

Hear UR: Seth Green Episode- Charlie Morse and Kayla Chavers

SFX: Sound of a rushing river begins softly and gradually grows stronger.

SETH GREEN

"It is only lately that the culture of fish has claimed the attention of our people. The supply of fish is daily decreasing. The importance of fish as food, and their cheapness, render it a matter of great importance that the supply shall not be diminished, but very much increased. This can be done in no way so well as by artificial breeding."

KAYLA

These are the words of Seth Green, a Rochesterian and fish culture legend, who recognized even in 1870 that a waning fish supply posed a problem.

SFX: River fades out. Fade in on sounds from a fishing dock, voices shoutings, seagulls, bells.

CHARLIE

In 2023, the amount of seafood produced globally is expected to exceed 186 million tons, more than any other animal protein in the world.

KAYLA

That's a lot of fish. And the world is only getting hungrier.

SFX: Crowd noises start to layer over and get gradually louder.

KAYLA

By 2050, the global demand for animal protein will increase by 52%. As this demand rises, so must our capacity to produce fish.

CHARLIE

And there's a problem. Wild-capture fish production has nearly plateaued since the 1980's, and as overfishing continues, those numbers will only get worse. But all hope is not lost.

SFX: Crowd noises stop suddenly, echoing.

CHARLIE

Aquaculture.

SFX: Fish swimming/jumping out of the water at the hatchery.

Kayla

Aquaculture?

CHARLIE

That's right. Aquaculture is the controlled breeding and farming of fish and aquatic plants. And the branch which deals specifically with fish production is known as "pisciculture". Since its introduction, fish production through pisciculture continues to grow rapidly. Today, over 50% of the fish that the world consumes come from fish farms.

KAYLA

Though its importance has only recently been recognized, pisciculture is increasingly turned to as a global solution for the rising demand for plentiful protein.

CHARLIE

But fish farming as we know it in North America all started with one man, studying fish along the banks of the Genesee.

SFX: Fade out.

Music bed: Fade in curious, pulsing intro music.

CHARLIE

I'm Charlie Morse.

KAYLA

And I'm Kayla Chavers.

CHARLIE

And you are listening to Hear UR: Season 6, "Rapid History: Tales of the Genesee River ", EPISODE NUMbEr 3: The Gentleman of Fish.

In this episode, we discuss the life and work of Seth Green, and how he pioneered the modern practice of fish farming in the Genesee valley. He was the first to make a living not through his success fishing in the Genesee but through his experiments alongside it, honing its resources for the production of knowledge.

KAYLA

Today, he is known as the Father of Fish Culture in North America, having established the country's first fish hatchery just outside of Rochester, in Caledonia, New York.

Music bed: Fade out.

CHARLIE

Seth Green loved fish. He studied them tirelessly, acquiring a deep understanding of their development and habits, and felt an immense closeness to the animals.

KAYLA

It's true! Local Rochester Historian, Slyvia Black, who wrote an extensive account of the man in 1944, documents one particular example, when Seth was transporting 12,000 young fish on a train across the country to stock waters in California.

SFX: Fade in sound of chugging rail-cars.

CHARLIE

As the journey progressed, he quickly ran out of clean water to keep the fish alive

SETH GREEN

"It was a blue time for me. The helpless little fellows were suffering, and so was I. I had brought them into the world, and would not see them suffer if it was possible for me to help them."

KAYLA

He spent the remainder of the train ride carrying jugs of clean water from the dining cart to provide for his fish.

SFX: Rail-cars fade out.

CHARLIE

Green seemed to understand his fish as well as he would any human acquaintance. Accordingly, the story of his own life, from young fisherman to internationally renowned fish culturist, might be most fittingly understood through a topic near to his heart. The life cycle of a trout.

SFX: Fade in light nature sounds. Birds, bugs, rushing water.

Music Bed: Fade in simple, pensive, old-timey, acoustic plucking, setting the time in 1800s.

SETH GREEN

Chapter 1. The Egg. The eggs of a Trout are about one-sixth of an inch in diameter, and nearly round. The length of time required to hatch the eggs depends upon the temperature of the water. We are inclined to believe that the fish hatched at a temperature between forty-five and fifty-three degrees are stronger and longer lived.

SFX and Music Bed: Fade out.

KAYLA

Like the eggs of a trout, a carefully calibrated environment was crucial for Seth Green's development as a child. For Green, that environment was a one-story cabin in the forests of Rochester, New York.

