

Welcoming Rachel Carson to College of the Atlantic¹ A Centenary Celebration of Life

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In 1967 a young Harvard psychologist by the name of Stanley Milgram conducted a simple experiment. A small packet was given to several hundred randomly-selected individuals. Each person was instructed to forward the packet to an unknown 'target' person across the country. An additional constraint was added. The package could not be mailed directly to the addressee. They could send it only to someone whom they knew on a first-name basis who they thought was more likely to know the target person than themselves. The result was surprising. It took, on average, only six person-to-person contacts to complete the chain. This phenomenon, known as 'six degrees of separation', was subsequently popularized in John Guare's 1990 play of the same name. It has also been widely applied to all manner of human relations - from internet communications to the spread of diseases like AIDS and Asian flu. But the results of Milgram's 'small world experiment' were not a discovery. They were a demonstration of something we already knew. We learned it from Rachel Carson.

In the 1950s and 1960s ecology was only beginning to emerge as a new kind of science. It showed us that the classical notions of simple cause and effect were

no longer adequate. Life is more complex than that. It operates through ongoing interactions that organize into webs and chains and pyramids. The links and patterns of living systems function at multiple levels. They take shape as molecules or cells or whole organisms. Individual organisms coalesce at the level of species and further as ecological communities - ultimately becoming the living world as a whole. Our earth is replete with many compound effects as well. Outcomes are sometimes dramatic biological accumulations; other times extinction is the result. The organic decomposes to the inorganic and recycles back again, as biological and human domains combine in a single ecological story.

Rachel Carson taught my generation that story. She was a scientist, a writer, and an educator, as well as a sole provider for an extended family. These were not separate roles. They were overlapping facets of an integrated life. As a scientist, Rachel Carson was known for her careful research and attention to detail. These were critical skills required to disclose the complex relations among living creatures and their environment. Whether doing her own field work or combing through the scientific literature, she constantly searched for

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the threads of life's web. From her early books on the ocean, she always found a way to tell the story from the point of view of the organisms themselves. In her classic *Silent Spring*, she revealed the ominous scope of human impacts. Even more important, she delivered a lasting insight that ever since reminds us of our responsibilities.

As a writer, Carson's writing was born in her love of poetry and appreciation of the power of the pen. She wrote, as she would say, "by ear" - always reading her drafts aloud. Frequently she would enlist close friends or her mother to read entire manuscripts as she fine-tuned her revisions. She was pleased to discover that E. B. White also "wrote by ear". For many years they shared a friendship through correspondence and their joint appreciation for the environment.

For my birthday this year my wife Patricia gave me several books. One was a new biography of Rachel Carson, written in celebration of the 100th anniversary of her birthday. The author is Mark Lytle, a professor of history and environmental studies at Bard College. The title of the book is *The Gentle Subversive*. This phrase comes from a paper written many years ago by the renown ecologist Paul Sears, who taught conservation and chaired the forestry department at Yale. It was Sears who was first to declare that ecology would become 'a subversive subject'. His point, simply, was that sooner or later ecology would lead to a transformation in our thinking.

First - as an interdisciplinary domain - ecology required a seamless integration among all sub-fields of the physical and life sciences. But Sears maintained that ecology would do more than merely change the way we do science. Its influence would reach far beyond the sciences. Our entire world view would be broadened by ecology. It would overturn how we, as humans, see our place in the world. This notion - along with Rachel Carson's revelations - were among the first inklings in my own awareness of a human ecological perspective.

As I read Lytle's book, I was reminded of Plato's *Republic* and the parable of the cave. This is the allegory in which Socrates invites us to consider an underground world where everyone is chained in place. The prisoners are shackled for life, so firmly that they can not turn their heads or view one another directly. All they can see are their shadows on the wall, cast by the light of a fire behind them, which is also out of sight. If one of them should somehow slip their bonds, what then would happen? Could this freed person make sense of their world?. Could their mind grasp this new perspective? What if they escaped the cave itself and saw the sky and sun above? Moreover, on returning to the darkness of the cave, would it be possible to persuade their still-fettered companions of a wider world beyond their imagination?

A somewhat more contemporary version of this dilemma was rendered by Paul Sears. He put it this way: "The ecological scientist climbs and climbs the mountain, and when he reaches the top he finds the foot prints of the poet". How did they get there? Where is the poet? Why do poets so often get where they are going before scientists? If they met, would they - or could they - talk to each other. And if they tried, is it possible for them to create a single story out of their diverse ways of knowing? For Sears, this was the core challenge of ecology and its call for interdisciplinary integration. Rachel Carson climbed the mountain as a scientist. But the footprints of the poet, at the top, were her own. That is what made her so effective.

Carson, the educator, took us inside the story. As adults, she did this through her writing. She taught us ecology from the vantage point of a scientist. Yet her writing always went a step further - conveying a feeling for life and its human dimensions. She was also concerned with education for children. This was most beautifully captured in her article "Help Your Child to Wonder" which appeared in *Woman's Home Companion* in 1956. The ideas and natural history experiences it contained were developed with and for her grand-nephew Roger. After her death, an

expanded and illustrated version became the popular book *The Sense of Wonder*. The joy of discovery and appreciation of the unknown were at the heart of her teaching. "I sincerely believe that for a child, and for the parent seeking to guide him", she said, "it is not half so important to *know* as to *feel*." We see, so clearly here, the fullness of both her approach to nature and her attitude toward learning. It is akin to Plutarch's view that "a student is a lamp to be lighted, not a vessel to be filled". For myself, this has always been a hallmark for College of the Atlantic's philosophy of education. When a student discovers their passion, being their teacher is a special joy. This is the essence of self-directed education. The student who follows their interests, and is encouraged to cross boundaries, will inevitably expand into interdisciplinary discoveries. These are the cornerstones of COA's human ecology mission, non-departmentalized structure, and commitment to self-directed study.

