | | |
|------------------|------|
| 1) Bradley Moore | CCAC |
| 2) Bobby Sutton | CCAC |
| 3) Dave McKane | CCAC |
| HM) Tarri Bain | CCAC |

Best Spawning Article 500 to 1000 words

- | | |
|---------------------------|-------------|
| 1) Al Ridley | KWAS |
| 2) Alan Rollings | ACLC |
| 3) Joseph Ferdenzi | GCAS |
| HM) Greg Steeves | FOTAS |

Best Spawning Article, more than 1000 words

- | | |
|-------------------|-------|
| 1) Gerald Griffin | FOTAS |
| 2) CJ Bourg | FOTAS |
| 3) Alan Rollings | ACLC |

Best Article on a Genus of Fish

- | | |
|-------------------|-------|
| 1) Greg Steeves | FOTAS |
| 2) Gerald Griffin | FOTAS |

Best Article on a Species of Fish

- | | |
|-------------------------|-------------|
| 1) Al Ridley | KWAS |
| 2) Karen Murray | KWAS |
| 3) Dan Radebaugh | GCAS |
| HM) Jayne Glazier | KWAS |
| HM) Stuart Morley | KWAS |

Best Article on Aquascaping or Design

- | | |
|----------------------|------|
| 1) Tony Gomez | AGA |
| 2) Karen Murray | KWAS |
| 3) Zenin Skomorowski | KWAS |
| HM) Karen Murray | KWAS |

Best Article on Plant Maintenance / Cultivation or Reproduction

- | | |
|---|-------|
| 1) Ole Pedersen, with Anne B. Hinke, Dennis Konnerup, Anders Winkel | AGA |
| 2) Karen Murray | KWAS |
| 3) Keith Arnold | FOTAS |
| HM) Alan Rollings | ACLC |

Best Show Article

- | | |
|-------------------------|-------------|
| 1) Gerald Griffin | FOTAS |
| 2) Dan Radebaugh | GCAS |
| 3) Kyle Osterholt | FOTAS |
| HM) Clay Trachtman | FOTAS |

Best How To or Do-It-Yourself Article

- | | |
|----------------------------|-------|
| 1) Karen Haas | ACLC |
| 2) Mike and Lisa Hufsteler | FOTAS |
| 3) Lilian Stroh | KWAS |
| HM) Charley Grimes | CCAC |

Best Article on Health or Nutrition

- | | |
|-------------------------|-------------|
| 1) Robert Channen | KWAS |
| 2) Karen Murray | KWAS |
| 3) Al Ridley | KWAS |
| HM) Susan Priest | GCAS |

Best Collecting Article

- | | |
|------------------|-------|
| 1) Karen Randall | AGA |
| 2) Marco Arroyo | FOTAS |

Best Traveling Aquarist Article

- | | |
|-----------------------|-------|
| 1) Greg Steeves | FOTAS |
| 2) Joel Antkowiak | ACLC |
| 3) Zenin Skomorowski | KWAS |
| HM) Zenin Skomorowski | KWAS |

Best Humorous Article

- | | |
|------------------------------------|-------------|
| 1) The Undergravel Reporter | GCAS |
| 2) Susan Priest | GCAS |
| 3) The Undergravel Reporter | GCAS |

Best Cartoon	
1) Elliot Oshins	GCAS
2) Elliot Oshins	GCAS
3) Elliot Oshins	GCAS
Best Conservation Related Article	
1) Greg Steeves	FOTAS
2) Greg Steeves	FOTAS
3) Greg Steeves	FOTAS
Best Continuing Column	
1) Rachel O'Leary	AGA
2) Dan Radebaugh	GCAS
3) Cavan Allen	AGA
HM) Karen Haas	ACLC
Best Article, All Other Categories	
1) Joseph Ferdenzi	GCAS
2) Joseph Ferdenzi	GCAS
3) Dan Radebaugh	GCAS
HM) Stuart Morley	KWAS