CHARLIE

Back in the early 19th century, before Rochester was incorporated as a city, his father cleared a small area in the woods to build a home for his family.

**SFX: Sound of tree being chopped down, and crashing to ground.
"Timber!"**

KAYLA

Seth was born in 1817, and quickly acquired a deep appreciation of the nature and wildlife that surrounded him. His father taught him how to farm, hunt, and catch fish. Seth learned quickly.

CHARLIE

The Greens soon moved to nearby the town of Carthage, where young Seth began to find a community. His parents tried to send him to school but he preferred to spend his time outdoors by the river. It was here that he found companionship amongst the local Seneca Tribe.

SFX: Fade in wilderness sounds and children playing.

JOHN SPAULDING

The Senecas were a big part of Rochester and he made fast friends with a bunch of them, and they taught him how to hunt and fish and they were really good at it, and Seth was a natural.

SFX: Fade out.

CHARLIE

This is Rochester native, John Spaulding. John grew up visiting Green's hatchery in Caledonia, and fishing in the waters around it. He has since become an expert on the man, presenting at the annual Caledonia Trout Festival, and serving in the Seth Green Chapter of Trout Unlimited, a national fish conservation group.

JOHN SPAULDING

He was very keen. He could see a lot of stuff that other people would glance over. He was very particular about the things that he saw.

SFX: Fade in sounds of animals crunching on leaves in the woods.

KAYLA

According to Black's account, one legend claims that Seth could distinguish between hundreds of different animals by their footsteps alone. But he took a specific interest in the habits of fish and how best to catch them.

SFX: Fade out. Fade in tavern noises, laughing, storytelling.

CHARLIE

His parents had opened a tavern in the town, and Seth helped out where he could, talking to and learning from the fishermen and sailors who frequented it.

KAYLA

But Seth's pleasant childhood was cut short when the national Panic of 1837 shook the town and put his family in serious economic danger.

SFX: Drops out.

He quickly realized he had to learn how to make a living for himself and for his

family. He turned to the trade he knew best: fishing.

Music bed: Hopeful, driving, "getting to work" music fade in.

CHARLIE

Even at 20 years old, Seth Green knew fish better than anyone else on the Genesee, thanks to his extensive education with the Seneca tribe. He scraped together enough money to buy a net and took to banks of the Genesee to start a new life.

KAYLA

Black recounts his immediate success, stating that his superior knowledge allowed him to produce twice as many fish as his competitors. He eventually opened his own fish market on Front Street, employing over 100 men. He expanded the company's fishing practice to larger waters nearby, and he slowly gained a reputation as one of the greatest fishermen in New York.

Music bed: Fade out

SFX: Sound of fishing reel whizzing by.

CHARLIE

Green is even credited with inventing the modern fishing reel, and created his own rig, the Seth Green rig, which is still used today, according to Spaulding.

JOHN SPAULDING

"There's five hooks that descend so that you could catch 5 fish on the same line!"

KAYLA

His contributions to the fishing community and the skills he gained in his earlier career all proved vital for his beginnings in fish culture. The eggs were primed to hatch.

SFX and Music Bed: Same nature sounds & old-timey music.

SETH GREEN

"Chapter 2. The Young Trout. Upon birth, the trout is about one-half inch long, the body thin as a needle, with a pair of eyes huge in comparison with that of the body. At this weak and defenseless period of their lives, nature gives them the instinct to get out of the way of harm as much as possible."

SFX and Music Bed: Fade out.

CHARLIE

It was during a fishing outing that Seth made a discovery that would define his legacy. Along the creek, he noticed an odd habit in the salmon who were preparing to spawn.

SFX: Fade in fish swimming in shallow waters.

JOHN SPAULDING

"He watched a male salmon eat its own eggs, after he spawned on them and he thought, well that's not very productive. So for three solid days, he sat in a tree and watched."

KAYLA

Though the mothers would try to save their eggs, less than 5% survived the initial casting and even fewer hatched. As Seth observed from the tree above, he came to a realization: if he could find a way to hatch the eggs artificially, countless more could be saved from the predators. He recorded his findings in his journal.

SFX: Fade out.

SETH GREEN

"Fish only need our help in one way; at breeding time their eggs are mostly destroyed by numerous enemies, but few are hatched. By artificial means, at a trifling cost, nearly all the eggs can be saved and vast numbers of young produced."

