

modern AQUARIUM



July 2021
volume XXVIII
number 5

Greater City Aquarium Society - New York

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Series III Vol. XXVIII, No. 5 July, 2021

ON THE COVER

Our cover photo this month comes from our Fishy Friends Facebook page, and features a rainbowfish, *Melanotaenia* Sp. Bindoola Creek. The Bindoola Creek is located in Western Australia. This writer has been unable to find the species listed on the usual search sites, but it's certainly a striking fish!

Photo by Rob McAlister

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From the Editor

by Dan Radebaugh

Well, I must say that in this pandemic-plagued year I certainly did not expect to have not one, but two new authors in a single issue of **Modern Aquarium!** But it happened! See “My Life With Fish” by Jason Gold (page 6), and “An Appreciation of Our *Synodontis* Catfish” (page 17) by Arthur Mayer.

And these are not the year’s only new member-authors! In March we had a wonderful debut article by another new member, Jack McDonnell! These are all in addition to the contributions from our familiar and valued member-authors, who have also stayed busy this year! There’s even a Letter to the Editor this month! Look in the right-hand column on this page. Read ‘em and smile!

Our prolific “two Joes” (Graffagnino and Ferdenzi) weigh in with an article apiece. Joe Graffagnino’s “How Do Fish Age?” is on page 10, and Joe Ferdenzi’s “Heaters 101” is on page 15. Separating these two is this month’s exchange article, “The Dragon of Cichliddom – Firemouth” by Joel Antkowiak of the Lancaster County A.S. You will find our Fishy Friends’ Photos on page 6, while perennial favorites The Undergravel Reporter (“Mega Monster”) and Fin Fun (“Find The Flag”) are on pages 21 and 22, respectively.

So a resounding “Thank You!” to all of our authors! I hope everyone enjoys reading all of these stories as much as I have!



AND

To the Editor

I really enjoyed your story about the ponds and fountains that you encountered years ago. Your article reminds me of when I was a paperboy and decided to add goldfish to a fountain that was in front of one of the apartment buildings that I delivered the **Long Island Press** to in the mid 70’s.

I had caught these fish from a local pond, using dough balls from the bakery that would sell you a wad of dough for 25 cents. Next step was transporting them in a bucket, riding about two miles on my bicycle. Thankfully I had a basket on my bike to hold the bucket!

The fish survived the ride and stayed in the fountain all summer without incident. The residents of the apartment building loved seeing the fish and wondered where they had come from.

Each day upon my arrival to deliver the papers I would feed them goldfish pellets, which they gobbled up. Unfortunately, the superintendent of the building didn’t appreciate the fish as much as the residents did, and I wound up having to net these fish and return them to their home. I do however think these fish enjoyed their summer in the fountain!

Thanks,
Ron Webb





GCAS Programs

2021

While because of the Covid19 situation we cannot yet predict when we will be able to resume our normal meeting schedule at the Queens Botanical Garden, we do hope to be able to resume in-person meetings sometime this year. We will post updates to this schedule as we are able to do so. Hope to see you all soon!

March 3	Joseph Ferdenzi <i>Lake Tanganyika Cichlids (via Zoom)</i>
April 7	Dr. Richard Pierce <i>A Second Look at Tetras</i>
May 5	Joe Graffagnino <i>A Pond Grew In Brooklyn</i>
June 2	Markita Savage <i>The Xiphophorus Genetic Stock Center</i>
July 7	Sal Silvestri <i>Interesting and Unusual Fish I Have Worked With</i>
August 4	TBA TBA
September 1	TBA TBA
October 6	TBA TBA
November 3	TBA
December 1	TBA

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 (347) 379-4984. Copyright 2021 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 gcas@earthlink.net. 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 or by email. For more information, contact: Dan Radebaugh at (718) 458-8437, email gcas@earthlink.net, or fax to (347) 379-4984. For more information about our club or to see previous issues of **Modern Aquarium**, you can also go to our Internet Home Page at <http://www.greatercity.net>, <http://www.greatercity.org>, or <http://www.greatercity.com>.

President's Message

by Horst Gerber

You will be reading this after the day has arrived, but let's talk about that day anyway. Each of you will no doubt remember 2021 well into the coming decade. July 4th of this year will go down in history as the July 4th that never was. No matter where we live this year, our communities are still practicing 'social distancing,' 'open for limited group' gatherings, or some combination or permutation of the two. Independence Day will be different from the days that came before.

July 4th is the true mid-point of the year—the pivot when the season turns to high summer. So let's hope this is the real start of all the predictions, guesses and hopes that Covid-19 is under control, out the window, blown in the wind, and that we are back to the old normal. I wrote this a lifetime ago, when tempers were running short, and you would say "don't hold your breath" for all the predictions to come true.

It's hard to hold your breath for a long time. The world record for a human to do so is 22 minutes. I can just manage to hold mine for 5 minutes. There is a seal in Antarctica that can stay under water for an hour and a half.

But back to us. We received the wonderful news that we can resume our meetings at the Queens Botanical Garden as of September, and we all finally began to breathe again. So if no one throws a monkey wrench into our plans, our meetings will resume, our lives will slowly return to normal, and though life will never be exactly the same again, we will create a new way of living.

We hope that you'll enjoy the stories in this month's **Modern Aquarium**, and that you'll find encouragement for a better tomorrow! Thank you for being members of Greater City. We look forward to welcoming you back to the world we knew before all this! While not yet official, it looks very likely that we'll be holding meetings again beginning in September! Hooray! Our first meeting back will be an auction. We know there's some pent-up demand. We'll keep you posted. Watch your email!

It is in our nature to focus on the future, and despite pandemics and politics we are looking forward to next year marking a *significant* milestone: 100 consecutive years of the Greater City Aquarium Society! I can hardly wait until September to see all of you again!



Cicada 1:

After I get her pregnant I'm going underground for 17 years to hide from her father!

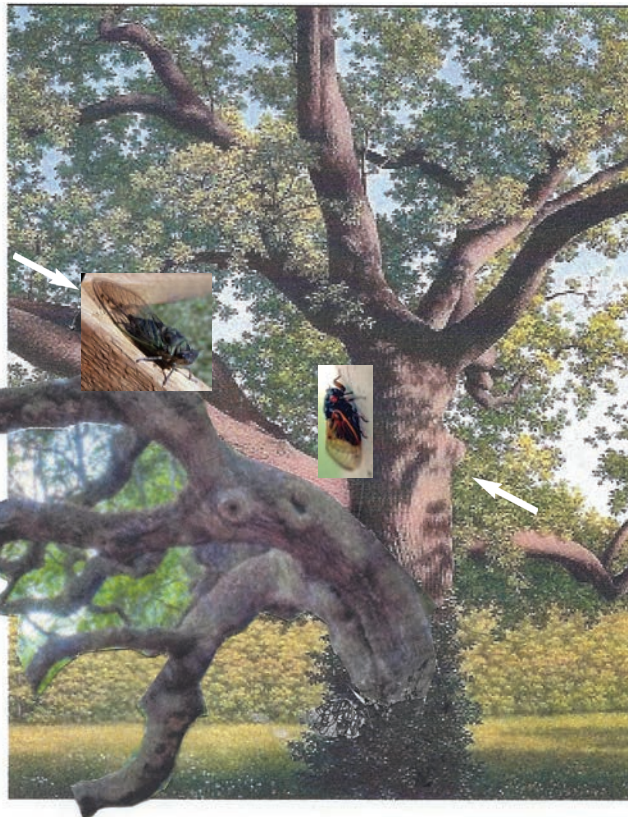
(Photo from Wikipedia)



Cicada 2:

Romeo there is cute, but he's too dumb to notice that we're not the same species!

