AMERICAN ACADEMY OF ARTS & SCIENCES

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Lecture and Fall Reception – Cambridge

"Considering the Election"

Speakers: Howard Gardner, Ernest May, and **Sidney Verba**, all Harvard University

Location: House of the Academy

Saturday, October 9, 2004

National Induction Ceremony and 1882nd Stated Meeting – Cambridge

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Time: 4:00 p.m.

Saturday, October 30, 2004

1883rd Stated Meeting, Western Center – Seattle

"The Predicament of American Healthcare"

Speaker: Harvey Fineberg, Institute of Medicine

Location: Seattle Art Museum

Wednesday, November 10, 2004

1884th Stated Meeting – Cambridge

"Name Worshippers: Religion, Russian and French Mathematics, 1900 – 1930"

Speakers: Loren Graham, MIT, and **Jean-Michel Kantor**, University of Paris

Location: House of the Academy

Saturday, November 13, 2004

1885th Stated Meeting, Midwest Center – St. Louis

"Biodiversity and Our Common Future"

Speaker: Peter Raven, Missouri Botanical Garden

Location: Missouri Botanical Garden

Wednesday, December 15, 2004

1886th Stated Meeting – Cambridge

"A Bach Cult"

Speaker: Christoph Wolff, Harvard University

Location: House of the Academy

For information and reservations, contact the Events Office (phone: 617-576-5032; email: member-events@amacad.org).

Academy News

New Academy Councilors

The results of the spring ballot for the election of Councilors have been tabulated, and the Academy is pleased to announce that the following Fellows will serve on the Council for a four-year term beginning in fall 2004:

Class II – Biological Sciences

Randy Schekman, Section 2 – Cellular and Developmental Biology, Microbiology, and Immunology, elected 2000

Schekman is Professor of Molecular and Cell Biology at the University of California, Berkeley and Howard Hughes Medical Institute Investigator. Among his honors are the Albert Lasker Award for Basic Medical Research, the Eli Lilly Award in microbiology, and the Lewis S. Rosenthal Award in basic biomedical sciences. Schekman is scientific director of the Jane Coffin Childs Memorial Fund for Medical Research, past president of the American Society for Cell Biology, and former editor of both the *Journal of Cell Biology* and *Molecular Biology of the Cell*.

Class V – Public Affairs, Business, and Administration

Neal Lane, Section 3 – Educational, Scientific, Cultural, and Philanthropic Administration, elected 1995

Lane is the Edward A. and Hermena Hancock Kelly University Professor and Senior Fellow of the James A. Baker Institute for Public Policy at Rice University. His writings and presentations focus on topics in theoretical atomic and molecular physics and science and technology policy. Lane served in the federal government as Assistant to the President for Science and Technology and director of the White House Office of Science and Technology from 1998 – 2001, and as director of the National Science Foundation and member of the National Science Board from 1993 – 1998.

Linda Greenhouse, Section 1 – Public Affairs, Journalism, and Communications, elected 1994

Greenhouse began covering the Supreme Court for *The New York Times* in 1978. With the exception of two years during the mid-1980s, when she covered Congress, she has been the paper's Supreme Court Correspondent. Previously she reported on local and state government and politics for *The Times* in New York and was chief of the newspaper's legislative bureau in Albany. She is the recipient of the 1998 Pulitzer Prize in Journalism, the Henry J. Friendly Medal of the American Law Institute, and the Golden Pen Award of the Legal Writing Institute.

At Large

Richard Meserve, Section 1 – Public Affairs, Journalism, and Communications, elected 1994

Meserve became President of the Carnegie Institution of Washington in 2002 and served as a member of its board of trustees from 1992 – 2003. A lawyer with a Ph.D. in applied physics, he was formerly chairman of the U.S. Nuclear Regulatory Commission. Before joining the NRC, he was a partner in the law firm of Covington and Burling, where he devoted his practice to technical issues arising in environmental and toxic tort litigation, nuclear licensing, and counseling scientific societies and high-tech companies. From 1977 – 1981, he was legal counsel to the President's Science Advisor and has served on numerous legal and scientific committees throughout his career.

Continuing Members of the Council include:

Robert Alberty (MIT)

Carolyn S. Shoemaker (Lowell Observatory)

David D. Sabatini (New York University)

Robert C. Post (Yale University)

Charles M. Haar (Harvard University)

Gerald Early (Washington University in St. Louis)

Peter D. L. Stansky (Stanford University)

and the Officers of the Academy:

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Vice President, Midwest Center **Martin Dworkin** (University of Minnesota)

Randy Schekman

Neal Lane

Richard Meserve

Linda Greenhouse

Project Update

Randomized Studies and Educational Development

In the past decade, policymakers and donor agencies around the world have increasingly demanded concrete evidence that investments in education reform will pay off. Will new textbooks boost achievement or go unread? Does the provision of school lunches increase enrollment in poor regions? Do vaccination programs help to keep kids in school? To answer such questions, a small number of researchers are using experimental methods akin to randomized trials in medicine with powerful results. For over a decade analyses comparing randomly selected "treatment" and "control" groups have been on the ascendance in the education field in the United States. Outside of the United States, government ministries, international agencies, and nongovernmental organizations are also beginning to cite such methods as a "gold standard" for evaluating the efficacy of education projects and programs they fund or implement.

Last spring, the American Academy's Universal Basic and Secondary Education (UBASE) project held a workshop to discuss current trends in the delivery of basic and secondary education. Academy Fellow Michael Kremer (Harvard University) and Eric Bettinger (Case Western Reserve University and former Visiting Scholar at the American Academy) led a discussion of the use of randomized trials to evaluate low-cost education interventions, a question at the heart of educational policy in regions where budget constraints are formidable.

Eric Bettinger

The use of randomized data, Kremer observed, enables researchers to isolate the effects of a given program or intervention and eliminate problems of data selection and observation that have plagued social science. When implemented successfully, the method can provide policymakers with highly reliable conclusions about the effectiveness of various interventions. As Academy Fellow and co-chair of the UBASE project Joel E. Cohen remarked, "the use of randomized trials revolutionized medicine in the twentieth century. Their use in educational research could do the same for education in this century."

Kremer and Bettinger presented evidence from a number of programs that had undergone randomized evaluation, some with impressive results. Kremer found, for example, that a program for eliminating intestinal worms in children in randomly selected schools led to a 7.5 percent average gain in primary school participation rates in the treatment schools, and a reduction of absenteeism of at least 25 percent. These changes in student attendance came at a cost of only $3.50 per student per year. Researchers in India found that high school graduates who provided remedial tutoring within their own communities significantly raised the test scores of their students at a fraction of the cost of hiring new fully trained teachers.

According to proponents, these findings and others based on field trials are important because they are reliable. Their reliability, in turn, can increase the probability of sustained political support over different political administrations – a must in the field of education where the returns on investments may take years to accumulate.

The use of randomized trials in education research is not without controversy. At the March workshop several participants mentioned the ethical dilemma of withholding much-needed resources from some students or schools simply for the purpose of gathering bias-free data. Others noted the expense of including randomized evaluation in the design of a given educational intervention. The difficulty of generalizing and applying the results of a randomized evaluation more broadly was also considered – although the evidence is iron-clad that eliminating intestinal worms in children in Kenya raised enrollment rates. Would the same be true for a similarly administered health intervention elsewhere?

Academy Fellow and political scientist Donald Green (Yale University) defended the use of randomized trials in education, suggesting that many of the criticisms applied more generally to all social research. Research and evaluation is sometimes costly, regardless of the methods, but the costs must be assessed in light of the value of the research. If nonrandomized studies produce ambiguous or unreliable results, then their costs are not offset by the benefits of new knowledge. Indeed, Green questioned whether it is ethical to conduct social research that is not based on randomized data.

Michael Kremer

Careful program evaluation, such as that discussed at the March workshop, can increase a program's political viability and visibility. Research can be used to bring new policies into the mainstream, replicate successes and weed out ineffective programs, and "scale up" successful pilot programs to expand education delivery and quality. A strong message emerging from the workshop was that the value of randomized trials in education is that they can create greater certainty as to how we should proceed when much is at stake. As Derek Bok famously quipped, "If you think education is expensive, try ignorance."

The William and Flora Hewlett Foundation has generously provided support for the Universal Basic and Secondary Education (UBASE) project.

The UBASE project is cochaired by Joel E. Cohen (Rockefeller and Columbia Universities) and David E. Bloom (Harvard School of Public Health). ■

Perspectives

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Can Torture Ever Be Justified?

Torture is unequivocally prohibited in some of the most basic documents of current international law, yet it continues to be practiced, even by democratic societies, as was graphically demonstrated in the photographs of abuse at Iraq's Abu Ghraib prison. A few days after those photographs appeared in the media, the Academy held an Understated Meeting on May 3, 2004, at its House in Cambridge on "Contemplating Torture and Lesser Forms of Highly Coercive Interrogation." Planned months earlier, the discussion of legal and legislative perspectives on torture was all too timely.

Judge Michael Boudin, of the U.S. Court of Appeals for the First Circuit, introduced the evening's speakers: Sanford Levinson, the W. St. John Garwood and W. St. John Garwood, Jr. Centennial Chair in Law and professor of government at the University of Texas at Austin and the editor of *Torture: A Collection*, published in 2004; and Philip B. Heymann, James Barr Ames Professor of Law at Harvard Law School and the author of *Terrorism, Freedom and Security*, published in 2003.

Levinson opened the forum by drawing the audience's attention to Article 2 of the United Nations Convention Against Torture, which states that no "exceptional circumstances whatsoever" may be invoked to justify the practice. Yet, Levinson added, "many if not most [of the 130] countries that have signed the Convention in fact engage in torture."

In our own country, Levinson said, suggestions that we use or would consider using forms of highly coercive interrogation began to emerge well before the Abu Ghraib photographs. Within weeks of September 11, 2001, there were newspaper reports of plans to extradite suspects in the terrorist attack to countries known to practice torture, a practice explicitly forbidden by the Convention. These reports were followed by accounts of such extraditions actually taking place. By the end of December 2002, the *Washington Post* reported that prisoners in Afghanistan were being forced to stand or kneel for hours in black hoods or spray-painted goggles, were being held in awkward and painful positions, and were being deprived of sleep with bombardments of light for extended periods.

In view of these reports, and in light of the photographs from Abu Ghraib, Levinson said "it has become necessary for us, in the sense that we recognize our own responsibility for the actions of our government, to contemplate torture." When states define torture, Levinson added, they tend to place the bar very high, to use ambiguous terms such as severe, prolonged, and imminent, and to leave the door open for some forms of coercive interrogation if there is a "compelling interest."

If we are willing to torture under certain circumstances, how do we give form to this decision within our laws and society? Levinson laid out three possible approaches. One is to create a legal mechanism that would permit torture but simultaneously minimize its use. He described Alan Dershowitz's controversial proposal to require government officials to obtain judicial warrants before conducting interrogations employing torture. Critics of this approach, Levinson said, argue that it gives legitimacy to torture opening a legal door that other nations may open far wider. An alternative approach is for the legal system to set no conditions for the use of torture. Adherents of this view point to the importance of maintaining the position that torture is never acceptable, but urge a "don't ask, don't tell" policy that would permit torture without sanctioning it. Public officials would decide when to use torture, and indeed it would be used, but it would not be given legitimacy. The responsibility for using torture, then, would be relegated to the political realm, with its potential for public accountability.

The third alternative is for the legal system to permit torturers to plead the "law of necessity," which means torturers would be excused under certain conditions. This approach would open a loophole in the UN Convention's absolutist position, but those who torture would be placed at serious risk of being punished if their appeal to

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Torture
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necessity fails. Even so, said Levinson, the difficulty with this approach is that only people at the lower levels of the system that tortures would likely be punished, and there would be little hope of challenging the policy decision they were following in good faith.

If we are willing to torture under certain circumstances, how do we give form to this decision within our laws and society?

Whereas Sanford Levinson considered the question of torture from a legal perspective, Philip Heymann outlined a legislative approach, laying out a specific proposal for consideration by Congress and the public. He noted that, with funding from the Justice Department, he and his colleague Juliette Kayyam of the Kennedy School of Government conducted a series of meetings that examined "the ten hardest questions" surrounding terrorism. Participants included representatives of British and American intelligence, law enforcement, and the academic world, with political orientations ranging from very liberal to very conservative. The discussions led to a set of recommendations for dealing legislatively with the subject of torture and lesser forms of highly coercive interrogation.

To begin with, Heymann said, the United States should abide by both its treaty and statutory obligations prohibiting torture. Further, it must take seriously the UN Convention's restrictions on turning prisoners over to countries where they might be tortured or encouraging other nations to do likewise.

