Technology manias:

From railroads to the Internet and beyond

Andrew Odlyzko
Digital Technology Center
University of Minnesota
http://www.dtc.umn.edu/~odlyzko

Warning: little direct relevance for current (early 2008) financial crisis

- in broad outline, that crisis is exactly like scores of other financial crises over the last two centuries
- it's the little details that are different (mass psychology, novel instruments, levels of complexity) that matter for the current crisis
- this lecture: about technology manias only
  - may provide some some explanation for the recurrences of financial crises and some guidance for detecting them

"WHERE IGNORANCE IS BLISS, 'TIS FOLLY TO BE WISE!"

(NEW VERSION.)

"I say, Jim, Vot 's a Panic?"
"Blow'd if I know; but there 's Von to be seen in the City."

Main points:

- technology prediction inherently hard
- techno-manias rooted in human mass psychology
- several common patterns in techno-manias
- some techno-manias can be identified beforehand as destined to burst
- “beautiful illusions” and “credulous simplicity” lead to collective hallucinations that are hard to burst
- future bad techno-manias may be harder to identify
- lawyers will continue to flourish

Mistaken predictions:

The goals of the advertising business model do not always correspond to providing quality search to users. ... we expect that advertising funded search engines will be inherently biased towards the advertisers and away from the needs of the consumers. ... But we believe the issue of advertising causes enough mixed incentives that it is crucial to have a competitive search engine that is transparent and in the academic realm.

One can be wrong and still succeed:

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Sergey Brin and Larry Page, 1998

Widespread claims that bubbles cannot be identified:

Advocates of bubbles would probably be forced to admit that it is difficult or impossible to identify any particular episode conclusively as a bubble, even after the fact.

B. Bernanke and M. Gertler, 1999

Widespread claims that bubbles cannot be identified:

FALSE!