Music bed: Optimistic driving music fades in.

KAYLA

He quickly got to work. He started small, conducting experiments with salmon in small pools on an island in the Genesee River, and soon found success in saving greater amounts of eggs. He was eventually able to hatch 97% of the eggs he cultivated.

CHARLIE

This was thanks to his novel method of dry impregnation. Rather than combining the eggs and sperm in water, simulating natural means, he developed a technique of dry fertilization, which proved far more successful in hatching large amounts of eggs.

KAYLA

But, like the bulging eyes of a young fry, Seth's journey to prominence in pisciculture was not without its awkward phase.

Music bed: Fade out.

CHARLIE

To most, his experiments were unusual, as the country had little to no knowledge of fish culture. Black recalls an anecdote, in which someone suggested that fish eggs were hatched under the warmth of a hen,

and no one dared to challenge the claim at risk of seeming uninformed. But Seth knew the importance of his work.

JOHN SPAULDING

"He knew had to give back to the environment. That was extremely important to him. He saw the fish being fished out. The sturgeon were going, all the salmon were going. In no time there won't be any fish left to eat."

KAYLA

He began raising fish to stock in nearby waters, with a larger goal of providing the world with a reliable and renewable method of producing meat.

KAYLA

His work was a source of resentment amongst many of the fishermen. They feared that his plans to make fish plentiful and inexpensive would cost them their jobs. Black documents his initial restocking attempts, in which his experimental supplies were destroyed by angry fishermen. But Seth continued refining his methods.

CHARLIE

Though he still maintained control of a successful fish market, his motivation lay not with personal profit but with the greater problems of environmental conservation and food production. The money he made through his markets went directly to his experimentation.

KAYLA

As his experiments grew in size and audacity, it became clear that he needed a location that could adequately house them. He decided to purchase a sizable plot of fishing grounds in the nearby town of

Caledonia, establishing the first hatchery in North America.

CHARLIE

Word of his work began to spread across the nation and, soon, Seth's mailbox was flooded with letters, some inquiring about his methods, and others requesting his assistance with restocking initiatives outside of Rochester.

SFX: Sound of furious scribbling.

JOHN SPAULDING

"He would reply to every letter that was sent to him. Wherever it came from, he sat down and replied to it. I cannot believe how much time he would have spent with that."

KAYLA

He had every intention to spread his ideas far and wide. His work was finally reaching maturity.

SFX and Music Bed: Fade out. Same nature sounds & old-timey music.

SETH GREEN

Chapter 3. The Adult Trout. It is impossible to tell the age of a Trout by its size, as its size depends very much upon the quantity of food which it obtains. With good feeding, a trout three years old will weigh one pound. With proper care, they will more than double their weight in a single season.

SFX and Music Bed: Fade out.

CHARLIE

By the time Seth Green's hatchery was developed into adulthood, he had made a pretty good name for himself. Even the

city of Rochester hadn't realized the extent of fame.

KAYLA

Black recounts a conversation in which a Rochester reporter is questioned by a Westerner from out of town.

SFX: Old-timey journalist office sounds, low chatter.

WESTERNER

"Who do you consider your most famed Rochesterian?"

Reporter

"Why, George Eastman, I suppose."

WESTERNER

"No, your best known man is Seth Green. Why, he is a thousand times more famed out of Rochester, I judge, than in it. The newspapers in other parts of the country have something about him every week or two, but I see no extracts of the same sort from the Rochester papers."

SFX: Fade out.

KAYLA

And it was, in fact, true that his reputation preceded him outside the bounds of Rochester. Since opening his hatchery, he went on countless trips across the country to assist with propagation efforts, water stocking, and establishing hatchery practices.

CHARLIE

He was credited with introducing shad to waters in California and Connecticut. He also introduced the brown trout, originally native to the black forest

Germany, to the United States amongst countless other initiatives.

KAYLA

He realized the necessity of a more mandated and organized means of employing his practices, and, with the help of a few others, established the New York State Fishing Commission, and later assumed the role of Superintendent of Fisheries in New York.

CHARLIE

He gained immense notoriety outside of the country for his efforts in transporting eggs across the globe, receiving gold medals from France and Germany for his work, before his death in 1888.

JOHN SPAULDING

"He invented the method to make fish viable for the rest of the population. My conclusion is that we would not be eating seafood like we are today without Seth."