Heymann's recommendation would prohibit what the UN Convention defines as torture, taking it off the table completely, and closing all loopholes that make it exportable to other countries. To permit torture while the prohibition is in place, he said, was to pay too high a price in terms of lawlessness and disaffection within our own country as well as hostility from abroad. This blanket condemnation of torture would preclude the Dershowitz proposal of exceptions with judicial assent, which Heymann sees as likely to be ineffectual in any case.

Heymann nevertheless defined a category of lesser forms of highly coercive interrogation that would be permissible in certain situations, including sexual humiliation, sleep deprivation, and hooding, along with other measures. This category of interrogation methods would be regulated in a way that would specify clear conditions for its use.

The attorney general of the United States, in Heymann's proposal, would present the president with a document outlining the forms of interrogation that would be permissible. The president would explicitly authorize the interrogation methods contained in the document, which would either be made public or shared with relevant committees in the House and Senate.

The presidential guidelines would restrict the use of highly coercive measures to cases in which "interrogators have probable cause to believe that an individual possesses significant information about one of two things: either a specific plan that threatens American lives and which cannot be prevented by any other reasonable alternative, or a group or organization making such plans whose capacity could be significantly reduced by exploiting the information." Heymann explained that the determination of probable cause "would be made in writing, on the basis of sworn affidavits and would be available to congressional intelligence committees, the Attorney General, and the Inspectors General of the pertinent departments," including Justice and Defense, thus ensuring high-level oversight of the process.

Judge Michael Boudin (U.S. Court of Appeals), Sanford Levinson (University of Texas at Austin), and Philip B. Heymann (Harvard Law School)

In addition, Heymann's recommendation would entitle individuals interrogated in violation of these restrictions to damages in a civil action against the government. A further restriction would prohibit information gleaned through highly coercive methods from being used against the individual in an American court.

Our worst problem is that our government will do things that we don't want to know about, and they don't want us to know about.

The general discussion that followed ranged over a number of issues but focused in particular on the question of distinguishing between forms of interrogation. Levinson observed that the Heymann proposal "follow[s] a general strategy of defining torture as that which we hope we don't do and in fact which we shouldn't do, not only because it's immoral, but for all the other more consequentialist reasons we've cited. The real debate turns out to be about the acceptability of 'highly coercive interrogation.' We must decide what we think about sleep deprivation or hooding or extended uncomfortable positions, because it may be that the distinction between highly coercive interrogation methods and torture is the kind only lawyers could really take seriously, while most lay people would run them together."

Heymann responded that formulating distinctions was indeed possible and would be encouraged by the public accountability at the heart of his proposal. "I don't think the president of the United States would publicly condone standing a prisoner on a box and threatening him with severe electrical shocks," he said. "But I believe that our worst problem is that our government will do things that we don't want to know about, and they don't want us to know about. I'm satisfied with a political test that requires the president to say 'Yes, this is included on the list of things we will do.'"

In concluding the meeting, Judge Boudin praised the speakers for their forthrightness, observing that "the arguments you've heard here this evening are ones that are carried on partly in the light and partly in the shadows – but perhaps mostly in the shadows." What is needed more than anything else on this extraordinarily difficult issue is "broader public discussion such as we have had here tonight." ■

"Torture and Lesser Forms of Highly Coercive Interrogation?" Excerpts from Academy Meeting

Sanford Levinson

It has become necessary for us, at least in the sense that we recognize our own responsibility for the actions of our government, to contemplate torture. Yet any discussion of torture must recognize that it is really a placeholder, an abstract work that is made concrete by the knowledge and imagination of the reader. What this means is that we must ask ourselves precisely what constitutes torture, as distinguished not only from inhuman and degrading acts, which are also prohibited, though perhaps not so absolutely, by the United Nations Convention, but also and more significantly from what might be termed merely unattractive methods of interrogation that are nonetheless distinguishable from those that are forbidden . . . .

For the UN Convention, "torture means any act by which *severe* pain or suffering, whether physical or mental, is intentionally inflicted on persons for such purposes as obtaining from him or a third person information or a confession . . . . " The U.S. Senate's ratification of the Convention carried a reservation that "in order to constitute torture, an act must be specifically intended to inflict *severe* physical or mental pain or suffering and that mental pain and suffering refers to *prolonged* mental harm caused by or resulting from 1) the intentional infliction or threatened infliction of *severe* physical pain or suffering; 2) the administration or application, or threatened administration or application, of mind altering substances or other procedures calculated to disrupt profoundly the senses or the personality; 3) the threat of *imminent* death; or 4) the threat that another person will *imminently* be subjected to death, severe physical pain or suffering, or the administration or application of mind altering substances or other procedures calculated to disrupt profoundly the senses or personality."

One does not need to be a well-trained lawyer to know that the marked words are all significant: severe, prolonged, imminent. This raises the grim possibility that the recent events in Iraq might not constitute torture. They almost certainly would constitute inhuman and degrading acts, but the way the rhetoric of the argument often works is to say, "Well, torture is absolutely forbidden" and then set a definition so high that you can assure yourself that we're not doing that. Nobody is using the thumbscrew today, but, according to a report in *The New York Times*, the United States did place an Egyptian national in solitary confinement in Tulsa for 71 days before being released because, after that period, he was so broken that if he had anything useful to say, he would have said it, and, in fact, he didn't have anything useful to say. Torture or not?

Philip B. Heymann

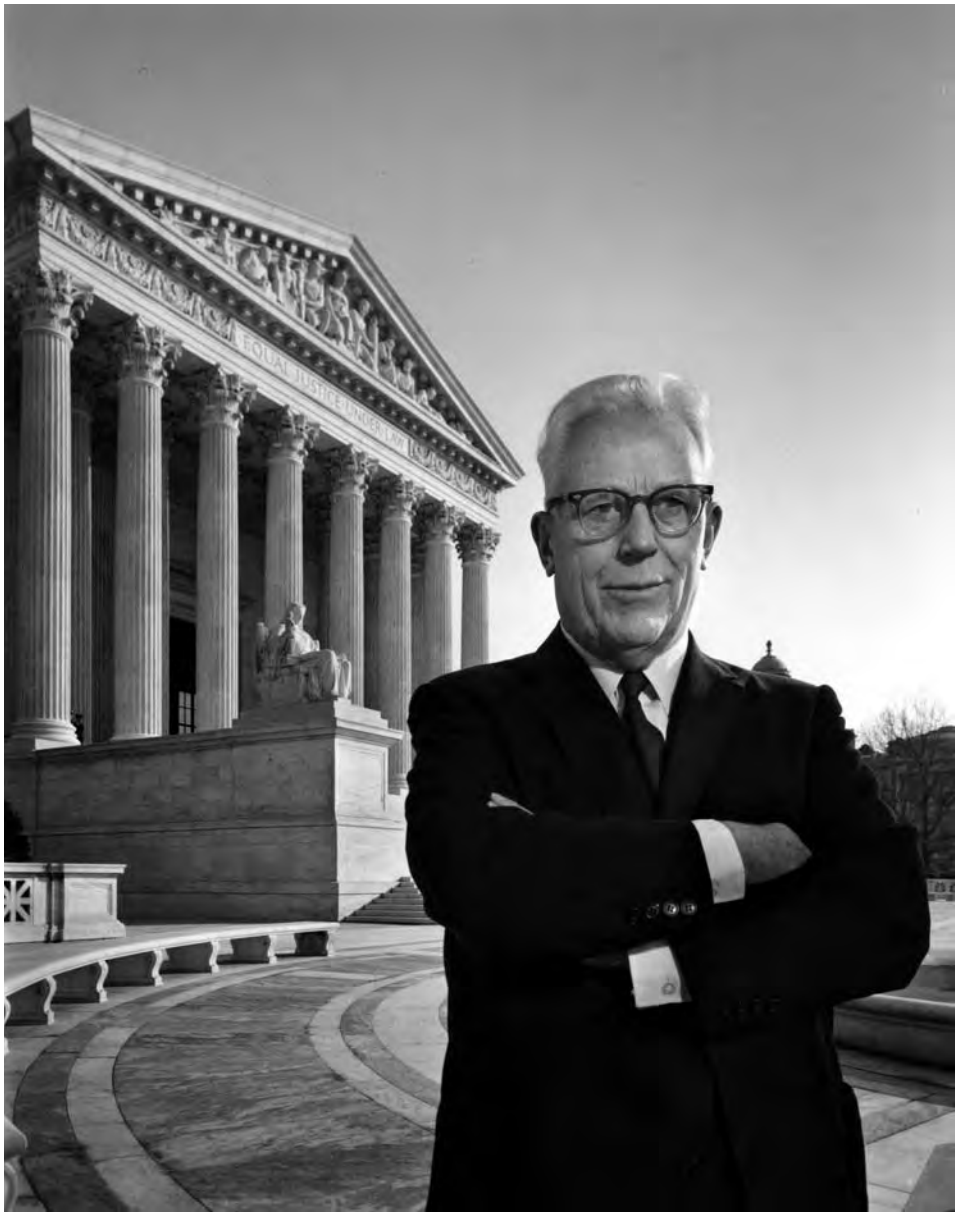
Inadequately monitored and regulated coercion against prisoners has now caused a truly major setback in terms of our foreign and military policies and in particular for the goals that have claimed over 700 lives in Iraq and more in Afghanistan. The administration hopes to portray the problem as one of failed management, in the field, of a few bad apples. But to prevent a repetition we need not only a full investigation of the management of detention and interrogation but also to examine more broadly the policies and systems we need for the future.

There are six major questions that have to be addressed in setting up any system dealing with interrogation for intelligence purposes. They are:

1. What coercive steps are permissible under our treaty and statutory obligations and in light of our moral and policy concerns?
2. Under what circumstances may highly coercive but legal and duly authorized steps of interrogation be used?
3. Who should decide each of the first two questions?
4. How should the process be managed by the Defense Department or other executive agencies to assure that the rules are complied with and not ignored in the field?
5. In what, if any, circumstances should the president have the power to waive either of the first two determinations?
6. What form of oversight by non-executive agencies should be put in place as to each of these issues?

It is revealing to consider how these questions were answered prior to the public revelations about Abu Ghraib. The list of permissible and impermissible methods seems to have been largely promulgated at the general officer level, somewhere well short of the cabinet or presidential level, in documents kept secret from the public. We cannot tell the relationship of the list to judgments about either applicable treaty law or domestic constitutional law. Under what circumstances these steps should actually be used is a decision that seems often to have been made, without any statement of standards, by intelligence or prison personnel at a quite junior level in the military. A startling absence of management controls also allowed the rules to be ignored at operating levels. There has been no oversight by legislative or judicial bodies; indeed executive secrecy has been pervasive and no audit requirements have left a trail. With no public rules or accounting, the president's discretion has been absolute and wholly delegable to any level. This means, of course, that the president is not formally accountable for the decisions actually made.

The recommendations are designed to answer these six questions. They outline the steps involved in creating a transparent and legitimate system of interrogation of suspects in terrorism matters. Congress must also consider how the answers to these questions should change in the future. Nothing less is at stake than our claim as a nation to self-respect and to a needed level of respect of others. ■



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Congress and the Earl Warren Court

Philip P. Frickey and Gordon Silverstein
Commentaries by Neal Devins and Nelson W. Polsby
Introduction by Harry N. Scheiber

These papers were presented at a conference on "Earl Warren and the Warren Court: A Fifty-Year Retrospect," held at the Boalt Hall School of Law at the University of California, Berkeley, on February 27 – 28, 2004.

Philip P. Frickey is Richard W. Jennings Professor of Law at the University of California, Berkeley. He has been a Fellow of the American Academy since 2002.

Gordon Silverstein is assistant professor of political science at the University of California, Berkeley.

Neal Devins is Goodrich Professor of Law, director of the Institute of Bill of Rights Law, and professor of government at the William & Mary School of Law.

Nelson W. Polsby is Heller Professor of Political Science at the University of California, Berkeley. He has been a Fellow of the American Academy since 1982.

Harry N. Scheiber, who became a Fellow of the American Academy in 2003, is director of the Earl Warren Legal Institute at the University of California, Berkeley, and the Riesenfeld Professor of Law and History at the Boalt Hall School of Law, University of California, Berkeley.

Harry N. Scheiber

Fifty years, almost to the day, after Earl Warren was confirmed as chief justice of the United States in March 1954, the University of California, Berkeley commemorated the Warren Court's legacy with a conference cosponsored by the Academy. The meeting was organized and hosted by UC Berkeley's Earl Warren Legal Institute.

During his sixteen years as chief justice, Warren was instrumental in advancing durable changes in American law in the cause of equal rights and democratic governance. The unique influence of the Warren Court went far beyond its most famous rulings, in *Brown v. Board of Education* and other school desegregation cases. Thus the conference devoted several panels to analyses of the Court's legacy in the areas of free speech and press, criminal law, federalism, and one-person/one-vote doctrine. In addition, Professor Jesse Choper of the Boalt Hall faculty, former Earl Warren law clerk, and three other former clerks – Senior Judge James Browning of the U.S. Ninth Circuit Court of Appeals, UC Berkeley Chancellor Emeritus I. Michael Heyman, and Professor Scott Bice of the University of Southern California – offered their reflections on Earl Warren's character and achievements. (Judge Browning's address is available on the Earl Warren Legal Institute website, www.law.berkeley.edu/cenpro/earlwarren/constlaw.html.)

