The Great Carbon Conspiracy

Welcome to the five hundred twenty fifth graduation convocation at the University of Chicago. This is a great day! A day for congratulations, and for reflection. I can't help but reflect that, if you had gone to Northwestern, you might have gotten Oprah right now, instead of a nerdy oceanographer like me. And also that you don't typically hear much from the sciences in general at these things.

You may come to your own conclusions in the next few minutes about why that might be, but I think part of the reason is because a lot of the stories from the sciences are not very congratulatory. They're sort of humbling, make us feel puny. The Earth is not the center of anything, except maybe the middle of nowhere. It was here for a long, long time without us. Humans are not special among creatures, we are built of the same stuff as liverworts and slime molds, your basic scum of the Earth.

But I've got a very uplifting story from the Earth sciences that you never would have believed, if you hadn't seen it for yourself. It has to do with the element carbon. If you were just cruising around in space checking out piles of atoms like our planet, and if you somehow hadn't come from a place like this, you never would have expected all the stuff that carbon has got up to. The living carbon! Machines of unfathomable complexity, self-correcting, self-reproducing, evolving! Thumbing its nose at the somewhat dour Second Law of Thermodynamics (locally, I mean, thumbing… never mind).

But it's done more than that. The living carbon has altered the chemistry of the planet, charging it up with energy like a giant battery, in the form of oxygen in the air, and buried dead plants (maybe a bit of dinosaur) in the ground. We are creatures of this battery. If you buy a candy bar, over in the Cobb coffee shop maybe, you can read on the back how many calories it has. What that means is, if you combine that candy bar chemically with oxygen, either by burning it or eating it, that's how much energy you get. If you eat that candy bar on the moon, and you don't bring oxygen with you, no calories for you! The candy bar doesn't actually contain those calories. It's like our local currency.

Those of you who have taken PhySci 134 know where I'm going with this. By using fossil fuels as an energy source, we have learned to steal a jolt of energy from this planetary battery. You might wonder if we could discharge the battery, like running down a car battery by running the stereo all day at a picnic. But for the planetary battery it would be more like shorting out the terminals of the car battery with a jumper cable. Which you should never do, because it would catch fire and explode, spewing acid everywhere, long before it could discharge all of its actual chemical potential energy. With our planetary battery, discharging the battery's energy by using up atmospheric oxygen is not the immediate concern either. The more immediate problem is the impact of the waste product, carbon dioxide, building up in the atmosphere and changing the climate of the Earth.

If this were a story from the deeply unsympathetic world of microbiology, say a culture of slime mold in a Petri dish, the outcome would be inescapable, that the culture would reach its limit and then crash. What can save us is, in fact, the third great miracle of the carbon cycle. In addition to harvesting and storing energy, the biosphere of the Earth has begun collecting and storing information, understanding, and awareness. The eye of the Universe is opening. In all the vastness of space and the immensity of time, it is happening right here, right now. Maybe this isn't THE center of the universe, but it is certainly A center of the universe. I think of this, and I don't feel puny any more. Fellow carbon atoms: We have hit the jackpot! What are the odds?

I know what you're thinking. Eye of the universe, that's very nice, professor, but this is a graduation speech, and we were wondering if you could comment on, well, What's in this for us? Fair enough, I always expect and hope for challenging questions from you guys. The one insight I can offer arises from an apparently robust characteristic of the carbon cycle, that its growth through time seems to feed on itself. On all different scales, from the evolution of biological complexity to the speed of computer chips, it's not growing linearly through time, but accelerating, following an exponential trajectory. The thing about living on an exponential curve is that you never can quite see what's coming. Everyone expects the next century to be like the last, but it never is. For thousands of years in the human world, nothing ever changed. Now it's changing so quickly, I can perceive, in my lifetime, not just the change, but the acceleration. I'm not sure what use this insight is to any of us, except to say, we do live in interesting times!

In terms of navigating the difficulties that lie ahead, I would just like to affirm my opinion that we are not a culture of slime mold in a Petri dish, anymore. We have awareness, we can choose. We can do this no problem. If there were simply no more coal on the planet, it would not be an apocalypse, but a business opportunity. It's just hard to make the decision. I was so excited to hear, last year, that 70% of you voted in favor of the proposition that the University should not profit from the fossil fuel industry. I quite agree. It's one level of moral culpability to be an addict, another thing entirely to own a piece of the drug pusher. Anyway, sounds like a decision to me. Problem solved! Just a matter of time! And details to be worked out. And, I guess in classic academic tradition, we are leaving those details as an exercise for the students. I'm sorry about that. But it'll be a piece of cake, really, once a decision is made for real.

Before I sit down, on this congratulatory day, I want to call out a salute, to the carbon atoms! You industrious little rascals, you! I never would have believed all that you do if I hadn't seen it for myself. And then a special salute to the sentient carbon atoms! You know who you are! Watch out for the fossil fuel thing, but I know you're up to the challenge. And finally, on this occasion of convocation number six hundred twenty five, that's five to the rocking fourth power, at the

University of Chicago, I’d like to salute the graduating … carbon atoms! I just want to say, you guys are amazing! Keep up the good work, and have a great day!