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Honors Convocation Speech

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Honors Convocation 2009
Jonathan Dey

Jonathan Dey: Well, thank you and congratulations to all of you receiving honors this year. As much as I'm surprised to be standing in front of you today, I'm sure some of my students and former students are probably wondering how in the world this happened.

[Laughter]

Jonathan Dey: Well, let me get started before somebody asks for a reconsideration. Well Charlie—well, not Charlie Brown, but Charlie Darwin. This year is the 150th anniversary of the publication of the *Origin of the Species*. Out of curiosity I did some reading on two great links, two great websites. One of them is “The Complete Work of Charles Darwin Online” and the other one is the “Darwin Correspondence Project”. In the first part of this talk, a longer part, a longer Charlie part, I would like to share with you some information that will give you some insights and aspects of Darwin's life and his career as a scientist. For those of you that might be interested and would like citations of things that I quote or paraphrase, contact me. Then I hope to answer the following question: What, if anything, do Charles Darwin and three former Wesleyan students—Amy [Emily] Richter, Amy Cadwallader, and Kelly Petrowski—and I have in common? So, first the Charlie part. I'm gonna give you a number of items that I'm gonna talk, so bear with me. Item number one: First a few comments about Charles Darwin's college years. Charles' father, physician father, encouraged him to study medicine at Edinburgh University. After two sessions, which would be two years of classes, it became clear that Charles had no interest in medicine. Quoting him, “I became convinced...that my father would leave me property enough to—enough property to subsist on with comfort...my belief was sufficient to check any strenuous effort to learn medicine.” Subsequently his father proposed that he should become a clergyman and attend Cambridge University. Charles did take theology courses among others and earned his B.A. Charlie did come from a well-to-do family as his father married into the Wedgwood family of pottery fame. In fact, Charles was married several years after the voyage of the Beagle when he married his cousin, Emma Wedgwood, and they had a very comfortable home life with many servants. Financial records were uncovered at Cambridge last month and they indicate that Darwin lived the life of “a well-to-do young gentleman.” He paid people to carry out tasks such as stoking the heating fires in his room and polishing his shoes, and he paid extra to get vegetables with his meals on his meal plan. Some newspapers, looking at the records, made the claim that he spent more money on shoes than on books, but this is not true. The books won out just by a little bit. Darwin noted his three years at Cambridge were the most enjoyable of a happy life. He also stated, “...at Cambridge my time was wasted, as far as academical studies were concerned.” However, it also became certainly the case that he became irreversibly devoted to science at Cambridge. According to a university spokesman, “Darwin famously spent little of his time at Cambridge studying for lectures, preferring to shoot, ride, and collect beetles.” Because he was so sickened with the lectures at Edinburgh, he was not much interested in attending lecture. Later in life, Darwin did express the regret “that he did not even attend Professor Sedgwick's eloquent and interesting geology public lectures.” He noted that “if he had done so, he

probably would've become a geologist earlier in his life. He did, however, attend the lectures of Professor Henslow on Botany and liked them...and the field excursions...during which the professor lectured on the rarer plants and animals which they observed.” Item number two: Professor Henslow became an important mentor to Darwin. It was Professor Henslow that persuaded Darwin to begin the study of geology after he passed his final exams for his B.A. in 1831. Henslow also recommended Darwin to Professor Sedgwick so he could accompany the professor during a geological fieldwork in Wales that summer and subsequently recommended Darwin to Captain Fitzroy of the *Beagle*, and the relationship between the professor and Darwin continued for the rest of the professor's life. Item number three: Comments on Charles' father being a concerned father. Captain Fitzroy was willing to give up the part of his own cabin to any young man who would volunteer to go with him without pay and act as a naturalist on the voyage of the *Beagle*, so basically it was a—besides being a naturalist, Darwin would be a companion. Darwin was instantly eager to accept this offer but his father strongly objected. Paraphrasing some of his father's objections: that going on the trip would be disreputable to Charles' character when he became a Clergyman later; that it was a wild scheme and a useless undertaking; that Charles would never settle down to a steady life afterwards; that he would again be changing his profession; that the position could not have been a good one because others probably had already rejected the offer—maybe there were some problems with the ship or with the expedition. Darwin's uncle, Josiah Wedgwood, wrote to Darwin's father and demolished the arguments and Darwin's father then approved the trip and Darwin's father was supportive of his son. Item number four—by the way, there are eleven of these, just so you keep track—