The Warren Court's impact on the law reached in dramatic ways beyond America's borders, a dimension of global constitutional development that is less well known than is the Court's impact on American life and law. The conference featured a justice of the Greek Supreme Court, Ioanni Dimitrakapolous, and scholars from law faculties in Chile, Japan, Canada, Norway, and Sweden who considered how modern-day changes in foreign jurisprudence and judicial behavior have reflected that wider impact.

Ineluctably the theme of the Warren Court's "judicial activism" cut across all the topical panels. It may be said that in every era of its history, from the days of John Marshall's chief justiceship to William Rehnquist's, the Supreme Court has ruled in an "activist" vein in a variety of causes. Although many of the conference papers at Berkeley were concerned with interpretive questions and case law given little attention in previous scholarship, they reinforced the conclusion of Warren's chief biographer, G. Edward White, namely, that what distinguished the Warren Court from many others was that

its activism "facilitated social change . . . and promote[d] the interests of the disadvantaged" rather than defending established interests and reinforcing the status quo.

The focus of one of the panels at the Berkeley conference was a reappraisal of the relations between Congress and the Supreme Court during Warren's tenure. The Academy is currently assessing the interaction between Congress and the Court today – a collaborative study inspired by the dramatic upsurge in the Rehnquist Court's overturning of congressional statutes in the redefinition and defense of "federalism" and "state sovereignty" principles. Two members of that Academy study, Philip P. Frickey and Nelson W. Polsby (both, UC Berkeley), joined with Neal Devins (William & Mary School of Law) and Gordon Silverstein (UC Berkeley) as principal speakers on the Berkeley panel.

Although these four authors do not agree on how the functional relationship of judicial and congressional power should be interpreted for the Warren Court period, there is a fascinating common ground in that none of them accepts the revisionist idea (popular in some scholarly quarters today) that the Warren Court was only marginally responsible for advances of the 1950s and 1960s in regard to equal protection, civil rights, and democratic governance.

The conference's sponsorship was shared by the Boalt Hall School of Law at Berkeley, where Warren earned his law degree in 1914, and by the University's Jefferson Lectures Endowment, the Institute of Governmental Studies, and the Center for the Study of Law and Society. Additional sponsors of the conference were the UC Berkeley Vice Chancellor for Research and the Robbins Collection and the Sho Sato Program in Japanese and U.S. Law, both of the Boalt Hall School of Law.

Later this year, the Institute of Governmental Studies Press at UC Berkeley will publish under my editorship the full papers from the entire conference.

Philip P. Frickey

Managing Court-Congress Confrontations: Interpretation to Avoid Constitutional Issues

The American Academy of Arts and Sciences has launched a study of the relationship between Congress and the Supreme Court, based on the hypothesis that conflict between the branches has accelerated in recent years.[1] One interesting aspect of this relationship has been the way in which the Court can limit direct conflict with Congress while accomplishing many of the justices' goals. A prime example of this strategy is when the Court avoids deciding whether a federal statute is unconstitutional by interpreting the statute to be constitutionally unobjectionable.

When the Court strikes down a federal statute as unconstitutional, ordinarily Congress has no authority to reenact the statute.

For a host of reasons, this "rule of avoidance" may seem prudent. When the Court strikes down a federal statute as unconstitutional, ordinarily Congress has no authority to reenact the statute. Assuming the Court will not overrule itself at some future point, the only way to overturn the Court's decision is by constitutional amendment. Thus, the arguably awesome, counter-majoritarian exercise of judicial review – whereby as few as five unelected justices with life tenure can displace the judgment of the entire elected Congress – should be very cautiously undertaken. Relatedly, it may seem wise to indulge in the assumption that Congress would prefer the Court retain the statute, even if narrowed by a saving interpretation, rather than strike it down. Moreover, if the Court interprets the statute more narrowly than Congress wishes, Congress can of course amend the statute to make it broader and, in all likelihood, the constitutional question would come back to the Court eventually. For these and other reasons, the rule of avoidance is not a controversial approach among the justices.

As with just about everything else, however, the devil is in the details. In a recent study,[2] I examined a fascinating period, roughly paralleling the McCarthy era, in which application of the rule of avoidance allowed the Court to avoid many direct confrontations with Congress over extremely controversial matters. A brief summary follows.

In 1951, in *Dennis v. United States*, the Supreme Court upheld the constitutionality of the Smith Act, which among other things outlawed the advocacy of overthrowing the national government by force or violence. *Dennis* has come to be understood as a major deviation from the Court's jurisprudence of free speech, for the case allowed to stand a statute that outlawed advocacy of political ideas.

In fairly short order, the Court considered a long string of cases involving alleged political subversives – some prosecuted under the Smith Act, others dragged before legislative investigating committees bent on invading their privacy of thought and association, still others thrown out of public employment or kept out of the organized bar on grounds of disloyalty, and a few threatened with loss of citizenship or deportation. In light of *Dennis* and the apparent capitulation to public pressure suggested by it, one might have expected the Supreme Court to have feared to tread upon these proceedings. Nonetheless, while the Court's actions were somewhat uneven, in many cases a majority of justices made it more difficult for these investigations and loyalty proceedings to be conducted, and provided a measure of justice to persons harmed by them. Rarely did the Court invalidate government action as unconstitutional; instead, using the rule of avoidance, the Court generally found a nonconstitutional ground for setting aside the proceeding. The rule of avoidance, usually thought to be an instrument of judicial restraint, became a narrow but sharp sword of judicial revision. In the space allotted to me, I shall examine a few examples of this indirect judicial technique and then consider its political aftermath.

In 1953, a year before Earl Warren became chief justice, Justice Frankfurter's majority opinion in *United States v. Rumely* provided a textbook example of narrow but effective invalidation of congressional action based on technicalities. Rumely, the secretary of an organization that, "among other things, engaged in the sale of books of a particular political tendentiousness," refused to disclose to the House Select Committee on Lobbying Activities the names of persons who had made bulk purchases of such books. He was convicted of violating a federal statute that criminalized the failure to provide testimony or documents "upon any matter" under congressional inquiry. Frankfurter first acknowledged the serious First Amendment questions at stake when congressional committees engage in sweeping inquiries concerning political expression and association. He also alluded to the "wide concern" that had been raised about the intrusiveness of congressional investiga-

1 Robert Post, "Congress & the Court," *Dædalus* 132 (3) (Summer 2003): 5 – 8.

2 "Getting from Joe to Gene (McCarthy): The Avoidance Canon, Legal Process Theory, and Narrowing Statutory Interpretation in the Early Warren Court," *California Law Review* (forthcoming, 2005).

tions. In classic deference to the rule of avoidance, Frankfurter concluded that it would be inappropriate to address the serious constitutional questions before considering whether the House resolution authorizing the committee inquiry had in fact empowered the committee to seek the information Rumely had refused to provide. Frankfurter stressed that the avoidance rule – developed in cases involving constitutional challenges to statutes – was even more appropriate in the context of congressional resolutions, which "secure passage more casually and less responsibly, in the main, than do enactments requiring presidential approval." Frankfurter justified the canon in part as a technique to encourage both congressional responsibility to constitutional obligations and judicial respect for a coequal branch. Frankfurter implemented these policies by an aggressive clear-statement requirement. "Whenever constitutional limits upon the investigative power of Congress have to be drawn by this Court," he wrote, "it ought only to be done after Congress has demonstrated its full awareness of what is at stake by *unequivocally* authorizing an inquiry of dubious limits." The policies "strongly counsel abstention from adjudication unless no choice is left." For Frankfurter, this judge-driven interpretive approach was justified as "in the candid service of avoiding a serious constitutional doubt."

Measured against this stringent standard, the House resolution, which authorized the committee to investigate "lobbying activities" intended to influence the legislative process, was insufficiently clear to empower the committee to explore general attempts to affect public opinion, such as through the distribution of books. Nor could the discussion of the House in contempt proceedings after Rumely refused to comply with the committee's request provide posthoc ratification of more expansive committee power: "it had the usual infirmity of post litem motam, self-serving declartions."

A wonderful example of the lawyerly undercutting of governmental abuse that arose after Warren became chief justice is *Peters v. Hobby*. In that 1956 case, a prominent Yale medical professor who had worked as a consultant to the Public Health Service on nonclassified matters was barred from further federal employment by a board charged with reviewing agency determinations of the disloyalty of federal employees. The board's procedures were remarkably shoddy, even for the era: after the agency loyalty board had twice cleared him of any disloyalty, the review board on its own motion conducted its own hearing and found him disloyal based upon unsworn statements by unidentified informants who were not available for cross-examination. The case was so fishy that the solicitor general, the Justice Department officer in charge of Supreme Court litigation, refused to sign the brief and appear in defense of the sanction. In an odd coincidence, that task fell to the assistant attorney general for the civil division, Warren Burger, who shortly thereafter was appointed to a federal appeals court and who later succeeded Warren as chief justice.

Relying upon the avoidance rule, Warren's majority opinion ducked the constitutional issues raised by the doctor's attorneys by finding that the review board had no jurisdiction to undertake an investigation on its own motion – an argument not raised until the Court required it to be briefed! Peters's attorneys had sought to forgo that argument to avoid giving the Court a nonconstitutional out, but the strategy failed.

Rarely did the Court invalidate government action as unconstitutional; instead, using the rule of avoidance, the Court generally found a nonconstitutional ground for setting aside the proceeding.

The Court's somewhat covert undermining of the government's campaign against alleged subversives reached its apotheosis in the 1956 term when the Court decided twelve cases involving alleged subversives – and resolved every one in their favor. The biggest bombshells were dropped on July 17, 1957, a day the Court's detractors called "Red Monday," when four major cases were decided in this fashion. Two of them merit brief mention here.

Watkins v. United States dealt with a challenge to a contempt conviction for refusing to answer questions posed by a subcommittee of the House Un-American Activities Committee concerning whether certain persons had been former members of the Communist Party. Chief Justice Warren's majority opinion began with a long, pointed lecture to Congress about the dangers of "a new kind of congressional inquiry unknown in prior periods of American history," "a new phase of legislative inquiry involv[ing] a broad-scale intrusion into the lives and affairs of private citizens." He then posited serious constitutional problems associated with congressional investigations intruding into individual privacy without a valid public purpose. "We have no doubt that there is no congressional power to expose for the sake of exposure," Warren wrote, responding to counsel's argument, on behalf of Watkins, that the sole purpose for the questions posed "was to bring down upon [him] and others the violence of public opinion because of their past beliefs, expressions, and associations." But the decision ended up rooted in a much narrower rationale: the House had not defined the committee's delegated investigatory responsibilities clearly enough to allow the witness to know whether the questions posed were pertinent to the investigation the committee was allowed to undertake. Pertinency was an element of the criminal statute the witness had allegedly violated, but more to the main point, "[p]rotected freedoms should not be placed in danger in the absence of a clear determination by the House or the Senate that a particular inquiry is justified by a specific legislative need." In an odd way, Warren invoked the principles of avoidance to duck a range of constitutional issues, but ended up narrowly holding that the sanction of the witness violated due process on the narrow ground of the "vice of vagueness" – that he was "not accorded a fair opportunity to determine whether he was within his rights in refusing to answer."

Of course, if the committee's charge was to investigate communism – which everyone understood to be the committee's task – the questions posed were relevant. Surely Watkins knew what the House wanted the committee to investigate. The force of this contention can be acknowledged without undermining the rationale of *Watkins*, however. Warren used the narrow pertinency holding to shift responsibility to the House to monitor its committees under clear delegations of authority. The Court was in no position to consider the actual dangers of communism to the country, much less how relevant the questions asked of Watkins were to any real dangers, but it could at least call upon the House to undertake that inquiry before authorizing witch hunts and fishing expeditions by a committee.