KAYLA

As Seth Green's life came to a close, his influence remained strong. Before the adult trout dies, it lays its eggs, creating a foundation for the next generation.

SFX and Music Bed: Same nature sounds & old-timey music.

SETH GREEN

Chapter 4: Spawning. As the spawning season approaches, the Trout seek places in the creek adapted to the purpose. The places sought after are a pebbly bottom in shallow water close to the spring of the creek.

SFX and Music Bed: Fade out.

CHARLIE

Seth Green was careful to spread the spawn of his knowledge far and wide, but not even he could be certain what would become of it.

KAYLA

We decided to investigate for ourselves, taking a trip to the Caledonia Fish Hatchery, where Seth Green found his initial success.

SFX: Fade in found nature/fish sounds from the hatchery

STEPHEN GALBRETH

"It's changed a lot. There weren't all these nice clean concrete ponds like we have now. A lot of them have been added over multiple improvement projects over the years."

CHARLIE

We talked to Stephen Galbreth, the hatchery's current Assistant Manager. He walked us along the grounds showing us the various artificial ponds, holding brown and rainbow trout of increasing size, and gave us a sense of how the hatchery has evolved.

STEPHEN GALBRETH

"A lot of what we do is sports fishing. There is some restoration work with depleted like the paddlefish and sturgeon. But all these trouts that we raise here are being put into the lakes and streams so that people will be more successful when they go out sports fishing."

KAYLA

Perhaps most surprising was that Stephen revealed that the Caledonia Hatchery no

longer hatches eggs, but receives their fish as small fries from a nearby hatchery.

STEPHEN

"The system has aged, the creek has aged. We have a ton of fine sediment in our creek, which irritates their gills at that young life stage. If we hatched them up here, we'd lose them by the thousand."

SFX: Fade out.

CHARLIE

Stephen made it quite clear that the Caledonia hatchery has changed significantly since its founding, both in function and purpose. But one 150-year old hatchery is not representative of the entire practice.

KAYLA

As technologies evolve, fish culture has become increasingly adaptive and specific to an area's needs. While smaller, suburban hatcheries may veer towards sports fishing, other forms of fish farming, such as the raising of salmon or tuna in giant nets in the ocean, specifically for consumption, prevail elsewhere.

CHARLIE

And though its implications for global food supply are clear, there are also some concerns about where the practice has gone. Animal activists point to the moral problems of raising fish in overcrowded, unnatural environments.

KAYLA

Fish raised in these less than ideal conditions have a greater chance of developing disease and parasites, which could harm wild fish populations as well as the humans who consume them.

CHARLIE

The excessive nitrogen and phosphorus waste that is produced by fish farms through their fecal matter and excess food pellets also poses a threat to the cleanliness of adjacent waterways.

KAYLA

And Genetic Modification introduces an interesting consideration. Gene-editing technology allows the production of fish which grow twice as fast, but this too raises a question of morality and safety.

Music bed: Closing music fades in. It is curious and inquisitive.

CHARLIE

It's hard to say whether Seth had imagined these possibilities when he first began his work along the banks of the Genesee.

KAYLA

While pisciculture may be a flawed discipline, Green's work opened a world of possibility for how we conceptualize our relationship to fish.

CHARLIE

And Seth showed Rochester, and the rest of the world, how the mighty Genesee River could be used not as an exhaustible resource, but as means of intellectual production.

Music bed: Fade out

KAYLA

HearUR is a podcast created by students at The University of Rochester. Our lead researcher was Charlie Morse. Our engineer was Kayla Chavers. The Music used on this episode was from Blue Dot Sessions. "The

River Genesee," written and performed by Milford Fargo, is the song played during the end credits. We'd also like to thank John Spaulding and Stephen Galbreth for their interviews. The executive producers of HearUR are Thomas Fleischman and Stephen Roessner. Coordinating producers are Alyssa Koh and Jason Lee. This season was made possible through the financial support of the Department of History and the Program in Audio and Music Engineering at the University of Rochester. Special thanks to Tom Wenzel, Natural Resources Specialist at the Mt. Morris Dam and Recreation Area and the Army Corps of Engineers, who gave us an incredible tour of inside and outside of the dam. Thank you as well to Autumn Haag from Rare Books and Special Collections at the University of Rochester. And finally, be sure to check out show notes, photographs, transcripts and links for this episode and others at HearUR.com.