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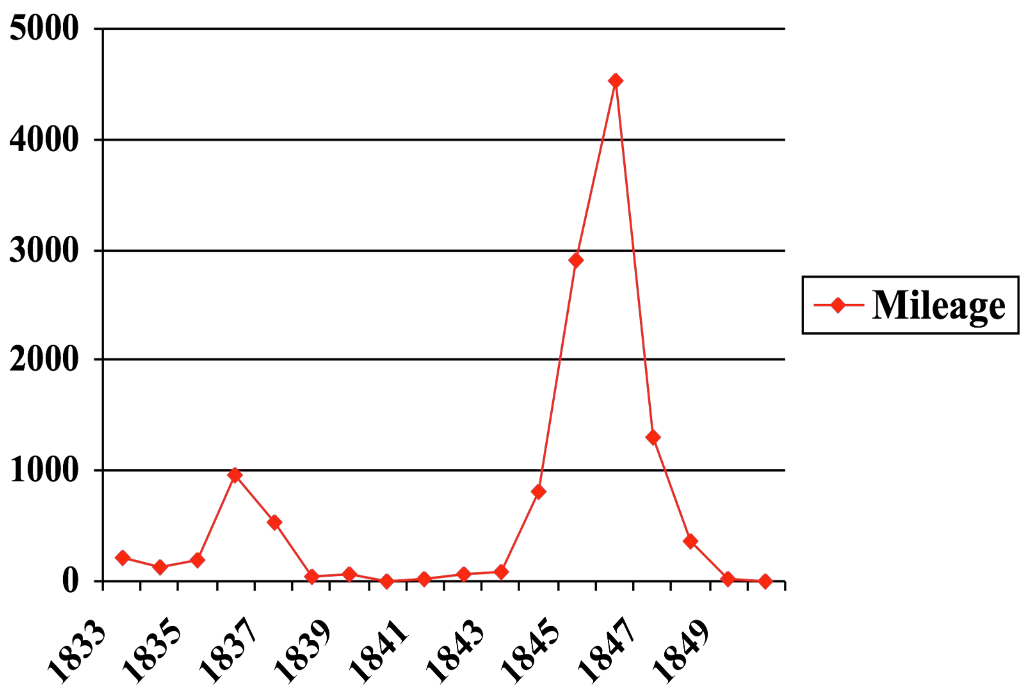
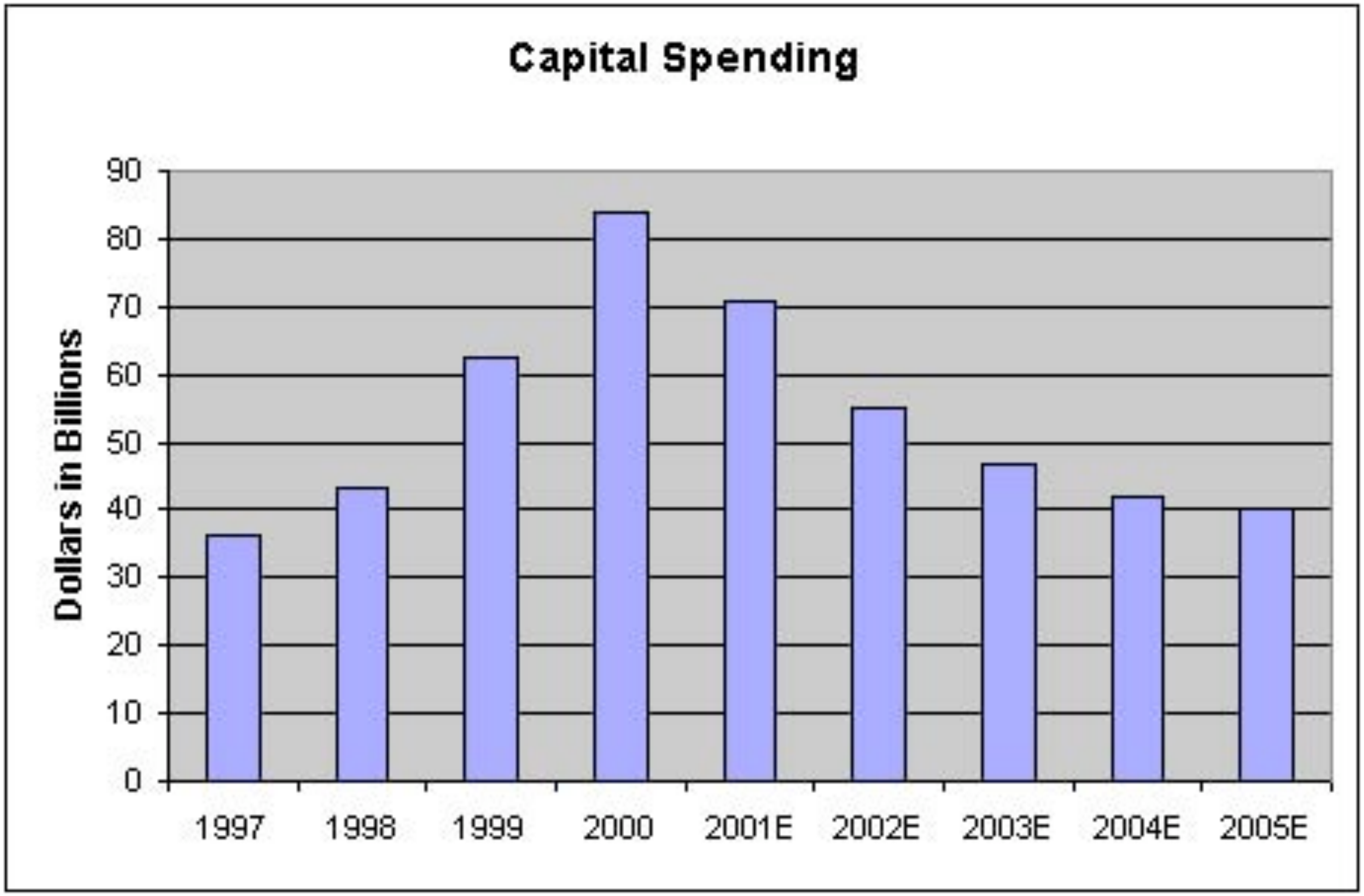
Long history of technology leading to overinvestment and crashes:

Railways authorized by British Parliament (not necessarily built)



US telecom industry



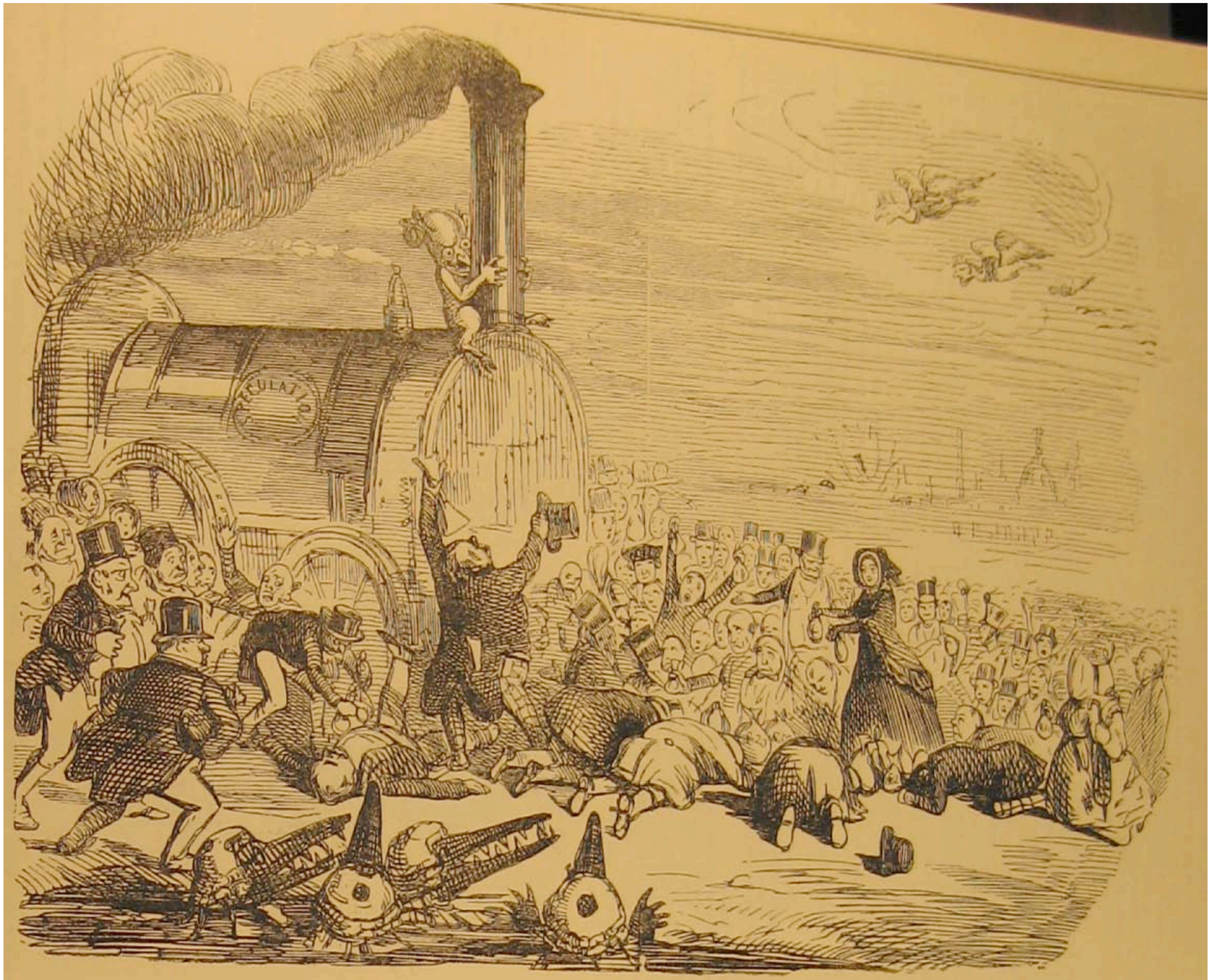
Source: Light Reading

Magnitudes of real capital investment:

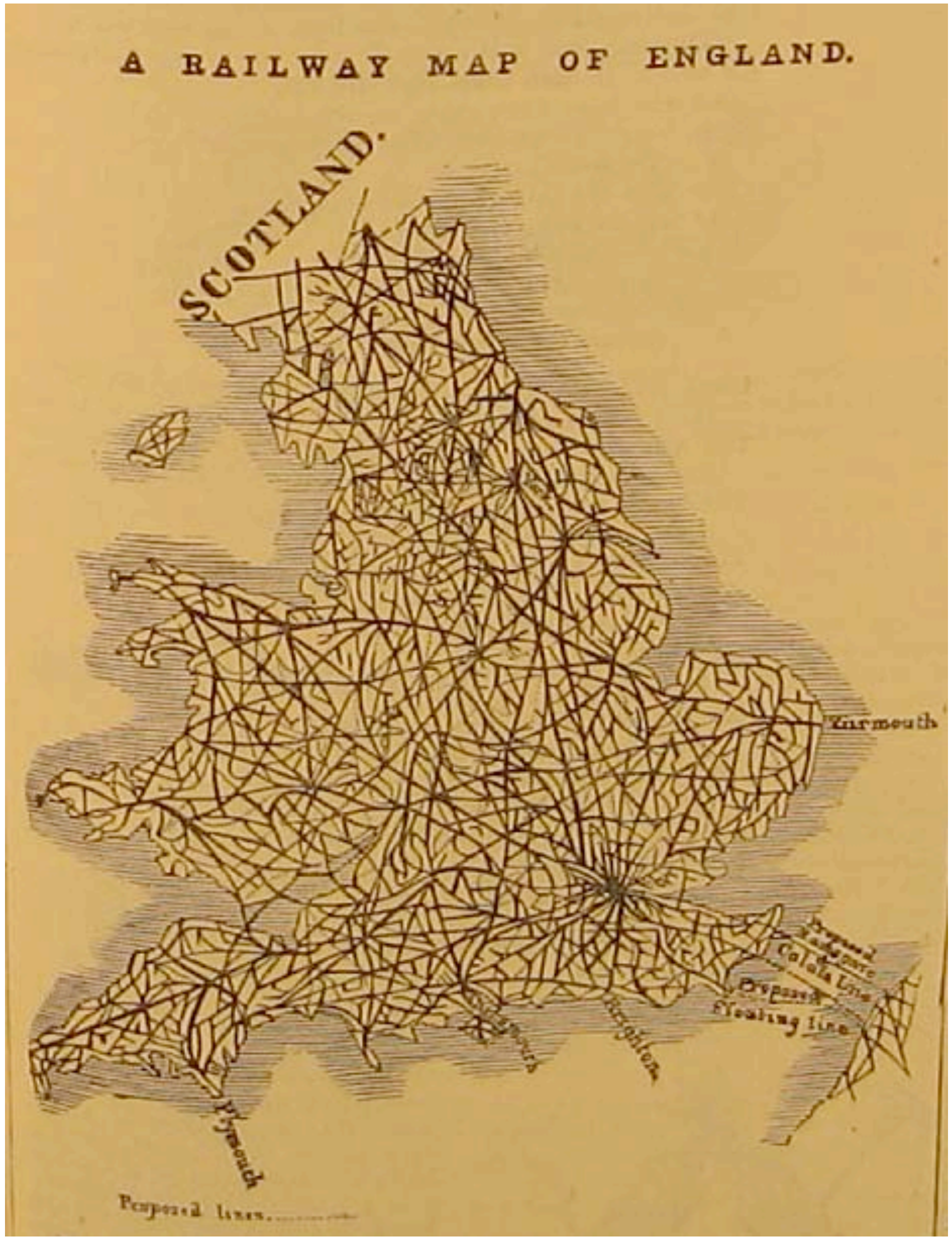
- British Railway Mania: 200 million pounds sterling, equivalent to about 6 trillion dollars (40% of GDP)