The other Red Monday avoidance decision of note here was Justice Harlan's opinion in *Yates v. United States*. The central issue in *Yates* for our purposes was whether the Smith Act prohibited "advocacy and teaching of forcible overthrow as an abstract principle, divorced from any effort to instigate action to that end, so long as such advocacy [was] engaged in with evil intent." The statutory text was expansive enough for this interpretation, as one of its provisions reached "whoever knowingly or will-

The criminal procedure revolution of the Warren Court had just begun with decisions that aroused opposition from police and provided more fodder for opportunistic politicians.

fully advocates, abets, advises, or teaches the duty, necessity, desirability, or propriety of overthrowing or destroying the government of the United States . . . by force or violence." For Harlan, however, "[t]he distinction between advocacy of abstract doctrine and advocacy directed at promoting unlawful action is one that has been consistently recognized" in the Court's First Amendment opinions. "We need not, however," he continued, "decide the issue before us in terms of constitutional compulsion, for our first duty is to construe this statute. In doing so we should not assume that Congress chose to disregard a constitutional danger zone so clearly marked, or that it used the words 'advocate' and 'teach' in their ordinary dictionary meanings when they had already been construed as terms of art carrying a special and limited connotation." *Dennis* was narrowed down to a case that upheld the Smith Act on the ground that it criminalized advocacy directed at promoting unlawful action "at a propitious time" in the future, not "mere doctrinal justification of forcible overthrow, if engaged in with the intent to accomplish overthrow." The latter form of advocacy, "even though uttered with the hope that it may ultimately lead to violent revolution, is too remote from concrete action to be regarded as the kind of indoctrination preparatory to action which was condemned in *Dennis*."

Harlan admitted that "distinctions between advocacy or teaching of abstract doctrines, with evil intent, and that which is directed to stirring people to action, are often subtle and difficult to grasp." Harry Kalven, the venerated legal scholar, put it more colorfully: "at first acquaintance [*Yates*] seems a sort of *Finnegans Wake* of impossibly nice distinctions."[3] Indeed, if in a statutory interpretation case the Court's "duty is to give coherence to what Congress has done within the bounds imposed by a fair reading of legislation," as Justice Frankfurter wrote in another case in the 1956 term, Harlan's opinion in *Yates* (which Frankfurter joined) is an abomination. But of course Harlan was concerned much more with quasi-constitutional creativity than with statutory coherence. *Yates* may have left the Smith Act "a virtual shambles," as one member of the Court of Appeals panel reversed in *Yates* later grumbled, but it simultaneously helped reconstruct the American system of freedom of expression while avoiding any constitutional decision. It was a masterful performance of avoidance theory – all the while illuminating the submerged normativity and judicial power authorized by that approach.

Decisions like these – though carefully crafted to avoid broadly deciding controversial constitutional issues and to ensure that Congress had at least a theoretical opportunity to respond and have the next word on the subject – provoked a firestorm in Congress. By 1957, Southerners in Congress, spoiling for a fight with the Court over *Brown v. Board of Education*, had forged an anti-Court alliance with other lawmakers concerned about national security. The loose coalition railing against the abuse of judicial power started its agitation after the 1955 term and gained significant momentum after Red Monday. They were not alone in their hostility. The criminal procedure revolution of the Warren Court had just begun with decisions that aroused opposition from police and provided more fodder for opportunistic politicians. The Court had also made no friends in the organized bar, which was livid with the direction of the Court in general and with its bar admission decisions involving alleged subversives in particular; nor in the business community, which considered the Court hostile in labor and antitrust cases. State officials considered some of the Court's decisions on alleged subversives to be invasions of state power. In 1957 the American Bar Association failed to pass a resolution supporting the Court, and then its Committee on Communist Strategy issued a report blasting the Court during a meeting in London attended by none other than Earl Warren (who soon thereafter resigned from the ABA). Several major newspapers attacked the Court in vitriolic terms.

Members of Congress engaged in an orgy of proposals countering the Court. In addition to the inevitable calls for impeachment were bills that would remove major areas of the Court's jurisdiction, bills designed to overturn particular decisions, bills giving the Senate appellate jurisdiction over the Court's decisions, bills requiring a unanimous vote of the justices to strike down a state law, bills abolishing life tenure for the justices, bills purporting to require that a justice must have prior judicial experience, and a wonderfully counter-hegemonic measure that would have required lower courts to ignore any Supreme Court decision "which conflicts with the legal principle of adhering to prior decisions and which is clearly based upon considerations other than legal" (read: *Brown v. Board of Education*). To some extent, of course, the Court had itself played into this, by using the avoidance rule and other techniques that did not formally prevent congressional override of its decisions. But although the Court had been careful to leave open the opportunity for congressional response, the other element of the enterprise – admonition concerning constitutionally dubious government acts – had touched a sore spot in many sectors. Moreover, the fine points of procedural or interpretive versus constitutional rulings tended to be lost in the political uproar, never creating much of a safe harbor for the Court once politics came to the fore. As Walter Murphy, the esteemed political scientist, explained, "the general indirectness of the Warren Court's approach [did not] mask from jealous members of Congress the incontrovertible fact that the Justices were setting public policy in major areas of national affairs. That they were doing so more adroitly than had previous judges was an added source of irritation."[4]

The short version of what followed is that both Congress and the Court backed off. It took some legislative legerdemain by Senate Majority Leader Lyndon Johnson to pull it off, but all the major Court-bashing bills failed to be enacted. At about the same time, the centrist justices – Frankfurter and Harlan – led a majority of the Court to avoid any more serious confrontations with Congress. In fairly short order, much of the wind came out of the sails of the antisubversive movement, John Kennedy was elected president, and the Court again changed composition, producing a solid liberal majority. Avoidance of constitutional issues went out of fashion, in favor of constitutional invalidation of illiberal statutes and proceedings.

The series of 1950s decisions using the rule of avoidance and other techniques to move public policy in the direction of a more tolerant stance toward dissenters provides an excellent case study for evaluating the Court's performance on the margin of confrontation with Congress. The Court's behavior might be defensible on descriptive grounds: that it accurately accommodated congressional and judicial preferences in a way less judicially activist than

3 Harry Kalven, Jr., *A Worthy Tradition: Freedom of Speech in America* (New York: Harper & Row, 1988), 211.

4 Walter Murphy, *Congress and the Court: A Case Study in the American Political Process* (Chicago: University of Chicago Press, 1962), 111 – 112.

constitutional rulings would have been. Alternatively, the decisions might be justified on normative grounds.

In the longer study that will be published, I conclude that descriptive defenses of the rule of avoidance are, at best, indeterminate. Performing interpretive surgery on a statute can be seen as about as judicially activist as striking it down as unconstitutional. This approach still might map on congressional preferences if those were the only two alternatives – but they are not. Obviously, the third alternative is to let the statute stand and mean what it seems to say.

Consider an obscure but interesting case from 1957, *United States v. Witkovich*, a classic avoidance decision by Justice Frankfurter. A deportable alien had refused to answer a host of remarkable questions asked by the Justice Department about whether, for example, he was acquainted with certain persons, had visited certain addresses, or had spoken before or was a member of certain organizations. The questions directly probed what materials he read and with whom he associated, including those from whom he may have asked for help with his legal problems. Among these questions, my personal favorites are, "Do you subscribe to *The Daily Worker*?" "[H]ave you attended any meeting of any organization other than the singing club?" "Have you attended any meetings or lectures [at a certain auditorium]?" "Have you attended any movies [at a particular theatre]?" and "Have you addressed any lodges of the Slovene National Benefit Society requesting their aid in your case . . . ?" The problem for Frankfurter was that the statute in question authorized the attorney general to require deportable aliens in Witkovich's circumstances "to give information under oath as to his nationality, circumstances, habits, associations, and activities, and such other information, whether or not related to the foregoing, as the Attorney General may deem fit and proper."

Frankfurter began his *Witkovich* opinion by acknowledging that the language of the provision, "if read in isolation and literally, appears to confer upon the Attorney General unbounded authority to require whatever information he deems desirable." "The Government itself shrinks from standing on the breadth of these words," however, and "once the tyranny of literalness is rejected, all relevant considerations for giving a rational content to the words become operative." Frankfurter concluded that the statute as a whole and its legislative history both suggested that the provision only authorized inquiries regarding the alien's continued availability for departure. He then clinched the argument by invoking the rule of avoidance: because supervision of such aliens "may be a lifetime problem," "issues touching liberties that the Constitution safeguards, even for an alien 'person,' would fairly be raised on the Government's view of the statute."

Especially in areas where Congress has wide-ranging power, a checking function in the judiciary seems appropriate in our system of shared powers.

Witkovich cannot easily be defended on descriptive grounds. Frankfurter performed radical surgery on the statutory text, when presumably Congress intended the statute to mean what it plainly said in the first place. To be sure, his decision narrowed the statute down to its probable core purpose; but had supporters of the statute specifically considered whether that was the only purpose they had in mind, or whether the immigration authorities ought to have wide discretion to ask questions beyond that purpose, it seems quite likely the legislators would have endorsed the wide-ranging meaning embodied in the statutory text. Nor can Frankfurter's de facto textual amendment of the statute be justified on the ground that it avoids a judicial invalidation of the law. Based on the precedents in place in the early 1950s, which acknowledged a "plenary power" in Congress over immigration affairs, it seems unlikely that a majority of justices would have voted to strike down the statute.

Nonetheless, in my judgment Frankfurter got it right. It seems to me that the best – perhaps even the only plausible – defense for his decision is normative. Especially in areas where Congress has wide-ranging power, a checking function in the judiciary seems appropriate in our system of shared powers. In effect, Frankfurter said:

> The statute you passed is probably normatively unobjectionable in most circumstances. As for the case of this man, however, the statute seems to allow inquiries that are offensive to our basic liberties of freedom of thought, expression, and association. We doubt that Congress anticipated that the executive authorities in charge of immigration affairs would engage in such abusive treatment. Because immigration affairs involve considerations of foreign policy, national security, and so on, the judiciary rarely believes that it is competent to have the final say even on questions of constitutional dimension in that domain. That does not mean, however, that the judiciary, based on its familiarity with concrete circumstances illuminated in litigation, cannot play a useful role in guiding policy toward what seems to be a more normatively plausible direction. Based on the facts of this case, we therefore cut back this statute to its apparent core purpose. If Congress objects, it can, of course, amend the statute to certify that greater authority should be in the hands of immigration officials. If Congress does so, we cannot respond unless a case comes before us at some future time. What we are doing is providing worthwhile relief in this case, setting a more defensible status quo, and buying time for a potential evolution in national policy.

This cooperative venture for channeling public policy is exceedingly controversial. In the view of many legal scholars, the judicial role should consist of identifying and implementing the most appropriate meaning to the Constitution without consideration of prudential factors. This is a quest for neutral principles grounded in the legalistic methodology of objective textual and historical interpretation. But Frankfurter's technique, as I have described it, would not be surprising to political scientists who study judicial behavior, who generally assume that judicial policy making rather than legalism better explains what justices do. What especially interests me about Frankfurter's approach is the blend of legalistic and policy-making models, with at least a formal acknowledgment that Congress can have the final say if it really desires to. In retrospect, this technique helped the Court, Congress, and the polity to get from Joe to Gene McCarthy – no small feat.

Gordon Silverstein

The Warren Court and Congress: Both Necessary – Neither Sufficient

In many ways, what we think of as the 1960s began fifty years ago, when the U.S. Supreme Court's *Brown v. Board of Education* decision struck down legally mandated racial segregation in public schools. From that moment, many social activists looked to the Court rather than Congress or state legislatures to advance their public policy goals. And a quick review of the Supreme Court over which Earl Warren presided as chief justice from 1953 until his resignation in 1969 seems to confirm their instinct. From civil rights to privacy, from protections for the rights of the accused to reforms of the

electoral process itself – it is the Warren Court that leaps to mind.

Recently, revisionists have tried to demonstrate that when it comes to social policy, the Court may speak loudly but has little real impact.[1] Only Congress and the president, they argue, can really change social policy. Supreme Court decrees may be cathartic, but little more than symbolic.

Who's Right? Neither. And Both.

Many of the most important changes in American public policy, including those in the arena of civil rights, were the product of the Warren Court *together with* Congress. This was not a case of collaboration, but rather a case of two independent builders working on the same structure. Each built on the product of the other, and each was constrained by what the other had done and was likely to do in the future. Their medium of communication and constraint was constitutional and statutory interpretation and precedent – both legislative and judicial.

If we want to understand how Congress and the Court work together with each other, and if we want to understand how and why the Warren Court made a difference, we need to understand precedent, but not in the narrow legal sense that usually comes to mind. Too often we conflate precedent (previous examples used to support current choices) with *stare decisis*, the traditional legal rule for the application of precedent, a rule that previous decisions should govern or determine current similar cases. Although Supreme Court justices may not feel bound by *stare decisis*, the way judges, legislators, and the public think about important policy questions is powerfully shaped by precedent. In this broader sense, precedent is a source of power, influence, and constraint in politics as well as in law, and particularly in the interplay between the two.

Decisions are powerfully influenced by "the formulation of the problem," by the way in which we understand the problem.[2] Students of political psychology have long understood this observation,[3] which has long been applied – consciously and otherwise – in a path-dependent way by legislators and lobbyists as well as by lawyers and judges.