[Laughter]

Jonathan Dey: What were Darwin's goals during the voyage of the *Beagle*? “At the start of the voyage, Darwin was twenty-two; he had some experience collecting beetles and small sea creatures, and was fast-developing a strong interest in geology, but he saw himself rightly as a novice in all other areas of natural history. His plan for the *Beagle* voyage was twofold—to continue his own investigations of geology and marine invertebrates, and to collect specimens of other organisms that might be of—that might be new to science and for experts to examine and describe when the *Beagle* returned to England.” Item number five: Over the years, scholars have debated as to when Darwin first became convinced that species were mutable, that is changeable, and that they can evolve to form new species. Was it during the voyage or did it occur later?—is the question. The voyage that was expected to take two years took almost five years. Upon his return to England, he enlisted other scientists to examine many of his specimens including the fossils, plants, and birds. Other specimens such as barnacles he worked on by himself and the identification of rocks and minerals he collaborated with others. And by the way, in 1936, he was awarded his master's degree from Cambridge. And then quoting from a scholar in the introduction to a volume of his correspondence, he writes—this is the introduction to the volume—“During the voyage itself, although generalisations and theories were plentiful in the records, there is no indication that he had given up a belief in—in immutable, created species.” And “In the winter of 1936, the question of stability of species, awaited further consideration.” So this was after the

voyage. As Darwin was able to properly consider the results of his own and others' examinations of the Beagle specimens, the suggestion of instability developed into a conviction that species were mutable. By the spring of 1837, Darwin was a transmutationist and embarked on the long task of gathering facts, constructing theories, to explain this view, his view, of the origin of species. In October 1838, Darwin read Malthus' "Essay on the principle of Population" and noted that "being well-prepared to appreciate the struggle for existence...having long-observed the habits of plants and animals, it at once struck me that under these circumstances favourable variations would tend to be preserved, and unfavourable ones would be destroyed. The result of this would be the formation of new species. Here then I had at last a theory by which to work; I was so anxious to avoid prejudice, that I determined not for some time to write even the briefest sketch of it." Item number six: There was also a controversy among scholars as to whether or not Darwin held back on publishing of his theory for various reasons including: they might offend people, they might give ammunition to some of his contemporaries. That is, he didn't publish until he was forced to. The Director of the Darwin Online Project recently made the case that Darwin did not hold back on his views and there's a reasonable argument to support the idea. In the years following the voyage, Darwin concentrated on working up his notes, his journals, and collections and published many volumes on the geology and natural history of the places that he visited. This was always the master plan and part of Darwin's goal as a naturalist on the Beagle. He simply pursued that goal. As Darwin contemplated the specimens and insights of others who had looked at the specimens, he notes: "I started my first notebook for facts in relation to the *Origin of Species*, about which I had long reflects, and never ceased working for the next twenty years." Darwin's correspondence clearly indicates that during this time, he freely discussed his ideas with other scientists of the day—his ideas were not a secret. In his autobiography, Darwin commented that he had received the essay titled "On the Tendency of Varieties to Depart Indefinitely from the Original Type from Alfred Wallace in the summer of 1858; and that this essay, when he read it, "came to exactly the same theory as my own." It was subsequently arranged by friends that Wallace's essay and Darwin's overview sketch and a letter to Asa Gray, American botanist, would be read to others at a meeting of the Linnean Society in London and the manuscripts were later published in the same issue of the journal. It simply noted that the sketch that Darwin had written and that was published and the letter to Asa Gray were never meant to be—be—never meant to be written for publication. There was no subsequent discussion of the talks at the meeting, so—because neither Darwin nor Wallace were there. Reflecting later, Darwin wrote, "Nevertheless, our joint productions excited very little attention and the only published notice of them that I can remember was by Professor Houghton of Dublin, whose verdict was that all that was new in them was false, and what was true was old." This showed Darwin how necessary that any new views should be explained at considerable length in order to arouse public attention. Thus, it was with a sense of urgency that Darwin worked hard to pull together his thoughts and observations and the first edition of his book—*The Origins of Species by Means of Natural Selection for the Preservation of Favored Races in the Struggle of Life*—was published in 1859. Well, item seven: Why was Darwin so successful? In a statement relevant to today's academics and the development of effective arguments, Darwin wrote in his autobiography that he attributed the success of the *Origin* in large part to his having long before written two

