1. Be the House

1. J. Edward Russo and Paul J. H. Schoemaker, *Winning Decisions: Getting It Right the First Time* (New York: Doubleday, 2002), 3–10.

2. Alfred Rappaport and Michael J. Mauboussin, *Expectations Investing* (Boston, Mass.: Harvard Business School Press, 2001), 106–8. In this discussion, we assume investors running diversified portfolios are risk-neutral. For techniques to capture risk aversion, see Ron S. Dembo and Andrew Freeman, *Seeing Tomorrow: Rewriting the Rules of Risk* (New York: John Wiley & Sons, 1998).

3. Michael Steinhardt, *No Bull: My Life In and Out of Markets* (New York: John Wiley & Sons, 2001), 129.

4. Steven Crist, "Crist on Value," in Andrew Beyer et al., *Bet with the Best: All New Strategies From America's Leading Handicappers* (New York: Daily Racing Form Press, 2001), 64. Crist's chapter is one of the best descriptions of intelligent investing I have ever read. I also highly recommend Steven Crist, *Betting on Myself: Adventures of a Horseplayer and Publisher* (New York: Daily Racing Form Press, 2003).

5. From Robert Rubin's commencement address, University of Pennsylvania, 1999, http://www.upenn.edu/almanac/v45/n33/speeches99.html.

6. See chapter 5.

7. Sarah Lichenstein, Baruch Fischhoff, and Lawrence D. Phillips, "Calibration of Probabilities," in *Judgment Under Uncertainty: Heuristics and Biases*, ed. Daniel Kahneman, Paul Slovic, and Amos Tversky (Cambridge: Cambridge University Press, 1982), 306–34.

8. Peter Schwartz, *Inevitable Surprises: Thinking Ahead in a Time of Turbulence* (New York: Gotham Books, 2003).

9. Roger Lowenstein, *When Genius Failed: The Rise and Fall of Long-Term Capital Management* (New York: Random House, 2000); Nassim Nicholas Taleb, *The Black Swan: The Impact of the Highly Improbable* (New York: Random House, 2007).

10. Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decision Under Risk," *Econometrica* 47 (1979): 263–91.

11. Nassim Nicholas Taleb, *Fooled By Randomness: The Hidden Role of Chance in Markets and in Life* (New York: Texere, 2001), 89–90. Taleb takes to task the well-known investor Jim Rogers for arguing against investing in options because of the frequency of loss. Says Taleb, "Mr. Jim Rogers seems to have gone very far in life for someone who does not distinguish between probability and expectation."

12. See chapter 3.

13. Russo and Schoemaker, *Winning Decisions*, 123–24.

14. Rubin, commencement address, University of Pennsylvania, 1999.

2. Investing—Profession or Business?

1. Burton G. Malkiel, "The Efficient Market Hypothesis and Its Critics," *Journal of Economic Perspectives* 17, no. 1 (Winter 2003): 78. This is not a new finding. See also Burton G. Malkiel, "Returns from Investing in Equity Mutual Funds, 1971–1991," *Journal of Finance* 50, no. 2 (June 1995): 549–72; Michael C. Jensen, "The Performance of Mutual Funds in the Period 1945–1964," *Journal of Finance* 23 (1968): 389–416.

2. Special thanks to Gary Mishuris for creating the initial list and prompting this line of inquiry.

3. Jack Bogle, using John Maynard Keynes's terminology, contrasts *speculation* ("forecasting the psychology of the market") with *enterprise* ("forecasting the prospective yield of an asset"). Bogle argues that the turnover ratios suggest most investors are speculators. See John C. Bogle, "Mutual Fund Industry in 2003: Back to the Future," 14 January 2003, http://www.vanguard.com/bogle_site/sp20030114.html.

4. See Charles D. Ellis, "Will Business Success Spoil the Investment Management Profession?" *The Journal of Portfolio Management* (Spring 2001): 11–15, for an excellent exposition of this tension.

5. Bogle, "Mutual Fund Industry in 2003." Also see, "Other People's Money: A Survey of Asset Management," *The Economist*, July 5, 2003; John C. Bogle, "The Emperor's New Mutual Funds," *The Wall Street Journal*, July 8, 2003; and John C. Bogle, "The Mutual Fund Industry Sixty Years Later: For Better or Worse?" *Financial Analysts Journal* 61, no. 1 (January–February 2005): 15–24.

6. Ellis, "Will Business Success Spoil the Investment Management Profession?" 14.

3. The Babe Ruth Effect

1. I am not equating investing to gambling. In fact, long-term investing is really the opposite of gambling. In gambling, the more you play the greater the odds that you lose. In investing, the longer you invest, the greater the odds that you generate positive returns.

2. Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decision Under Risk," *Econometrica* 47 (1979): 263–91.

