Victor Loosanoff: from czarist Russia to groundbreaking shellfish scientist in Connecticut

By Ronald Goldberg

In 1916, a young Victor Lyon Loosanoff, graduate of the Emperor Alexander First Cadet Corps in Russia, never could have imagined his future. Born into a family of noblemen, his immediate fate would be to continue in his family's military service tradition and defend Czar Nicholas' rule against the Bolsheviks during the Russian Revolution. As an officer in the Russian Royal Army, he fought in a brutal campaign, retreating eastward across Asia, and eventually reaching Harbin, China, in 1921.

Victor Loosanoff as a young solider in czarist Russia. Photo: Loosanoff family collection

At 22, as part of a displaced White Russian community in China, his early formal education in military science, mathematics, engineering, swordsmanship and history provided no apparent occupational opportunity in this foreign environment. He worked as a railroad detective, chasing thieves from the rail yards. Russian elders in Harbin's expatriate community sought to establish a "new Russia" in America, by providing transit for Loosanoff and others considered their "best and brightest." Arriving in Seattle in 1922 with 47 cents in Chinese coins in his pocket and speaking no English, he took on physically demanding and dangerous jobs to make a living.

But an obscure life of physical labor would not be his destiny. Within a few years, he would find himself on the East Coast on his way to establishing himself in a very different kind of occupation. Eventually, he distinguished himself internationally in the nascent field of shellfish biology as the founding director of what would become the National Oceanic and Atmospheric Administration's (NOAA) Milford Laboratory.

"The part of Dr. Loosanoff's legacy we most embrace today," said Gary Wikfors, Loosanoff's heir as current director of the Milford Lab, "is innovation—bringing knowledge and methods from outside the field of marine biology to scientific challenges constraining the expansion of sustainable shellfish aquaculture."

Loosanoff started on his unlikely path to becoming a prominent scientist with a detour through the rough-and-tumble world of the logging and fishing industries in the Pacific Northwest. The robust six-footer's physical strength served him well in logging camps and afforded him opportunities to wrestle and box for prize money. According to one anecdote, Loosanoff signed on to a fishing vessel for a few months at sea, motivated to learn English from the crew. At the end of the trip, he proudly tried out his new language skills on the docks, only to learn that he was speaking Norwegian.

While pondering prospects for a better life, a friend suggested that he pursue his education at the University of Washington. Initially interested in forestry, a meeting with Professor Trevor Kincaid in 1924 spurred an interest in fisheries. In only three years he earned a bachelor's degree with honors in Fisheries Science.

He accepted a position with Washington Department of Fisheries and Health and was later hired by the state of Virginia as a shellfish biologist. In 1931 the then U.S. Bureau of Fisheries was actively striving to improve and expand the country's oyster industry, and hired Loosanoff to work in Milford, the beginning of what would be a long and distinguished career there.

Loosanoff's tenure as a biologist in Milford began in temporary quarters along the Wepawaug River, then shifted to a small wooden building provided by a local oyster company. The commercial oyster fishery in Long Island Sound (LIS) was in decline and industry leaders had sought assistance from the government. Connecticut, at the time, played a major role in the region's oyster production. Loosanoff's arrival marked the start of what would become an enduring institution. Equipped with only an "oyster knife and a microscope," as he once

Victor Loosanoff, (right), examines oysters harvested by a shellfisherman aboard a working boat in Long Island Sound. Photo: NEFSC,Milford Laboratory photo archive

The Milford Lab as it appeared in 1935, early in Loosanoff's career in Milford. Photo: NEFSC, Milford Laboratory photo archive

recalled, he energetically embraced a mission of improving oyster industry productivity.