Author of the Year	
1) Greg Steeves	FOTAS
2) Gerald Griffin	FOTAS
3) Karen Murray	KWAS
Best Article on a Species of Fish (junior)	
1) Benjamin Gantz	ACLC
2) Dalton Stoner	ACLC
Best Marine Article - Invertebrates (junior)	
1) Zack Brideau	KWAS
Best Article on Plant Maintenance / Cultivation or Reproduction (junior)	
1) Holly Bolander	ACLC
Best Article on Health or Nutrition (junior)	
1) Brittney Leister	ACLC
Best Original Artwork (junior)	
1) Xavier Deng	GCAS
2) Adrian Deng	GCAS
Best Article, All Other Categories (junior)	
1) Zachary Leitner	ACLC
2) Zach Uggowitzer	ACLC

Legend:

ACLC	Aquarium Club of Lancaster County
AGA	Aquatic Gardeners Association
CCAC	Circle City Aquarium Club
FOTAS	Federation of Texas Aquarium Societies
GCAS	Greater City Aquarium Society
KWAS	Kitchener-Waterloo Aquarium Society

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The breeding and care of *Epiplatys roloffi*

by Jules Birnbaum

A pair of this peaceful little (1.5-inch) killifish was given to me by a fellow Long Island Killifish Association (LIKA) member, doing his part to try to keep this endangered little fish going in the hobby.

Epiplatys is from the Greek, epi meaning above, on top of, and platys, meaning flat or broad, in reference to the flat dorsal surface of the anterior half of the body in members of this genus. Roloffi is from the person for whom the fish was named.

This killifish comes from Liberia in Africa. It was introduced to the hobby in the 1970s, and named for Erhard Roloff, a German aquarist, who collected the fish in 1971. The fish has a muted chocolate/brown coloration. As with most killies, the male has all the color. Since many female killifish look pretty much alike, you would want to keep different species segregated in a species-only tank.

I housed my pair in a 5-gallon tank with a sponge filter and a breeding mop. The pH runs about 7.2 and the temperature stays about 74°F. I should explain a little bit about the mop, which looks rather like an aquatic plant hanging from the surface to the bottom of the tank. Mine was made from synthetic yarn attached to a floating ping pong ball, but a wine cork can also be used as a floatation device. Several years ago Joe Ferdenzi was kind enough to give me one of his breeding mops. The purpose is to allow the female to deposit her eggs on and in the mop. You can use any color synthetic yarn except for white. A white mop with the clear eggs just would not work well. I use a green color for my mop, which gives me an easy time harvesting eggs.

No other plants or decorations are used, because I want to make sure the pair uses the mop. I inspected the mop daily for some time, but no eggs were visible, so I decided to perform a 50% water change a few times a week and start heavy feedings of brine shrimp and blackworms for conditioning. After a week or two, eggs started appearing near the top of the mop. I harvested approximately five or six eggs a day. These eggs are fairly firm, and easy to pick off the mop with a thumb and forefinger. The clear eggs were placed in a flat 12-inch tray with about two inches of water. No

filtration was used, although I would think filtration might be helpful. Two drops of Aquaflavin were added to the water to inhibit the growth of bacteria. The eggs get very dark just before hatching. None of these eggs showed signs of fungus; if they had I would have pulled them out. I also added a small amount of Java moss, which houses microorganisms for starter fry to feed on, and a couple of snails to eat excess food and encourage beneficial bacteria.

After approximately 14 days I had the thrill of seeing at least a dozen very small fry. I started feeding them a small amount of microworms, and Golden Pearls powdered fry food.

I performed daily 20% water changes (avoiding scooping up any of the fry).

After a week I added a drop or two of brine shrimp. After three weeks I placed the fry in a one-gallon plastic tank with a small sponge filter, and after one month the fry were transferred to a 2.5 gallon tank with a small sponge filter. I now do water changes of 50% a couple of times a week. A tank top is required, as killifish are jumpers—In their African or South American biotope they have to be able to jump from one puddle to another. As adults they will find the smallest opening to try to escape a fish tank. They hit the floor on the run, so wear your sneakers. I recently chased one all the way across my fishroom before he jumped into my net.