3. Nassim Nicholas Taleb, *Fooled By Randomness: The Hidden Role of Chance in Markets and in Life* (New York: Texere, 2001), 87–88.

4. Taleb points out that well-known investor Jim Rogers avoids options because "90 percent of all options expire as losses." Rogers is confusing frequency with how much money is made on average.

5. Brent Schlender, "The Bill and Warren Show," *Fortune*, July 20, 1998.

6. Charlie Munger, "A Lesson on Elementary, Worldly Wisdom As It Relates to Investment Management and Business" *Outstanding Investor Digest*, May 5, 1995, 50.

7. Warren Buffett, speech given at the Berkshire Hathaway Annual Meeting, 1989.

8. Alfred Rappaport and Michael J. Mauboussin, *Expectations Investing* (Boston, Mass.: Harvard Business School Press, 2001), 105–8.

9. Steven Crist, "Crist on Value," in Andrew Beyer et al., *Bet with the Best: All New Strategies From America's Leading Handicappers* (New York: Daily Racing Form Press, 2001), 63–64.

10. Edward O. Thorp, *Beat the Dealer* (New York: Vintage Books, 1966), 56–57.

4. Sound Theory for the Attribute Weary

1. See Mitchel Resnick, *Turtles, Termites, and Traffic Jams* (Cambridge, Mass.: MIT Press, 1994), 50–52. Also see, Steven Johnson, *Emergence: The*

Connected Lives of Ants, Brains, Cities, and Software (New York: Scribner, 2001), 12–13.

2. Professor Burton Malkiel: "It's like giving up a belief in Santa Claus. Even though you know Santa Claus doesn't exist, you kind of cling to that belief. I'm not saying that this is a scam. They generally believe they can do it. The evidence is, however, that they can't." *20/20*, ABC News, November 27, 1992. See http://www.ifa.tv/Library/Support/Articles/Popular/NewsShowTranscript.htm.

3. Clayton M. Christensen, Paul Carlile, and David Sundahl, "The Process of Theory-Building," *Working Paper, 02–016*, 4. For an updated version of this paper, see http://www.innosight.com/documents/Theory%20Building.pdf.

4. Phil Rosenzweig, *The Halo Effect: … and Eight Other Business Delusions That Deceive Managers* (New York: Free Press, 2006).

5. Peter L. Bernstein, *Capital Ideas: The Improbable Origins of Modern Wall Street* (New York: The Free Press, 1992), 129–30.

6. Richard Roll, "A Critique of the Asset Pricing Theory's Tests: Part 1: On Past and Potential Testability of the Theory," *Journal of Financial Economics* 4 (1977): 129–76.

7. Clayton M. Christensen, "The Past and Future of Competitive Advantage," *MIT Sloan Management Review* (Winter 2001): 105–9.

8. Kenneth L. Fisher and Meir Statman, "Cognitive Biases in Market Forecasts," *Journal of Portfolio Management* 27, no. 1 (Fall 2000): 72–81.

9. Mercer Bullard, "Despite SEC Efforts, Accuracy in Fund Names Still Elusive," *The Street.com*, January 30, 2001. See http://www.thestreet.com/funds/mercerbullard/1282823.html.

5. Risky Business

1. Gerd Gigerenzer, *Calculated Risks* (New York: Simon & Schuster, 2002), 28–29.

2. John Rennie, "Editor's Commentary: The Cold Odds Against Columbia," *Scientific American*, February 7, 2003.

3. Gigerenzer, *Calculated Risks*, 26–28.

4. Jeremy J. Siegel, *Stocks for the Long Run*, 3rd ed. (New York: McGraw Hill, 2002), 13.

5. Michael J. Mauboussin and Kristen Bartholdson, "Long Strange Trip: Thoughts on Stock Market Returns," *Credit Suisse First Boston Equity Research*, January 9, 2003.

6. See chapter 3.

6. Are You an Expert?

1. J. Scott Armstrong, "The Seer-Sucker Theory: The Value of Experts in Forecasting," *Technology Review* 83 (June–July 1980): 16–24.

2. Atul Gawande, *Complications: A Surgeon's Notes on an Imperfect Science* (New York: Picador, 2002), 35–37.

3. Paul J. Feltovich, Rand J. Spiro, and Richard L. Coulsen, "Issues of Expert Flexibility in Contexts Characterized by Complexity and Change," in *Expertise in Context: Human and Machine,* ed. Paul J. Feltovich, Kenneth M. Ford, and Robert R. Hoffman (Menlo Park, Cal.: AAAI Press and Cambridge, Mass.: MIT Press, 1997): 125–146.