At the time, the LIS oyster industry was entirely dependent on naturally occurring "seed," which results when adults spawn and free-swimming larvae attach as spat to hard substrates such as old shell. Seed oysters were then moved to underwater shellfish beds leased from the state. On these beds the oysters grew to a harvestable size. Shellfishermen could either collect natural seed from estuaries or actively place clean shell in areas where spatfall was expected. For the latter method to be successful, timing was essential. If shell was placed too early, it could become fouled with other organisms and the oyster larvae would fail to set. If the shell was placed too late, the seasonal spatfall was missed. Solving this dilemma was one of the first problems Loosanoff addressed.

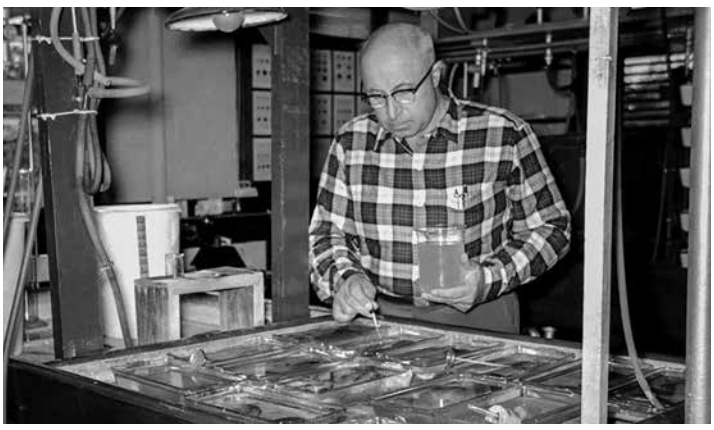
Loosanoff and fellow scientist James B. Engle published results of early studies in a comprehensive scientific paper titled: "Spawning and Setting of Oysters in Long Island Sound in 1937, and Discussion of the Method for Predicting the Intensity and Time of Oyster Setting." Loosanoff had devised a clever way to determine when and where oysters were setting by deploying small bags of shell in different locations and concurrently measuring a wide range of environmental conditions.

Loosanoff frequently spent time collecting data aboard the *Shellfish*, the vessel of Connecticut's Shellfish Commission (precursor to the state Department of Agriculture Bureau of Aquaculture) and routinely engaged those working in the industry. During spawning season, Loosanoff released real-time bulletins to growers with timing advice on shell planting.

Another research focus was on oyster predators. Starfish can decimate a crop of oysters; growers would spend countless hours "mopping" their beds to prevent this. Large fabric mops were dragged over the beds, capturing clinging starfish. The mops were then raised onto a vessel and submerged in a vat of boiling water to kill the starfish. These measures were often necessary to prevent loss of an entire harvest.

Loosanoff addressed this major industry concern by documenting variations in timing and intensity of starfish presence, as he had done with setting oysters. In one study he dyed 12,000 starfish bright blue to determine their movements. Oystermen observed their presence for a nine-month period, enabling Loosanoff to conclude that the greatest distance starfish migrate was only about 5,000 feet. This information informed the shellfishers where to focus their predator control efforts.

Countless hours in the lab peering through a microscope enabled Loosanoff to better understand the early life history



Loosanoff conducted many types of research on oysters that was beneficial to commercial oyster farmers. Photo: NEFSC, Milford Laboratory photo archive

of oysters and many other molluscan bivalves. He was an experimentalist, devising methods to measure filtration rates and responses to environmental variables. He sought to answer questions about what oysters feed on. Importantly, Loosanoff envisioned a process to farm shellfish in the manner of livestock or land crops. Although not fully developed in the 1930s, his future research would directly lead to the hatchery-based shellfish aquaculture that is practiced widely today.

One of the greatest contributions Loosanoff and his team made was the development of methods to artificially spawn and rear shellfish. Research had revealed the secrets of laboratory manipulation of seawater temperature to induce gamete production out of season, stimulate release of egg and sperm, and to culture the embryos and larvae. Methods were devised to grow large quantities of microalgal cells, necessary to feed the growing larvae. Additionally, problems were solved to enable nurturing of the free-swimming larvae through a metamorphosis when they settle on a shell cultch substrate as tiny versions of the adults they will grow into. Loosanoff was able to build on previous science and advance it with innovative ideas to demonstrate a hatchery for shellfish. Much of the entire process is practiced in aquaculture facilities worldwide today, referred to as the "Milford Method."

