

Paul Sereno

503rd Convocation Address: "Historical Contingency and Ultimate Aims,"

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"Historical Contingency and Ultimate Aims" by Paul C. Sereno

Over eons of time myriad species have flourished and perished in the face of competition and catastrophes, something Darwin famously characterized as the "grandeur of life."¹ This evolutionary tapestry is etched in the fossil record and ingrained in the anatomy and genes of today's survivors. My science—paleontology—traces the threads of this tapestry by digging up creatures from deep time in order to understand how evolution works over millions of years.

We have discovered some ground rules, such as the timely, almost clocklike extinction that awaits all species. Chance events, like an earth-shattering asteroid, also play a major role. Looking back across deep time, we are amazed at evolution's handiwork in fashioning fins into limbs and wings in species long extinct, but we also stand in awe at the unpredictable power of happenstance. The predictable and unpredictable—evolution's yin and yang—apply in particular to our species. We yearn to see ourselves as the fine-tuned pinnacle of evolution, something more than an odd and plucky survivor, whose lineage more than once teetered on the brink of extinction. In paleontology we call such circuitous pathways *historical contingency*.

A good life often flows in similar fashion. "The full enigma of Darwin's life has never been grasped," according to his greatest biographers.² A practiced liar and attention-seeker in his youth, he was pulled from secondary school on account of his dismal performance. On the prestige of his family name, he enrolled in college to obtain a medical degree, but he skipped classes with regularity, abhorred dissection, and eventually dropped out. He then re-entered college to become a country parson in the Anglican Church, in an effort to avoid more demanding careers in law or the military. There he took classes from noteworthy scholars and spent much of his time wandering the countryside, collecting specimens and poking at rocks. Then, as he awaited ordination, an opportunity fell into his lap—a position for a "well-bred gentleman" with "naturalist" inclinations who might also entertain the captain aboard the *H.M.S. Beagle* during her two-year voyage around the world. After his father relented, Darwin leapt at the opportunity, and the course of history was altered.

I, too, am an improbable scientist. I was born not far from here, second in a family of six children. My mother, an art teacher, has an identical twin sister, and the twins married brothers. The “parallel” family settled in Los Angeles, also raising six children over the same period. The 12 of us, 6 boys and 6 girls, met for the first time when I was 15 years old. There were no academics in our family tree, the grandparents with only an elementary school education. Similarly, there was no entrenched scholarly tradition among large American families of Portuguese or Italian origin. Yet all six children in our family became scientists of note, I the most unlikely.

Like Darwin, I was an attention-seeking prankster, performing poorly in grade school, with a “deficit disorder” of some sort in today’s typology. By sixth grade, I had matured into an accident-prone nightmare for my parents. That year, at the hands of a gym teacher who held me vertically on the back of my neck, I collapsed to the mat unconscious and in serious trouble, having swallowed my tongue. Later that same year, another gym teacher knocked me unconscious with a volleyball, and I hurt myself badly in countless accidents of my own design. And so on.

In that same grade, however, I was smitten by a young English teacher, and my sterling performance in her class provided a steppingstone to seventh grade. Later, in high school, perusing a dictionary improved my weak vocabulary, and I was accepted at a state university not far from here with the aim of becoming a studio artist, much to the relief of my parents. Accompanying my older brother on college interviews as a junior, I fell under the spell of paleontology during a behind-the-scenes tour at the [American Museum of Natural History](#) in New York. Setting my portfolio aside, I left for New York to study fossils and, ultimately, travel the world to uncover their secrets.

I recount these life stories to extol the virtues of pathways marked by unpredictable life-changing events small and large. Contingency is to be embraced not feared. Darwin’s foray into the church, mingling with the great naturalist-clerics of his day, was hardly a dead end. Rather it prepared him fortuitously for his global voyage and celebrated role in overturning a theological explanation of the natural world. In my own modest journey, time spent in the art studio, with live models and abstract forms, has turned the reconstruction—and even the discovery—of fossils into exercises in visual art.

The credo of this university has a similar theme, that an interdisciplinary liberal education spawns creative excellence. A grounding of this sort will hold you in good stead as you face an uncertain job market. The road ahead will demand experimentation and exploration. You must cast aside doubt and follow your

interests, feed your curiosity, trust your instincts. Only in hindsight can we connect the dots that underpin a creative life. Having come this far, I have little doubt you *will* find your calling. The real sadness in life, it's worth remembering, is that some of our finest talents and capabilities will go undiscovered.