4. R.J. Spiro, W. Vispoel, J. Schmitz, A. Samarapungavan, and A. Boerger, "Knowledge Acquisition for Application: Cognitive Flexibility and Transfer in Complex Content Domains," in *Executive Control Processes*, ed. B.C. Britton (Hillsdale, N.J.: Lawrence Erlbaum Associates, 1987), 177–99.

5. Robyn M. Dawes, David Faust, and Paul E. Meehl, "Clinical Versus Actuarial Judgment," in *Heuristics and Biases: The Psychology of Intuitive Judgment*, ed. Thomas Gilovich, Dale Griffin, and Daniel Kahneman (Cambridge: Cambridge University Press, 2002), 716–29.

6. Gawande, *Complications*, 44.

7. Katie Haffner, "In an Ancient Game, Computing's Future," *The New York Times*, August 1, 2002.

8. James Surowiecki, *The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations* (New York: Doubleday, 2004).

9. Joe Nocera, "On Oil Supply, Opinions Aren't Scarce," *The New York Times*, September 10, 2005.

10. Philip E. Tetlock, *Expert Political Judgment: How Good Is It? How Can We Know?* (Princeton, N.J.: Princeton University Press, 2005), 68.

11. Ibid., 73–75.

7. The Hot Hand in Investing

1. Thomas Gilovich, Robert Valone, and Amos Tversky, "The Hot Hand in Basketball: On the Misperception of Random Sequences," *Cognitive Psychology* 17 (1985): 295–314.

2. Amos Tversky and Daniel Kahneman, "Belief in the Law of Small Numbers," *Psychological Bulletin* 76 (1971): 105–10. For an illustration, see Chris Wetzel, Randomness Web site, http://www.rhodes.edu/psych/faculty/wetzel/courses/wetzelsyllabus223.htm.

3. Adapted from Stephen Jay Gould, "The Streak of Streaks," *New York Review of Books*, August 18, 1988, available from http://www.nybooks.com/articles/4337, accessed 25 May 2005.

4. Stephen Jay Gould, *Triumph and Tragedy in Mudville* (New York: W. W. Norton & Company, 2003), 151–72. See http://mlb.mlb.com/mlb/history/rare_feats/index.jsp?feature=hitting_streaks.

5. Gould, "The Streak of Streaks."

6. Here's the math: DiMaggio had 7,671 plate appearances in 1,736 career games, or 4.42 plate appearances per game. He also had 2,214 career hits, for a 0.289 hit-per-plate appearance average. With a 0.289 hit-per-appearance average, DiMaggio would be expected to get a hit in 0.778 percent of his games. So the probability of getting a hit in fifty-six straight games is $(0.778)^{56}$, or 1-in-1.279 million. See Rob Neyer, ESPN Baseball Archives, January 2002, http://espn.go.com/mlb/s/2002/0107/1307254.html. For DiMaggio's career statistics, see Major League Baseball Historical Player Stats, http://mlb.mlb.com/NASApp/mlb/stats/historical/individual_stats_player.jsp?c_id=mlb&playerID=113376.

7. Amazingly, DiMaggio's fifty-six-game streak wasn't his longest. As a teenager in the Pacific Coast League, DiMaggio had a sixty-one-game streak. Of note, too, is immediately after DiMaggio's fifty-six-game streak was broken, he went on to a sixteen-game hitting streak. So he got a hit in seventy-two of seventy-three games during the course of the 1941 season.

8. Here's a sample of some references (there are too many to list exhaustively): Burton G. Malkiel, *A Random Walk Down Wall Street* (New York: W. W. Norton & Company, 2003), 191; Nassim Taleb, *Fooled By Randomness: The Hidden Role of Chance in Markets and in Life* (New York: Texere, 2001), 128–131; Gregory Baer and Gary Gensler, *The Great Mutual Fund Trap* (New York: Broadway

Books, 2002), 16–17; Peter L. Bernstein, *Capital Ideas: The Improbable Origins of Modern Wall Street* (New York: Free Press, 1992), 141–43.

9. Baer and Gensler, *The Great Mutual Fund Trap*, 17. Baer and Gensler only consider the streak's first ten years (even though the book came out after the eleventh year was complete). The difference between ten- and fifteen-year streaks is significant.

10. Miller also ran a second fund, Opportunity Trust, which has a different composition but beat the market for the six years ended 2005. The probability of beating the market twenty-one years consecutively (assuming a 44 percent fund outperformance rate) is roughly 1 in 31 million.

11. While the Value Trust streak is Miller's longest, it is not his only streak. In the six years that ended with 1993, Miller's Special Investment Trust beat the market every year.