There are alternate ways to harvest and hatch killifish eggs. One way is to remove the parents, or just remove the entire mop to a grow-out tank. After all the effort of raising the fry separately, I recently found several fry swimming with the parents. I guess the fry ate whatever they could find until they were large enough to eat the brine shrimp I was feeding the parents.

Our large monthly auctions usually have a few pairs of killifish available. If you want a real treat try a pair! We have several killifish experts in our club. These people can be very generous. They will also show you how to make a mop for the female to use to deposit her eggs. A 2.5 gallon tank and a small box or sponge filter are all that is required. No substrate should be used (makes for easier maintenance).



Photo from Oliver Buisson: Images.killi.net



Pictures From

Photos by various members

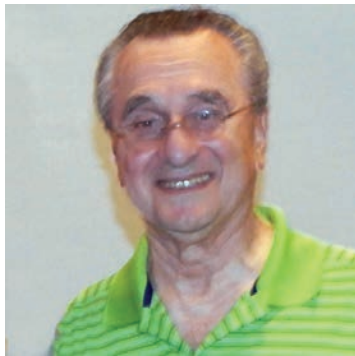


Our President, Horst "The Rock" Gerber



He talks to us about decorating with rocks

GCAS winners of the 2016 FAAS Publication Awards:



Jules Birnbaum



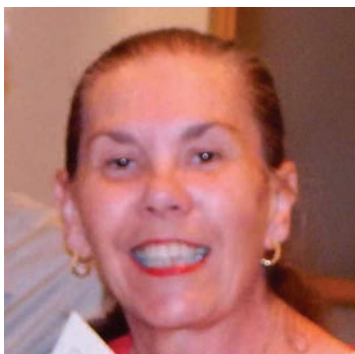
Joe Ferdenzi



Elliot Oshins



Dan Radebaugh



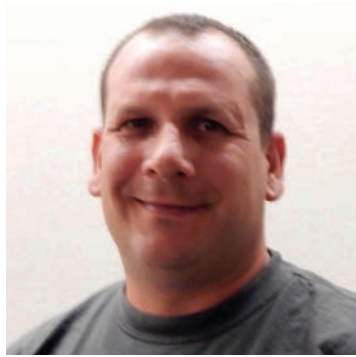
Sue Priest



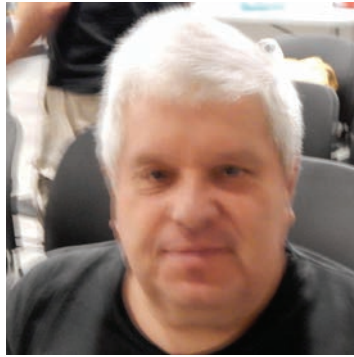
The "Undergravel Reporter"

Our Last Meeting

We warmly welcome our newest members:



Dennis Dietrich



Herb Karen



Kristofer Knowles

Bowl Show Winners:



1st & 3rd place: Rich Waizman



2nd place: Bill Amely

Door Prize Winner:



Roger Brewster

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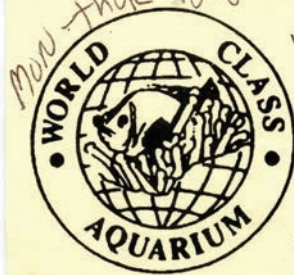


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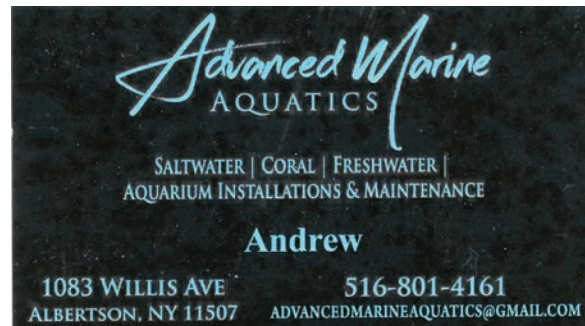
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Meeting Reminders



Almost every month at least one meeting reminder postcard is returned undelivered. Sometimes the member moved and just forgot to update his or her contact information with Greater City. Other times, well it's a mystery—the address was correct, but the Post Office marked it as “undeliverable.”