(Photo from Encyclopedia Britannica)





GCAS Thanks You!

Our Generous Sponsors and Advertisers

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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!



My Life With Fish

by Jason Gold

At the May meeting of the GCAS, an appeal was made for people to write for **Modern Aquarium**. I thought, hmmm, I live in a Manhattan two-bedroom and don't have a giant fish room, or an extensive breeding program, or a backyard koi pond. I dream of these things and admire these things, but my life just isn't set up that way. But I have been in the hobby for over fifty years now, and I do have a lot of stories. I thought, well, maybe I can share some of those stories. Maybe there's something in my experiences that will strike a common chord among other aquarists. So let's start at the beginning—my first aquarium.

I have two lifelong amateur-naturalist hobbies—plants and fish. I have no idea where they came from. My parents did not share my interests, but they did facilitate them in a hands-off sort of way—or at least they did not discourage them. They would drop me off at nurseries and aquarium stores and meetings and shows, but they rarely stayed, even when I was only 7 or 8 years old. On weekends my dad also gave me the chance to earn money for my hobbies doing odd jobs at his office. He managed a garment factory in Cartersville, GA, a textile belt mill town about an hour north of where we lived in suburban Atlanta. I'd get minimum wage, which was something like \$1.60 per hour at the time. I think Mom and Dad thought both hobbies were phases I'd grow out of before becoming interested in stuff they wanted me to be interested in, like maybe baseball and money. But that's not how things went.

We moved to Atlanta from the Bronx when I was six. When I was a small fry in the Bronx, it was typical to ask little boys, "What do you want to be when you grow up?" Little boys in the early 60s had options. The usual and accepted answers were things like policemen or fireman or astronaut or doctor. All fine answers, though the grown-ups in my life always seemed most pleased with the doctor option and the little boys who professed it. But my 5-year-old dream was a little different. I'd answer, "I want to be a farmer." I'm sure all those well-meaning adults thought I was too young to notice the way they'd roll their eyes and exchange doleful glances with my parents at the prospect of my becoming a farmer. But I noticed. I

definitely noticed. My grandmother's reaction was, "We came to this country so you shouldn't *have* to be a farmer."



The author at 6 years old in our apartment in the Bronx

In first grade at PS 24, I heard that another class, not mine, had been invited to work in the model garden on the school's roof. I went home and pitched a fit. My parents talked to the teachers, and every week after that, for the rest of the school year, I got to go up to the garden with that other class. On my first visit I planted my first radish seed. That

radish seed changed my life. I remember, viscerally and vividly, placing the little brown orb in the cold earth. The next week there was a seedling. The week after a little plant. The week after that, a bigger plant. And the week after that, a little red bit of radish peeping out at the base of the plant. My first harvest! I grabbed tentatively at the leaves and pulled. But the radish pulled back, and only a single leaf came off in my hand. Visceral and vivid. Determined, I grabbed again with my full fist and yanked, and there was the radish. I brushed it off and ate it right there. "NO, you have to wash it first!" Too late. A gardener, a naturalist, and something of a foodie was born.

That summer we moved from a high-rise on Henry Hudson Parkway in The Bronx to a cul-de-sac in suburban Atlanta. When we were getting ready to move, the most exciting things to me were the prospects of 1) not having to share a room with my bossy big sister and 2) having a garden (or more accurately in my mind) a farm of my own. I had vivid nighttime dreams of feeding chickens in the yard as the sunrise angled across the fields. I guess my ideas of what life in Georgia would be were a little, well, naive.

We arrived at a ranch house on 1/4 acre, not a Great Plains homestead. My parents really didn't know what to make of my gardening thing. They'd both grown up in Brooklyn—my mom in Manhattan Beach and my dad in Midwood—and agriculture was just not part of their world. My dad didn't even know how to mow the lawn. After one unsuccessful try at that, they hired someone else to do it, and after much pleading from me had him make me a garden. It consisted of four railroad ties filled with bags of soil in the most distant corner of the backyard. You

know, something they didn't have to look at that could be easily dismantled when I lost interest. I never lost interest. Years later, between bouts of packing for college, I was still dumping armfuls of zucchini and tomatoes on the kitchen counter, all from that same square of railroad ties in the back of the backyard.

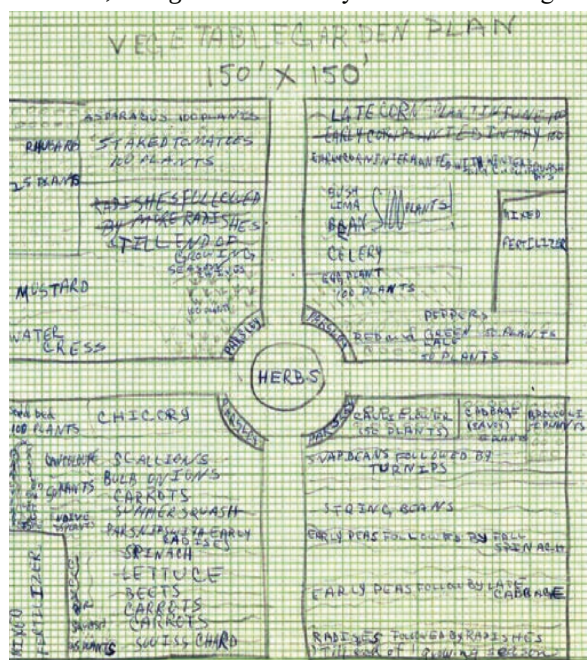
Each spring they'd give me ten whole dollars and leave me at the Green Brothers Nursery on Roswell Road, where I'd spend hours looking at and absorbing EVERYTHING. The guys who worked there would ask if they could help me and if my parents were here. "No, I'm just looking, thanks. My parents are picking me up at 3." Early on, I bought an issue of **Rodale's Organic Gardening**—then more like a newsletter, pamphlet-sized, printed on newsprint and held together with staples—and put the coins from my allowance in an envelope to buy a subscription. Every month I read it from cover to cover—including the ads. I sold American Seed Company seeds to my neighbors (but mostly, actually, to my parents). I ordered catalogs and books from the ads and learned all about plants and botany and gardening. Even now, living in NYC my entire adult life, every windowsill is packed with plants and I've been a member of a community garden in Riverside Park since 1985. You can find me there almost every weekend during the growing season as certainly as you can find me at the Union Square Petco or Pacific Aquarium or Monster Aquarium any time of the year.

