

■ ANDREW RUPPEL, Feature Editor, McIntire School of Commerce, University of Virginia

## The Sky's the Limit! Oh . . . Really?

Andrew Ruppel, Feature Editor

Decision scientists are eager to deal with limits. They want to quickly capture them in mathematical form, so they don't wriggle away only to return at solution's end to rudely announce the impossibility of implementing it. Decision scientists also play speculative games about the relaxation or complete removal of limits. Of course, one might readily say that without limits, there would be no need for decisions—anything one did would eventually reach one's goal. That leads to an interesting question: what would happen to goals in the absence of limits? John Barrow (see below) says that science would disappear. After all, scientists and mathematicians make their reputations by dealing with, and even inventing, limits. Clearly, limits are of considerable importance and interest to us. Here are some recent books that deal with limits, albeit in different guises—from the societal to the technical to the commercial.

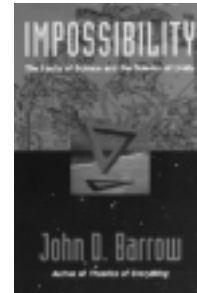


**Graduation Day:  
The Best of  
America's  
Commencement  
Speeches**

A. Albanese &  
B. Trissler, eds.

Morrow, 1998, 264 pp.

[www.williamorrow.com](http://www.williamorrow.com)



**Impossibility:  
The Limits of  
Science and the  
Science of Limits**

John D. Barrow

Oxford University  
Press, 1998, 279 pp.

[www.oup-usa.org](http://www.oup-usa.org)



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THIS IS A COLLECTION OF THREE DOZEN speeches by well-known contemporary and historical figures, e.g., Colin Powell, Jodie Foster, JFK. As you might suspect, a recurring underlying theme is that limits are to be surpassed, new achievements to be attained, and greater challenges to be met. Some of the speakers reflect on the limits they themselves have broken—barriers of race, ceilings of gender, or mental blockades to accomplishment. Others speak of challenges that the graduates collectively will face, some of the graduates' own doing, more of them handed-down as unwelcome legacies from preceding generations. Roughly two-thirds of the addresses are from the current decade; the most recent ones are to the Class of 1997. The earliest commencement speech in the collection is by Ralph Waldo Emerson—made at Harvard in 1838. Harvard tops the graduation venue list with three talks. The most humorous talk is by George Plimpton; the most serious, by George C. Marshall. Taken individually and together, this collection offers inspiration not only to the graduates, but also to the faculty who teach them.

BARROW IS AN ASTRONOMER AND AUTHOR of several general-audience books on science and mathematics. In his latest book, he examines the human mind's ability to comprehend the limits of nature and the limits of the mind itself. The book's eight chapters are divided into sections, each introduced by an exceptionally apt quote. Even the preface, chapter summaries, and notes section have opening quotes. I don't think I've ever seen a book where the author has done so careful a job of matching quotes from a diverse array of sources to the spirit of his material. In considering the question of limits, the author moves through a succession of fundamental questions: What is progress? What is a future? What does it mean to be a human? Will technological gains continue? What can we learn from the cosmos? Are there fundamental scientific truths? Does free will really exist? One comes away from his answers to these questions certainly more informed, but also certainly a bit more pessimistic.

We often think of the speed of light as the ultimate limit. Nothing can travel faster

through empty space. But of course, there are media through which light cannot travel at all. Barrow asks us to consider what would happen if all 'signals' traveled as fast as light does or even faster? Well then, we would be bombarded *simultaneously* with sensory inputs that would overload our limited capability to process them. Computers have permitted us to overcome many of these processing and storage limitations and thereby enable the solution of previously formidable problems. For example, Barrow shows a picture of the largest solved traveling-salesman problem; the tour involved 3,038 sites. Nevertheless, there remain classes of problems that, while solvable in principle, simply would take too long to solve. Barrow feels that we must find new ways of simulating natural processes if we are to get more answers. As an astronomer, Barrow obviously looks to the heavens as one way of studying processes not readily replicable on earth, such as those involving extraordinarily high temperatures. Yet he asks, "Where would we be in our understanding if the sky were always cloudy?" Maybe there are 'clouds' we are not aware of. As he says, "There is no reason to expect the Universe to have been constructed for our convenience."