8. Time Is on My Side

1. Paul A. Samuelson, "Risk and Uncertainty: A Fallacy of Large Numbers," *Scientia* 98 (1963): 108–13; reprinted at www.casact.org/pubs/forum/94sforum/94sf049.pdf. Shlomo Benartzi and Richard H. Thaler, "Myopic Loss Aversion and the Equity Premium Puzzle," *The Quarterly Journal of Economics* 110, no. 1 (February 1995): 73–92, available from http://gsbwww.uchicago.edu/fac/richard.thaler/research/myopic.pdf, write: "Specifically, the theorem says that if someone is unwilling to accept a single play of a bet at any wealth level that could occur over the course of some number of repetitions of the bet, then accepting the multiple bet is inconsistent with expected utility theory."

2. Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decision Under Risk," *Econometrica* 47 (1979): 263–91.

3. Nicholas Barberis and Ming Huang, "Mental Accounting, Loss Aversion, and Individual Stock Returns," *Journal of Finance* 56, no. 4 (August 2001): 1247–92.

4. Elroy Dimson, Paul Marsh, and Mike Staunton, "Global Evidence on the Equity Risk Premium," *Journal of Applied Corporate Finance* 15, no. 4 (Fall 2003): 27–38.

5. Benartzi and Thaler, "Myopic Loss Aversion."

6. This and following exhibits closely follow William J. Bernstein, "Of Risk and Myopia." See http://www.efficientfrontier.com/ef/102/taleb.htm. Also, see Nassim Nicholas Taleb, *Fooled By Randomness: The Hidden Role of Chance in the Markets and in Life* (New York: Texere, 2001), 56–59.

7. Michael J. Mauboussin and Kristen Bartholdson, "Long Strange Trip: Thoughts on Stock Market Returns," *Credit Suisse First Boston Equity Research*, January 9, 2003.

8. Benartzi and Thaler, "Myopic Loss Aversion," 80.

9. James K. Glassman and Kevin A. Hassett, *Dow 36,000: The New Strategy for Profiting from the Coming Rise in the Stock Market* (New York: Times Books, 1999).

10. Josef Lakonishok, Andrei Shleifer, and Robert W. Vishny, "Contrarian Investment, Extrapolation, and Risk," *Journal of Finance* 49, no. 5 (December 1994): 1541–78.

11. Bernstein, "Of Risk and Myopia."

9. The Low Down on the Top Brass

1. Berkshire Hathaway Annual Letter to Shareholders, 1993, http://berkshirehathaway.com/letters/1993.html.

2. Jim Collins, *Good to Great* (New York: HarperBusiness, 2001), 21.

3. Meghan Felicelli, "2006 YTD CEO Turnover," *SpencerStuart*, December 31, 2006. Also, Chuck Lucier, Paul Kocourek, and Rolf Habbel, "CEO Succession 2005: The Crest of the Wave," *strategy+business*, Summer 2006.

4. When an interviewer recently asked Nokia CEO Jorma Ollila how he ensures that he knows all that he needs to know, he replied, "I think you just have to read a lot." (See David Pringle and Raju Narisetti, "Nokia's Chief Guides Company Amid Technology's Rough Seas," *The Wall Street Journal*, November 24, 2003.) Charlie Munger said it more bluntly, "In my whole life, I haven't known any wise person who didn't read all the time."

5. http://csfb.com/thoughtleaderforum/2003/harrington_sidecolumn.shtml.

6. Robert E. Rubin and Jacob Weisberg, *In an Uncertain World* (New York: Random House, 2003), 20.

7. Alfred Rappaport and Michael J. Mauboussin, *Expectations Investing* (Boston: Harvard Business School Press, 2001), 191–94.

8. Bethany McLean and Peter Elkind, *The Smartest Guys in the Room* (New York: Penguin Group, 2003), 132.

9. Take Pfizer as an example. From 1998 to 2002, roughly 85 percent of Pfizer's $192 billion in investments have been M&A related.

10. Berkshire Hathaway Annual Letter to Shareholders, 1987, http://berkshirehathaway.com/letters/1987.html.

10. Good Morning, Let the Stress Begin

1. Sapolsky has spent over twenty summers in Africa studying baboons to understand the link between stress and social hierarchy in primates. Writes Sapolsky: "The baboons work maybe four hours a day to feed themselves; hardly anyone is likely to eat them. Basically, baboons have about a half dozen solid hours of sunlight a day to devote to being rotten to each other. Just like our society . . . We live well enough to have the luxury to get ourselves sick with purely social, psychological stress." See Robert M. Sapolsky, *A Primate's Memoir* (New York: Scribner, 2001).

2. Robert M. Sapolsky, *Why Zebras Don't Get Ulcers: An Updated Guide to Stress, Stress-Related Disease, and Coping* (New York: W. H. Freeman and Company, 1994), 4–13.

3. Richard Foster and Sarah Kaplan, *Creative Destruction: Why Companies That Are Built to Last Underperform the Market—and How to Successfully Transform Them* (New York: Doubleday, 2001), 13.