Our backyard was bordered by woods, and I'd wander there by myself for hours—climbing trees, looking under rocks, wading into streams. There was one tree in particular that grew nearly horizontally out of a steep slope before angling skyward, and that horizontal portion of the trunk was my favorite spot. It could be my trusty steed or my rocket ship to Mars or my dugout canoe, slipping silently along a jungle river. I had an active imagination, to say the least. And I was a nerd, a miniature adult and an information junkie, but I was an outdoor nerd, always scratched up and bitten up and covered in mud. I'd come home with my finds: a snail or a fern or a cup full of frog's eggs or actual frogs, or in one case a live snake. (Mom shrieked, I dropped it, and it was days before we got it out from under the refrigerator—our Yorkie maintaining a hilarious vigil at the fridge the entire time.) As with the gardening thing, my parents just didn't have any reference point for a kid who wandered in the woods and brought

home slimy and scaly and wriggling stuff in his bare (dirty) hands..

The aquarium thing came a couple of years later, when I was 8. We'd flown to NYC to attend my cousin Robert's fancy Westchester bar mitzvah. I was the youngest kid there, but as usual spent all my time hanging out with the grown-up's. All us kids got to take home a most exotic gift: two neon tetras in a little globe bowl! My older sister and I each got one (my younger sister, who was only 4, had stayed back at the hotel with a sitter). We carefully carried the fishbowls on the plane back to Atlanta and put them in the kitchen window sill. A few days later the water was getting cloudy, and Mom changed it. The chlorine in the tapwater killed two of the fish, but the other two survived. I pitched a fit over the two dead fish. (By the way, despite the garden fit and the fish fit, I was actually an unnaturally calm and self-contained child.) Mom took me to Pet Village at Lenox Square—now a fancy mall, but then an open-air shopping center—to get an aquarium for the two survivors. Primed by my obsession with gardens, that aquarium, like the

radish seed, again changed my life. That first tank was a 10-gallon with a metal frame. I had four neon tetras, two black tetras, a pair of black mollies, a pair of sunset platies, and a bronze *Corydoras*. I watched them constantly, fed them way too much, and then something amazing happened: the first batch of black molly babies, eensy-weensy replicas of their parents! That really did me in. I was hooked. I was hooked for life! Now they would also leave me for hours at Pet Village, and it was also **Tropical Fish Hobbyist Magazine**, also on newsprint held together

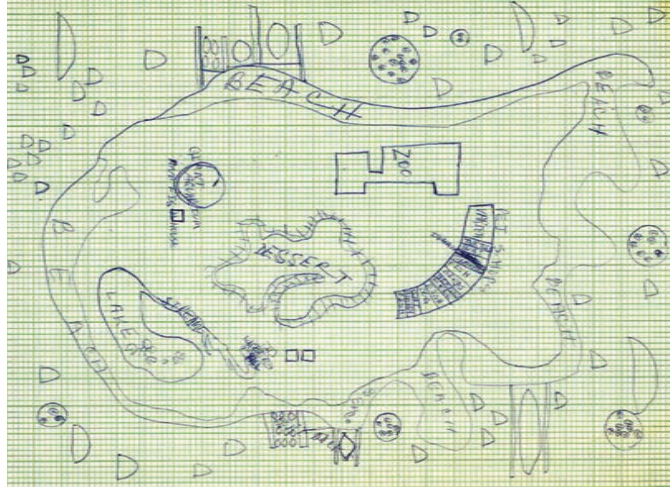


One of my garden plans from when I was about 10.

with staples, that I would devour the minute it arrived each month. Each issue featured an article about fish breeding, or about advances in hobby technology—filters, lighting, etc.—and another, more scientific, about taxonomy. But my favorites were always about the explorers and ichthyologists and natural historians heading up some remote backwater or down some marshy estuary to seine for new species to bring to science and the hobby. Those guys—Herbert Axelrod, Heiko Bleher, William Innes—were my action heroes—my Neil Amstrongs and Hank Aarons and Albert Einsteins. I wanted to do what they were doing, go to those places, wade in those waters, meet those people, and find those fish!

I requested Innes' **Exotic Tropical Fish** for my next birthday. It was the biggest book I'd ever had that wasn't a dictionary or an encyclopedia. I read it cover to cover, filled with wonder. Innes gave the natural range for each fish, and I plotted them on the gridded world maps on the book's overleaves. Through that, I learned not only about fish, but about the geography of the planet. The places fueled my hobbyist wanderlust: Borneo and Madagascar and New Guinea, the Amazon and Rio Negro and Orinoco, the Congo and Ubangi and Zambezi, the Irrawaddy and Salween and Mekong, Lakes Nyasa and Tanganyika and Victoria. Certain places became sort of mythical domains for me—Land of the Archer Fish, Realm of the Pipefish, Kingdom of the Elephant Nose. I made elaborate maps of my own personal fantasy island zoos

with buildings devoted to various kinds of fishes from various parts of the world. I had inventories of all the bettas and killies and cichlids I'd breed, and the numbers and sizes of the aquariums I would need for the whole operation. The zoos were surrounded by elaborate organic gardens too, with all the plant rotations and companion plantings specified. Yeah, I was a total fish and plant nerd, sailing off into a fish and plant nerd's fantasy paradise.



A private island plan (upside down) from the same time. Note that I had an entire private pet mall right next to my very own private desert.

And yet as a Manhattanite with, oh yeah, a job and a family and all those other great things, I don't have a huge spread to house my childhood fantasies of private zoos and farms, of seining the igapos of the Upper Amazon or feeding the chickens at sunrise. Instead I have four tanks in my living room and 110 square feet of garden in Riverside Park. And I still have those dreams of going to faraway places to see where loaches and tetras and rainbows and angels (and their

saltwater cousins), and orchids and begonias and pitcher plants live in the wild. And as of a few years ago, with my kids having flown the coop to start their own lives in Brooklyn, I have begun to make my way to some of those off-the-grid spots. You know, like the GCAS presentation a few months ago by the woman, a frontosa-ophile, who snorkeled the Zambian coast of Lake Tanganyika.

Well, diving the Rift Lakes is the kind of thing that's on my list. I won't be able to get to all of them or even many of them, but even just a few is already a lifelong gardener/aquarist's dream come true. I may have no idea where these hobbies came from, but I'm definitely going wherever they take me.

Next up, at nine years old, I join the Greater Atlanta Aquarium Society. I'm the youngest member. Ever. By a lot!



An Aquarist's Journey

Rosario La Corte is one of the world's leading authorities on breeding fish and he has written numerous articles and books, contributing greatly to our understanding of fish and their habits.