Unlike some aquarium societies, at Greater City there is never a charge for non-members to attend, there is no “bidder card fee” to bid on items in our monthly auctions, the refreshments are free to everyone at the meeting, and anyone can purchase raffle tickets. But membership does have its privileges, including this award winning magazine, door prize chances, the ability to participate in our bowl shows, and advance reminders of our meetings. If you have an e-mail account, please consider getting your meeting reminders by e-mail, instead of by postcard. You will be getting two notices (one a week in advance, the other a day in advance) instead of only one, and the chances of non-delivery are virtually none (unless you change your e-mail address). While it's a very small thing, you'll even help the environment by using less paper. An e-mail sign-up sheet is at the membership/Modern Aquarium table, or send an e-mail to gcas-webmaster@usa.net.

New Book from an NJAS Member!

Now Available On:
amazon.com

E-Book Edition and
Print Edition— both in Color!*



The beauty and novelty of a backyard pond is on the wish list of people from all walks of life. But the required space, landscaping, logistics, maintenance, and expense drives many away from this dream. The solution is the freestanding container pond or water garden, also known as a tub or patio pond. If you are plagued by a black thumb, this is no-fail gardening. If you are an aquarium hobbyist (or just want fish without the tank), you can take your hobby outside to breed or maintain interesting fishes and other aquatic life with minimal effort.

Written by the hobby's leading voice on "summer tubbing," *The Tub Pond Handbook* is the most comprehensive guide to date on the subject. Topics covered include: philosophy and advantages to container ponding; tub selection and preparation; plant and fish selection, care and propagation; design ideas; pest control; timetables; maintenance; and working with temperature, light, and water to create a biologically balanced container pond that requires little maintenance and no moving parts (except the fish). At 180 PAGES with OVER 100 COLOR IMAGES, *The Tub Pond Handbook* will inspire, instruct, and be a handy reference source for container and patio pond hobbyists for years to come.



A Comprehensive Guide to
Creating and Maintaining Patio
Ponds, Container Water Gardens,
and Tropical Fish Breeding Tubs

* if your previously purchased a print edition that came in BxW, you can return it to Amazon as their "Look Inside" preview showed color. All print editions are now guaranteed to be full color when purchased



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GCAS Classifieds

FOR SALE: African cichlids -- all sizes, as well as tanks and accessories.
Call Derek (917) 854-4405

FOR SALE: 45 gal Tall tank w/black stand, hood, light.
 46 gal Bow brown tank w/stand, hood, light
 20 gal tank w/hood, light, filter

Call 516-567-8641

WANTED: 48" Strip light: Fluorescent or LED.
Call Ron (718) 464-8408



GCAS Happenings

August

Last Month's Bowl Show Winners:

1 RICHARD WAIZMAN	GOLD HALFMOON
2 WILLIAM AMELY	RED DRAGON BETTA
3 RICHARD WAIZMAN	BLUE & WINE

UNOFFICIAL 2017 BOWL SHOW TOTALS:

WILLIAM AMELY	15	RICHARD WAIZMAN	13	CARLOTTI DEJAGER	8
JEFF BOLLBACH	5	ED VUKICH	4		

A WARM WELCOME BACK TO RENEWING GCAS MEMBER RON KASMAN!

A SPECIAL WELCOME TO NEW GCAS MEMBERS DENNIS DIETRICH, HERB KAREN, AND KRISTOFER KNOWLES!