4. John Y. Campbell, Martin Lettau, Burton Malkiel, and Yexiao Xu, "Have Individual Stocks Become More Volatile? An Empirical Exploration of Idiosyncratic Risk," *Journal of Finance* 54 (February 2001): 1–43.

5. This does not mean that stock prices reflect short-term expectations.

6. John C. Bogle, "Mutual Fund Directors: The Dog that Didn't Bark," January, 28, 2001, http://www.vanguard.com/bogle_site/sp20010128.html. Updated data are from John C. Bogle, "The Mutual Fund Industry Sixty Years Later: For Better or Worse?" *Financial Analysts Journal* (January–February 2005).

7. Kathryn Kranhold, "Florida Might Sue Alliance Capital Over Pension Fund's Enron Losses," *The Wall Street Journal,* April 23, 2002.

8. This is *not* to say that the stock market is short-term oriented. The research consistently shows that stocks reflect expectations for ten to twenty years of

value-creating cash flow. Increasingly, though, investors are making short-term bets on long-term outcomes.

9. Ernst Fehr, "The Economics of Impatience," *Nature*, January 17, 2002, 269–70.

10. John Spence, "Bogle Calls for a Federation of Long-Term Investors," *Index Funds, Inc.*, http://www.indexfunds.com/articles/20020221_boglespeech_com_gen_JS.htm. By my calculations, the weighted average return in 2001 was −4.8 percent for the funds with 20 percent turnover or less, −7.8 percent for the funds with turnover over 100 percent, and −10.5 percent for the funds that had over 200 percent turnover. See http://www.indexfunds.com/articles/20020221_boglespeech_com_gen_JS.htm.

11. Alice Lowenstein, "The Low Turnover Advantage," Morningstar Research, September 7, 1997, http://news.morningstar.com/news/ms/FundFocus/lowturnover1.html.

12. Russ Wermers, "Mutual Fund Performance: An Empirical Decomposition into Stock-Picking Talent, Style, Transaction Costs, and Expenses," *Journal of Finance* 55 (August 2000): 1655–1703.

13. Yahoo provides the risk classifications (above average, average, and below average) based on the standard deviation of portfolio performance. I quantified the three levels, allocating a value of 1 for funds with below-average risk, 2 for average-risk funds, and 3 for above-average-risk funds, in order to attain an average risk level for each turnover range. The numbers are on an asset-weighted basis.

11. All I Really Need to Know I Learned at a Tupperware Party

1. Robert B. Cialdini, "The Science of Persuasion," *Scientific American* (February 2001): 76–81.

2. Robert B. Cialdini, *Influence: The Psychology of Persuasion* (New York: William Morrow, 1993), 18.

3. See chapter 11.

4. For an interesting account of Asch's experiment, see Duncan J. Watts, *Six Degrees: The Science of a Connected Age* (New York: W. W. Norton & Company, 2003), 207–10.

5. Cialdini, *Influence*, 208–15. Also see Rod Dickinson, "The Milgram Reenactment," http://www.milgramreenactment.org/pages/section.xml?location=51.

6. Lisa W. Foderaro, "If June Cleaver Joined 'Sex and the City': Tupperware Parties for the Cosmo Set," *The New York Times*, February 1, 2003.

7. Cialdini, *Influence*, 37.

12. All Systems Go

1. Antonio R. Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain* (New York: Avon Books, 1994), xi–xii.

2. Thomas A. Stewart, "How to Think With Your Gut," *Business 2.0*, November 2002.

3. Antonio R. Damasio, *The Feeling of What Happens: Body and Emotion in the Making of Consciousness* (New York: Harcourt Brace & Company, 1999), 301–3. Antoine Bechara, Hanna Damasio, Daniel Tranel, and Antonio R. Damasio, "Deciding Advantageously Before Knowing the Advantageous Strategy," *Science* 275 (February 28, 1997): 1293–95.

4. Daniel Kahneman, "Maps of Bounded Rationality: A Perspective on Intuitive Judgment and Choice," Nobel Prize Lecture, December 8, 2002, http://www.nobel.se/economics/laureates/2002/kahnemann-lecture.pdf.

5. Paul Slovic, Melissa Finucane, Ellen Peters, and Donald G. MacGregor, "The Affect Heuristic," in *Heuristics and Biases: The Psychology of Intuitive Judgment*, ed. Thomas Gilovich, Dale Griffin, and Daniel Kahneman (Cambridge: Cambridge University Press, 2002), 397–420.

6. Slovic, Finucane, Peters, and MacGregor, "The Affect Heuristic."

7. Donald G. MacGregor, "Imagery and Financial Judgment," *The Journal of Psychology and Financial Markets* 3, no. 1 (2002): 15–22.