Now, for the first time, here is a compilation of his travels, adventures, successes (and, very occasional failures) all relating to collecting, keeping, and breeding fish, and in his own words (and edited by **Modern Aquarium's** Editor, Dan Radebaugh).

Available in softcover at [Amazon.com](https://www.amazon.com)





How Do Fish Age?



by Joseph Graffagnino

A friend sent me a notice about a koi fish that was born in Japan in 1751. This fish was handed down from generation to generation, and obviously was provided with the best care possible, because it died on July 7, 1977 at the grand old age of 226 years! Koi Hanako was the oldest koi fish ever recorded¹. I sent this notice to Dan Radebaugh, Editor of **Modern Aquarium**, Greater City Aquarium Society. Dan thought it was amazing, and suggested that I write an article about the aging of fish. He didn't specify what type of fish, so I thought I would write about fish in general. Since this article was originally about koi, let's start with the history of koi and goldfish.

KOI AND GOLDFISH:

Breeding efforts began in China during the Tang Dynasty (618-907 BCE), with the Russian carp (*Carassius auratus gibelio*), a food fish kept in ponds. They were a drab green color, but some of these fish started showing color variations of orange and gold. Those with these brighter color variations were moved to smaller ponds as pets and curiosities. They bred and created still more colorful offspring. These offspring were kept and propagated, and became *Carassius auratus*, what we now call the common goldfish.

Koi are believed to have originated from the common carp (*Cyprinus carpio*) in the Jin Dynasty (266-420 AD), specifically with the Amur carp (*Cyprinus rubrofasciatus*), a food fish also kept in ponds. As with goldfish, some of these fish started producing different colors. The Japanese started selective breeding of the Amur carp in the 1820s. They were called *nishikigoi*, which developed into the common name koi².

Koi can grow to three feet, and specialized koi in Japan can grow larger. In 2007 the largest koi in the world came from a Japanese koi farm. She weighed 90 pounds and was 4 feet long³. This species is bred for specific colors and color patterns. Koi eat a variety of items, such as insects, worms, water plants, fish eggs and small fish. Goldfish have pretty much the same diet. A goldfish's maximum length is about one foot. Fancy goldfish have egg-shaped bodies and reach about ten inches in length. Goldfish come in a multitude of colors and patterns. Neither koi nor goldfish have a stomach; what they eat goes from their mouth directly to their intestines, where it is absorbed or excreted. Both species require large water areas to grow to their full size⁴. It's been said by koi lovers that each koi needs 100 gallons of water.

As for fins, koi have carp fins, however there is a variety of koi that sports long, flowing fins in a variety of colors. Butterfly koi were discovered in an Indonesian drainage ditch. A United States fish

farm began experimental breeding of fish with these mutations, eventually developing the long-finned butterfly koi of today. Koi purists do not consider the butterfly koi to be a legitimate koi. Goldfish have a variety of body forms and tail types due to selective breeding⁵.

How To Determine The Age of a Fish:

There are several methods to determine the age of various fish species:

Scales – The oldest method is to remove 10 scales, using the blunt edge of a knife, from the top of the fish under the front edge of the dorsal fin and above the lateral line. Place the scales in a small envelope and record on the outside of the envelope who the collector was, the type of fish, location, method of capture, date and time of capture, and total length and weight of the fish. When ready, moisten the scales and place on a microfiche reader, or place the moistened scale in a 35mm glass slide mount, and with a slide projector project it onto a screen. It's the same as aging a tree by counting the number of growth rings. The age of the fish is determined by counting the number of wide growth rings, called annuli. As a method of verification you can calculate the size of a fish during each year of its life. The size-at-age calculation is based on the ratio:

$$\frac{\text{Total length at age X}}{\text{Scale length at age X}} = \frac{\text{Total length}}{\text{Scale length}}$$

The equation can be solved for total length at age X:

$$\text{Total length at age X} = \text{Scale length at age X} \times \frac{\text{Total length}}{\text{Scale length}}$$

Because the relationship is based on a ratio, the scale length and length to each annulus can be measured directly from the projected image. The calculated length at each age can be compared to the length and age chart to determine how the fish in your lake, pond or river compare to average sized fishes for your fishing location⁶.

Examine the otoliths (inner ear bones), spine or vertebrae bones – Aging scale-less fish such as catfish, or fish with small scales such as trout can be done by bony structures such as spines, vertebrae or otoliths (ear bones). These are cut into thin sections so the annuli can be read. Some bones must be softened with chemicals to make them easier to slice with a razor blade. Catfish joint bone is cut just behind the

joint and can be chemically stained to make the annuli easier to see.

Example Fish Exptncy	Length (in inches)				
	1 st Summer	2 nd Summer	3 rd Summer	4 th Summer	Life
	Age 0	Yearling	2 yr. old	3yr. old	
Largemouth bass	1-4	6-8	8-10	10-12	14-15
Channel catfish	1-4	5-7	8-10	11-13	10-14

During times of slow growth, such as winter for warm water fish, the layers of growth in these structures are closer together and form a dark line (annuli, for annual rings)⁶.

Radiocarbon dating - Graduate students at North Dakota State University used slices of otolith (inner ear bone that help fish balance while they swim) to obtain the age of bigmouth buffalo fish (*Ictiobus cyprinellus*), similar to carp but in the suckerfish class. They can weigh up to 39 pounds. 386 fish were tested; the ages were between 80 and 112 years old. This fish species come from northern United States and Canada. The study leader would not believe the results, and needed another verification of the species age. They went to bomb radiocarbon dating, a well-established method that compares the isotope carbon-14 released in the mid-20th century during atomic bomb testing. The method has been used to age everything from human remains to sharks. They then cross-checked against their otolith results and found that the data matched. These findings were published in **Communications Biology** journal. The study proved that the earlier known age for this species at 26 was four times greater. It also identified that the fish were born prior to 1939, which suggested a reproductive failure of greater than 60 years. The reason for lack of breeding was dam construction, which prevented these fish from reaching their spawning grounds⁷.

Cold water sharks' eyes - In 2016 a study of a Greenland Shark's eyes found a female estimated to be almost 400 years old. Turns out that Greenland Sharks have no hard tissue (like bones) in their bodies. However, they have what are called lens chrySTALLINES in their eyes, and the cold war carbon-14 spike is detectable in those chrySTALLINES, allowing scientists to accurately estimate the age of these long-lived sharks⁸.

Fish Ages and How Do They Live so Long and Impediments to Fish Getting Older:

Freshwater fish:

Koi – We mentioned earlier that the average life span for a koi was 25-50 years, but the oldest recorded age of a koi was 226 years.

Goldfish – Average life span is 15 years, but the oldest record of a goldfish is 43 years, by a common comet won at a fair in England that lived its entire life in a large bowl. This fish was placed in the Guinness Book of World Records in 1998⁹.

