Democrats who supported the central North American Free Trade Agreement of sugar and textile industries. But increasing numbers of United States to mitigate the costs of countries that are not required to adhere. Economist Robert Samuelson, globalization is destined to triumph. As we have seen, the "open systems" is as much a product of the national "psychology" and potential wealth. How effectively, and in the long run, remains to be seen.

Whether one explores issues in U.S. science and technology policy for academic or for practical reasons, the first step is to learn "the lay of the land." However, because an individual's interest in this subject is rarely neutral, the danger is great at the outset of becoming captive to special pleading (or one's own biases). Policy advocates as well as academic scholars will be more effective if they fully appreciate every salient position on the controversy at hand. Thanks to the developments discussed in chapter 6, Internet access to congressional deliberations and policy development in the executive branch is substantial. Readers should start with the following websites (most of which have site maps with links to more specific sources of information or opinion):

- <http://www.house.gov/science>, website for the U.S. House of Representatives Committee on Science;
- <http://www.senate.gov>, for links to the U.S. Senate committees on commerce, science, transportation, and energy and natural resources; and
- <http://www.ostp.gov/index.html>, the Office of Science and Technology Policy (OSTP) for links to White House policy position papers (many of which can be in the form of speeches made by the president's science advisor or reports by the National Science and Technology Council and President's Council of Advisors on Science and Technology).

Links on White House, OSTP, and Office of Management and Budget (OMB) website home pages vary somewhat from administration to administration. The OMB's website at <http://www.whitehouse.gov/omb>, which tends to be the most consistent over time, is an essential tool for students of federal science and technology policy. Currently (during the second George W. Bush administration) OMB's home page has direct links to White House policy on energy, environment, transportation, health, science, and space policy issues. There are also direct links to current budget documents and executive branch testimony before and reports to Congress. The page's search feature allows readers to see administration statements and reports from federal agencies involved in science and technology, by entering in their acronyms, e.g., NASA, EPA (Environmental Protection Agency), and NSF (National Science Foundation). Meanwhile, each executive branch agency has a website that can be accessed by entering its name into a browser's search field, and virtually all executive
branch agency websites have links to their internal policy development organizations and publications. Also an essential bookmark for Internet users is the federal government's web portal, "FirstGov" (<www.firstgov.gov>), which has an excellent reference section with links to federal data, statistics, libraries, laws, and regulations.

The largest challenge facing first-time researchers is the surfeit of policy-relevant information. A good screening rule is to limit one's initial searches to organizations that have gained some traction in the policy-making process. Some of the many organizations and interest groups that cluster around science and technology policy agendas carry more weight than others in the White House and the Congress, whether for substantive or financial reasons. A good way to identify those organizations and individuals is to scan the hearing calendars of the pertinent congressional committees to determine the organizational affiliations of scheduled witnesses; having done so, visit the organizations' websites for more information about them and their policy views.

For the executive branch, from the OSTP website use the site map and outreach/reports links to reach a list of reports on various subjects, most of which name the participating individuals and organizations. Among the biggest non-government players are the National Academy of Sciences/National Research Council, the National Academy of Engineering, and the American Association for the Advancement of Science, at <http://nationalacademies.org> and <http://www.aaas.org/np>. For more critical views visit the websites of Public Citizen (<http://www.citizen.org>), the Center for Science in the Public Interest at <http://www.cspinet.org>, and the Center for Responsive Politics, which collects and publishes information on campaign contributions and lobbying at its website, <http://www.opensecrets.org>.

In addition, federal agencies responsible for promoting U.S. research and development publish annual or periodic surveys which, when consulted together, can provide a necessary anchor for the generalizations we rely on to frame valid policy questions or proposals. These are the National Science Board's annual Scientific and Engineering Indicators, published by the National Science Foundation in both print and online versions (Washington, D.C.: National Science Board, annually); the Office of Management and Budget's annual "Analytical Perspectives, Budget of the United States Government" most readily accessed online at <http://www.whitehouse.gov/omb/budget/>; and the U.S. Department of Commerce (DOC), Office of the Secretary annual "Summary Report on Federal Laboratory Technology Transfer [calendar year]: Report to the President and the Congress Under the Technology Transfer and Commercialization Act," available online at <http://www.commerce.gov/Reports.html>.

APPENDIX

Having sketched out a topographical map of the science and technology policy issues that interest one the most, researchers can begin to burrow down and make some geological observations of those issues’ political, institutional, and historical terrain. Any list of sources must necessarily be somewhat idiosyncratic, for the simple reason that the quantity of publications, from good journalism to the most obscure doctoral dissertation, is so great that to include them all would consume the pages of another book. Therefore no reader is likely to find the following suggestions complete, but this author has found the following published resources especially valuable.


A good sampling of commentary on the varied ways in which scientific and cultural authority have competed in twentieth-century America can be found in Ronald G. Walters, ed. Scientific Authority in Twentieth-Century America (Baltimore, Md.: The Johns Hopkins University Press, 1997). See also Kleinman’s, Politics on the Endless Frontier; Sheila Jasanoff, The Fifth Branch: Science Advisers as Policy Makers (Cambridge, Mass.: The MIT Press, 1990); Bruce L. R. Smith, The...