Meeting times and locations of some of the aquarium societies in the Metropolitan New York City area:

GREATER CITY AQUARIUM SOCIETY

Next Meeting: September 6, 2017

Speaker: Emily Voigt

Topic: *The Dragon Behind the Glass*

Meets: The first Wednesday of the month (except January & February) at 7:30pm:
Queens Botanical Garden

43-50 Main Street - Flushing, NY

Contact: Horst Gerber (718) 885-3071

Email: gcas@earthlink.net

Website: <http://www.greatercity.org>

BIG APPLE GUPPY CLUB

Meets: Last Tuesday each month (except Jan, Feb, July, and August) at 7:30-10:00pm.

Alley Pond Environmental Ctr.: 228-06 Northern Blvd.

Contact: Donald Curtin (718) 631-0538

BROOKLYN AQUARIUM SOCIETY

Next Meeting: September 8, 2017

Speaker: Joshua Wiegert

Topic: *Brackish Water Fish*

Meets: 2nd Friday of the month (except July and August) at 7:30pm:

NY Aquarium - Education Hall, Brooklyn, NY

Call: BAS Events Hotline: (718) 837-4455

Website: <http://www.brooklynaquariumsociety.org>

LONG ISLAND AQUARIUM SOCIETY

Next Meeting: September 15, 2017

Speaker: TBA

Topic: TBA

Meets: Olive Garden Restaurant

257 Centereach Mall,

Centereach, NY 11720

Phone: (631) 585-4027

For map directions, go to olivegarden.com/locations/ny/centereach/centereach-mall/1507.

Email: Margaret Peterson - president@liasonline.org

Website: <http://liasonline.org/>

EAST COAST GUPPY ASSOCIATION

Meets: 2nd Tuesday of each month at 8:00 pm.

Alley Pond Environmental Ctr.: 228-06 Northern Blvd.

Contact: Gene Baudier (631) 345-6399

NASSAU COUNTY AQUARIUM SOCIETY

Next Meeting: September 12, 2017

Speaker: TBA

Topic: TBA

Meets: 2nd Tuesday of the month (except July and August) at 7:30 PM

Molloy College - Kellenberg Hall ~1000 Hempstead Ave -
Rockville Centre, NY

Contact: Mike Foran (516) 798-6766

Website: <http://www.ncasweb.org>

NORTH JERSEY AQUARIUM SOCIETY

Next Meeting: July 20, 2017

Speaker: TBA

Topic: TBA

Meets at: Days Hotel, East Brunswick NJ

Contact: NJAS Hotline at (732) 332-1392

Email: tcoletti@obius.jnj.com

Website: <http://www.njas.net/>

NORWALK AQUARIUM SOCIETY

Next Meeting: August 17, 2017

Speaker: Dr. Paul Loiselle

Topic: TBA

Meets: 8:00 P.M. - 3rd Thursday of each month except for
July & December at: Earthplace - the Nature Discovery
Center - Westport, CT

Contact: Sal Silvestri

Call our toll free number (866) 219-4NAS

Email: salsilv44@yahoo.com

Website: <http://norwalkas.org/>

Psychedelic Goldfish?

A series by "The Undergravel Reporter"

In spite of popular demand to the contrary, this humor and information column continues. As usual, it does NOT necessarily represent the opinions of the Editor, or of the Greater City Aquarium Society.

For 10 years Hidetomo Kimura has staged an annual "Art Aquarium" exhibition. The 2017 edition of the show, which opened July 7, features no less than 8,000 sea creatures, including 5,000 goldfish in 130 faceted glass tanks, lit with colored lights.



The "Art Aquarium 2017" exhibition at Nihonbashi Mitsui Hall, Tokyo. Courtesy of China Global TV Network via Facebook

Kimura's psychedelic display showcases the many kingyo varieties in sculptural fishbowls. Some are shaped like Japanese lanterns, while others are embellished with lace trim. Still others feature concave and convex lens that magnify or otherwise distort the view of the tanks.