Precedent does not determine the outcome of a particular case and "legal rules do not lay down any *limits within* which a judge moves," Karl Llewellyn once wrote. "Rather, they set down *guidelines from* which a judge proceeds toward a decision." They direct and even constrain decisions, indicating "the experimental basis and the approved direction for developing norms, and thus the foundations of existing law."[4] It is in this sense that we need to think about the cross-institutional role of precedent and about the ways in which the words *together with* apply to the relationship between the Warren Court and Congress, and between the Court and Congress more generally.

Many of the most important changes, including those in the arena of civil rights, were the product of the Warren Court together with Congress.

Litigators and legislators take cues from court opinions, framing their arguments in ways they anticipate will most likely win support from the Supreme Court. These frames set the Court on a path, and future litigation and legislation tends to reinforce and extend that path. New cases that can be linked to existing paths are far more likely to succeed than are cases that require a new path or even the abandonment of an existing path. This does not mean that outcomes are preordained, but there is evidence to suggest that once a case has started down a particular path, some results are far more likely than others – and some become increasingly hard to imagine.[5] As Justice Cardozo put it, the "power of precedent, when analyzed, is the power of the beaten track."[6]

Lobbyists, legislators, and concerned citizens alike pay attention to the courts. They look backward in retrospective efforts to anticipate the frames that will appeal to the Supreme Court, and to identify plausible paths for their objectives. They craft legislation and lawsuits with these experiences in mind. But they also try to anticipate, to shape their efforts prospectively: Where is the Court likely to go? How is the path likely to extend? This process works within the judicial system, between litigators and judges, and it works as well across the legal/political divide, with judicial precedent influencing legislative choices, and legislative precedent influencing judicial strategy.

Court decisions are part of an ongoing process, akin to a tennis match rather than a horse race. Like a tennis match, judicial decisions are part of a back-and-forth process, a multi-iterated game where the players respond to each other's moves over the course of a long volley. Where one hits the ball influences the options available to the player on the other side of the net; the return shot, in turn, influences and constrains the next set of shots.

The Warren Court's experiences with civil rights illustrates both the way in which judicial precedent can serve as a legislative tool (and constraint) and the way in which legislative precedent can serve as a judicial tool (and constraint). Its experiences with civil rights also help us understand the need to view the Court and Congress not as antagonists, but as codependents. But the Warren era also offers a cautionary tale for those inclined to see this interactive process as a model for the making of American public policy. Far from a model for how separate institutions can work together to advance public policies, this was in many ways a rather novel moment of confluence, with just the right people in just the right places at just the right moment in history. But that's getting a bit ahead of the story.

Legislative/Judicial Serve-and-Volley: The Strange Link between Hamburgers and Human Rights

When legislators and members of the Johnson administration decided to push for civil rights legislation in 1964, they faced a dilemma. Even if they could survive a certain filibuster in the Senate, they had to build a law that would also survive Supreme Court review. The problem was that most instances of racial discrimination, particularly those dealing with places of public accommodation, were areas traditionally assumed to lie constitutionally within the exclusive control of state governments, beyond the reach of the national government. To elim-

1 Gerald Rosenberg, *The Hollow Hope: Can Courts Bring About Social Change?* (Chicago: University of Chicago Press, 1991).

2 Amos Tversky and Daniel Kahneman, "The Framing of Decisions and the Psychology of Choice," *Science* 211 (January 30, 1981): 453.

3 Erving Goffman, *Frame Analysis: An Essay on the Organization of Experience* (New York: Harpers, 1974).

4 Karl Llewellyn, *The Case Law System in America* (Chicago: University of Chicago Press, 1989), 80, emphasis in the original.

5 See Paul Pierson, "Increasing Returns, Path Dependence, and the Study of Politics," *American Political Science Review* 94 (2) (2000): 251.

6 Benjamin Cardozo, *The Growth of the Law* (New Haven: Yale University Press, 1924), 62, cited in Barry Cushman, *Rethinking the New Deal Court: The Structure of a Constitutional Revolution* (New York: Oxford University Press, 1988), 216.

inate segregation, Congress had to find a constitutional foundation for this assertion of power. But looking back retrospectively at the Supreme Court's doctrine, rulings, and precedent, it became obvious that the most logical constitutional foundations (the Fourteenth Amendment's equal protection and privileges and immunities clauses) were not promising paths to pursue. This was because the Supreme Court had narrowly circumscribed these clauses almost one hundred years earlier in two Reconstruction era cases,[7] and they had steadily atrophied in the years and decades since those decisions.

Looking ahead, legislators had two choices: Ask the Supreme Court to undo almost one hundred years of case law, precedent, and rulings, with a distinct chance that the justices would not cooperate, thereby setting civil rights back yet again; or find another source of constitutional power, another path that the Court might be more willing to endorse. Recognizing how hard it would be to defeat a Senate filibuster and pass this legislation in the first place, the Johnson administration along with members of Congress were determined to rest this legislation on the least assailable constitutional foundation possible. The answer was to turn to America's superhighway of national power – the commerce clause of the U.S. Constitution.

The then solicitor general, Archibald Cox, did not believe there was a majority on the Supreme Court that would support a Fourteenth Amendment argument for the desegregation of public accommodations. Cox, Richard Cortner has noted, felt that "if we went for all or nothing," the result "would have been nothing." Thus, in his brief for the administration, Cox wrote, "We stake our case on the commerce clause."[8]

It was a successful choice. Justice Harlan made it clear that the reliance on the commerce clause was the key to his vote: "It is perfectly clear," he noted during oral argument, "that the government is arguing only that this act . . . is a constitutional exercise of the Commerce Clause power, and that's all we've got; this other [Fourteenth Amendment] debate may be interesting, but hasn't anything to do with this lawsuit." Justice Black said he would have preferred "to

Litigators and legislators take cues from court opinions, framing their arguments in ways they anticipate will most likely win support from the Supreme Court.

have rested the decisions of the Court on the Fourteenth Amendment, but it seemed clear that Congress had relied primarily on the commerce clause."[9]

Though this certainly allowed for a significant expansion of civil rights, it was an expansion of a particular sort. The Court was signaling to members of Congress and the administration that the most efficient and reliable path for the expansion of civil rights was a path that built on the commerce clause. And that certainly offered a lot of potential. But what about civil rights that might not be able to be linked to commerce? Justice William O. Douglas raised this concern in his concurrence in the cases testing the 1964 Civil Rights Act. Future cases, he said, would now turn not on questions of fundamental human rights, but rather "over whether a particular restaurant or inn is within the commerce definitions of the Act or whether a particular customer is an interstate traveler."[10] Justice Goldberg agreed with Douglas. He noted in a draft concurrence that the primary purpose of the 1964 law ought to be "the vindication of human dignity and not mere economics." During the formal reading of the Court's opinion in these cases, a frustrated Goldberg passed a scribbled note to Douglas saying, "It sounds like hamburgers are more important than human rights."[11]

The commerce path was a wide one indeed, but not unlimited. The worries expressed by Goldberg and Douglas began to materialize as early as 1969, when Hugo Black sent an ominous warning that commerce could be stretched just so far and no further.

After the Court upheld the 1964 Civil Rights Act, Euell Paul and his wife decided to turn their segregated amusement park on the outskirts of Little Rock, Arkansas, into a "private club." Membership in the new Lake Nixon Club could be had on a seasonal basis upon payment of a 25-cent "membership" fee. This was a pretty obvious dodge, as the lower courts recognized, but was this small, privately owned recreation center a place of public accommodation? Was it somehow involved in the stream of interstate commerce that would bring congressional control?

Writing for the Court, Justice Brennan had no trouble extending the commerce path, suggesting a number of ways in which the club was linked to interstate commerce. But Justice Black's discomfort level had been reached. To apply these rules to a recreation center in the Arkansas hills that was "miles away from any interstate highway," Black wrote, "would be stretching the Commerce Clause so as to give the Federal Government complete control over every little remote country place of recreation in every nook and cranny of every precinct and county in every one of the 50 States." This, he concluded, "goes too far for me."[12] In a footnote, he added that this was precisely what he had been worried about in the 1964 cases, where he had warned that "every remote, possible, speculative effect on commerce should not be accepted as an adequate constitutional ground to uproot and throw into the discard all our traditional distinctions between what is purely local, and therefore controlled by state laws, and what affects the national interest and is therefore subject to control by federal laws."[13]

Was this Hugo Black returning to his Alabama roots, preparing to say of civil rights, "Thus far, and no further"? No. This was Hugo Black saying that the Court and Congress had built this important enterprise on the wrong foundation, that they had selected the wrong path. Expanding the commerce clause may have been an efficient path to some desegregation, but the implications of this expansion could not and would not be limited to integration. Meaning that if Black and the Court did not draw the line somewhere, the cost for federalism would be significant as legislators and litigators interested in expanding national power in other realms hitched their wagons to the expanded commerce path. Black argued that he would be willing to enforce national power over segregation, but he would only do so if the law (and the Court's interpretation of the law) were built on what he thought was the

7 *The Slaughterhouse Cases* 16 Wall. (83 U.S.) 36 (1873) and the *Civil Rights Cases* 109 U.S. 3 (1883), which gutted the Civil Rights Act of 1875 – an act that would have banned virtually all of the racial discrimination in question in the 1964 Act.

8 Richard Cortner, *Civil Rights and Public Accommodations: The Heart of Atlanta Motel and McClung Cases* (Lawrence, Kan.: University Press of Kansas, 2001), 6.

9 Ibid., 102, 145.

10 *Heart of Atlanta Motel, Inc. v. United States* 379 U.S. 241, 280 (1964), Justice Douglas dissenting.

11 Cortner, *Civil Rights and Public Accommodations*, 108, 169, 180.

12 *Daniel v. Paul*, 395 U.S. 298, 315 (1969), Justice Black dissenting.

13 *Heart of Atlanta Motel, Inc. v. United States* 379 U.S. 241, 275 (1964).

more appropriate foundation of the Fourteenth Amendment – the alternative that Congress and the Court had explicitly sidestepped.

While Justices Goldberg and Douglas worried about the power of precedent to shape, constrain, and limit the extension and expansion of civil rights, Black was concerned about the power of the unintended consequences of opting for the most efficient route to a mutually desirable result. Congress, Black agreed, had the power to end segregation, but to do so under the commerce clause was unacceptable because of the consequences of further paving the commerce path to national power. These worries would eventually flower twenty-five years later in Rehnquist Court rulings that the commerce path could only go so far, and no further.[14] But despite the misgivings voiced by Douglas, Goldberg, and Black, the Warren Court together with Congress did follow the commerce path to a significant transformation of American law and a major blow against racial discrimination.

The Case of the Judicial Exploitation of Legislative Precedent: Putting Meat Back on the Bones of Laws Against Private Discrimination

One of the reasons Congress was so eager to find a constitutionally foolproof foundation for the Civil Rights Act of 1964 was Senate Rule XXII – the Senate's filibuster rule. Even if civil rights advocates could break a filibuster once, they certainly did not want to have to do it again, which is what would have been necessary if the Court struck down their efforts.

Until 1975, ending a Senate filibuster required the support of two-thirds of those present and voting. This meant, of course, that even though one side might have had the support of sixty-six out of one hundred senators, the other thirty-four could have blocked action, meaning that a minority held veto power, and therefore disproportionate leverage in negotiating the final contours of any successful legislation. And this meant that to overcome a filibuster, any successful civil rights law would require significant compromise that would water down what a majority in Congress (and in the nation at large) wanted and was willing to support.

This takes us to a second perspective on the way the Warren Court together with Congress used precedent to expand civil rights in the area of the sale and rental of private homes. But in this case, it was the Court that used legislative precedent to put meat back on the bones of civil rights laws that had been significantly compromised and watered down to survive Senate filibuster.

Among the civil rights laws passed during Reconstruction, one (later codified as 42 U.S.C. 1982) sought to ban discrimination in the sale and leasing of residential property. But this provision had been gathering dust ever since the Supreme Court seemed to have gutted it along with other laws designed to end racial discrimination in wide areas of public and private life in the Civil Rights Cases of 1883.[15] Little was done about racial discrimination in housing for the next eighty years, until President Kennedy signed an executive order in 1962 barring racial discrimination in housing built with federal funds. But important as it may have been, this provision covered less than 1 percent of existing housing, and only 15 percent of new construction.[16] Even the Civil Rights Act of 1964, passed two years later, did little more than speak loudly and swing a small stick. In part this was because most housing was in private hands, and the understanding was that the Court had foreclosed any possibility of national power reaching purely private transactions. Any real change, therefore, would seem to require both a very aggressive legislative effort (to overcome a certain filibuster in the Senate) and a significant judicial reversal.