Exotic goldfish – average life span is 8-10 years.

Neon tetras, angelfish, Oscars and plecostomus – average life span is 10 years.

Betta splendens (Siamese fighting fish) – average life span is 2-5 years.

Northern pike – average life span is 7-10 years.

Common carp – average life span is 20 years.

Wels catfish (Siluris glanis) – average life span is 60 years (in captivity). Largest record of a species caught centuries ago was 16 feet in length and weighed 680 pounds¹⁰.

Mekong Giant Catfish (Pangasianodon gigas) lives in large rivers in Vietnam, Cambodia, Laos and Myanmar. This species was placed in the Guinness Book of World Records as the largest catfish and largest fish, based on verification of size and weight (9 feet long and 646 pounds). Larger species listed could not be verified¹¹. Mekong Giant Catfish average life span is 60 years. This species has the fastest growth rate of any fish in the world – 440 pounds in 6 years¹².

The largest North American catfish is the blue catfish (*Ictalurus furcatus*) which can reach a length of 65 inches, a weight of 150 pounds, and live for 20 years. This species is found in large rivers such as the Mississippi and Missouri rivers¹³.

Fresh to Saltwater fish:

Chinese paddlefish (Psephurus gladius) – There were 10,000 of them in the 1970s; today there are less than 100. The Chinese paddlefish has been extinct in the wild since 2003. In less than 40 years humans wiped them out. Contributing factors to their demise were water pollution which destroyed their source of food, overfishing for food, heavy boat traffic, and dam construction that prevented them from migrating to their breeding grounds in the northern portions of the Yangtze River. The largest member of this species ever recorded was 23 feet long and weighed several thousand pounds¹⁴.

Chinese Giant Sturgeon (Acipenser sinensis) – a species on the verge of extinction, with fewer than 1,000 remaining. This species was native to the Yangtze River in China, and also found in Korea and Japan. It can grow to over 16 feet and weigh as much as 1,100 pounds. Sturgeons can spawn multiple times in their lives. A mature female can carry over 1,000,000 eggs, which require external fertilization. Survival rate of the hatchlings are less than 1%. The decline of this and other migratory species, such as the paddlefish and Mekong giant catfish are the same: inability to reach their spawning grounds. Water pollution kills their food sources and their young, along with overfishing for food, building dams without pathways for migratory fish, destroying rapids in rivers to accommodate boat traffic, and heavy boat traffic. All of these factors are killing off these species.

Update – finally some good news! In 2015 juvenile sturgeons were found in the Yangtze River, which means that some sturgeons found a way to access their spawning grounds or found a new spawning area. Also, China has started using an artificial breeding technique with sturgeons¹⁵.

Marine species:

Midnight snapper (*Macolor macularis*) – Off the coast of Australia and New Zealand researchers studying the coral reef in 2016 discovered the oldest tropical reef fish, at 81 years of age. This fish broke the record by 20 years. Also found at the same area in the Rowley Shoals was a 79 year old red bass. During their research at reefs at different parts of the world they found 11 fish that were more than 60 years of age. The researchers identified the age of the fish by studying the fishes' otoliths (inner ear bones)¹⁶.

Orange Roughy (*Hoplostethus atlanticus*) – a popular food fish in the 1980s & 1990s, it is now endangered due to overfishing. This fish is slow to mature, and grows in deep (700 fathoms) and cold (37-48 degrees F.) waters. A sea species that doesn't reach sexual maturity until it is 30 years old. They can live for 150 years, can grow to 30 inches long, and weigh 3.5 pounds. They are found in the Australia and New Zealand waters. One main problem (which may help this species come back) is that they carry high levels of mercury, which is dangerous to people¹⁷.

Other Fun Facts:

The oldest known mammal is the bowhead whale. A specimen has lived for 211 years.

The oldest living land animal is a 187 year old Aldabra giant tortoise¹⁸.

Conclusion:

I can find no logical correlation regarding the age, weight and size of fish. Whether they are freshwater, marine, or travel between fresh and salt water, migrate to and from different areas, live in deep water, shallow water, warm water or cold water, or if they hibernate for months of the year you can't discern any rational patterns among them.

What I have discovered is that *all* fish species require adequate space to live and grow, clean water, and good food in abundant supply. They can be harvested within reasonable amounts, must avoid pollution, and must be able to populate without man's interference. I have seen that nature finds a way, but man must help and not hinder if we wish fish to survive into the next century.



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THE DRAGON OF CICHLIDDOM

...Firemouth

Photos & Story by Joel Antkowiak

The firemouth cichlid, *Thorichthys meeki*, has a long history in the aquarium hobby, and this old stalwart is certainly aptly named. The fish displays a fiery red underbelly that extends into the lower jaw and sometimes even further into the head. The base body color is gray to brown, and some individuals also display vertical striping. Iridescent blue spangles dot the dorsal, anal and caudal areas and a red edge to the dorsal completes the fish. A striking animal!

But it gets even more striking when it is excited. The body will darken and the red underneath also intensifies, and when in this condition it is easy to see why this species has been popular in the hobby and trade for so long.

The type locality for *T. meeki* is near Progreso, Yucatan, Mexico. The species can be found in lakes, rivers, sinkholes and springs - mostly in areas of slow-moving water. The range of the firemouth is fairly extensive—from the Yucatan Peninsula area of Mexico south to Belize and Guatemala and into parts of Honduras, Panama, Nicaragua and Costa Rica. There are several collection locations available in the hobby today, with the most commonly seen perhaps being the Rio Candelaria, Mexico location.

There are also several feral populations that are known to exist. Of course there are populations in parts of Florida, where numerous tropical fish farms breed the species. It has also been collected in Mesa, Arizona. Perhaps more surprisingly, there are established populations on Oahu in Hawaii, as well as in Honolulu. There have also been reports of the species being collected in Puerto Rico.

The original description of the species was as *Thorichthys helleri meeki* in 1918 by Walter Brind. It was moved to the genus *Cichlasoma* in 1935 as *C. hyorhynchum* and was given the name *C. meeki* in 1961. The currently accepted *T. meeki* was established in 1996 by Sven Kullander. The specific name 'meeki' was given to honor American ichthyologist Seth Eugene Meek (1959 – 1914), who compiled the first book on Mexican freshwater fishes.

According to the **Cichlid Room Companion**, a great website for identifying cichlids from all over the world which is managed by the world renowned Juan Miguel Artigas-Azas, there are nine species within the genus *Thorichthys*. Only a few of the firemouth cousins are occasionally seen in the hobby. The most colorful

cousin of the firemouth is probably *T. aureus*, which is rarely seen. More commonly encountered species of the group are *T. pasionis* and *T. maculipinnis*.



Figure 1: Head on shot of an adult male firemouth cichlid clearly demonstrating how it got its common name.