The "Art Aquarium 2017" exhibition at Nihonbashi Mitsui Hall, Tokyo.

Courtesy of China Global TV Network via Facebook.

Tickets cost 1000 yen (\$8.75), with several special evening performances, featuring traditional Japanese music, taking place during the exhibition's run.

Goldfish, called kingyo by the Japanese, were first imported from China in the early 1500s, and have been carefully bred to create ornamental creatures with exaggerated features.

The fish unwittingly become part of the art, in some cases swimming back and forth against an LED screen featuring sakura blossoms floating gently on the wind. A new piece for 2017 features Black Moor goldfish, imitating Japanese ink painting by projecting their constantly moving shadows onto a white screen.

I guess this is better than those "picture frame" wall mounted tanks.



References

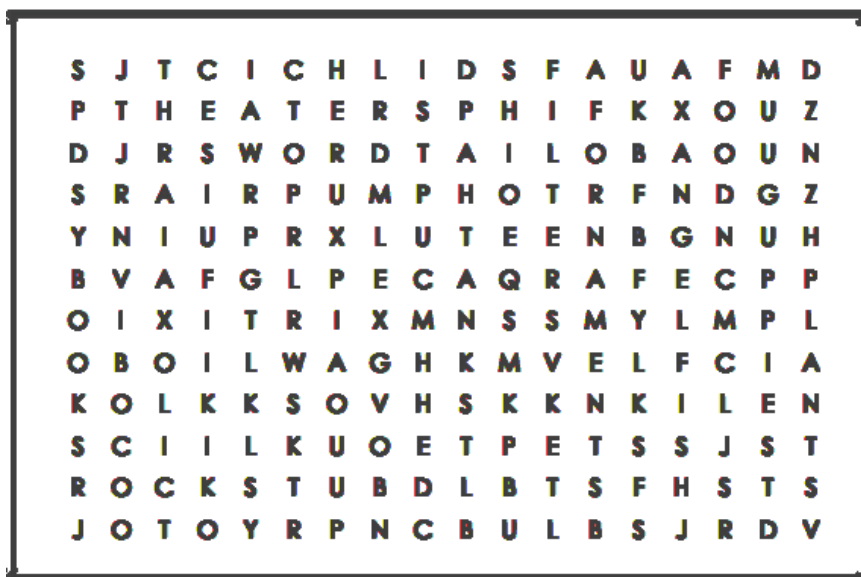
<https://news.artnet.com/exhibitions/art-aquarium-japan-1017791>

Note: "Art Aquarium 2017" is on view at Nihonbashi Mitsui Hall, COREDO Muromachi 1, 4F, 2-2-1 Nihonbashi Muromachi, Chuou-ku, Tokyo, July 7–September 24, 2017.

Fin Fun

AUCTION!

Find the items often found in our auctions in the word search puzzle below



ROCKS
PLANTS
FILTERS
GRAVEL
TANKS
HEATERS
STRIPLIGHT
ANGELFISH
CICHLIDS
SNAILS
BULBS
FOOD
DRIFTWOOD
AIRPUMP
GUPPIES
SWORDTAIL
BOOKS
ORNAMENTS

Solution to our last puzzle **FAMOUS FISH**



Zappa confluentus
(Frank Zappa)



Materpiscis attenboroughi
(David Attenborough)



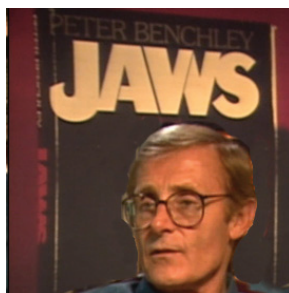
Etheostoma teddyroosevelt
(Theodore Roosevelt)



Pycnomma roosevelti
(Franklin D. Roosevelt)



Tosanoides obama
(Barack Obama)



Etmopterus benchleyi
(Peter Benchley)



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