- US telecom bubble: 150 billion dollars (~$200 B in 2008), 1.5% of GDP

- US dot-com bubble: 10-20 billion dollars



THE RAILWAY JUGGERNAUT OF 1845,


A RAILWAY MAP OF ENGLAND.
SCOTLAND.
Yarmouth
Plymouth
Proposed lines

Success or failure:

- dot-coms a roaring success from societal perspective
  - Yahoo! alone (ailing as it is) more than paid for all the silly and fraudulent failures
- US telecom bubble: ~$100 B poured into long-haul fiber a waste, aside from some indirect benefits in stimulating industry restructuring
- European 3G auctions of 2000: ~$150 B, but that was just a transfer from shareholders to governments
- British Railway Mania: about 1/3, or $2 T out of $6 T, lost to investors (but only partially to society)
  - all provided ancillary benefits: profits to promoters, VCs, lawyers, investment bankers, and entertainment and gambling for investors

Similarities:

- perception of a new and far faster world
  - Internet time
  - railway speed

- "Build it and they will come" mantra
  - key (and extremely lucrative) role for lawyers

"we hope, some day, to gaze down [Oxford-street's] long vista, and behold every lamp-post adorned with a pendant lawyer."

Era, March 14, 1847

THE MOMENTOUS QUESTION.

"Tell me, oh tell me, dearest Albert, have you any Railway Shares!"

Further similarities:

- buildout phases of comparable length
  - telecom: 1998 – 2001
  - British railways: 1845 – 1848
- lack of demand apparent to insiders by 1848 and 2001
- “creative accounting” delayed financial collapse by a year, till 1849 and 2002

Highly recommended reference:

William Aytoun short story, “The Glenmutchkin Railway”
(annotated version at http://www.dtc.umn.edu/~odlyzko/rrsources/)

- protagonists: Augustus Reginald Dunshunner and Bob O’Corkindale
- “abhorred [work] with a detestation worthy of a scion of nobility”
- eager to “[have] a pluck at the public pigeon”
- “the magical bands of iron [were uniting] all the populous towns”
- supporting characters: Tavish M’Tavish of Invertavish, the Captain of M’Alcohol, …

Another highly recommended reference:

Video clip of May 2000 presentation by Mike O'Dell of WorldCom/UUNET, "Racing with an exponential, or the dangers of linear thinking in an exponential world"

http://stanford-online.stanford.edu/optic/optic-4/embed-100.asp

- 2x growth every 100 days: 10^6 growth from 1993 to 1999
- predicted 10^6 or 10^7 growth in next 5 years
- "If you aren't scared, you don't understand."

(Identical or very similar to many presentations over many years by John Sidgmore, also of WorldCom/UUNET.)

Key elements in Railway Mania and telecom bubble:

- beautiful illusions
- credulous simplicity (aka “willing suspension of disbelief”)
- collective hallucinations
- presence of skeptics with concrete negative information but no effect on market (i.e., ineffective information dissemination and inefficient markets)

Telecom bubble warning signals:

- transparent nonsense of the O'Dell/Sidgmore talks
- grating disparity between Global Crossing 2x and WorldCom/UUNET 10x annual growth claims
- WorldCom telling some that heavy capital expenditures were over, and others they were going to grow 10x per year
- financial analyst premises violated right and left

…

Railway Mania:

Between 1837 and 1845 inclusive, there were gentlemen who rode in their carriages and kept fine establishments, who were called 'traffic takers'. He stumbled over one of these gentlemen in 1844, who was sent to take the traffic on a railway called the Manchester and Southampton. It did not go to Manchester and it did not go to Southampton; but it was certainly an intermediate link between these places. This gentleman went to a place in Wilts where there was a fair, and there took the number of sheep on the fair day, and assuming that there would be the same number all the days of the year, he doubled or trebled the amount for what he called 'development' and the result was that he calculated that by sheep alone the Manchester and Southampton line would pay 15 percent.