While there are reports of the firemouth cichlid reaching upwards of 6 inches in size, males more commonly max out at just under 5 inches, and females at just over 3 inches. They are not fussy as to water conditions, but do prefer an alkaline pH level and some hardness, as well as warmer water, say 74 – 85 F. They are very peaceable cichlids, but may dig in the aquarium substrate. They have a tendency to flare their gills at other fish in their own defense as an intimidation tactic, but rarely does this lead to an attack on the intruder. Of course when they decide to start a family, like with most cichlids, they become quite aggressive and territorial.

Breeding the firemouth is not difficult, as the fish are very good parents and provide great care to their young once they have practiced the routine a time or two. Conditioning the breeders is not difficult these days, with a myriad of acceptable high protein foods available. If you really want good egg production, condition using live foods such as blackworms,

Reprinted from the Aquarium Club of Lancaster County's Tank Tales, April 2018 - Volume 47, issue 4.

chopped earthworms, bloodworms, mosquito larvae, etc. Raising the temperature to 80 or 82 helps induce spawning, but my firemouths have spawned at 75. They will lay their eggs on a flat surface in the aquarium, such as a rock or clay flower pot. The female lays tan eggs on the spawning site by gliding over it and laying each egg individually one after the other in a line. The male then glides over the eggs and fertilizes them. When all the eggs have been laid and fertilized, the result is a rock neatly covered in eggs, which can number in the hundreds. The male and female guard and tend the eggs until they hatch. They clean the eggs and remove any dead eggs to avoid contaminating the other eggs.

The eggs hatch in 3 – 4 days depending on the temperature, and are free swimming in another 2 days. At this point they will take newly hatched brine shrimp nauplii as a first food, but if brine shrimp are not available finely crushed flake food or ground pellets, as well as commercially available fry foods will suffice. The fry can be removed from the breeding tank and raised separate from the parents, but then you would be depriving yourself of one of the great joys of keeping cichlids – watching the parents care for their young.

The rate of growth of the fry will depend on several factors, including temperature, frequency of feedings (as well as quality of food) and frequency of water changes. They will reach an inch in total length



Figure 2: The same fish from figure 1. An excellent specimen that took first place in it's class and won the 'People's Choice Award' at the 2011 convention of the American Cichlid Association. He flared at anybody and anything that got near his tank!

in about 8 – 10 weeks. The young fish will become sexually mature and start to pair off in 8 to 12 months.

It is easy to see why the firemouth has been a mainstay in the aquarium hobby for so many years. It is a beautiful species, with interesting behavioral patterns typical of new world cichlids, and is easy to breed. It is generally peaceful, and can be kept with a wide variety of tankmates of similar size and disposition.



Tonight's Speaker

Sal Silvestri: Interesting and Unusual Fish I Have Worked With



An active hobbyist for over 40 years, it all started with one goldfish won at a carnival. This one bowl eventually grew to a 55 gal tank which housed two 14" Oscars. Even though he has kept and bred a variety of fish, cichlids are still his favorite.

Sal's tanks grew along with his breeding skills, and 40 years later he currently has 17 active tanks, which range from 10 to 125 gallons. Four of those tanks are devoted to communities of Lake Tanganyika cichlids, and four house several varieties of *Apistogramma* species, another of Sal's favorites. The remaining tanks contain a variety of cichlids from West Africa, tetras, bettas and a newfound love—unusual plecos and *Corydoras*.

Sal joined and became very active in the Norwalk Aquarium Society in 1975, has held every position in the club and presently serves as the programs chairperson. Sal's notoriety has spread far and wide, as he has generously shared his knowledge and wisdom during many speaking engagements throughout the Northeast and Europe. He has also written many articles and been honored with reprints in the ACA's **Buntbarche Bulletin** as well as in society magazines across the country and abroad.



HEATERS 101

by Joseph Ferdenzi

When tropical fish started becoming popular denizens of the aquarium at the turn of the 20th century, one of their advantages was thought to be that, unlike the popular goldfish that needed cool water, they thrived at room temperatures. Of course this proved to be not entirely true, and especially not true if you were trying to maintain or breed certain fish, such as discus or bettas. So as early as the 1930s, various kinds of electric heaters for aquarium use were developed.

Most of those early types are no longer on the market, but there is one type that has been around since at least the 1950s that is still in use. This type of heater is what I call the two-strip contact heater, and it is illustrated in the accompanying ad (at right) from the September 1965 issue of *Tropical Fish Hobbyist* magazine. This particular model was very well-made, and very popular in its day. Essentially, the way all such heaters work is that they have two copper strips that expand and contract. When they expand and make contact, the heating element is turned on. As the aquarium water reaches a certain temperature (for which you adjust at intervals by turning a dial), the copper contacts contract, the contact is lost, and the heating element shuts off. When I started in the hobby in the 1960s, these were the only kinds of heaters available. They

were relatively inexpensive and usually worked well, but they had a few downsides. For one, the glass tube would sometimes crack, which let in water, destroyed the electronics, and might cause unwanted voltage to enter the aquarium. But by far the most common peril was that the two copper strips might “stick”—that is, as the water reached the desired temperature, the two strips might stick together and not lose contact. This meant that the heater would keep working unless there was an intervention by the hobbyist, such as by unplugging it. The real harm of this was that, depending on the wattage of the heater relative to the size of the tank, water temperatures could dangerously exceed the desired level before being noticed, thereby resulting in numerous fish deaths.

One of the ways to avoid this problem is to *not* use a heater that has a wattage that is too much for your tank. For example, use a 25 watt heater for a five-gallon tank, a 50 watt heater for a 10 gallon, and a 100 watt heater for a 20 gallon tank. A 55 gallon tank should easily handle a 200 watt heater. Do not use a 100 watt heater in a 10 gallon tank or a 200 watt heater in a 20 gallon tank. If these heaters get stuck and you don’t notice it, the water temperatures could easily climb into a lethal range.

Of course every tank should have a thermometer. You should look at it every day if you have a heater in the tank. If you see that the temperature is climbing in a way that you don’t want, unplug the heater. **Do not** put your hand in the tank until you unplug the heater! After you determine what is wrong with the heater, repair it or replace it—**do not** use it again without doing one or the other!

Luckily, nowadays we have many alternatives to the old-fashioned two-strip contact heater. Beginning in the 1980s, hobbyists began to see the advent of what I call electric circuit board heaters. These heaters essentially work with a sensor, often attached by a remote wire, which sends a signal to the circuit board that then turns the heater on or off. These types of heaters tend to

be more accurate, and most importantly, they do not get stuck in the “on” position, so there is no danger of overheating your tank. This is not to say that they do not malfunction, but my experience has been that when they do, they effectively shut themselves off, so there is no danger of overheating your tank. (I find that an overheated tank is more likely to be deadly than one that has simply leveled off at room temperature (68-70 degrees F.) Because these types of heaters will not overheat your tank (at least not in my experience) you can use wattages that would normally be considered too high for a particular gallonage. For example, I would consider it safe to use a 100 watt heater in a 10 gallon tank or a 300 watt heater in a 55 gallon tank.