This time, the Court moved first. Concurrences in a 1964 sit-in case (*Bell v. Maryland*) along with the Court's rulings in cases testing the Voting Rights Act in 1965 suggested that though the Warren Court would not single-handedly eliminate housing discrimination through judicial interpretation, some of the justices might be open to new laws that would attack the problem through the Fourteenth Amendment.[17]

Justice Brennan seemed to make the invitation rather explicit in a 1966 case, *U.S. v. Guest*. "Viewed in its proper perspective," Brennan insisted, Section 5 of the Fourteenth Amendment "appears as a positive grant of legislative power, authorizing Congress to exercise its discretion in fashioning remedies to achieve civil and political equality for all citizens." The remedy, Brennan wrote, "is for Congress to write a law" that would properly build on the correct foundation.

The invitation was sent, and the guests were arriving. The Court was standing at the altar, apparently ready to work together with Congress. But a wedding still requires two participants. Would Congress walk down the aisle?

The opportunity to do so came quickly. About six weeks after the Court handed down *U.S. v. Guest*, President Johnson proposed the Civil Rights Act of 1966, which, among other things, would have significantly expanded fair housing guarantees.

But we don't talk much about the great Civil Rights Act of 1966. That's because it never came to a vote. And that's because of Senate Rule XXII – the Senate filibuster.

Two years later, after a long, hot summer of urban riots that devastated Detroit and Newark, there was broad public demand for legislative action. A new civil rights law moved quickly through the House and reached the Senate floor in January 1968, where it, too, promptly ran into a filibuster.

But this time, with the Kerner Commission's famous report ("We are two nations, separate and unequal . . . ") fresh off the press, GOP Minority Leader Everett Dirksen signaled that he was willing to compromise, and defeat the Southern Democratic filibuster. But he would do so only if the housing provisions were significantly watered down and another seven million residences were excluded, in addition to the exemptions already built into the original bill.

As the House Rules Committee opened hearings on this new, compromised bill, across the street, the U.S. Supreme Court was hearing oral argument in a housing discrimination case called *Jones v. Alfred H. Mayer Co.*

14 The stretching of the commerce clause would eventually snap, in *United States v. Lopez*, 514 U.S. 549 (1995) and again in *United States v. Morrison*, 529 U.S. 598 (2002), where the Court struck down efforts to extend the reach of the commerce clause to cover laws banning handguns near schools and violence against women.

15 *The Civil Rights Cases* 109 U.S. 3 (1883) consolidated five cases coming from Kansas (*United States v. Stanley*), California (*United States v. Ryan*), Missouri (*United States v. Nichols*), New York (*United States v. Singleton*), and Tennessee (*Robinson v. Memphis & Charleston Railroad Co.*). The question of the reach of congressional power to private discrimination was revisited in *Hurd v. Hodge* 334 U.S. 24 (1948).

16 Executive Order 11063, November 20, 1962: Equal Opportunity in Housing. Available online through the Department of Housing and Urban Development at www.hud.gov/offices/fheo/FHLaws/EXO11063.cfm. See George Metcalf, *Fair Housing Comes of Age* (New York: Greenwood Press, 1988), 38.

17 *South Carolina v. Katzenbach* and *Katzenbach v. Morgan*.

Joseph Jones had sued the Mayer Company, a private developer that refused to sell Mr. Jones a house because of his race. The problem was – just what law had the Mayer Company violated?

The 1968 bill would address this, but it was still in limbo at the Rules Committee, and its future was far from certain. This left lawyers for Mr. Jones to search for an alternative foundation for their argument. Looking back – way back – they found a nearly forgotten provision of the Civil Rights Act of 1866 that stated that "[a]ll citizens of the United States shall have the same right, in every State and Territory, as is enjoyed by white citizens thereof to inherit, purchase, lease, sell, hold, and convey real and personal property."[18]

For better or worse, the American constitutional system is designed to make change hard.

But would the Court be willing to enforce this long-ignored statute? Would the justices use the statute to enforce what Congress seemed reluctant to pass in a bill under current consideration?

Before the Court could arrive at a decision, race relations in the United States were thrown into a very different light. Just two days after oral argument ended in *Jones V. Alfred H. Mayer Co.*, and just hours after the Rules Committee recessed for the week without taking a final vote on the new law, everything changed when the Rev. Dr. Martin Luther King stepped out onto the balcony of the segregated Lorraine Motel in Memphis, Tennessee, and was shot and killed by an assassin's bullet.

The King assassination set off a tidal wave of rioting, nowhere more intensely than in Washington, D.C., where, according to *The New York Times*, whole city blocks went up in flames with looting and fires reaching within two blocks of the White House. The *Times* also reported that a detachment of troops from among eleven thousand soldiers of the 82nd Airborne, the 3rd Infantry Regiment, and the 6th Armored Cavalry joined by the National Guard "ringed the Capitol and set up a machine-gun post on the Capitol's west steps, overlooking the Mall," forcing members of Congress to skirt sandbagged gun installations to get to their committee meetings.

18 42 U.S.C. 1982.

One of those congressmen was Illinois Republican John Anderson, a member of the Rules Committee. Just days after the assassination, Anderson bucked his own constituents and his state's delegation, switching his vote in the Rules Committee and sending the unamended Civil Rights Act of 1968 to the House floor, where it was quickly approved and, within twenty-four hours, signed into law by President Johnson.

As important as this legislation was, it was a shadow of its original self, and far less than a majority in either House would have willingly endorsed, particularly in the wake of King's death.

It was at this point that the Warren Court came back into the picture. The *Jones* case was still pending, and the Court took it as an opportunity to actually use legislative precedent (the old and ignored provision of the 1866 law) to put back some of the meat Congress had compromised off the bones of the 1964 and 1968 legislation – and even to add some flesh the legislators hadn't dared to attempt in their original proposals.

For those eager to end discrimination in housing, this certainly seemed like a promising way to go. But because the Court was merely enforcing a statue rather than a constitutional mandate, it also meant there was a risk: If Congress really didn't want to go this far or this fast, what would stop civil rights opponents from repealing the earlier statute by a simple majority vote? What would happen if Congress really didn't want that meat – which had been painfully compromised off the bone – put back there by the Court?

This was, of course, technically possible. But this is where the Court in effect turned the pig's ear of Senate Rule XXII into a silk purse of more extensive civil liberties than even a majority in Congress could have achieved on its own. First, because civil rights opponents would now need to actually pass legislation rather than merely block it, they would need to assemble a majority, which was quite unlikely under the circumstances. But even if they could have managed to do that, any law would have faced a certain filibuster – this time from civil rights advocates. The Court had performed the neat trick of putting the shoe on the other legislative foot, without having to expand (or contract) any clause of the U.S. Constitution.

Here, the Warren Court together with Congress had done far more than either, alone, could have done. It certainly was not a collaboration. But both were necessary and neither was sufficient.

A Separation of Powers Success Story? A Model for Relations between Court and Congress?

These cases seem to paint a rather appealing portrait: two independent branches working to advance American public policy in a way neither alone could, or perhaps should. The problem with this as a model of how the government could (and perhaps should) develop important policy initiatives is that it was only possible because of a most extraordinary confluence of circumstances and individuals. This is, in fact, anything but a model of the way we might expect the system to work.

This moment of Congress together with the Court required an active and liberal court with a politically skilled chief justice; an active and liberal president with extraordinary political skill and a unique ability to manage the Congress, and particularly the Senate; and a congressional supermajority willing to expend significant political capital. And that required a set of truly extraordinary (and one can only hope unique) set of events:

- First, the assassination of John F. Kennedy in 1963 and the televised brutality of Bull Connor's Birmingham police dogs (which paved the way to end the filibuster and pass the Civil Rights Act of 1964).

- Then the extreme violence unleashed against nonviolent protesters in the South, culminating in the police attack at the Edmund Pettis Bridge during the March on Selma. This led to the vote to end the filibuster and pass the Voting Rights Act of 1965.

- Then the 1965 Watts riots in Los Angeles, followed by the 1966 urban riots in Chicago and Cicero, Illinois, and the 1967 riots that destroyed Newark and Detroit. And finally, and tragically, the assassination of Martin Luther King in 1968 and the riots that followed that event. All this led to the Civil Rights Act of 1968, which included fair housing provisions and the Court's expansive reading of the 1866 civil rights provisions in *Jones v. Alfred H. Mayer Co.*

This was an era where circumstances made it possible, even necessary, for extraordinary individuals to do extraordinary things, despite the institutional and constitutional impediments designed to frustrate this sort of change. None of these institutions – not the president, not Congress, not the Warren Court – could have done this alone. And even together it is almost impossible to imagine they would have done it absent these extraordinary and tragic circumstances.

For better or worse, the American constitutional system is designed to make change hard. Not impossible, but awfully hard. No one branch of the American government is capable of making significant and lasting changes on its own – and that is as it was designed to be. The branches of the national government can and do work together with the others, not only in obvious collaborative ways, but in iterated ways, each building on the work of the other, each constrained by the work the other has done and is likely to do. The Warren Court together with Congress and the president proved that the American system is capable of action – but also showed how difficult and unusual it is for the system to actually generate significant change. The Warren Court era provides an excellent set of case studies that might help us decide if this is an inherent flaw in the American constitutional system, or one of the system's most important safeguards against the abuse of power.

Neal Devins

What does it mean for the Supreme Court to "work with Congress"? Must a Court that works with Congress, for example, uphold federal legislation? Alternatively, does it mean that when reviewing legislation it considers constitutionally problematic, the Court should make use of avoidance techniques that limit congressional prerogatives without invalidating federal law? Finally, is it possible for the Supreme Court to strike down scores of (recently enacted) federal laws but nonetheless work with Congress?

In papers examining Warren Court – Congress relations, Gordon Silverstein and Philip Frickey suggest that a Court that "works with Congress" ought not to invalidate federal laws. Silverstein, for example, looks to mid-1960s decisions upholding and expanding lawmakers' efforts to prohibit race discrimination in housing and public accommodations. Contrasting these rulings (where "the Court together with Congress made a difference in civil liberties") to Rehnquist Court rulings invalidating gun control and domestic violence legislation, Silverstein claims that the "Warren Court era was extraordinary, and quite possibly unique." For his part, Frickey examines late-1950s Warren Court efforts to limit anti-communist legislative initiatives. Applauding the Court's use of "subconstitutional" avoidance, Frickey claims that "the Court used techniques that might defuse political opposition" and, in so doing, the justices "avoid[ed] the sharpest confrontations with Congress and with each other."

The lesson here is simple. The Court takes what Congress will give it. This is the Warren Court's legacy and, not surprisingly, Rehnquist Court decision making follows a similar pattern.

The facts relied upon by Silverstein and Frickey, however, support an alternative theory of Court-Congress relations, namely: The Supreme Court is not especially interested in having a true constitutional dialogue with Congress. Rather, the Court looks to Congress to see what it can and cannot do. Based on that assessment, the Court seeks to advance its own agenda in ways that will not prompt a legislative backlash. This was true of the Warren Court and it is true today. In other words, the Rehnquist Court's reinvigoration of federalism-based limits on Congress is very much in keeping with Warren Court traditions. That the Rehnquist Court is using constitutional law to invalidate federal legislation is beside the point. What matters is that the Rehnquist Court, like the Warren Court, looks to signals from Congress to sort out ways in which it can advance its agenda.

Consider, for example, the Warren Court's use of avoidance techniques. Rather than seeking to forge a constructive dialogue with Congress, the Court relied on subconstitutional avoidance as a possible escape hatch if Congress disagreed with the Court. In particular, the Court would not be saddled with a politically unworkable constitutional ruling. Consequently, it would not need to overrule itself in order to uphold analogous legislation.

There is good reason to think that this is precisely what the Warren Court was doing in its review of anti-communist legislation. At that time, Southerners in Congress were enraged by the Court's decision in *Brown*. This outrage took many forms, including polls showing that 86 percent of Southern lawmakers thought that Congress should not defer to Court interpretations of the Constitution. More generally, 40 percent of lawmakers thought that the Court should not second-guess congressional interpretations of the Constitution.

Put another way, when the Warren Court ruled against Congress in several "Red Monday" cases, it had good reason to fear that Congress would respond by enacting Court-stripping legislation. That the Court made use of subconstitutional avoidance would not – as Professor Frickey shows – defuse congressional opposition to Court decision making. The Court's moderates, Frankfurter and Harlan, may well have understood this phenomenon. For this very reason, they pushed for the use of subconstitutional avoidance and, once Congress signaled its disapproval of the Court, they beat a hasty retreat through the avoidance escape hatch. Following the Red Monday decisions, Harlan and Frankfurter shifted their votes to pro-Congress positions in order to stabilize Court-Congress relations.

Likewise, the Warren Court's 1962 jettisoning of avoidance in favor of constitutional invalidations of anti-communist legislation speaks to the Court's uninterest in a true dialogue with Congress. At that time, an increasingly liberal Congress was unlikely to resist such judicial innovations. Moreover, with the appointment and confirmation of Arthur Goldberg, elected government helped move the Court to the left.

