

Attempt the impossible!

You just might achieve it

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This article is excerpted from the Baccalaureate address delivered by Professor Cook at the invitation of the Class of 2007, on June 9.

This weekend's ceremonies mark the end of one chapter of your lives and celebrate your substantial accomplishments during your time at Lawrence. But they also mark the beginning of what you already know in your hearts to be the longer, the more important, and the more significant chapters in your lives. I offer a bold imperative to guide you in the chapter that begins when, tomorrow, President Beck confers upon you the degree or degrees you have earned: *Attempt the impossible!*

One of the quotations I sometimes post on the wall in my office comes from John Stuart Mill: "The pupil who is never required to do what he cannot do never does what he can do." Mill, too, urges us to attempt the impossible. I believe that the most important responsibility of your mentors has been and is to set high standards, to challenge you to attempt the impossible.

Columbus' impossible journey

I'm sure each of us can identify several achievements of the past that many at the time deemed impossible. Despite widespread public doubt, a few bold

individuals dared to try.

Here's an example from long ago: In the late 15th century, there was no doubt that Earth was a sphere and that a ship sailing west would ultimately arrive at the same destination reached by a ship sailing east. Nobody feared any longer that ships sailing west would fall off the edge. Nonetheless, despite the powerful desire to find routes along which the riches of India and the Orient might be brought back to Europe, despite the dual convictions that Earth was a sphere and that nothing but water stood between the west coast of Europe and the east coast of Asia, Christopher Columbus had many doubters, whose primary concern was that the ships of the day could not possibly carry enough provisions for the anticipated length of the journey. Columbus set sail on the third of August 1492, arrived in the Bahamas ten weeks later on the 12th of October, went on to Cuba, and finally returned to Spain on the 15th of March 1493, having successfully accomplished *something* his contemporaries deemed impossible.

I stress *something* impossible because Columbus did not correctly understand

what he had achieved. He persisted to his death in 1506 in believing he had reached Japan. One of the lessons to be extracted from this historical event is that, in attempting the impossible, one may well achieve something other than — or in addition to — the original objective.

A giant leap and a cup half full

In our day, a comparable event was the attempt inaugurated by President John F. Kennedy in May of 1961 to place a human being on the moon. How impossible a challenge that venture seemed to be at the time. What a risk we took for the sake of national prestige. But there were those who believed in themselves and accepted the challenge. On the 20th of July 1969, Neil Armstrong set foot on the moon.

Whatever one's feelings about whether putting a human on the moon was, *per se*, worthwhile, one cannot deny that the numerous scientific and engineering developments spawned by the effort have made major contributions to many areas beyond the Apollo project itself. One of the lessons in this project echoes the lesson from Columbus: In

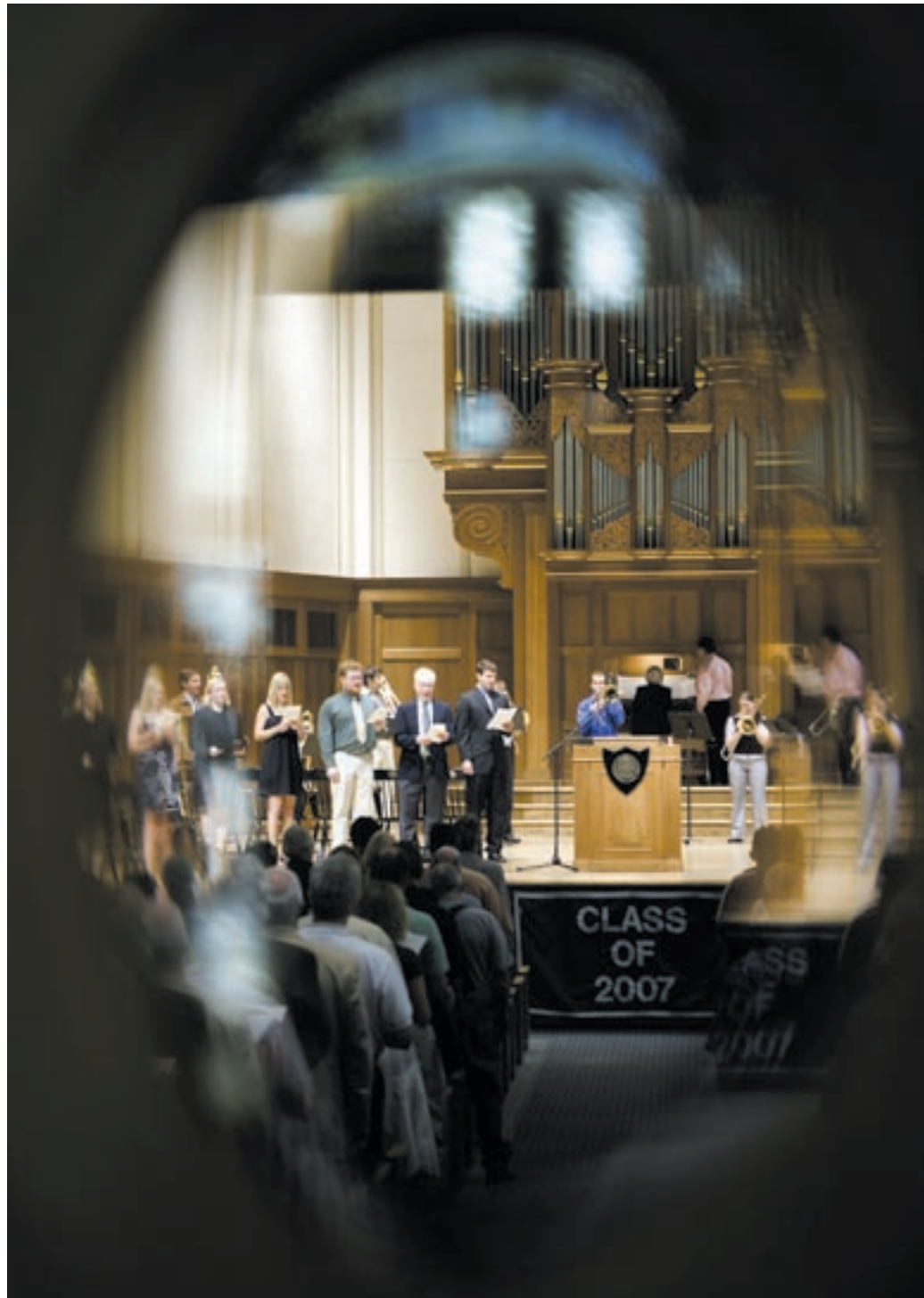
the attempt to achieve the impossible, numerous valuable and unanticipated spin-offs may well emerge.

