

Gras 2021 Yearly Letter

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### **On Evolution, Climate Change, and Values.**

I never finished the 2020 letter on evolution, and time kept adding more info so my final letter has become the yearly letter of 2021. Here it is:

I planted 700 loblollies and white pine trees on my Grasmere Farm in Rappahannock County back in 1984 – 87. About 470 have survived into fully 65 ft.+ trees. My purpose, originally, was to make some lumber for profit. Already, ten years ago, I had been approached by lumber businesses. But the trees are still here. I changed my mind from treating trees as mere commodities into being a helpful living friend. Not just because they absorb carbon in big air-gulps which helps reduce climate change, but that with the discovery of the vast belowground mycelial network came the revelation of a huge bustling community of mycorrhizal fungal species. And with them in the soil, trees also communicate easily with each other. They really are alive and communicate socially, much like we do. Even trees of different species connect by smell or passing chemical and electrical signals via their roots. It's an actual arboreal internet, a "wood wide web" (See Peter Wohlleben, *The Hidden life of Trees: What they feel; How they communicate*, 2015 ) Which is why that, like Wendy Wheeler, I think "biosemiotics" should be added to how evolution works. In *biosemiotics* later version, Jesper Hoffmeyer in his article "Semiotic Freedom: an emerging force" does a convincing job that "biosemiotics", based on "signs", makes more sense than Neo Darwinian Synthesis does on evolution. Many other biologists agree that Neo Darwinism is inadequate and passe'. We will start with them – Carl Woese, Joshua Lederberg, and Lyn Margulis (all biologists) have done away with NeoDarwinian genetic determinism. Genes certainly control and protect species but creating evolutionary change arrives much earlier than genetic determinism. It arrives at the microbial level, horizontally and not related to the prevailing gene centered view of evolution. Dan Quammen in his introduction to *The Tangled Tree: A Radical New History of Life (2018)* explains it better than I can how evolution is being changed by the three biologists above and others. It's called "molecular phylogenetics".

"The molecules mainly in question are DNA, RNA, and a few select proteins. ... The unexpected insights have fundamentally reshaped what we think we know about life's history and the functional parts of living beings, including ourselves. In particular, there have come three big surprises about who we are – we multicellular animals, more particularly we humans – and what we are, and how life on our planet has evolved. " (One of these three surprises was the discovery of a new form of life called Archae; the second discovery was a mode of evolutionary hereditary- change called horizontal gene transfer; and the third revealed that we humans probably come from these archae) "The recognition of horizontal gene transfer (HGT) as a widespread phenomenon has overturned the traditional certitude that genes flow only vertically, from parents to offspring, and can't be traded sideways across species boundaries.

The latest news on archaea is that all animals, all plants, all fungi, and all other complex creatures composed of cells bearing DNA within nuclei – that list includes us – have descended from these odd, ancient microbes.” To learn more, I suggest you read Quammen’s book.

Of course, every cell, organ, or body – whether animal or plant – has a protective immune system. Viruses are not to get through but kept out. Lederberg understood the horizontal movement of viruses and their ever-ongoing evolutionary change possibility, making them always a lethal possibility. He foretold back in 1950 that the “future of humanity and microbes would be a battle of our wits versus their genes”. Obviously, our wits have to do with our vaccines. We have such a battle now with the Covid-19 virus, which can’t be absolutely contained if new viruses arrive horizontally, which they frequently do and have now done so twice (Delta and Omicron). (See Jan Sapp, *Genes, Germs and Medicine: the Life of Joshua Lederberg*: World Scientific Publishing Co. NJ, 2021). Evolution is turning out far more complicated and trickier than what the orthodox view of Neo Darwinian Synthesis theory still pursues. But species are maintained thru genetic DNA connections and immunity defenses. Otherwise, life couldn’t exist as it does on this Earth.

But we are interested in how evolutionary changes occur. And now we have discovered how to produce such changes. It is called the Crispr/Cas9 gene-editing tool and the first two women to win a Nobel Prize by themselves (2020), Emmanuelle Charpentier and Jennie Doudna, put it together with their teams back in 2012. “CRISPR, short for *clustered regularly interspaced short palindromic repeats*, is a microbial ‘immune system’ that prokaryotes – bacteria and archaea – use to prevent infection by viruses called phages. At its core, the CRISPR system gives prokaryotes the ability to recognize precise genetic sequences that match those of a phage or other invader, and to target these sequences for destruction using specialized enzymes. ... these enzymes known as CRISPR-associated proteins (Cas9) with an RNA molecule that is involved in recognizing phage sequences showed that the system could be programmed to cut specific sites in isolated DNA. The programmable gene-editing system has inspired a gold rush of applications in medicine, agriculture and basic science.”