Many of these electric circuit board heaters

September, 1965

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come with tubes or casings of largely shatter-proof materials. I personally prefer titanium tubes. Most of these heaters are fully submersible, and often come with dials that allow you to easily set the temperature you desire. About the only drawback they have is that they are somewhat more expensive than the two-strip contact heaters. The number of tanks you have to heat, and your budget, will therefore often guide your choice.

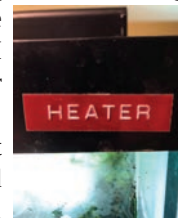
Regardless of the heater you choose, please remember to be careful when using them! Pay attention to the temperature in your heated tank, and if anything seems amiss, disconnect the heater. Also, when performing water changes, disconnect your heater about 10 minutes before you start. This will avoid the possibility of causing damage to your heater if the water goes below the heating element. Some modern heaters come with an automatic shut-off for



a heater has a little red label on the rim that says “HEATER,” so that I don’t forget to disconnect the heater before I start a water change.

Heaters are very useful, but you must choose them carefully, and use them carefully. When you do so, your fish will be grateful.

such a situation, but I still prefer to take no chances. All my heaters are plugged into a tap adapter with a switch that is then plugged into an outlet. This allows me to easily disconnect the heater without having to remove the heater’s plug. Also, every tank containing



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MADE IN CANADA

An Appreciation of Our *Synodontis* Catfish

by Arthur Mayer

After much indecision as to where my dream 75 gallon aquarium would be set up, I made the purchase in 2002 and claimed a wood-paneled basement wall as its home. Following weeks of preparation, and finally satisfied with my layout, I cycled the tank and introduced six fish into the pristine underwater environment: three bleeding heart and two Congo tetras and a *Synodontis* that was described as an “upside-down catfish,” or *S. nigriventris*.

The half-dozen pioneers in my newly-created glass-enclosed water world all acclimated very well and I was thrilled, but in a short time I became suspicious that my *Synodontis* was of another variety, for it never, ever assumed the as-advertised “upside-down” manner of swimming that I had seen in many aquarium shops, whether it be during “lights-on” time or overnight. I did not question the dealer, because I was happy with the fish; it was a good citizen, never bothered the others, and always made quick work of any food that sank to the substrate, including algae wafers bought with it in mind.

Months passed, and the number of fish inhabitants increased as cichlids such as *kribensis*, *curviceps*, keyholes and a *festivum* joined the ranks that already included several clown loaches and a marble angel. Still, my *Synodontis* was a mainstay, and delighted us with its ability to find

the foods that appealed to it the most, including wafers and tablets of all sorts. The ability of the fish to sense, seek out and ingest sinking foods seemed to be accomplished by its use of the barbels or “whiskers” that extended from its



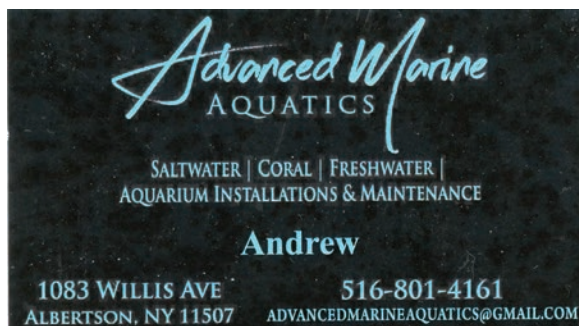
head, leading the fish straight to the food source. This would prove very important in later years, when it became obvious that our fish’s vision was impaired due to what appeared to be cataracts.

Months turned into years, and despite major changes to my tank’s hardscape, plant arrangements and fish population, our *Synodontis* was a

constant. Along the way the fish suffered a few bodily wounds that healed poorly, causing a loss of pigmentation that resulted in several patches of white skin, and this spread to its once fan-shaped tail fin, which eroded away. Yet the fish, now called “Mr. Ugly” by my older daughter, persevered and remained active, and as always, was a good citizen. Late last fall, I began to notice that our fish friend was laboring—it remained sedentary much of the time and did not rush out for foods any longer. I realized that time had caught up with Mr. Ugly, who had been with us slightly over 18 years. Sadly, during a breakout of ich earlier this year, our *Synodontis* died. Months have passed, but as my timer-controlled lights come on I still find myself looking towards the spots in the tank where I could count on seeing our aquarium’s most long-lived resident.



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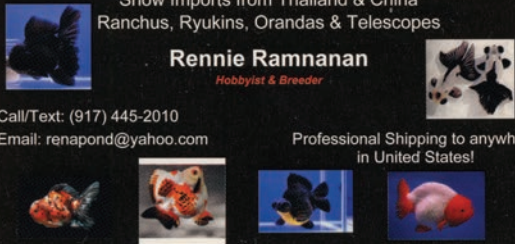
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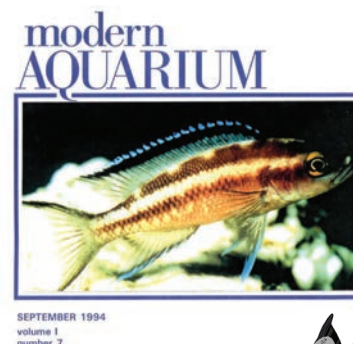
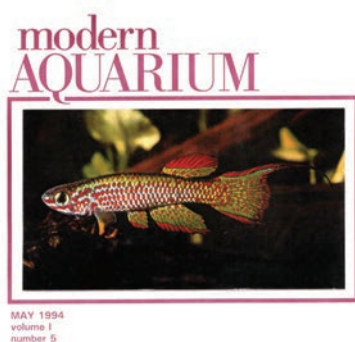
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Since last year I've been working on a comprehensive index for all of Greater City's current series (Series III) of **Modern Aquarium**. Recently I've taken a little break from that project. Meanwhile, to honor Greater City's upcoming 100th anniversary, I thought it would be fun to look at all of our front covers from **Modern Aquarium** from Series III's first year, 1994. I see some very familiar names here. Who knows? Maybe we'll continue this review in coming issues! Dan R

January 1994
Feb/March 1994
April 1994
May 1994
June 1994
September 1994
October 1994
November 1994
December 1994

Cichlasoma haitiensis
Aquarium with algae growth
Neolamprologus leleupi
Aphysemion gabunense
Farlowella and eggs
Neolamprologus buescheri
Betta splendens
Phenacogrammus interruptus
Pterophyllum scalare

by Joe Lozito
by Joseph Ferdenzi
by Joe Lozito
by F. Vermeulen
by John Moran
by Joe Lozito
by Sue & Al Priest
by Joe Lozito
by Joseph Ferdenzi



MEGA MONSTER

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.

A series by the Undergravel Reporter

The website futura.org recently posted¹ a study on the role native species can play in preventing the establishment of invasive species, titled Native Mosquitofish Attack to Keep Invasive Guppies Out. The study used guppies (*Poecilia reticulata*) and mosquitofish (*Gambusia holbrooki*).