condensed sketches. The first one was about, I don't know, thirty-five pages. The next one was two-hundred and thirty pages, but those were condensed sketches, and to us finally abstracted a much larger manuscript. By this means he was able to select the more striking facts and conclusions to help make his case. He also indicated that he followed the golden rule—a golden rule, namely that whenever he encountered a published fact, a new observation or a thought, which is opposed to a general result, that he needed to write it down without fail and at once because he had found by experience that such facts and thoughts were far more likely to be forgotten—I think that's pretty logical—than the ones that are favourable to your point of view. Owing to this habit, he noted very few objections were raised against his views that he had not at least noticed and attempted to answer. Darwin's "Origins of the Species" was heavily revised and as new editions were published they too were heavily revised. Darwin's message for students might be to revise, revise, revise your papers before being satisfied with them. Number eight: What was Darwin's—why were Darwin's ideas and methods so important at the time? In discussing Charles' relationship to his grandfather, Dr. Erasmus Darwin, Charles' great-granddaughter observed, "Charles' conviction of the power of Natural Selection, working on the universality of variation of plants and animals, led him to advocate in his own theory—in his own work a theory built on the firm structure of evidence. He espoused a new balance in Natural Science between theory and a more scrupulous observation of fact and a more rigorous recourse to experiment. The strength of his argument in the *Origin of the Species*—and indeed all of his work—lay in his power of generalisation under the strictest control of related observations; a generalisation became a short-hand expression with predictive power." Number nine: What was the myth of Darwin's finches that developed and was perpetuated in biology textbooks? We might note that the importance of the finches kind of went to their head too—their heads, I guess. It's a fact that the finches of the Galapagos Island were very diverse and they had adapted to different conditions on different islands but this was not recognized by Darwin during his five weeks in the Galapagos because his thoughts had been focused on mockingbirds. As it turns out, Darwin not only did not recognize some of the birds that he collected were even finches, but also that the Island location where the specimens were collected was not adequately recorded. The specialist that he sent the birds to for examination was the one that first pointed out the unusual diversity. While this piqueted Darwin's interest, he was limited in his ability to analyze the situation. It was up to other scientists much later who did careful studies in the Galapagos who documented the finches and recognized them as a "textbook case" of adaptive radiation. However, the myth was begun. Item number ten: No author of a good study or writing project goes unpunished. Even though Darwin was an excellent scientist and was fascinated with the organisms he studied, the work also led to frustrations. Here are some of the comments in letters to colleagues that might resonate with some of the faculty members in the audience: On Barnacles, October 1852, "I'm at work at the second volume of the Cirripedia, of which creatures I'm wonderfully tired. I hate a Barnacle as no man ever did before—"

[Laughter]

Jonathan Dey: "—not even a sailor on a slow-sailing ship...I hope by next summer to have done with my tedious work." Of course, despite his frustrations, we should note that

