

Celebrating the life of Dr. Carl N. Shuster, Jr.

By Glenn Gauvry, President, Ecological Research Development Group and Gary Kreamer, Delaware Division of Fish and Wildlife (retired)

On May 28, Carl N. Shuster, Jr., Ph.D., renowned “founding father” of horseshoe crab science, died in his Arlington, Virginia home at age 100.

Glenn Gauvry, founder and director of the Ecological Research & Development Group (ERDG), a nonprofit organization dedicated to the conservation of the world’s four horseshoe crab species, remembers the first time he met Carl in 1996. He stopped for lunch at a local convenience store in Broadkill Beach, Delaware. The store owner told Gauvry that an older man had been in and purchased a few of the group’s “Just flip ‘em!”™ T-shirts and left a small pewter horseshoe crab pin along with his card. Gauvry was astonished to read the name of the world’s authority on horseshoe crabs, Carl N. Shuster, Ph.D.

Gauvry found the courage to call this remarkable man who had dedicated his life to unraveling the mysteries of the horseshoe crab. To his relief, a warm and inviting voice greeted him. They talked for quite some time about horseshoe crabs and ended with Carl inviting Gauvry on a road trip to introduce him to others whom he felt could be helpful in the advancement of ERDG’s conservation efforts. On the journey that summer, they talked about horseshoe crabs and how their lives had led them on their current paths. Carl’s relaxed and unpretentious manner of sharing information was like lounging in a comfortable chair with a good book. They were friends ever since.

For over 70 years, Carl devoted his extraordinary energy, sharply focused mind, and an exceptional capacity for scientific insight into studying the biology and ecology of the American Horseshoe Crab, *Limulus polyphemus*. Along the way, Carl authored hundreds of scientific articles, presented at innumerable regional, national, and international conferences, and contributed substantially to the cause of education and conservation of this species.

As sometimes happens in science, Carl got his start working with horseshoe crabs serendipitously. After growing up a farm boy in central New Jersey, he attended Rutgers University, with plans to pursue a career in the science of farm animals. After receiving his undergraduate degree in 1942, Carl’s education was interrupted by World War II. As a navigator in the U.S. Air Force, he flew 27 missions over Europe, earning the



Carl N. Shuster, Jr., Ph.D., regarded as the founding father of horseshoe crab science, died May 28, 2020.

Photo: Courtesy of Glenn Gauvry

Distinguished Flying Cross for his service. Upon returning from the war, Carl undertook graduate work at Rutgers under the guidance of oyster expert Thurlow Nelson, Ph.D., who, one day, as Carl later recounted, provided him with a “jar of gunk” and told him to “study this.” That jar of gunk contained the eggs, embryos, and associated bay-bottom detritus of *Limulus*, and the rest became history.

After finishing his degree at Rutgers, Carl conducted horseshoe crab research at the Woods Hole Marine Biological Laboratory and then at New York University, where he earned his Ph.D. At various stages of his career, Carl was Director of the University of Delaware Marine Laboratories, acted as Director of the Northeast Shellfish Sanitation Research Laboratory, worked for the Environmental Protection Agency, served as Chief Environmental Advisor to the Federal Energy Regulatory Commission, and assumed the position of Adjunct Professor (and on retirement “Professor Emeritus”) at the College of William & Mary.

In 2001, in recognition of Carl’s outstanding contributions to the field of horseshoe crab science

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This article relates to the Delaware Estuary Program’s Comprehensive Conservation & Management Plan

CCMP	HEALTHY HABITATS	GOAL 3	Increase and Improve Fish and Shellfish Habitat
		STRATEGY H3.4	Protect and restore horseshoe crabs and their habitat

Dr. Carl N. Shuster, Jr.

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and conservation, the Atlantic States Marine Fisheries Commission set aside hundreds of square miles in the Atlantic Ocean off the New Jersey and Delaware coasts as the "Carl N. Shuster, Jr., Horseshoe Crab Reserve" as part of their coastwide management plan for horseshoe crabs. By protecting a large population of overwintering adult and sub-adult horseshoe crabs from harvest, this reserve has played a huge role in helping rebuild and sustain spawning capacities of *Limulus*.

One could describe Carl as an ecological generalist. His capacity for applying a broad sweep of scientific knowledge and real-life, natural history-based experience, along with a grounded, common-sense approach to issues, were his trademarks. These traits enabled him to identify meaningful pathways for research and postulate unique and logical explanations to patterns observed, that – in this time of scientist specialization – it is hard to imagine anyone else achieving. One of his favorite mantras to young people during their first encounter with horseshoe crabs was, "if you really want to know this animal, you've got to get down on the beach, eyeball to eyeball with it."

In this vein, Carl redirected his vast knowledge and passion for horseshoe crabs to another cause – education. In 2000, as awareness of the significance of *Limulus* to shorebird ecological and human uses emerged, an initiative launched to bring this story, and the controversy regarding management surrounding it, into schools in the Delaware Estuary. The resulting "Green Eggs & Sand" project, featured the development of a comprehensive curriculum on horseshoe crabs for weekend teacher workshops up and down the Atlantic Coast. Over the seminal years of GE&S, Carl hit the road to be a presenter at 25 workshops in six states. His talks at these sessions were always well-articulated and thought-provoking, but it was on the beach with horseshoe crab in hand that Carl was especially adept at working his magic with educators.

"My string of Dr. Shuster memories runs deep and wide," Green Eggs & Sand co-founder, Gary Kreamer, said. "They span nearly two decades, and thousands of miles of I-95 travel to workshop

Carl Shuster imparting information about horseshoe crabs.



Photo: Courtesy of Glenn Gauvry

venues up and down the coast, with memorable Carl stories entertaining me along the way. Like all great teachers, he challenged me to be a better observer, look at things in new ways, ask good questions, and trust my brain, gut, and common sense to seek the best answers. In these and other ways, he has made me a better horseshoe crab educator. His influence is evident, and his teaching carries on through every presentation I make, school group I take to see the spawning spectacle, and workshop we do."

When Carl was 80, Harvard University asked him to write a book dedicated to the horseshoe crab. He recruited colleagues, Jane Brockmann, Ph.D., and Robert Barlow, Ph.D., as co-authors. *The American Horseshoe Crab*, the acknowledged scientific "bible" on *Limulus polyphemus*, was published in 2003.

Carl N. Shuster is gone and will be immeasurably missed by many, but his influence and legacy live on in countless arenas. June 20 was the very first "International Day of the Horseshoe Crab", dedicated to Carl. Over a dozen countries where this once little-known and lesser-loved animal celebrated the day. It's hard to imagine any of this being possible were it not for the broad shoulders and strong foundation provided by Carl Shuster, and for that, we will ever be grateful. ♣