Minding air and water

Given what Dr. David Carlson '73 knows, it's hard to see how he's able to maintain his affable calm.

As director of the Atmospheric Technology Division within the National Center for Atmospheric Research, Carlson spends a lot of time pondering climate changes, and the natural and human factors that help predict what the world's weather will be like in the future. It's not a rosy forecast: global warming has matured from an "if" to a "how much" question, and the answers Carlson keeps coming up with are unsettling. And yet when he shares what he knows with audiences such as the one he addressed during a Community Convocation at Augustana last March, he is anything but Chicken Little. He matter-of-factly lays out what we know of climate changes over the past thousand years, peers into the future through a variety of models that indicate anywhere from four- to ten-degree Fahrenheit warming over the next century, then discusses how choices we make now will help determine which end of that range our descendants will find themselves coping with a hundred years hence. Although Carlson is not so optimistic as to expect the seismic social changes necessary to forestall warming—such as abandonment of fossil fuels, population decline and global embrace of clean manufacturing technology—he's also no doom-and-gloomer. In laying out scenarios of environmental change whose best-cases still have dramatic consequences ranging from rising ocean levels to declining agricultural productivity, Carlson's demeanor is as convivial as when he shares with the Augustana student audience his memories of the cross country team; he seems, in fact, almost tranquil.
Perhaps that's because Carlson has adopted the same measured stride in running his course as a scientist as his former professor, coach, Paul Olsen, has as an educator. During Olsen's nearly four decades as coach, the mantra of running at Augustana has been "the journey is the destination." And maybe that's what allows Carlson's concern for the planet to be tempered with a sort of bemusement: that no matter where the climate ends up during his lifetime, getting there will be an adventure—one in which we’ll all share.

That would be in keeping with Carlson's journey so far. He grew up in Aurora, Ill., and although no one in his family had attended Augustana and he’d never visited the campus, what he heard from teachers and friends at his church was enough for him to send off an application. He joined the cross country team under its young coach (Olsen came to campus three years before Carlson), and soon found himself heading north with a bunch of guys he'd just met.

It was the beginning of Olsen's tradition of taking runners up north for an intensive training trip preceding the College's orientation week. In the early years, he would take runners to a lakeside cabin in Minnesota owned by a family friend. As Carlson recalls, it was an incredible team-building experience. "What Olsen provided wasn't about running," he says. "It wasn't always even mostly about running. It was about the 'tribe,' and turning a bunch of introverted misfits into a team. At the time, he was as much an unfinished product as we were—he had not yet married, and hadn’t completed his doctorate," Carlson says.

Like many runners at Augustana, Carlson had Olsen as a teacher as well as a coach. Another English professor he came to know well during his four years here was Dorothy Parkander '46, in whose classes he says he tried to spend every minute he could. As a biology major, Ingemar Larson, Florence Neely and Ralph Troll were all favorites, but Carlson credits a visiting instructor of geology—Richard Benson—with helping to chart his postgraduate course.

"He taught a course that included oceanography and tectonics," says Carlson, "and I remember thinking, 'What? The planet works how?' It was amazing to conceive of the whole planet as a working system." In the late '60s and early '70s, the ocean was the new frontier, and Carlson became part of what he calls an entire demographic of people intrigued with oceanography through the work of Jacques Cousteau and others.

After graduating from Augustana, Carlson earned a Ph.D. in oceanography at Maine, where he focused on the upper ocean and its interface with the atmosphere. Following post-doctoral research at the Naval Research Laboratory in Washington, D.C., Carlson joined the faculty at Oregon State University in Corvallis. "It's a classic research institution," says Carlson. "A little bit of teaching, a big lab and research cruises, publishing and grad students." He maintained his ties with the Navy, which supported much of his work at Oregon State.

Head in the clouds

During the '80s, climate was becoming more and more of a pressing issue, and El Niño prompted a greater emphasis on understanding global climate systems. That sparked a multinational research initiative, centered on the western Pacific, which attracted hundred of oceanographers and atmospheric scientist Carlson says he "tossed his hat into the ring to direct the study, and wound up getting the job. "The oceanographers and the atmospheric folks didn’t want someone from the other camp head up the program." The fact that Carlson had a foot in each discipline, "and a good interview," he says, helped in his selection.

The El Niño project landed Carlson, his wife Mary Lou, and their two children, Gu and Sam, in the Australian state of Queensland for the better part of a year, before relocating to Boulder, Colo., where the project was headquartered. As the initiative was winding down, he learned the head of the National Center for Atmospheric Research was looking for a new leader for the Center's Atmospheric Technology Division, and Carlson found himself once again throwing his hat into the ring.