What then of mid- to late-1960s rulings upholding and expanding the scope of federal civil rights legislation? At this time, of course, the Court and Congress both supported nationalist solutions to eradicate race discrimination. For example, by upholding the public accommodations provisions of the just enacted 1964 Civil Rights Act, the justices validated both their own and Congress's preferences.

A more interesting and revealing case is *Jones v. Alfred H. Mayer Co.* As detailed by Professor Silverstein, *Jones* extended housing discrimination protections beyond those just enacted by Congress. Specifically, rather than embrace a legislative compromise that limited the reach of fair housing requirements, the Court transformed a Reconstruction era civil rights statute into a sweeping prohibition against housing discrimination. Knowing that a majority of lawmakers supported the Court, the justices recognized that they would not be slapped down for their pursuit of a more ambitious housing law than the one Congress was able to enact.

The lesson here is simple. The Court takes what Congress will give it. This is the Warren Court's legacy and, not surprisingly, Rehnquist Court decision making follows a similar pattern.

In thinking about the Rehnquist Court's revival of federalism, consider the following: A 2000 poll revealed that only 13.8 percent of lawmakers think that the Court should defer to congressional interpretations of the Constitution. In 1964 76 percent of those polled thought the federal government could be trusted "just about

always" or "most of the time"; by 2001, only 27 percent of those polled thought the government trustworthy. Indeed, the 1994 Republican takeover of Congress was tied to voter dissatisfaction with Washington. Running on the so-called Contract with America, House Republicans pledged a smaller federal government and a larger role for the states.

Not surprisingly, there has been no backlash to Rehnquist Court decisions striking down federal laws. If anything, Congress seems to support the Court. Congress has shown relatively little interest in rewriting statutes that have been struck down, and when Congress has revisited its handiwork, lawmakers have paid close attention to the Supreme Court's rulings, limiting their efforts to revisions the Court is likely to approve.

I do not mean to suggest that today's Congress wants the Court to overturn its enactments. Instead, just like the Warren Court before it, the Rehnquist Court is pursuing favored doctrinal innovations in ways that will not prompt a legislative backlash. In some measure, of course, the Court's assessment of what it can and cannot do makes clear that Congress plays a pivotal role in shaping Court decision making. At the same time, neither the Rehnquist nor the Warren Court has seemed especially interested in engaging Congress in a true dialogue about the Constitution's meaning.

Nelson W. Polsby

For the purposes of this brief comment, I am proceeding on the assumption that no account of judicial-legislative relations during the Warren era can be complete without consideration of the two major cases in which these relations appeared most explicitly on the agenda. I refer to *Baker v. Carr*,[1] which opened the door to an ever-lengthening line of cases where the Court has found it necessary to intervene directly in the representation process, first at the state level and later more comprehensively;[2] and *Powell v. McCormack*,[3] in which the Court went on record specifying (and presumably restricting) the qualifications for membership in Congress. Both cases throw a different light on Court-Congress relations than those cases described by my learned colleagues that lead to a picture of Court-Congress cooperation and of Court deference to Congress.

The question that for many years has nagged at me is whether the Court could have found grounds for requiring the state of Tennessee to follow its own constitution without judicial supervision as stringent as "one person, one vote" has proved to be.

Curiously, neither case needed to be decided in as intrusive a manner as it was. By that I mean simply that in both cases roughly the same short-run substantive result was available without the Court's moving so far into the political thicket.

Powell v. McCormack, Earl Warren's last opinion, is the simpler of the two cases. Adam Clayton Powell, a representative from New York duly elected in 1966 to the 90th Congress, was prevented from taking his seat by a majority vote of that Congress on grounds that were evidently compelling to his colleagues, though not particularly relevant here. He sued. By the time the case reached the Supreme Court, Powell had been elected to the 91st Congress and had been seated without incident. Earl Warren's decision for the Court held that despite the unavailability of an appropriate remedy (since the 90th Congress was no more), the case was not moot since there was still the outstanding issue of the reimbursement of Powell's back pay. Clearly the Court did not consider this an issue of great constitutional moment, since the justices remanded it to the court below for final determination. Instead, the Court availed itself of the opportunity to announce that grounds for exclusion from Congress were limited to those specified in the Constitution: age, citizenship, and residency.

This interpretation came in handy when the Court was faced with term-limit cases several decades later,[4] but this did not change the fact that Adam Powell's case was clearly moot. Powell was already sitting in Congress (though not the same Congress for which relief was asked) when the decision was announced. The Court could do nothing about that. I conclude that in this instance the Court, under Earl Warren's leadership, went well out of its way to admonish Congress on an occasion when the Court's decision could have no practical effect. No practical effect was equally available to the Court by acknowledging the obvious mootness of this case and keeping its powder dry for a future that included the issue of term limits.

Baker v. Carr (1962) is the more complicated of the two cases. It deserves a broad and careful discussion, which I will not provide here. Instead, I will limit my comments to a few basic points, relying on the general knowledge about this case and its successors that has diffused into the community. *Baker v. Carr* was not a direct attack on Congress, because it dealt with the apportionment of the Tennessee legislature – but it opened the Pandora's box of equal protection as the grounds for judicial intervention. This soon led to deep Court involvement in districting issues all over the political system and to more and more detailed specification of the practical meaning of equality.

This case raises the interesting procedural issue of how much detail the Court needs to provide in laying out criteria that other political actors must meet in order to satisfy the Constitution. "One person, one vote," the criterion that soon (in *Wesberry v. Sanders* and *Reynolds v. Sims*) fortified the Court as it charged into the political thicket, has in practice turned out to be an unwieldy measure of equal protection, an outcome that justices may or may not fully have anticipated when they fastened upon this measure as the sovereign test of political equality. It is certainly true that in *Baker v. Carr* the facts supported some sort of judicial response. The Tennessee legislature was grossly malapportioned, and the state of Tennessee had not followed its own constitution, which explicitly required periodic reapportionments.

The question that for many years has nagged at me is whether the Court could have found grounds for requiring the state of Tennessee to follow its own constitution without judicial supervision as stringent as "one person, one vote" has proved to be. One possibility, which

1 *Baker v. Carr*, 369 U.S. 186 (1962).

2 *Gray v. Sanders*, 372 U.S. 368 (1963), prohibiting the unequal weighting of votes in statewide elections; *Wesberry v. Sanders*, 376 U.S. 1 (1964), mandating the equal population of congressional districts within states; *Reynolds v. Sims*, 377 U.S. 533 (1964), requiring that legislative districts at all levels of government be drawn on the basis of equal population; *Karcher v. Daggett*, 462 U.S. 725 (1983), introducing a standard for population deviation in congressional districts which is admittedly more stringent than the margin of error of federal census data.

3 *Powell v. McCormack*, 395 U.S. 486 (1969).4 *U.S. Term Limits, Inc. v. Thornton*, 514 U.S. 779 (1995); *Cook v. Gralike*, 531 U.S. 510 (2001).

4 *U.S. Term Limits, Inc. v. Thornton*, 514 U.S. 779 (1995); *Cook v. Gralike*, 531 U.S. 510 (2001).

occupies an exceedingly small niche in the literature,[5] would have been for the Court to invoke Article IV, Section 4 of the U.S. Constitution requiring the states to provide their inhabitants with a "republican form of government." This was a course of action presumably blocked by the Court's decision in *Colegrove v. Green* (1946),[6] and explicitly rejected in favor of equal protection in *Baker v. Carr*. It would have left the means of compliance sufficiently open to give a little wiggle room for political decisions using the traditional districting criteria of contiguity, compactness, accommodation of natural communities, incumbency protection, and so on. *Baker v. Carr* did not itself outlaw the construction of bicameral legislatures along the lines of the Connecticut Compromise, but it did set the Court on a path that eventually led to this outcome. I take the point in Justice Brennan's *Baker* opinion that "the Guaranty Clause is not a repository of judicially manageable standards which a court could utilize independently in order to identify a state's lawful government,"[7] but in light of subsequent developments, I think this might have been less burdensome a problem than judicial management under equal protection has proved to be.

How are we to reconcile these two cases with the account my colleagues have offered of Fred Astaire – Ginger Rogers relations between the judiciary and the legislative branch in Earl Warren's time? ■

5 See Jerold Israel, "On Charting a Course Through the Mathematical Quagmire: The Future of *Baker v. Carr*," *Michigan Law Review* 61 (1962): 135.

6 *Colegrove v. Green*, 328 U.S. 549 (1946).

7 *Baker v. Carr*, 369 U.S. 186, at 223.

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Voting with Dollars

Bruce Ackerman
Response by Barney Frank
Comment by Nick Littlefield

This presentation was given at the 1879th Stated Meeting, held at the House of the Academy on March 10, 2004.

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Bruce Ackerman

Recently, Ian Ayres and I coauthored a book, *Voting with Dollars*, that focuses on two basic ideas about campaign finance. The first is the concept of Patriot Dollars. It isn't enough to count every vote equally on election day; Americans should also be given a more equal say in funding decisions. Just as citizens receive a ballot, so they should receive a special credit card – a Patriot Card – to finance their favorite candidates. Suppose that Congress seeded every voter's account with fifty Patriot Dollars. When you go to vote, under the Ackerman system, you put your Patriot Card in an ATM machine and open an account with fifty Patriot Dollars that can be used only to finance a campaign. You can beam these dollars to any party, candidate, or interest group.

Such a proposal could never have been made twenty-five years ago, but now the transaction costs are very small. To give you a sense of magnitude, if the one hundred million Americans who voted in the year 2000 had donated with their Patriot Cards during that campaign, their combined contribution would have amounted to $5 billion, overwhelming the $3 billion provided by private donors.

This Patriot initiative avoids many of the difficulties associated with traditional "clean money." The old reform paradigm created a special bureaucracy charged with the delicate task of doling out funds to qualifying candidates and parties. In contrast, the Patriot paradigm does not keep ordinary Americans on the sidelines. Instead, it makes campaign finance a new occasion for citizen sovereignty – encouraging Americans to vote with their dollars as well as their ballots and giving renewed vitality to their democratic commitments. Rather than trying to repress the amount of money in politics, which is a great aim of much traditional campaign finance reform, my proposal seeks to democratize and diffuse finance – to drown out special-interest money with $5 billion worth of democratic, one-person, $50 votes. In primaries, candidates who generate a lot of interest will get a lot of money, and candidates who don't, won't. Consequently, money will support credible primary campaigns in a way that our current system doesn't.

In addition, Patriot Dollars would have a constructive impact on congressional races because, as a result of gerrymandering, a large percentage of House seats are not competitive. Let me give you an example. I live in New Haven, Connecticut, and I have Rosa DeLauro, a Democrat, as my representative. I happen to be a Democrat, but I have a lot of Republican friends whose candidates are always losing in the congressional race. Under the Patriot system, my Republican friends could experience a certain satisfaction in helping to elect a Republican in a swing district in Missouri. The result would be an increase in the number of competitive races, from the present 40 or so to 100 or 120.

The Patriot program is also superior to the existing campaign finance reform in a couple of less obvious ways. Under the present system, if candidates raise $18 million in private money, they can get another $30 million in public money for their primary campaign for their party's nomination. But they can also opt out and, like President Bush and John Kerry have done, they can raise hundreds of millions of dollars. Under the Patriot approach, candidates could still opt out – but it would never happen. If George W. Bush were to opt out of the Patriot program, there would be millions of Republicans with $50 in their pockets whom he could not reach. This would tempt a rival to enter the race and compete with Bush for the nomination. To preempt entry of a close competitor, Bush (and Kerry) would not opt out of the chance to obtain public money.

Rather than trying to repress the amount of money in politics, my proposal seeks to democratize and diffuse finance – to drown out special-interest money.

Second, let's think back to 2000. Why did so many people vote for Ralph Nader? As the fall campaign proceeded, Nader had a chance of garnering the 5 percent of the vote required to guarantee the Green Party a substantial subsidy in 2004. But as the candidates reached the finish line – and with Bush and Gore in a dead heat – Nader's backers had to reckon with the short-term consequences: voting for Nader might get the Greens funding in 2004, but it might tip the current election from Gore to Bush. The Naderites managed to get the worst of two worlds: not enough voted for Nader to obtain the 2004 federal subsidy, but enough defected from Gore to cost him Florida and other states. In contrast, the Patriot approach is immediately responsive to citizen's preferences during the very election with no time lag. If the Naderites of 2000 had acted under the new paradigm, many of them would have voted with their Patriot Dollars for Nader, giving the Greens a large fund for an effective campaign. But most would have voted for Gore on election day because Nader would not have needed to make the 5 percent threshold for the Greens to qualify for a subsidy the next time around.