13. Guppy Love

1. More accurately, the choice depends on how much the males diverged in coloration. When the difference was small, the females chose the less orange of the two. But if the male colors were sufficiently different, the females disregarded the cues from the others and went with the brighter hue. See Lee Alan Dugatkin and Jean-Guy J. Godin, "How Females Choose Their Mates," *Scientific American*, April 1998, 56–61.

2. Lee Alan Dugatkin, *The Imitation Factor* (New York: Free Press, 2000).

3. See Carl Anderson and John J. Bartholdi III, "Centralized Versus Decentralized Control in Manufacturing: Lessons from Social Insects," in *Complexity and Complex Systems in Industry*, ed. Ian P. McCarthy and Thierry Rakotobe-Joel (Warwick: University of Warwick, 2000), 92–105; http://www2.isye.gatech.edu/~carl/papers/cc.pdf.

4. For a discussion about the limits of arbitrage, see Andrei Shleifer, *Inefficient Markets: An Introduction to Behavioral Finance* (Oxford: Oxford University Press, 2000).

5. Investors should also note that feedback operates at different levels. There can be feedback at the product level, the company level, and the market level. Sometimes these layers of feedback are correlated; at other times they're not.

6. Sushil Bikhchandani and Sunil Sharma, "Herd Behavior in Financial Markets," *IMF Staff Paper* 47, no. 3 (2001), http://www.imf.org/External/Pubs/FT/staffp/2001/01/pdf/bikhchan.pdf.

7. Sushil Bikhchandani, David Hirshleifer, and Ivo Welch, "Informational Cascades and Rational Herding: An Annotated Bibliography," *Working Paper: UCLA/Anderson and Michigan/GSB* (June 1996).

8. Duncan J. Watts, "A Simple Model of Global Cascades on Random Networks," *Proceedings of the National Academy of Sciences* 99, no. 9 (April 30, 2002): 5766–71.

9. Anderson and Bartholdi, "Centralized Versus Decentralized Control."

10. Charles MacKay, *Extraordinary Popular Delusions and the Madness of Crowds* (1841; New York: Three Rivers Press, 1995).

11. Russ Wermers, "Mutual Fund Herding and the Impact on Stock Prices," *Journal of Finance* 54, no. 2 (April 1999): 581–622.

12. Ivo Welch, "Herding Among Security Analysts," *Journal of Financial Economics* 58, no. 3 (December 2000): 369–96.

13. Victor M. Eguiluz and Martin G. Zimmerman, "Transmission of Information and Herd Behavior: An Application to Financial Markets," *Physical Review Letters* 85, no. 26 (December 25, 2000): 5659–62.

14. J. Bradford DeLong, Andrei Shleifer, Lawrence H. Summers, and Robert J. Waldmann, "Positive Feedback Investment Strategies and Destabilizing Rational Speculation," *Journal of Finance* 45, no. 2 (June 1990): 379–95.

14. Beware of Behavioral Finance

1. Most experts agree that the starting point for the field came in 1985 with a landmark paper: Werner DeBondt and Richard Thaler, "Does the Stock Market Overreact?" *Journal of Finance* 40 (1985): 793–805.

2. See Alfred Rappaport and Michael J. Mauboussin, "Pitfalls to Avoid," at www.expectationsinvesting.com/pdf/pitfalls.pdf.

3. Hersh Shefrin, *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing* (Boston: Harvard Business School Press, 2000), 5.

4. Vernon L. Smith, "An Experimental Study of Competitive Market Behavior," *Journal of Political Economy* 70, no. 3 (June 1962): 111–37.

5. Andrei Shleifer, *Inefficient Markets: An Introduction to Behavioral Finance* (Oxford: Oxford University Press, 2000), 3. A few pages later, Shleifer is bolder: "It is this argument that the Kahneman and Tversky theories dispose of entirely" (12).

6. Sherry Sontag and Christopher Drew, *Blind Man's Bluff: The Untold Story of American Submarine Espionage* (New York: Perseus Books, 1998), 58–59.

7. Jack L. Treynor, "Market Efficiency and the Bean Jar Experiment," *Financial Analysts Journal* (May–June 1987), 50–53.

8. This is *not* true for corporate executives. Individual decision-making errors can have a significant negative effect on shareholder value. One good example is the winner's curse, where a company that wins an auction for an asset (winner) tends to overpay for the asset (curse).

9. See chapter 11.

15. Raising Keynes

1. W. Brian Arthur, "Inductive Reasoning and Bounded Rationality: The El Farol Problem," paper given at the American Economic Association Annual Meetings, 1994, published in *American Economic Review* (Papers and Proceedings) 84 (1994): 406–11, http://www.santafe.edu/arthur/Papers/El_Farol.html.

2. For a good discussion of expectation formation, see Karl-Erik Wärneryd, *Stock-Market Psychology* (Cheltenham, UK: Edward Elgar, 2001), 73–95.

