Thriving Thrift: On the Occasion of Paul Waggoner Appreciation Day

Connecticut Agricultural Experiment Station, 18 March 2013
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First, thanks to everyone at the Station for organizing this wonderful occasion honoring Paul's contributions to the Connecticut community, your expanding campus, Paul's amazing scientific career, and his 90th birthday.

The title of my brief remarks is "thriving thrift." Most of you know that Paul loves words and their palace, the dictionary. Reflecting on Paul's interests and style, I looked up the word "thrift" in the Oxford English Dictionary. First, the OED reminded me that the happy verb "thrive" is the origin of thrift. Thrift is the fact or condition of thriving. Thrift is also prosperous growth, economical management, frugality, saving. Thrift contrasts with thriftless, which means unprofitable, worthless, useless, wasteful, and improvident. Thrifty mean well-husbanded, fortunate, and provident.

Paul has taught me many lessons, but above all he has taught me, and the other members of our Program for the Human Environment at the Rockefeller University -- Doris Manville, Perrin Meyer, Mark Stoeckle, Jason Yung, Nadja Victor, and Iddo Wernick -- thrift.

Let me briefly speak about two of the lessons, about the power of thrift for nature and in writing.

Thrift is in fact the subject of most of our scientific work together. The question that has animated much of our collaboration for 20 years is "How much land can 10 billion people spare for Nature?" Obviously, research on land-sparing concerns thrift, and the profitable crops that allow the rest of Nature also to thrive. But then I realized that most of our other work concerns thrift, too. Thrift with wood products, with materials such as cadmium, with water, with energy. Thrift by using short sequences of DNA, barcodes, to identify the species of plants and animals. Thrift with sea life by shifting to aquaculture from hunting wild animals. Thrift by consumers and thrift by farmers and other producers. Our many analyses of so-called "dematerialization" of industrialized societies using less stuff chronicle thrift. "Industrial Ecology" attracts us because it is an appeal to thrift, to reduce and even eliminate waste, through recycling, reuse, better design, and smarter markets.

Over and over our examinations of land, water, energy and materials show the power of thrift. People sometimes call us optimists. I would say with Paul's superb analytic skills and logic we have demonstrated the power of thrift to spare Nature. Well-husbanded resources bring prosperous growth.

Just as Paul despises wasted resources, he despises wasted words. Paul exemplifies thrifty writing. The late Roger Revelle, geologist and founder of modern climate science, told me shortly after I met Paul in 1981 that Paul writes beautifully. Some of our colleagues have

not appreciated Paul's genius as a writer. I suppose these people also order supersized portions and leave half the food on their plate. Paul's editing has improved almost every piece I have published in the past 30 years.

And I love Paul's own direct, vivid style. Consider the titles of some of Paul's scientific papers:

Ozone uptake by bean leaves; The water economy of wilted tomato plants; Stomata and transpiration of droopy potatoes; Temperature of potato and tomato leaves; Weather and the rise and fall of fungi; Weather, space, time and chance of infection; Plants and polluted air; Variability of annual wheat yields since 1909 and among nations; A half century of natural transitions in hardwood forests; Evaporation of dew; Saving the water spent by plants; and of course *How much land can 10 billion spare for Nature?*

These charming and true titles invariably lead to powerful, efficient analyses and the insights that earned Paul's election to the National Academy of Sciences and recognition as one of the greatest agronomists of recent decades.

I must remark on the matter of decades. In preparing for today, I examined a list of Paul's publications, which exceed 180. Notably the first is in 1949 and the most recent in 2012. Paul has published peer reviewed papers in 8 different decades over 64 years. Typically, scientific careers span about 30-35 years. Thrift appears to double lifespan! Except possibly 2003, Paul has published a technical paper or report every year since turning 70. Several of these stand among his most cited works.

One of Paul's 2011 works is historical rather than scientific. His memoir, *Appanoose to Connecticut*, recounts his family and personal history. Now posted on the Internet, the memoir entrains us on an evocative journey from the Civil War through the Great Depression and World War II to this beloved Connecticut Agricultural Experiment Station. Paul's maturation during the 1930s on farms in Appanoose County, Iowa, may help explain his affinity for thrift. And his deep feeling for plants, for tomatoes and potatoes, strawberries and tobacco, chestnuts and wheat. And for drought and flood, mulch, compost, and gypsy moths. Most of today's Greens offer abstract versions of nature that really have no color in comparison to Paul's.

Reading Paul's list of publications also reminded me of the many people with whom he has partnered and thrived because of him, as I have. I mentioned Roger Revelle, and on this occasion we might also recall at least Don Aylor, Charlie Frink, James Horsfall, William Reifsnyder, and Vern Ruttan.

And of course, Barbara Lockerbie Waggoner. Together Barbara and Paul exemplified thrift, that is, prosperous growth and providence. In closing, in their honor, our Program for the Human Environment would like to make a donation to the Station for its "Book and Grounds Fund." May it assist the Station to continue to thrive.

Thank you.