"In the Atmospheric Technology Division we try to develop new technology to meet current scientific questions. Atmospheric and climate research rely heavily on observations—so when a research problem arises, we generally get a request to use our tools to look at it," Carlson says, citing melting ice caps and deforestation as examples. From his Boulder vantage point, he gets a global perspective from satellites and observation stations around the world. The picture is not pretty.

Above: "Unfinished products" Dave Carlson and Paul Olsen met through Augustana's amply-colifed cross-country team (Rockety-I, 1972). Below: Students use a seine to corral critters in the main pond at Green Wing, Augustana's 420-acre outdoor environmental laboratory near Amboy, Ill. As part of Dr. Kevin Geedey's summer course in aquatic biology, students learn to look for subtle clues in determining the health of an ecosystem.
The soundest predictions of future climate change are that the global average surface temperature will increase between four and ten degrees Fahrenheit over the next century. The high- end figure assumes that humans continue to rely primarily on fossil fuel energy sources and that carbon dioxide continues to accumulate in the atmosphere. If industrialized societies undergo a rapid conversion to wind, solar and hydrogen energy sources, the models predict an average warming of six to eight degrees Fahrenheit. Even if population levels stabilize and decline, and if all nations commit to unprecedented sustainable, cooperative economic and social practices, an average warming of four degrees Fahrenheit by 2100 seems probable,” says Carlson.

That warm future is thanks to our recent past. A 1,000-year Northern Hemisphere temperature record compiled from studying tree rings, coral, ice cores and lake sediment provides a very interesting look at pre-industrial temperature variability,” Carlson says. “This record confirms strong warming in the past 100 years. In fact, no decade in that thousand-year record had temperatures as warm as the 1990s.” That’s a heap of history to deal with, and no magic wand has as yet been discovered to reverse global processes set in motion by human causes.

It’s a fairly bleak outlook, and for someone more concerned about the destination than the journey, it might be demoralizing. But Carlson revels in all there is to be learned along the way, and there’s a surplus of that. For example, we’ve only recently begun to develop a global understanding of carbon dioxide production, exchange and storage. The more we learn, the more we can apply in making decisions about land use and management. And when the outcome could mean the difference between New Orleans remaining a city or becoming a reef, the journey’s got a lot riding on it.

Carlson is hopeful about the future. “I believe humans can and will respond to the threats our planet faces,” he says. The response will need to be comprehensive, from the macro-level of governments committing to global cooperation on behalf of the environment, all the way to the choices we make as individuals. The latter category includes a myriad of decisions and actions which may seem small, yet can yield astonishingly large results.

**On the water front**

Too often, problems related to the environment seem so intractable they can thrill us into hand-wringing and little else. What, after all, can one person do in the shadow of such large looming quandaries? At a Community Convocation one month after Carlson’s visit, students learned just how amazing the answer to that question can be.

Chad Pregracke grew up so close to the Mississippi River he could have his feet wet before the screen door slammed behind him. But it wasn’t until his teenage years, when he spent a great deal of time working on the River as a commercial shell diver, that he began to pay attention to how much waste washed up on islands where he and his brother would camp on diving junkets. On one such trip, Pregracke decided he had to do something about it. Although his own hindsight recognizes he was more than a little naïve, Pregracke made an impassioned pitch for support to a senior executive at ALCOA, a major corporate presence in the Quad Cities thanks to its sprawling Davenport Works plant. Although he thought the young man’s dream of cleaning the entire Upper Mississippi (St. Paul down to St. Louis) a bit pie-in-the-sky, ALCOA’s Tim Wilkinson helped Pregracke secure enough funding for a summer’s worth of trash pick-up on shoreline in and near the Quad Cities.

Soon, people began to notice the young man tooling around in a john-boat loaded down with tires, appliances, and sacks upon sacks of trash. A front page story in a local newspaper was picked up by the Associated Press, and soon a camera crew from CNN was riding along with Pregracke. The coverage helped open more corporate doors, and the following summer a small-but-hardy crew was enlisted to help in a much larger effort.

Each year since, the effort has grown, and with it a small fleet of used boats, including a salvaged sunken houseboat which became Pregracke’s headquarters. He found some old barges and an Army-surplus tug which, he boasts, “has enough power to push three barges...downstream only.” A donated office-barge is now being converted to mobile classrooms for educational presentations.

Pregracke and his growing complement of helpers have conducted clean-ups along the Upper Mississippi, the Illinois, the Ohio and the Missouri. Much of the help comes from community events held in conjunction with Pregracke’s visits: Anheuser-Busch gave corporate backing to one in St. Louis, and in tiny New Boston, Ill., fully half the town showed up. The “catch” is mind-boggling: 4,924 tires, 1,636 old drums, 287 refrigerators, a Ford Econoline van, and enough Styrofoam to lay a foot-deep blanket over two football fields. Throw in a kitchen sink? Try 49 of them. A running tally is kept at cleanrivers.com, the official website of Pregracke’s organization, Living Lands and Waters.