Thomas Edison's development of the light bulb illustrates another feature of attempts to achieve the impossible. Edison's notebooks reveal that he tried thousands of materials before finding a suitable filament. Edison's remark that "I have not failed. I have succeeded in finding 10,000 ways that won't work" surely expresses the ultimate in seeing the cup as half full.

The lesson here is that achieving the impossible may well require persistence in the face of repeated disappointments. The observation that "genius is 99 percent perspiration and one percent inspiration" is usually attributed to Edison.

Fermat's elusive solution

There are numerous triplets of integers having the property that the sum of the squares of the first two is equal to the square of the third. Perhaps the best known of these is 3, 4, 5 — $3^2 + 4^2 = 5^2$. In 1637, Pierre de Fermat conjectured that the square is the only power for which such triplets can be found and penned the tantalizing notation, "I have



Baccalaureate service, June 9, 2007. Professor Cook is second from the right of those who are standing.

a truly marvelous proof of this proposition, which this margin is too narrow to contain.” Fermat died in 1665, never having taken the time to write out his marvelous proof.

In the following centuries, numerous proofs were suggested by many quite notable mathematicians — and all were found to be flawed. The extremely talented and prolific 19th-century German mathematician Karl Friedrich Gauss refused to tackle the task because he thought that the prerequisite background mathematics had not yet been invented. Three-hundred fifty-seven years after Fermat’s assertion — and, as Gauss had predicted, after many new developments in mathematics — a proof that has withstood careful scrutiny was constructed by Andrew Wiles, an Oxford-educated British-American number theorist at Princeton University.

The lesson here is captured in the

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oft-quoted, supremely confident motto, “The difficult we do immediately; the impossible takes a little longer.”

All of these achievements — and many more that could be added — illustrate the ironic wisdom of Pliny the Elder from the first century AD, “Indeed, what is there that does not appear marvelous when it comes to our knowledge for the first time? How many things, too, are looked upon as quite impossible until they have been actually achieved?”

The impossible can indeed be achieved!

What’s your grand challenge?

Fermat’s last theorem constituted a *grand challenge* for mathematicians. That term, grand challenge, appeared first in the 1980s in the world of computer science



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and described “a fundamental problem in science or engineering, with broad applications, whose solution would be enabled by the application of high-performance computing resources that could become available in the near future.”

If you are looking for suggestions as to the impossible task you might attempt first, try “googling” *grand challenge*. You will be presented with — here’s an impossible marvel in itself — about 39,600,000 hits in 0.28 seconds (never mind that many of those hits will be decidedly off-target). In the first 20 hits, you will find not only a link to the computer-focused list, which is periodically revised as challenges move from the (nearly) impossible to the actually achieved, you will also find links to the current list of grand challenges in global health, face recognition, environmental science, disaster reduction, biogeochemistry, membrane biology, and computational astrophysics.

If those lists don’t contain an impossible task that appeals to you, perhaps

you can add your own favorites: develop an artificial pancreas to make life orders of magnitude easier for those afflicted with Type 1 diabetes; or bring peace to the Middle East; or provide safe drinking water and sanitary living conditions to all people of the world; or build a successful, efficient, and safe thermonuclear fusion reactor; or I leave expansion of the list to your imagination.

Dare to try

When you matriculated at Lawrence, a piece of you feared that you were undertaking the impossible, but you came anyway and, in tomorrow’s ceremony, you will be given tangible evidence of your success. Surely part of you is anxious about embarking on whatever happens after graduation. Some of that anxiety probably originates in your realization that, from this point on, you are very much more on your own than you have ever been in the past. Increasingly, the challenges you accept will be freely selected by you. Your direction and motivation will no longer come from outside yourselves, from your parents, your teachers, your coaches. Be assured, however, that your liberal education at Lawrence has fully prepared you to take full advantage of whatever opportunities come your way.

To paraphrase Professor William Chaney’s injunction many years ago to matriculating freshmen, “You are able to do whatever you want to do. Want much.” And, to quote from Professor Marshall Hulbert’s address on a similar occasion even longer ago, “If, 20 years from now, you contend that your college years were the best years of your life, your college education has failed you.”

Attempt the impossible. You just might achieve it — and you will never know if you don’t try. ■