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In Defense of Almost:  
Scientific Progress and What We Leave Behind  
(in the style of *The New York Times Opinionator*)

The publication of Charles Darwin's *On the Origin of Species* in 1859 signaled a veritable paradigm shift in evolutionary thought. Darwin's legacy as the "[father of evolution](#)" endures to this day – yet, a mere year before the release of *Species*, another scientist, Alfred Russel Wallace, had published his independently conceived theory of natural selection. In fact, it was Wallace's writings that prompted Darwin to finally produce *Species*. Over a century and a half later, [Wallace's role](#) in the history of evolutionary theory is mentioned only in passing, if it all, while Darwin is remembered and celebrated. Did Wallace and the life he dedicated towards the study of natural selection become meaningless once his findings were eclipsed by Darwin's? Philosopher Susan Wolf, in her seminal work, "[The Meanings of Lives](#)," suggests that one of the features of a meaningless life is "engage[ment], even dedicated, to a project that is ultimately revealed as bankrupt" (784). One particularly compelling example Wolf gives for this type of meaningless existence is of a scientist whose life's work is overshadowed by another scientist's breakthrough. She submits that such meaninglessness results not because the scientist's values are "shallow or misguided," but because "the project fails," reduced to obsolescence.

Does this mean then that Wallace and his life's work are failures, rendered meaningless in the shadow of Darwin's more enduring and substantial contributions? I suggest that by looking deeper into the history of science which is rife with examples of scientists who "almost" made it, we will see that being surpassed does not necessitate "bankruptcy," that by very virtue of being "close," these scientists and their work were meaningful in a distinctive way.

The dispute between Newton and Leibniz over who first invented the mathematical study of calculus was a [cause of major controversy](#) in the late 17<sup>th</sup> and early 18<sup>th</sup> centuries. Although Newton first made the discovery around 1666, he did not publish his findings until after Leibniz, who is believed to have independently conceived of the idea in 1674. Both men wanted to take credit for the discovery of this new branch of mathematics, and the dispute came to a head in 1711 when the controversy was taken to court. Leibniz was found guilty of plagiarism, and although it is now acknowledged that both developed calculus independently at nearly the same time, it is Newton, helped by his contributions to physics, who endures. Central to understanding why Leibniz, even though he was reduced first to a fraud and then to a secondary figure, can still be considered to have led a meaningful life lies in understanding the nuance of scientific discovery and development.

Part of the problem with Wolf's example is her oversimplification of how a scientific discovery comes about, and what a discovery itself entails. Calculus, just as with the theory of natural selection, was the culmination of centuries of work by other scientists and mathematicians. To speak of scientific "discovery" is misleading in this sense, because neither Newton nor Leibniz developed the field of calculus from a sudden epiphany or revelation. [Newton himself described](#) this process when he wrote, "If I have seen further, it is by standing on the shoulders of giants." No scientific discovery is wholly independent from the arc of history, and no discovery is final or all-encompassing.

Leibniz's conception of calculus differed significantly in important areas such as notation and application. In fact, much of modern-day calculus resembles Leibniz's work more than Newton's, although he goes largely uncredited. This recognition that each independent discovery contributes something singular, and is necessary in the development

of future discoveries, is the key to correcting Wolf's oversimplified anecdote. Perhaps scientists like Leibniz will not have their names nor legacies carry on in the same ways as the ones who come "first," but this does not reduce their work or lives to being meaningless.

In fact, I think we can go so far as to say that a scientist whose work is later disproved by other scientists can still be considered to have led a meaningful life. Ptolemy, a 100 AD Greco-Egyptian mathematician and astronomer, was the [forefather of the geocentric model](#) for the solar system which had the Earth at its center and the sun and planets revolving around it. Ptolemy's model was widely accepted and used for the next millennium and a half before his theory was gradually superseded by the heliocentric model developed by Copernicus and Galileo, among others. It is clear that had Ptolemy "gotten it right" during his time, human progress would have been accelerated for the better, but his mistaken theory does not make his work or life any less meaningful. To even recognize that the planets and sun moved in patterns relative to the Earth, and to attempt to model this motion was a major achievement. I say this not to inject meaning into an otherwise mistaken theory, but rather to emphasize that each discovery, whether eclipsed by some other finding, or in this case altogether wrong, contributes something valuable to the whole of science, the shoulders upon which future Newtons will stand.

Historian of science [Michael Shermer has found](#) that through both private correspondence and published works, Wallace served as a valuable confidant and scientific peer to Darwin. Without him, Darwin may not have published *On the Origin of Species* at all, so in this sense, Wallace is the giant who came before Darwin. We have seen how Wallace, Leibniz and Ptolemy, three scientists who almost, but not quite "made it," contributed meaningful work and led meaningful lives despite being overshadowed or

discredited by other scientists. By virtue of being “almost,” these scientists were meaningful in different ways than their unambiguously successful peers. I see this not as a rejection of Wolf’s notion of “bankruptcy” and meaninglessness, but rather an expansion and clarification of her ideas. If a meaningful life is about engaging in successful projects of value, then these projects can come in nuanced form, not always with enduring legacies, but certainly with enduring consequence.