3. See Bob Davis and Susan Warren, "How Fears of Impending War Already Take Economic Toll," *The Wall Street Journal*, January 29, 2003.

4. John Maynard Keynes, *The General Theory of Employment* (New York: Harcourt, Brace and Company, 1936), 162.

5. Ibid., 159.

6. John C. Bogle, "The Mutual Fund Industry in 2003: Back to the Future," remarks before the Harvard Club of Boston, January 14, 2003, http://www.vanguard.com/bogle_site/sp20030114.html.

7. This section relies heavily on Arthur, "Inductive Reasoning."

8. Corinne Coen and Rick Riolo, "El Farol Revisited: How People in Large Groups Learn to Coordinate Through Complementary Scripts," *Organizational Learning and Knowledge Management* conference proceedings, 4th International Conference, June 2001.

9. Max Bazerman, *Judgment in Managerial Decision Making*, 4th ed. (New York: Wiley, 1998), 36–39.

10. Hersh Shefrin, *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing* (Boston: Harvard Business School Press, 2000), 199.

16. Right from the Gut

1. Thomas A. Stewart, "How to Think with Your Gut," *Business 2.0*, November 1, 2002, http://money.cnn.com/magazines/business2/business2_archive/2002/11/01/331634/index.htm.

2. Ibid.

3. Peter L. Bernstein, *Against the Gods: The Remarkable Story of Risk* (New York: John Wiley & Sons, 1996), 99–100.

4. Raanan Lipshitz, Gary Klein, Judith Orasanu, and Eduardo Salas, "Taking Stock of Naturalistic Decision Making," Working Paper, July 15, 2000, http://organizations.haifa.ac.il/html/html_eng/raanan%20-%20taking.doc.

5. Robert A. Olsen, "Professional Investors as Naturalistic Decision Makers: Evidence and Market Implications," *The Journal of Psychology and Financial Markets* 3, no. 3 (2002): 161–67.

6. Ibid., 162–63.

7. Michael T. Kaufman, *Soros: The Life and Times of a Messianic Billionaire* (New York: Knopf, 2002), 141.

8. Gary Klein, *Sources of Power: How People Make Decisions* (Cambridge, Mass.: MIT Press, 1998), 161–66.

9. Stewart, "How to Think with Your Gut."

10. For more on the unconscious, see Frank Tallis, *Hidden Minds: A History of the Unconscious* (New York: Arcade Publishing, 2002), 95–109.

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2. http://www.phrases.org.uk/meanings/375700.html.

3. http://www.usdoj.gov/atr/cases/exhibits/20.pdf.

4. Dale Griffin and Amos Tversky, "The Weighing of Evidence and the Determinants of Confidence," in *Heuristics and Biases: The Psychology of Intuitive Judgment*, ed. Thomas Gilovich, Dale Griffin, and Daniel Kahneman (Cambridge: Cambridge University Press, 2002), 230–49.

5. Richard H. Thaler, *The Winner's Curse: Paradoxes and Anomalies of Economic Life* (Princeton, N.J.: Princeton University Press, 1994).

6. The 2003 sale of the Sears credit card portfolio is a vivid illustration of this point. Some investors were short the stock, believing the disposition price for the business would be below management guidance, and many potential buyers for the asset confirmed this view. But the buyer ended up paying more than what the average bidder thought the business was worth.

7. One example is of a former CSFB analyst, who in 2000 spent two days as a temporary employee, filling orders for an Amazon.com distribution center. Some generous math suggests he filled no more than $15,000 worth of orders in a quarter when the company generated $1 billion in sales. Yet the experience generated a research report and plenty of press.

8. Tarun Chordia, Richard Roll, and Avanidhar Subrahmanyam, "Evidence on the Speed of Convergence to Market Efficiency," Working Paper, April 29, 2002. Also Eugene F. Fama, Lawrence Fisher, Michael C. Jensen, and Richard Roll, "The Adjustment of Stock Prices to New Information," *International Economic Review* 10, no. 1 (February 1969); 1–21.

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11. http://www2.cio.com/techpoll/index.cfm.

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13. Sanford J. Grossman and Joseph E. Stiglitz, "On the Impossibility of Informationally Efficient Markets," *American Economic Review* 70 (1980): 393–408.

18. The Wright Stuff

1. Evolutionary economists Richard Nelson and Sidney Winters echo the same theme. They write, "Innovation in the economic system—and indeed the creation of any sort of novelty in art, science, or practical life—consists to a substantial extent of a recombination of conceptual and physical materials that were previously in existence. The vast momentum in scientific, technological, and economic progress in the modern world derives largely from the fact that each new achievement is not merely the answer to a particular problem, but also a new item in the vast storehouse of components that are available for use, in 'new combinations,' in the solution of other problems in the future." Richard R. Nelson and Sidney G. Winter, *An Evolutionary Theory of Economic Change* (Cambridge, Mass.: Harvard University Press/Belknap Press, 1982), 130.