Is it possible to harbor *ultimate aims*, if the journey ahead is so uncertain? Had I not survived my troubled past, I like to believe that some interesting creatures might never have been discovered, some students might have gone uninspired, and some kids in challenged neighborhoods might not have discovered their interests. With these as tangible examples, my ultimate aims have long been to make this world a more interesting and better place in which to live. Should your aims be any less grand?

Look around you. This is the university that welcomed the landmark Chicago World's Fair, that inaugurated the nuclear era, that is home to some of the greatest scientists, writers, historians, and composers, where black holes, life's origins, dinosaurs, and countless other discoveries are brought to light, and where Nobel prizes are so commonplace new subfields like "freakonomics" arise to compete for attention. This university was also home to a professor who now holds the reins of our nation. It is too late to deny that you graduated from the U of C, to profess that you never heard of a mega Scav Hunt or Polar Bear Run, or to claim that none of your "fun" has died since you arrived on campus. The eyes and expectations of the world are upon you.

The key to doing great work is to truly love what you do. Finding what you love to do also is central to a satisfying life. Is not that simple goal, to determine what you love to do, the principal purpose of your time here in this intellectual kaleidoscope?

On a larger scale, this is an urban university, not a college in a bucolic setting. The communities that surround us, far from a liability, are a gift, for they remind us daily of the challenge we face in this Century of Information. I see myself in the kids from the neighborhoods, where graduating high school is uncertain, where opportunities slip by unnoticed. A sea of unrealized potential surrounds this and other universities, a longstanding problem begging for a solution. The great challenge is how to actualize that potential, to harness that energy.

"Science has been taught too much as an accumulation of ready-made material with which students are to be made familiar, not enough as a method of thinking, an attitude of the mind." Those words, by John Dewey, a professor here and founder of the [Lab School](#), appeared in the journal *Science* exactly 100 years ago.³

Articulating ideas that are hauntingly prescient, he went on to say that “the future of our civilization depends upon the widening spread and deepening hold of the scientific habit of mind; and the problem of problems in our education is therefore to discover how to mature and make effective this scientific habit.”³ He foresaw a century ago the urgency of open access to advanced education and the primacy of science literacy—not only as the privilege of some, but as a human right for all and an integral part of a truly democratic nation⁴.

Melting ice, spilling oil, an aging population. Can we face these mega-problems as a participatory democracy without broader adoption of critical—yes, scientific reasoning?

My wife, Gabrielle Lyon, AB’94, AM ’94, and I co-founded [Project Exploration](#) a decade ago, because science is misconstrued as subject matter best suited for elite nerds. Our aim is to bring science opportunities to those least likely to engage in science or become scientists, so that the next generation of scholars, teachers, inventors, and active voters better reflects who we are as Americans. Time is short. Should not one of your aims be to tangibly make tomorrow slightly better than today?

In conclusion, I praise you for your outstanding academic achievements. I hope that my brief words have cast contingency in a hopeful, favorable light—that the most interesting work in your future may emerge from unexpected quarters. I also hope that you become difference-makers. To that end, I have a small request. When you raise a glass tonight to celebrate your well-earned academic status, save the last sip for a special toast—to make this world, in ways large or small, a more interesting and better place in which to live.

Have a great life—and best of luck!

Footnotes

¹ C. Darwin, *The Origins of Species by Natural Selection* (John Murray, London, 1859), p. 374.

² A. Desmond, J. Moore, *Darwin: The Life of a Tormented Evolutionist* (Penguin Books Ltd., London, 1991), p. xviii.

³ J. Dewey, Science as subject matter and as method. *Science* vol. 31, pp. 122, 127 (1910).

⁴ J. Dewey, *Democracy and Education: An Introduction to the Philosophy of Education* (The Macmillan Company, New York, 1916).

Paul Sereno, Professor in Organismal Biology & Anatomy, has discovered dinosaurs on several continents. His overall aim is to map the dinosaur family tree by tracing the many evolutionary changes recorded in their skeletons. The patterns of change recorded on the branches of the evolutionary tree are key to understanding how evolution works over millions of years. Sereno fuses his mission of scientific research with his educational mission, engaging his students directly in the process of discovery. In 1998, Sereno and his wife, educator Gabrielle Lyon, co-founded [Project Exploration](#), an organization dedicated to bringing dinosaur discoveries and natural science to the public and providing innovative educational opportunities for city kids.