The Internet has certainly facilitated the team approach to scientific research. Indeed, as we know, the Internet was developed at CERN, a leading center for nuclear physics research. Barrow notes that now genome research has pushed biology and genetics into "the multinational 'Big Science' league previously dominated by physics and astronomy." What distresses him about this increasing connectivity is the "ironing out" of divergent thinking—often generated by researchers who are out-of-regular-touch with their colleagues. With the Internet available, one need not (dares not!) be out of touch. Perhaps science has reached an asymptotic state, borne out of homogeneous thinking, with no way to jump it up to a new level of knowledge. With Heisenberg saying that you can't really measure it, with Goedel saying you can't really prove it, and with Einstein saying that it is all relative, it's hard to get in a jumping mood.



**Future Talk:  
Conversations about  
Tomorrow**

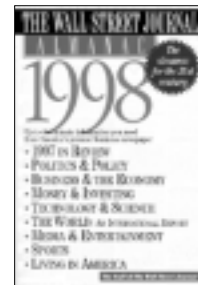
By Larry King with  
Pat Piper

Harper Collins, 1998,  
363 pp.

[www.harpercollins.com](http://www.harpercollins.com)

OF INTEREST TO FUTURISTS WHO PREFER qualitative statements to quantitative ones about what limits will be set or surpassed in the years ahead. The 44 interviews are not transcriptions of King's evening show; they are based on telephone or on-site discussions and are published here for the first time. Participants range across a wide spectrum of personalities and pundits—from Ross Perot to Lester Thurow, from Bill Gates of Microsoft to the Archbishop of Mobile, Alabama! The interviews are grouped into eleven sections, each of which has a brief introduction by King. The limits brought up by interviewees depend obviously on their respective areas of involvement. So, for example, Esther Dyson, along with media types, worry about limits on free speech and the Internet. Anthropologist Stephen Jay Gould wonders about the limits of athletic accomplishment and how the introduction of technology (e.g., the fiberglass pole for vaulting) enables new levels of attainment. Yet, Gould would like to see limits on genetic engineering. Boeing VP Jay Hayhurst observes that humans have pretty much reached their limit of endurance for long flights. As a result, Boeing is looking to increase the present short range of supersonic aircraft. On the other hand, no increase in the posted speed limits for cars is foreseen by Ford VP Neil Ressler. While Chief of Staff General Shalikashvili notes that the Pentagon will have to adjust to lower limits on defense spending, NASA Administrator Dan Goldin seems to exhibit no limit on ambitions for space travel. Former Surgeon-General Everett Koop feels that the total health care of the elderly will have to be limited in some way. And Bill Gates, who is presently worrying about what limits that the federal government might impose on his firm, expresses concern about the consequences of population growth. As King's questions are brief, direct, and without any elaborate in-

tellectualizing on his part, the interviewee's points come across quickly. This makes for fluid reading. While one might be tempted to just read King's interviews with media stars, one will be rewarded by also reading those with participants of non-star status.



**The Wall Street  
Journal Almanac  
1998**

R.J. Alsop, ed.

Ballantine Books, 1997,  
1137 pp.

[www.randomhouse.com](http://www.randomhouse.com)

ANNUAL COMPILATIONS, SUCH AS THIS ONE, represent our keen interest in empirical limits. Thus we can consider this one as a kind of *Guinness' Book of Records* for the financial set. "Who made the biggest business deal?" in addition to answers to "Who won the prize for...?" And so on. (Such compilations also exhibit a sort of record in terms how many pages can be paper-bound without the binding splitting and loose pages then falling out.) This almanac has the usual sections dealing with sports and entertainment plus the basics of US demographics, the world situation, and the year in review. Unlike other almanacs, this one includes, as you might suspect, sections on money and investing, including real estate. It is weak on science and technology in a who-invented-what sense, but does cover aspects of computing and telecommunications, the industry darlings of many of today's investors. The layout is attractive and many graphs are used, especially in the investing section. The index is weak, however. It would have been nice if the editors had included lists and data from other business publication, such as *Fortune* and *Forbes*, that put together their special lists of business record-setting/limit-breaking, e.g., the *Fortune 500*. That would have made this a more useful reference volume. ■