To be able to do this on humans, of course, has raised a host of ethical, social, and safety concerns. But according to Francis Collins (head of the National Institute of Health) “There is no molecular-biology laboratory that I know of that hasn’t started to work with CRISPR-Cas(9).” Many changes are going to be happening on the treatment of diseases and inheritableness. For now, they will skip cosmetic changes but for how long?

### **Climate Change:**

Meantime, politics has gotten much worse. So much worse, that Marvin Kalb (Harvard) in his PBS hourly discussions asked Judy Woodruff, Eugene Robinson, and Ted Koppel to comment on the disappearance of truth in politics. Each political side now believes only in its own truth. All three of the above have over 40 years of experience in journalism. So, can the three help resolve this problem of the damage being done to Democracy because ever more lies are threatening its survival? This isn’t just the usual left and right liberal and conservative opposition. It’s changing Democracy. The three did a good job on both the nature of the problem and the possibility of fixing it. I won’t isolate their comments but lump them together (you can still view Kalb’s hour on PBS TV). Like them, I, too, believe the serious undermining of truth in politics started on August 5, 1987, when Reagan asked the FCC to repeal the Fairness Doctrine which had required that stations provide free air time responses to any controversial opinions that were broadcast. Reagan tore down this wall and Rush Limbaugh was the first to proclaim

himself “liberated” and could now declare any political or social falsehood without fear of countervailing truth and which could also make him money. And he did so to the tune of \$84.5 million in the year 2018. R. Murdoch and Fox News also did the same with the assumption that corporations should be running the country instead of a democratic government serving all the people. Without any governing truth interference possibility, Fox News’s daily fake news will make 6 to 7 billion in 2021. Democracy is in serious trouble and also not helped by “whites” steadily losing their population majority. Many Southern and Midwest rural States are trying to block voting rights to Latinos and Blacks.

What used to be a line between factual news and opinion in newspapers, magazines, TV, and radio, no longer exists. All information is now considered as just opinion. Any possibility of truth has disappeared. So, is there hope that a believable truth can be salvaged in politics? If not, a genuine political Democracy can’t exist. But - yes, a way back to truth in politics does exist. It resides in the facts of climate change. When the Democrats won the Virginia state elections in 2019, it had much to do with replacing fossil fuel with solar, wind, and water energy. People, especially women, realized that climate change had to be pursued if our children are going to survive. Republicans still preferred corporate profits to earthly facts. They lost. Of course, if there are no truths and facts, politics can swing and sway as it always has. But when the earth tells us the truth repeatedly that climate change exists as experienced by the inescapable evidence shown in floods, droughts, fires, and ever more violent storms, truth can and does exist. Let’s hope that climate change may help politics right itself.

#### **Values:**

We now live in the Postmodern World. If you are 60 years old or more (like me), you still accepted Modernism. But you did experience the cleavage between the two back in the 1990’s. Look up google on “Modernism vs. Postmodernism” where you will learn that “Truth may exist independent of human consciousness, but there is no objective means of nailing it down. All postmodern conclusions lead and emerge from this assumption”. That assumption that all truth and values arise from our historical interpretations does owe its beginning to Einstein’s removal of Newton’s universals for whom reason and mathematical science always provided accurate, objective, reliable foundations for “knowledge”. Einstein’s “principle of relativity” did away with absolutes and all universals. Yes, belief in truth is still possible but it’s limited and depends on what you’re assuming or standing on. Following Einstein, Quantum physics forced us to give up the idea of the Cosmic Universe as a mathematically determined clockwork, in place since Newton. But, at least, the “Freedom vs Determinism battle between the Humanities and the Sciences did come to an end. Science lost its deterministic universals.

Values, however, do need truth which, remember, we had to establish with “climate change” to save democratic values in politics (above). So, what about values in general, besides politics? I suggest we go back to the virtues of truth, beauty, goodness and continue with them. The three values have nothing above them from which they could be derived. You have to start with them. Historically, they have been around a long time, starting maybe with the Greeks, Plato and Aristotle in 400-380 BC. Today, the three must stay open ended and creative. That’s true of science, the arts, and the earth viewed as the good. If the three values keep moving, historically, we need to care for their everchanging truth, beauty, goodness. The best way to pursue this is to accept creation as how the universe works. Which brings me back to Wendy Wheeler and her understanding that the Universe/Cosmos continues as

an ever-ongoing creative evolution which life itself as well as our culture creates by using “signs” all the way down to the cell level.

In this expanding evolution, humans were unique in creating language and then culture. But culture just operates at a higher level than how nature operates. We emerged and belong to nature. If we are earth’s children, we should treat her as our mother not just as raw material to enhance our profit. Our culture-nature relationship should become mutual in its love and care. That insight is becoming clearer as the mounting power and danger from an offended mother-earth becomes increasingly visible (34 tornados hitting at once). We need more effort to reverse our separation and alienation with earth. Our former joyous relation with mother-earth needs desperately to return.

This finishes my last yearly letter. But I may send other stuff now and then.

Vernon