An old joke among lawyers about pro se litigants warns that “he who represents himself has a fool for a client.” That may be so, but the survival of constitutional government requires that ordinary citizens have a general familiarity with constitutional principles so that they can recognize when those principles may be in jeopardy. Moreover, constitutional law sets both the boundaries and possibilities of creative and constructive policy making in the arena of science and technology policy no less than in any other policy arena—as we have attempted to illustrate in the preceding chapters. For an overview of the relations of science, technology, and law, see Sheila Jasanoff, Science at the Bar: Law, Science and Technology in America (Cambridge, Mass.: Harvard University Press, 1997). Three sources in particular are invaluable in offering general discussions of constitutional issues and the significance of critical decisions by the federal judiciary. For historical Supreme Court cases into the 1950s the best summaries can be found in the first edition of Robert E. and Robert F. Cushman's Cases in Constitutional Law (New York, N.Y.: Appleton-Century-Crofts, 1958). What generations of law and political science students know as “Cushman and Cushman” has been updated several times, most recently with the ninth edition published in 2000 by Robert F. Cushman and Brian Stuart Koukoutchos with Susan P. Koniak, Cases in Constitutional Law (Upper Saddle River, N.J.: Prentice Hall, 2000), but the discussions of cases, while more current, are not nearly as extensive as in the first edition.

For First Amendment decisions, which govern the extension of federal telecommunications power into the content of what is communicated, the place to begin is with Zechariah Chafee, Jr., Free Speech in the United States (New York, N.Y.: Atheneum, 1969), while Floyd Abrams's Speaking Freely: Trials of the First Amendment (New York, N.Y.: Viking, 2005) offers a more recent treatment. Discussions of more recent cases can be found in the new “Annotated Constitution” offered over the Internet by the Legal Information Institute (LII) of the Cornell University Law School, at <http://chrome.law.cornell.edu/ancon>. Meanwhile the federal judiciary's interpretations and applications of the “commerce clause” (Article I, Section 8) have set the legal framework in which the adoption of technologies spreads into the national and global market place. When the LII Annotated Constitution (online) is completed, one can consult it for contemporary discussions of critical cases in the interpretation of constitutional grants of (or restrictions on) federal power over commerce. For discussions of the use of expert testimony (science and engineering) by the federal judiciary, see Donald Kennedy and Robert A. Merrell, “Issues in Focus:

Public administration—what federal and state bureaucracies do—is one of the most maligned and least appreciated functions of government. A succession of would-be presidents on the campaign trail promises to "reduce" or "rid" the country of too much government and bureaucratic red tape, only to discover shortly after entering office that how they carry out their campaign promises (i.e., the administrative tools they use) can make or break the success of their policies. Unfortunately, the public administration literature rarely makes for light reading. Nonetheless the topic must be mastered to a modest extent to understand why, for example, the mandatory setting of emissions restrictions may, in the long run, prove less effective for environmental purposes than allowing firms to trade emissions "allowances."


A major watershed was reached during the 1980s' presidency of Ronald Reagan, whose eagerness to turn federal programs over to the private sector (manifest in the intellectual property policies of the 1980s) were not reversed during the centrist presidency of his Democratic successor, Bill Clinton. A good sketch of the Reagan redesign of federal policy tools can be found in Haynes Johnson's chapters "Privatizing" and "Deregulation" in his *Sleepwalking Through History: America in the Reagan Years* (New York, N.Y.: W. W. Norton & Co., 1991). See also W. H. Schacht, "Patent Ownership and Federal Research and Development: A Discussion on the Bayh-Dole Act and the Stevenson-Wydler Act" (U.S. Congressional Research Service Report R130320, 2002); Barry Bozeman, "Technology Transfer and Public Policy: A Review of Research and Theory, Research

For international comparisons with the administration of science and technology policy in the United States see David Mowery, “The Practice of Technology Policy,” in Paul Stoneman, ed., Handbook of the Economics of Innovation and Technological Change (Oxford, UK: Blackwell Publishers, 1995). Set in the broader context of economic policies which today have technology at their center, such comparisons are richly explored in Daniel Yergin and Joseph Stanislaw, The Commanding Heights: The Battle Between Government and the Marketplace That Is Remaking the Modern World (New York, N.Y.: Simon & Schuster, 1998). The international Organisation for Economic Cooperation and Development (OECD) maintains an excellent website that has numerous links to aggregate as well as country-specific information about such topics as science and innovation, science and technology policy, energy, environment, biotechnology, and information and communication technologies. See <www.oecd.org>.

The literature on the science and technology policy issues highlighted in chapters 6 through 9 does not observe any principle of parity. Some issues have inspired more publications (not necessarily a measure of quality) than others. That said, the following studies can be especially valuable in filling out the historical or political backdrop against which communications, health, biotechnology, space, energy, and environmental policy decisions must be assessed. For space policy, see R. Cargill Hall’s essay, “Origins of U.S. Space Policy: Eisenhower, Open Skies, and Freedom of Space,” in John M. Logsdon,


More than any other area of science and technology policy, issues in en-
energy and environmental policy are driven by quantitative questions of “how much” and “for how long?” Thus anyone venturing into this area should be familiar with the following widely consulted, though not always consistent, data sources. Among government sources, see the Energy Administration (<http://www.eia.doe.gov>), International Energy Agency (<www.iea.org>), Nuclear Regulatory Commission Information Digest (<http://www.nrc.gov/reading-rm/>) and the Federal Energy Regulation Commission (<http://www.ferc.gov>) websites. Among organizational and commercial sources, see the American Petroleum Institute’s website’s (<http://api-ec.api.org/> ) link to “Industry Statistics,” and the American Automobile Association’s “Daily Fuel Gauge Report” (<www.fuelgaugereport.com>). Data on motor vehicles use and other forms of transportation can be found at the Department of Transportation’s Bureau of Transportation Statistics’ website (<www.bts.dot.gov>). The most credible sources of information and policy discussions at the crossroads of energy and environmental issues are the websites of the U.S. Environmental Protection Agency (<http://www.epa.gov>), which have links to pertinent laws and policy documents, as well as data on a broad range of environmental issues; the Natural Resources Defense Council (<www.nrdc.org>) and Resources for the Future (<http://www.rff.org>).