2. Based on Romer's comments at a roundtable discussion held June 17, 1998, Pebble Beach, Calif., reproduced as Donald Lessand, moderator, "The Soft Revolution: Achieving Growth By Managing Intangibles," *The Journal of Applied Corporate Finance* 11, no. 2 (Summer 1998): 8–27.

3. Quoted in Stephen R. Waite, *Quantum Investing* (New York: Texere, 2002), 1–3.

4. The evolution of technique in sports shows the power of nonrival goods. Examples include the crawl swim stroke (which only became widespread within the past 200 years), overhand free-throw shots in basketball, and the Fosbury flop for high jumpers.

5. "Moore's law is the empirical observation that at our rate of technological development, the complexity of an integrated circuit, with respect to minimum component cost will double in about 24 months" (http://en.wikipedia.org/wiki/Moore's_Law).

6. Juan Enriquez, *As the Future Catches You* (New York: Crown Business, 2000), 62–65.

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3. Joseph LeDoux, *Synaptic Self: How Our Brains Become Who We Are* (New York: Viking, 2002), 79–81.

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7. See http://www.webmergers.com.

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9. William D. Bygrave, Julian E. Lange, J. R. Roedel, and Gary Wu, "Capital Market Excesses and Competitive Strength: The Case of the Hard Drive Industry, 1984–2000," *Journal of Applied Corporate Finance* 13, no. 3 (Fall 2000), 8–19.

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1. In fact, one of the new leader's first actions is often to kill all of the cubs in the pride. This allows the new leader to sire new cubs that carry his genes.

2. See Richard Foster and Sarah Kaplan, *Creative Destruction: Why Companies That Are Built to Last Underperform the Market—and How to Successfully Transform Them* (New York: Doubleday, 2001), 47.

3. Alfred Rappaport and Michael J. Mauboussin, *Expectations Investing: Reading Stock Prices for Better Returns* (Boston: Harvard Business School Press, 2001).

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7. John Y. Campbell, Martin Lettau, Burton G. Malkiel, and Yexiao Xu, "Have Individual Stocks Become More Volatile?" *Journal of Finance* 54 (February 2001): 1–43.

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4. Rob Axtell, "Zipf's Law of City Sizes: A Microeconomic Explanation Far from Equilibrium," presentation at a RAND workshop, Complex Systems and Policy Analysis: New Tools for a New Millennium, September 27–28, 2000, Arlington, Va.

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8. Per Bak, *How Nature Works: The Science of Self-Organized Criticality* (New York: Springer-Verlag, 1996), 1–3.

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36. The Pyramid of Numbers

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2. Paul Colinvaux, *Why Big Fierce Animals Are Rare* (Princeton, N.J.: Princeton University Press, 1978), 10–31.

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5. Eugene Stanley et al., "Scaling Behavior in Economics: I. Empirical Results for Company Growth," *Journal de Physique* (April 1997): 621–33.

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7. Corporate Strategy Board, "Stall Points: Barriers to Growth for the Large Corporate Enterprise," *Corporate Strategy Board* (March 1998).

8. Steven Klepper, "Entry, Exit, Growth, and Innovation Over the Product Life Cycle," *American Economic Review* 86, no. 3 (1996): 562–83. Also see Bartley J. Madden, *CFROI Valuation: A Total System Approach to Valuing the Firm* (Oxford: Butterworth-Heinemann, 1999), 18–21.

9. Louis K.C. Chan, Jason Karceski, and Josef Lakonishok, "The Level and Persistence of Growth Rates," *The Journal of Finance* 58, no. 2 (April 2003): 671.

10. At the time this essay was written, the upcoming year (T + 1), embedded-asset growth is 8.8 percent for the fifty largest market-capitalization companies versus 5.6 percent for the S&P 500, and CFROI is 8.8 percent against 7.6 percent. For 2008 (T + 5), the large companies reflect asset growth and CFROI of 8.9 percent and 10.9 percent, respectively. For the S&P 500, the corresponding numbers are 7.2 percent and 9.0 percent.

11. Financial services stands out as a sector that has increased significantly as a percentage of S&P 500 earnings (about 30 percent, excluding finance arms) and as a percentage of the GDP (roughly 21 percent versus 15 percent in 1980). Historically, sectors that have risen to such levels (energy and technology) have seen their importance wane. For more on this, see Paddy Jilek, Bradford Neuman, and Arbin Sherchan, "U.S. Investment Digest: Five Tidbits," *Credit Suisse First Boston Equity Research*, September 5, 2003.

37. Turn Tale

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