such detailed studies further contributed supporting facts too for his ideas on natural selection. On the Insectivorous Sundew Plant, Darwin comments on the excitement and the frustration. In the summer of 1860, he noticed the leaves of the sundew plant had entrapped numerous insects and he decided to study the processes through experimentation. The picture on the left shows the sundew and you see the leaves are highly modified. They have all these glandular hairs on them. And the picture on the right you can see that an insect has landed on the leaf on the hairs. The hairs are sticky and they start to move one after another and make contact with the insect and then eventually they digest it. Some sundews will flex the whole leaf and have a meal. Later that year he wrote to Hooker, "I have been working like a madman at *Drosera*..." And a few days later, writing to Charles Lyell, he said, "I will and must finish my *Drosera*,"—*Drosera* is the genus name—"manuscript, which will take me a week, for, at the present moment, I care more about *Drosera* than the origin of all the species in the world. But I will not publish on *Drosera* until next year, for I am frightened and astounded at my [experimental] results." And then he describes, "Is it not curious that a plant should be far more sensitive to the touch than any nerve in the human body? Yet I am perfectly sure that this is true." He ends it by saying, "When I am on my hobby-horse, I can never resist telling my friends how well my hobby goes, so you must forgive the rider." Other projects occupied him for many years and it was not until 1872 that his work on insectivorous plants resumed as he had time to pursue his experiments. Three years later he wrote to Hooker again at a time he was working at a book manuscript and was rather stressed: "You ask about my book and all I can say is I'm ready to commit suicide; I thought it was decently written and find so much once rewriting that it will take—that it will not be ready to go to the printers for two months and then—and will then make a confoundedly big book...I began to think of everyone who publishes a book a fool." Item number eleven, the last one: What was the significance of the life-changing—what was the most significant life-changing event in Darwin's life? Not surprisingly, in his autobiography he wrote, "The voyage of the *Beagle* has been by far the most important event in my life, and it has determined my whole career;...I have always felt I owe to the voyage the first—the first real training and education of my mind; I was led to attend closely to several branches of natural history, and thus my powers of observation were improved,..." Well, that brings us to the second part, the shorter part. So what—what brings—that brings us to the question: What do Charles Darwin, Emily Richter—Emily Richter, Amy Cadwallader, Kelly Petrowski, and I have in common with Darwin, if anything? In part, the answer is the Change theme for this conversation. It is that all of us started our training headed in one direction and after events, experiences, and happenstance we have reevaluated our personal goals and altered our career plans. Emily Richter graduated in 2006 as a biology major. While she was a student here, she served as a tutor at the Writing Center and was a laboratory teaching assistant; she worked on research projects on lichens with me, on bacteriochlorophyll biosynthesis with Dr. Bollivar, and on the SARS corona virus during summer research at Loyola University in Chicago. Microbiology research became a passion of Emily's. In the summer of 2006 she moved to New Orleans to begin graduate studies in the Department of Microbiology and Immunology at Tulane University. Then came the hurricane named Katrina and everything changed in her life. Tulane closed for the fall semester; her building was damaged; programs were being eliminated; some of the research faculty were leaving and

trying to find new locations for their labs. Emily headed back to the Chicago-land and wondered, “What next?” By spring, Emily’s major professor at Tulane worked out a deal and moved her lab to Arizona State University and Emily joined the new lab. Emily was given lots of lab teaching responsibilities and she participated in a research project that included the exposure of bacteria on the space shuttle. She was a coauthor of the research findings published in the *Journal of Science*, which is a biggie. Emily was even featured in a story in the *IWU Alumni Magazine*. As her graduate studies proceeded, Emily began reevaluating her interest in microbiology. Last fall she decided she did not want to follow the typical laboratory research/get grants path leading to a career at a major research institution, but rather to change the focus of her research to improve with the teaching of microbiology in higher education. Eventually she hopes to teach at a small liberal arts college like IWU. This January she made the big shift to the new major professor and a new direction. She’s excited, happy and enthusiastic in her new direction. Amy Cadwallader was another outstanding IWU Biology major, graduated in 2006. She was also interested in micro. By the way, I’m telling you stories about people in micro—there’ve been a lot of them who’ve been happy with what they’ve done, but—

[Laughter]

Jonathan Dey: At IWU, Amy served as a laboratory teaching assistant and she was very active in Habitat for Humanity. She participated in research projects at Illinois State, IWU, the University of Iowa and the Mayo Clinic. Here at IWU she studied pesticide contamination of North American resident birds while working with Doctors Given Harper and Jeff Frick. While at the Mayo, Amy also had the chance to interact with some patients suffering from the effects of an immune system disorder that she was researching in the laboratory. The ability to work on such research problems that can help people was highly motivating to Amy. She was recognized as an, and awarded, a 2006-2007 National Phi Kappa Phi Graduate Fellowship to support her first year of doctoral studies at the University of Michigan in the Department of Microbiology. Amy had an outstanding year in Ann Arbor—the laboratory research was going well and it led to coauthored publication of two articles. Although she had a bright future as a laboratory research scientist, Amy decided that she needed a career where she would have more direct person-to-person contact. She joined Americorps and for the past two years, Amy has worked with volunteers for Habitat for Humanity in Charlotte, North Carolina. She began to explore career options. This summer she’ll begin graduate studies to earn her doctorate in physical therapy at Duke University. Through her training in physical therapy she will be able to continue to directly help others and enjoy the interactions with them. As for myself, in college I started out in the Department of Botany and Plant Pathology at Oregon State University and I also did undergraduate research on a project on a plant pathogenic fungus *Verticillium*. I was heavily into the natural sciences, but during my junior year I applied to a new Peace Corps Program called the Senior Year Program and was accepted into training for English-speaking West Africa. After spending the summer of 1964 at the University of California-Berkley, we were to return to our college campuses knowing that we would be going to West Africa. At this point feeling that I had too—had been too natural sciences-oriented, I discovered that if I switched from the Department of Botany and Plant Pathology, I could move to the Department of General