Edward Watkin, 1868

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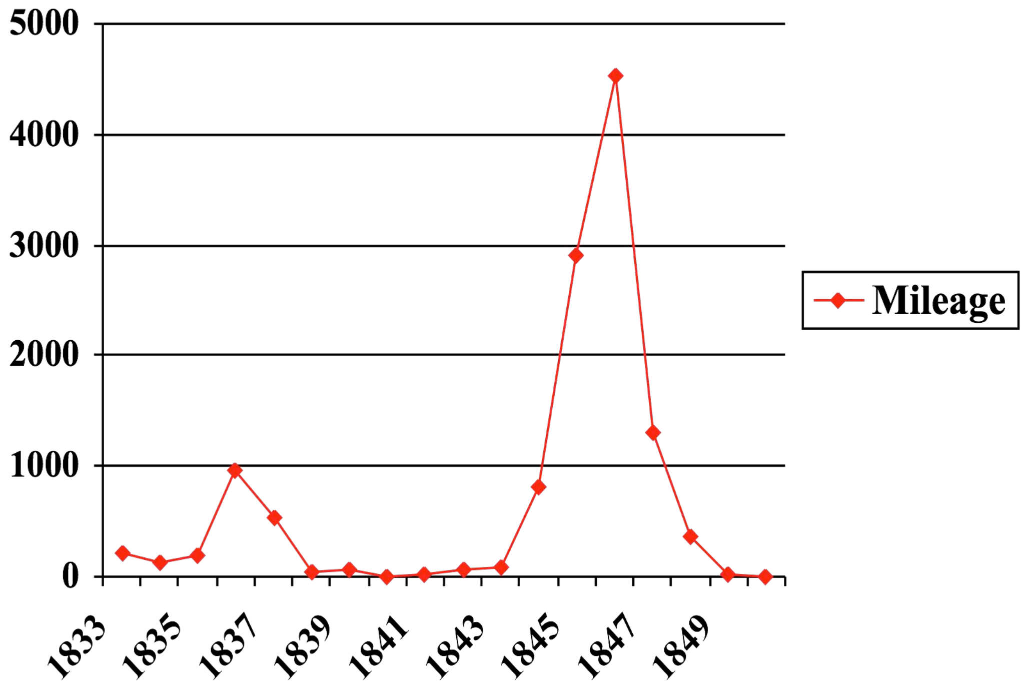

The "little railway mania" of the 1830s:

- 2nd largest techno-mania in history
- capital investment equivalent to about 2 trillion dollars
- by early 1840s railways perceived as success, the 1830s' bubble as having burst prematurely
- results never analyzed carefully

Most popular explanation: corruption

- Internet bubble: “Those in positions to notice were paid a lot not to notice”
- British Railway Mania of the 1840s: Herbert Spencer, “Railway morals and railway policy,” 1854

But not full story, as there were influential opponents of Railway Mania:

The Times

Economist

James Morrison, MP

Railway Mania warning signals:

year ended June 30	railway industry revenues million pounds
1843	4.54
1844	5.07
1845	6.21

Implicit investor expectations for 1850 revenues: 30-50 million pounds

British GDP: 500 million pounds

British national budget: 50 million pounds

"This subject opens many curious and interesting views; but our limits warn us that we must at present dismiss it."

Differences between Internet bubble and British Railway Mania:

- concrete railroads vs. invisible photons, mind share, monetizing eyeballs, ...
- far more information available today, but also far more misinformation, and problems dealing with information overload
- “hype makes reality”

Future techno-manias:

- difficulty in determining technology and business directions
  - back in 2000, online search and online advertising were widely perceived as having no business cases
  - human factors increasingly important
- credulous simplicity increasing
  - when the cream of Wall Street and Silicon Valley fall for something as ludicrous as the O'Dell/Sidgmore talks, we can count on many more transparently empty bubbles

Further data, discussions, and speculations in papers and presentation decks at:

http://www.dtc.umn.edu/~odlyzko