My own acquaintance with Rachel Carson goes back to the 1950s. I grew up in a home without television. My parents thought that books were good enough. My mother was very community minded, and one of her activities revolved around a reading group. The books they read and discussed were frequently Book of the Month Club selections. Afterwards they became mine. I still remember reading *The Sea Around Us* which joined our family library at some point during its eighty six weeks on the best sellers list.

Growing up in the Hudson River valley, my memories of the 1950s include the wide-spread infestation of gypsy moths - with their silky nests in the branches of trees - as well as the spread of Dutch elm disease. I also remember the aerial spraying of DDT over our home, and the concerns of my parents and friends. These would become important parts of the *Silent Spring* story, along with many deeper lessons.

The case of Clear Lake, California was one that especially stood out. In 1949 an aerial application of insecticides was made to eradicate an influx of gnats - a non-biting, but somewhat annoying relative of the mosquito. The concentration was low, in the order of 1/70 parts per million (ppm). Right after the application, the problem appeared to be eliminated. But a 'flare-back' in 1954 followed. The concentration this time was increased to 1/50 ppm. A third assault was applied in 1957. During this period, reports began to come in that the western grebe, which wintered on the lake, was disappearing. Careful study of the situation showed that the concentration of pesticide was 5ppm in the lake's plankton, substantially higher than in the original applications. In the plant-eating fishes it was much higher, and in the fatty tissues of the grebes it

had accumulated to an astounding 1600 ppm. But the grebes were dead. And so to were many other birds, insects, fish and frogs.

Perhaps an even more poignant example involved the American bald eagle. Farmers were using DDT to control the European corn-borer which was attacking their crops. But the pesticide also found its way into the soil and ground water, and then into the streams and rivers. As in the Clear Lake story, it was further magnified biologically as it went up the food chain. Increasing concentrations accumulated in algae and plants, in small and then larger fish, and finally to the eagles. At high levels it altered the eagle's physiology, interfering with the uptake of calcium. This resulted in a thinning of the egg shells which could no longer support incubation and hatching - ending, as we all know, with the eagle on the endangered species list.

Rachel Carson brought us these stories. These were some of the first lessons of ecology many of us received. They revealed the multitude of compounding effects - of what were thought to be simple actions - on non-target species, on human health, and the environment as a whole. The interactions were often of geometric proportion as bio-magnification operated throughout food chains and pyramids. We were discovering the importance of the new science of ecology. The complexity of interactions within the living world was coming into awareness.

But Carson fashioned ecology as much more than just science. She made it psychological. She made it aesthetic. She made it moral. It was, all at once, interdisciplinary. You could enter the story from all points: the farmer seeking to protect his crops, would find there were eagles at the other end of his spraying equipment; lakeside residents wishing only for a pleasant evening outdoors now saw connections to a bird-less lake; a housewife in Cleveland wanting cleaner clothes was faced with evidence that her phosphate detergent was killing Lake Erie.

Some people responded by attacking the messenger. Others found ways to ignore or minimize the consequences. As a psychologist, I know that the psychological defenses of repression and denial can work — for a while. In the long run, however, we are seldom able to maintain a secure lid on buried conflicts. Though we may not intend to do harm, once we know that we have, it is a matter of time until insight beckons our sense of responsibility.

At the other end of the story, biologists of all stripes were no longer able to observe or explore nature with an impartial attitude. The birds and animals and insects

they studied were disappearing before their eyes. Their scientific knowledge was called into action. Many of them stepped forward, giving birth to entirely new fields like conservation biology and applied ecology. It would not be long until these concerns were manifested throughout society. There was an environmental movement on the horizon, and *Silent Spring* was one of its first text books.

In conclusion, let us return to Milgram and his six degrees of separation. Rachel Carson died in 1964, five years before College of the Atlantic was founded in 1969, eight years before it opened for classes in 1972. But I believe that she was headed our way. If not for her early and untimely death, there are many indications that she would have become a part of our community.

First, her way of seeing the world, her concern for the environment and her approach to education were all spot on with the mission and practices of the college. Second, in terms of interpersonal connections, she was far closer than six degrees removed. She had, in fact, many first-order, personal relations. William Drury in the 1960s was Director of Research for Massachusetts Audubon. He was also a member of the President's Science Advisory Council and became a major defender of Rachel Carson's scientific claims

in *Silent Spring*. When the fire-storm of criticism was leveled on her credibility - by the chemical companies, food industry and agri-business - Drury, a highly qualified ornithologist, backed her up. The Drury family, at that time, lived in Lincoln, Massachusetts. Among their neighbors and friends was Paul Brooks - Carson's publisher and one of her most respected biographers. Bill Drury would later leave his positions at Mass. Audubon and Harvard to become a faculty member at COA. Rene Dubos - co-author of *Only One Earth* with Barbara Ward - was another friend and supporter. He too would join COA as one of the early trustees. There are other friends and members of the college who touched her life. And finally, there is Carson's love of the Maine coast - something we all share. Many of her natural history explorations of birds and tide pools were centered around her house in Southport overlooking the tidal flats of Sheepscot's Bay. It was there that much of her research and writing for *Silent Spring* took place.

Taken together, it is hard to imagine with all these connections that Rachel Carson would not have been among us. It is with great pleasure that I join you all in welcoming Rachel Carson - on the occasion of her 100th birthday - as a permanent member of COA through this endowed chair of human ecology in her name.