Since Loosanoff's time, an alternative approach to shellfish cultivation has been developed which relies solely on hatchery produced seed. Growers obtain the seed from hatcheries, grow them to a larger size in "nurseries," then plant them in natural waters, protected from predators in cages or by netting. This method of shellfish farming has expanded rapidly in all coastal waters of this country and the world. Much of the recent resurgence of availability and popularity of oysters are through these intensive aquaculture practices. Coastal aquaculture of shellfish is also favored as an environmentally friendly endeavor, in which shellfish help remove excess nutrients from seawater, which contribute to eutrophication. Eating shellfish, a protein source low on the food chain, also presents an ecologically sound alternative to more energy consumptive types of food production.

While he was director, Loosanoff continued his formal education at Yale University, earning a doctorate in zoology in 1936. By then the shellfish industry was clearly impressed with this young productive scientist. Famed Connecticut decoy-carver, legislator, and early environmentalist Charles "Shang" Wheeler and Howard Beach, member of the Connecticut Shellfish Commission and president of the Oyster Dealers and Growers' Association of North America, lobbied Congress to establish a permanent research laboratory in Milford with Loosanoff as director.

Construction of the lab was approved in 1938 (in the midst of the Depression!) and a substantial well-equipped two-story brick building was completed in 1940. The small laboratory staff was expanded to include additional researchers and scientific productivity grew. In 1951 a 50-foot research vessel was built in New Haven for the laboratory and named the *R/V Shang Wheeler.*

As director of Milford Laboratory, Loosanoff was a formidable presence. He expected his staff to abide by his rigorous work ethic and could be a demanding taskmaster. Some said that he thought of himself as an orchestra conductor with his staff as the musicians. In a Russian-accented booming voice he demanded steady progress and results from his subordinate scientists. To his credit, Victor had a remarkable ability to identify the pertinent scientific questions that needed to be answered to attain his goal of advancing shellfish propagation.

In a 1951 article in the *Saturday Evening Post*, writer Robert Yoder recounted several days spent interviewing Loosanoff in Milford. At this time Loosanoff was "a man in full" (a phrase coined by author Tom Wolfe), having achieved the recognition of scientific peers both nationally and internationally. Aboard the *R/V Shang Wheeler*, Loosanoff hosted the author and described oyster farming practices on the Sound. A photo in the article shows Loosanoff eating a raw oyster with a caption saying that after 20 years of researching oysters he had eaten his first only the year before.

Loosanoff's legacy endures today. He and colleagues published more than 200 scientific papers and articles. A leader among his scientific peers, he received many awards and honors for his achievements. In 1962 he stepped down as Milford Laboratory Director, moved to the West Coast and took a teaching position at a university.

The Milford Laboratory that Loosanoff helped found on the shore of the Wepawaug River over 90 years ago still exists. A new laboratory facility was completed in 1967, and today it is part of NOAA's Northeast Fisheries Science Center. In addition to continuing his vision of conducting research to advance shellfish aquaculture, laboratory scientists study contemporary environmental concerns such as ocean acidification.

"There are none in the Milford Lab today who met Dr. Loosanoff in person," said Wikfors, "but some of us were mentored by scientists who worked under his direction. The profile we heard about is a strong, driven personality who was equally demanding of himself and those around him. Dr. Loosanoff looked to agricultural and biomedical sciences for solutions to research needs in his day, and we continue this approach nearly 100 years later."

Known as the Milford Lab, the National Marine Fisheries Northeast Fisheries Science Center invites the public to visit its facility and learn about its work at an annual open house. Photo: Kristen Jabanoski