The researchers put guppies into outdoor containers. Months later they found mosquitofish killed the guppies, even if only a few mosquitofish were involved.

Supposedly this showed that “the native mosquitofish provides what scientists call 'biotic resistance,' or the ability of a collection of species to resist an invasion. This work has important implications for invasive species management in Florida and elsewhere.”

Well, I don't know if that generalization makes much sense. Consider that a dead *Arapaima* (*Arapaima gigas*), possibly the largest freshwater fish in the world, reaching up to 440 pounds and 10 feet in length recently washed ashore in Florida's Cape Coral's Jaycee Park.² The *Arapaima* is native to the Amazon River, and its scales are said to be as impenetrable as armor.

It's hard to imagine any native species capable of driving this monster fish out. Well, maybe a native Florida alligator, but certainly not an inch long mosquitofish.



Arapaima (*Arapaima gigas*) courtesy of the Smithsonian's National Zoo

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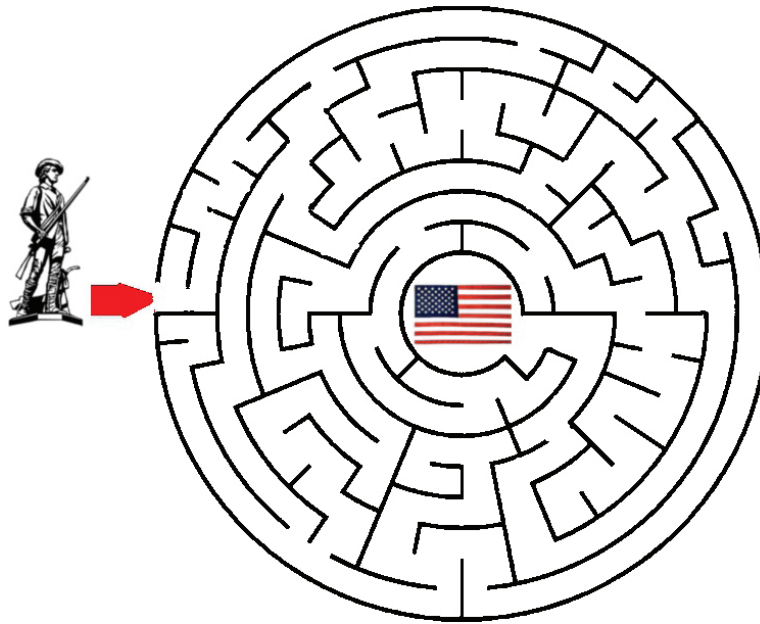
¹ <https://www.futura.org/native-mosquitofish-invasive-guppies-2578252/>

² <https://www.cbsnews.com/news/florida-arapaima-new-invasive-species/>

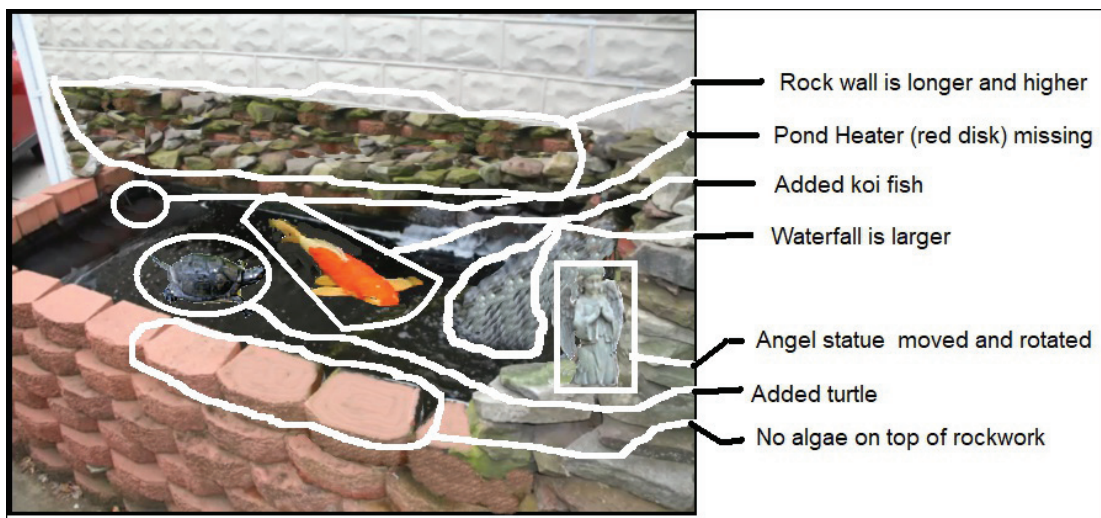
Fin Fun

Find The Flag

Can you guide our patriot to the flag? Solution next issue.



Solution to our Last puzzle: *A Pond Grew In Brooklyn*



Enjoy the 2021 American Cichlid Association Convention in St Louis, MO, July 23-25!



Cichlid enthusiasts of all ages and experience will be there for all things Cichlid, fishy talk and fellowship and have access to world class speakers, manufacturer & vendor booths, an ACA hospitality suite and fish being sold throughout the event.

Everyone is bringing their newest acquisitions, spawned and ready to distribute! Party with your Buddies and go home with new fish!

This event features a slate of 5 special speakers, an extra special vendor room, a tank rental room and a hopping hospitality room. Attendee room sales, found throughout the venue, will be intense.

The ACA will not have a Show but the Convention will finish with a large Cichlid only auction!

In 2021 make up for staying at home in 2020!

<https://convention.cichlid.org/>

Use the convention website for Convention & Vendor registration, additional details and offers.



21 Co-Sponsors

- **Rusty Wessel** - Rusty speaks about the Central American Fishes he successfully collected in Belize, Costa Rica, Cuba, Guatemala, Honduras, Panama, Mexico and Uruguay.
- **Pam Chin** - Shares stories and videos about Cichlid Safaris to both Lake Malawi and Lake Tanganyika. She is a founding member of "Babes In The Cichlid Hobby" whose goal is to make a difference in cichlid keeping.
- **Steve Edie** - Banquet Keynote Speaker, believes that attending conventions all over the US is one of the best means of finding friends, information, and rare species and plans to make Conventions fun for all with "The Talk".
- **Dave Schumacher** - Speaking nationally about basic cichlid genetics and nomenclature, in 2006 Dave bought a fish store and turned it into the Dave's Rare Aquarium Fish specialty store, currently, selling more than 200 cichlid species.
- **Don Danko** - Don has collected extensively throughout Mexico on more than a dozen visits. An accomplished photographer, he has gathered an extensive collection of award winning cichlid photos.



Holiday Inn

Airport West - Earth City
3400 Rider Trail S
Earth City, MO 63045
US Reservations 314-291-6800

Within easy driving distance for most and good flight connections for everyone.

