

Ralph's Dispatch #1 from the Ross School
East Hampton, NY, Saturday, 03 November 2007

Please let me know if I should delete your name from my email list for these dispatches, there will be no penalty !!!

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As I write this, Hurricane Noel rages outside, with winds to 70 mph and torrents of rain.

The Ross School calendar includes three trimesters and, in the Spring, a two-week lapse called "M-term". This is the time for many Ross high-school students to sign up for educational trips to far-flung places that related to their curriculum. Last Spring I was invited, for the first time ever, to join a Ross School trip. Together with Mrs. Ross, fourteen students, and four teachers, I went to Andalucia to study one of the transmission routes over which the knowledge of Ancient Greece reached the European Renaissance. The high point for me was the Alhambra in Grenada, where the crystallographic groups are in evidence in repeating patterns tiled onto the walls and floors of the palaces.

On this school trip I was invited to make presentations to the group on these repeating patterns, and thus I gave five lectures --- illustrated with computer graphics, animations, and agent based models --- in the bridal suites of various hotels in Andalusia. The success of these presentations led to an invitation to visit the Ross School this Fall as Scholar in Residence, and also, to teach an elective course in Complex Dynamical Systems: Modeling and Simulation with NetLogo. While preparing for this course there occurred a crescendo of publicity on global climate warming, including the Nobel Prize for Al Gore and the Intergovernmental Panel on Climate Change (IPCC) established by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) in 1988. After conferring with everyone involved I decided to focus the course on a few exemplary complex dynamical systems related to climate change.

I left home on Wednesday, 17 October, to spend a few days in Vermont visiting family and friends. For many years I have wanted to come back to Vermont at the height of the annual Fall foliage season, but always seemed to miss it. Well I remember the time my friend Dutch White sent me a manila envelope full of red maple leaves to keep me going. And here at last I made it. I had chosen a window seat on Jet Blue to experience the full shock and awe while circling to land in Burlington. Imagine my disappointment to see nothing but green and brown leaves !!! A couple days later there was an article in the Burlington Free Press by a biology professor at the University of Vermont explaining in detail the mechanisms by which global climate change had spoiled the foliage season, which in past years had brought \$35M to the state's coffers. This was the fourth year in a row with poor foliage in Vermont, and the tourist trade as winding down. On Sunday, 21 October, I reboarded Jet Blue for the Ross School, where again I found very warm weather and very poor foliage.

By now, 03 November, we have completed two weeks of the four-week course on complex dynamical systems. This course integrates three threads: agent-based computer programming, complex dynamics (aka chaos theory), and the science of climate

regulation (aka gaia theory). We have very superficially discussed computer programming in NetLogo (my favorite agent-based modeling language), the basic concepts of chaos theory (attractors, basins, and bifurcations), and the Daisyworld model from Gaia theory. This model of Lovelock and Watson (1983) had two populations: white daisies which cool the planet, and black daisies which warm it. The equilibrium of these two populations maintain the average temperature of the fictitious planet, even as the sun gets gradually brighter.

Meanwhile, the seven students have been working independently on major fact-finding tasks regarding the climate of our area (Long Island, and a large piece of the Atlantic Ocean): albedo, carbon footprint, demographics, and so on. Their reports are due this Monday morning, and we will then see if all this is coming together or not.

My modest goal is to submit a letter to the journal, Nature, that completes a paper published there by Lovelock and Kump in 1993. They reported their results in simulation studies of a computer model for climate regulation that has never been published, and which seems no longer to exist. This missing model, patterned after Daisyworld, had areas of algae and forest as cooling agents, to offset the warming effects of greenhouse gas emissions by humans. We also intend to use our model to raise awareness of the effects of local planning policies on the physical and economic climate of Long island.

Besides my full-time obsession with this course, I have been trying to invent a life in this new environment, with music lessons, pilates sessions, and ferreting out old friends.