Science where the Biology majors were and virtually I had all my science requirements met, so this in turn allowed me to branch out to explore areas in the social sciences and the humanities. I enjoyed the experience and even took the opportunity to take a course on the Geography of Africa. After graduating in 1965, I did a second summer of Peace Corps training at Morehouse College in Atlanta. Attrition was high in my group of volunteers between the two summers and the Peace Corps did not continue the Senior Year Program experiment after that. My assignment in Nigeria was to teach secondary school biology, health science and mathematics at a boys' boarding school. Those were interesting, rewarding and trivial times in Nigeria with two coups and the start of a civil war. Besides traveling around the country and into neighboring Niger and the Cameroons during the school breaks during my first year, in my second year the Peace Corps encouraged us to travel out of the country because of political unrest. I went on an extended trip that took me to South Africa, then to Kenya and Tanzania, on to Ethiopia and Khartoum. Subsequently, the Biafran War for independence began. In the spring, Shell Oil began to evacuate their workers from the Niger River Delta, which is where I was stationed, of the Eastern Region and the Midwest Region. The day after I left Nigeria for home, the Igbo led East, that is the Biafrans, invaded the Midwest Region and all the Peace Corps volunteers were evacuated from the Midwest. In 1967 I returned to my strengths in the natural sciences and started doctoral graduate studies at Duke University in plant ecology. However, my draft board thought I should help the country out. So during my second year with an undergraduate background of being a Fun Guy, I switched to water mole research project so I could complete a master's degree while delaying my induction into the army until the summer of 1969. My army service took me from Fort Lewis, Washington through Fort Ord to Camp Roberts, California where I worked in the Personnel Office as a clerk. Eventually I was reassigned to Walter Reed Army Institute of Research in Washington, D.C. where I spent the rest of my time in the Department of Human Studies in the Division of Surgery. As a research assistant, I was involved in projects such as ulcer studies in rats and monitoring dogs after experimental heart transplants. I can make a mean rat popover. In 1971 I headed back to Duke, but I wasn't really too excited about water moles, so I was only gunna give myself a year—by this time I was also married—I was only gunna give myself a year to get excited. It was during that year that I took a course in lichens and I found out that I like 'em so that became my passion. In the spring of 1975 on the same day I was offered a Post-doctoral Fellowship at the Smithsonian Institution, I was offered the botany position at IWU. I've been at Illinois Wesleyan ever since. It's—it was a great decision for me. I enjoy teaching and working with students, keeping up with the new scientific developments, and trying to incorporate information into my classes. I have been fortunate to have students accompany me on lichen-collecting trips and have students work with me on specimens and projects here on campus. It has been personally satisfying to help students as they explore careers and apply to programs and then to follow the careers of some of them after they leave IWU. Working with my colleagues in the Biology Department over the years has given me immense pleasure. For you students, a drawback—for us is—I know for you students—I know that you dislike taking tests but you may be surprised to know that I and many of my colleagues actually dislike writing tests and really, really hate grading them. My biggest fans—oops, a little bit too soon there. Currently I am vicariously living—reliving some of my Peace Corps memories. Quite a few of you may

know Kelly Petrowski, she was a Biology major and graduated last spring. She was formerly IWU's Student Body President. Kelly's interest in biology recently turned toward considering a career in public health, but she decided to join the Peace Corps before applying to graduate programs. Kelly is currently teaching science and English at a community co-ed secondary school in Malawi. I am envious of the wonderful experiences she is having and sharing on her blog and in some emails. Coincidentally, this semester I have two students from Nigeria in my microbiology course and one, Kemi Onajin, comes from Warri, a town about twenty miles west of the rural school that I taught at during my Peace Corps service. By biggest fans—in conclusion—heyyyy.

[Laughter]

Jonathan Dey: As the experiences of Charles, Emily and Amy and Kelly and myself illustrate, it will be okay for you students to explore and change the direction of your life, even if you've been committed to a specific career goal. Do not worry if you might disappoint others. Your friends and family will be there to support you in the end. If you ask some of your teachers, you will find that many of them have also had big changes in direction too. Be prepared to test your preconceived ideas, be flexible, and never stop learning. Thank you for your patience.

[Applause]