So much for the book's first big idea: Patriot Dollars. The second idea, which comes from my coauthor, Ian Ayres, focuses on the issue of full disclosure of donations required by present campaign laws. Ian and I reject full disclosure and make a case for the "secret donation booth," analogous to the secret ballot. Contributors would be barred from giving private money directly to candidates. They would instead have to pass their money through a blind trust. Candidates could get access to all money deposited in their accounts through a blind trust, but they wouldn't be able to identify who provided the funds. Lots of people could go to a candidate and say they have given vast sums of money to his or her campaign, but the candidate wouldn't be able to determine who is telling the truth. And just as the secret ballot makes it more difficult for candidates to buy votes, so a secret donation booth would make it much harder for candidates to sell access or influence. There remain lots of reasons for giving to a political campaign, and the new paradigm undercuts only one of them: the desire to obtain a quid pro quo from a victorious candidate.

If we add these two ideas together, it makes sense to call our basic proposal "voting with dollars," because it mimics two core attributes of the franchise: Citizens are given equal voting power, but they must exercise this power anonymously. The basic equality is expressed by citizens' equal access to Patriot Dollars. The secrecy of the ballot box is expanded to disrupt special-interest deals in campaign finance. Our new paradigm uses anonymity to cleanse private giving of its worst abuses while allowing it to serve as a valuable supplementary support to the robust public debates fostered by billions of Patriot Dollars allocated by millions of concerned citizens.

Barney Frank

I would like to begin with a semantic point, Bruce. I know you wrote your book some time ago, but I think that, for political purposes, the word "Patriot" has been taken. Personally, I would like to outlaw the use of metaphors in discussions of foreign policy and of acronyms as the names of bills.

I have a divided reaction to your proposal. I favor the idea of distributed money, but for a somewhat different reason. The campaign finance system is a serious problem, but I think that the standard critiques of it greatly overstate the extent to which it is corrupting in the narrow sense. As to the second part, the idea of the secret donation booth, you are doing away with what I don't think exists. There is not as much buying of votes on specific issues as people think.

Here is my analysis. The problem with the campaign finance system, in my judgment, is that it distorts our democracy. We have two systems in this country: a political system – democracy – based on equality for each individual; and an economic system – capitalism – which may be the best way to generate wealth, but which is built, in part, on inequality. The tension between these two systems has evolved to the point where money has become so influential in the electoral process that the unequal capitalist system is eroding what should be the formal equality of the political system. My own approach would be to say that inequality is a good and necessary thing in our society, because it's the framework within which we can create wealth. But left entirely to its own devices, the free market system is going to create more inequality than is either socially healthy or necessary for efficiency. Part of the role of the political system is to put some limits on that inequality.

On the basis of my thirty years of experience in the legislature, I believe that the votes of politicians do not follow money nearly so much as money follows the votes. By and large, people vote according to their general partisan and ideological approach. That doesn't mean that money never has any influence – although the kind of quid pro quo that Bruce is talking about just does not happen. Money breaks down what should be equality and gives an advantage to those people who have a commitment to inequality in society. And disparity in income is increasing significantly.

The corrupting influence of campaign contributions in large amounts is not that the contributions lead to anything close to a quid pro quo; it's that they give the unequal element of society more leverage than it ought to have.

The notion of the Patriot Dollar is a very good way to diminish the extent to which money interferes with what should be the equality part of our society. But the concept of the secret donation booth leaves open the possibility that private individuals can still contribute unlimited amounts of money – tens of thousands of dollars – that will continue to allow the unequal part of society too much influence in what should be the equal part.

One issue missing from Bruce's analysis is the role of labor unions, which are a major source of campaign finance. I generally vote in the way that labor unions would like me to vote, but not because they give me money. In fact, they give me money because I vote that way. Again, money follows the votes much more than the other way around. I've heard silly arguments (and I don't attribute this to Bruce) that say, "We can show you what campaign money does. Look at all these congressmen from North Carolina and Virginia who voted for tobacco interests, and they got money from tobacco." In reality, they vote for tobacco interests because tobacco is an important commodity in their states.

The corrupting influence of campaign contributions in large amounts is not that the contributions lead to anything close to a quid pro quo; it's that they give the unequal element of society more leverage than it ought to have, philosophically speaking, in the political system. And secret donations don't cure that. I also think that the ability to make contributions entirely secret is dubious. If I'm watching a python, I may not know whether it ate a rat or a pigeon, but I can probably tell if it ate. And if I'm looking at my account, I'll see bulges.

A few other points. I doubt that the people in New Haven who are unhappy with Rosa DeLauro would give to the Sierra Club even if they wanted to. But they can already give elsewhere, so that is not a unique element of the Patriot system.

Gerrymandering is a problem, and I favor the adoption of nonpartisan redistricting. Even more significant is the possibility of dealing with incumbent protection by passing a rule that prohibits us from writing to constituents unless they write us first. Last year, my colleagues passed legislation banning unsolicited emails, with the exception of emails from members of Congress. I suggested that congressmen send out an email bragging about this action, but they didn't think it was a good idea.

To summarize, I support the idea of removing the unequalizing effect of campaign finance through the Patriot Dollar system, but I would accompany it by tougher restrictions on spending. The Supreme Court has said that you can limit what one person gives to another, but you can't limit spending. Without such limits, you give too much influence to people on one side of the spectrum.

On another level, it used to be that members of Congress and members of the legislature in Massachusetts could take their funding with them when they retired, so there was an incentive to raise money you could use when you left office. Now campaign contributions are very definitely a means – and getting elected is the end. You can raise money only if you need it for electoral purposes. We are concerned here not just with the presidency, but also with elections to the House and Senate. In the case of House and Senate races, you might very well have a situation where private money would overpower Patriot Dollars, and that would allow the unequalizing element to persist. The proposed system would not diminish the evil that can be generated by private campaign contributions in any substantial way.

Nick Littlefield

I would like to make a few comments on Barney and Bruce's presentations.

Barney, you focused on the point that there is no longer a quid pro quo on campaign contributions on the part of the legislative branch, but I would dare to disagree with you in terms of the executive branch. Think what the vast contributions have done to the energy policy of the Bush administration, particularly the Halliburton situation. I'd even go back to the day of the Massachusetts Special Anticorruption Commission – the Ward Commission – when you and I worked together twenty years ago. In his final report in 1981, Ward wrote that corruption was a way of life in Massachusetts, and we showed example after example of road builders, architects, and contractors of one sort or another who made major contributions in order to get their contracts. The governor may have been straight, but the bagmen were collecting money, and that's just the way it was in Massachusetts then.

We need to reverse the U.S. Supreme Court's 1976 decision in Buckley v. Valeo that prohibits governments from imposing spending limits on candidates, and we should provide broad-scale public financing to candidates under a set of reasonable criteria.

As for "Voting with Dollars," Bruce is a hero for coming up with this remarkably bold idea. Bruce makes something of a habit of developing new and different ideas in a number of areas: for example, his proposal to give a newborn child $80,000 as a birthright of citizenship, financed by an annual wealth tax equal to 2 percent of every individual's wealth in excess of $180,000, or the concept of a new national holiday – Deliberation Day – held two weeks before presidential elections to discuss the central issues raised by the leading candidates. While I like these ideas in principle, my reaction is generally: Will they work? Are they practical? Could you upset an existing campaign system and start anew with Patriot Dollars?

I tend to agree with Barney that we need to reverse the U.S. Supreme Court's 1976 decision in *Buckley v. Valeo* that prohibits governments from imposing spending limits on candidates, and we should provide broad-scale public financing to candidates under a set of reasonable criteria. We should also have shorter elections, provide free television time, and ban advertising eight months out. What are we looking forward to in the next eight months? The Red Sox baseball season hasn't even begun (and to me that's a lifetime, a baseball season) and the World Series will be over before the presidential election is over. That's a staggering thought. A child who was conceived last week will be born before the election is over. If we push ahead on our current agenda, I think we might actually get the kind of reform we need. ■

Bruce Ackerman

Nick Littlefield

Barney Frank

Barney Frank and John Kenneth Galbraith (Harvard University)

© Martha Stewart

Peabody Terrace, Cambridge, Massachusetts.

Why Don't the Rest of Us Like the Buildings the Architects Like?

Robert Campbell

This informal talk was given at the House of the Academy on April 2, 2004, as part of the Academy's Friday Forum series.

Robert Campbell is an architect and a writer. He has been a Fellow of the American Academy since 1993.

Perhaps I should enlarge a bit on Jim Carroll's gracious introduction. Besides being an architecture critic, I'm also an architect, and was part of the client team that built the Academy's House many years ago. Since then, I've done a fair amount of that kind of work. I've been an architectural advisor to the Boston Symphony for more than twenty years now. I'm currently doing similar work for the Gardner Museum.

I was working in a Cambridge architectural office called Sert, Jackson & Associates when I started writing for *The Boston Globe*. I started writing for the *Globe* because I went to a party in the Riverside neighborhood of Cambridge. Brendan Gill, another journalist with a strong interest in architecture, used to say, "Everything happens at parties." It's true: I ran into a friend at this party and he said, "Oh, Riverside is such a pleasant little neighborhood – tree-shaded streets, and small houses, and all that – except for those three *ugly concrete towers* that Harvard has just built."

Well, those three towers were part of Peabody Terrace, a group of apartments for graduate students on the bank of the Charles River in Cambridge. My firm had designed those towers, although I wasn't involved in them.

Peabody Terrace is a building beloved by architects and disliked by almost everyone else. It is built of raw concrete, relieved by accents of brightly colored panels and white balconies. It won a national Honor Award from the American Institute of Architects. The senior partner in the architectural firm won the Gold Medal of the American Institute of Architects, the highest U.S. accolade for architects. And the firm won the Firm Award of the American Institute of Architects.

No building could have had more praise heaped upon it by the architectural community than Peabody Terrace. It's still greatly admired by architects, including myself. But more or less everybody else did, and does, hate it.

That encounter at the party was a wake-up call for me. I said to myself, for the first time, consciously, "Nobody likes what we're doing." And so I started writing. The first article I ever wrote for the *Globe* was about that party, that comment, and that building. And ever since then, I think I've been trying to build a bridge of mutual understanding between the larger culture and the subculture of architects.

I should perhaps say a word in defense of Peabody Terrace. It does have a number of qualities. First, it is porous to the neighborhood. When he designed it, Josep Lluis Sert said that he didn't want it to be like Dunster House and the other Harvard houses, which created a barrier between the neighborhood and the Charles River. And, in fact, you can walk through Peabody Terrace. What Sert didn't foresee is that the people in the neighborhood would act as if they're wearing electronic dog collars. When they step onto Harvard land, they feel uncomfortable.

Second, it's a much denser development than anything around it, but it steps down in height to match the heights of lower buildings along the street. The towers are in the center; at the edges, Peabody Terrace comes down to the scale of the neighborhood. I don't think it's overwhelming. The towers are very slim.

And the whole complex is ingeniously organized. There's a corridor only on every third floor, which means that the apartments above and below the corridor run all the way through the building, so that you can enjoy ventilation and views in both directions. And the corridors are lined with windows. They're not the usual so-called double-loaded corridors, running in darkness down the middle of the building. The balconies double as fire escapes: Sert was particularly pleased by that because he realized that if there were a budget problem, nobody would be able to cut the balconies. The pattern of balconies, sunshades, and brightly colored, operable panels, set against the raw concrete of the walls, makes for a very rich façade in the modernist manner. Sert loved Paris and liked to talk about it as "elephants and parrots": long grayish buildings enlivened, at street level, by the bright color accents of the shops and cafes. Peabody Terrace is inventive and fun; to me, it seems to handle the issues of scale – of putting a big building in a small place – very well. But its architectural language remains, for most people, unfamiliar and offensive.

What I'm going to do now is synopsize a talk that I gave at the Boston Public Library a couple of months ago. I called it "Memory and Invention." I like the phrase because of its assonance. "Memory and Invention" – the rhyming "e" is the memory that lurks within invention. All art and all periods must work within this spectrum. There is always memory. There is always invention. The question is the relationship between the two. The tension between them is where the energy comes from.

There is no energy in architecture if it is only a memory of the past. There is no energy if it is only invention. And I find as a critic of architecture writing for the *Globe*, for a general newspaper, that the connection between memory and invention has been severed in our culture. The readers who send me email fall into one of two groups. Either they hate modernism and love everything old – and that's by far the majority – or they think it's boring to imitate the past, and they want everything to be new and daring and experimental. I call them the "rads" and the "trads" – the radicals and the traditionalists, the "pastists" and the "futurists." They need each other. They are equal and opposite. They live in each other's eyes. If one were to disappear, the other would have to disappear

It's easy to invent new shapes. Children do it all the time. So do cartoonists. What's hard is to give those shapes and forms any meaning.

too. They need each other just as the U.S. and the U.S.S.R. needed each other to define who they were during the Cold War.

The trads want everything to look *beau-ti-ful*. That is to say, they want it to look like the buildings of the past they have learned and been conditioned to love. Picasso pointed out, as others have, that anything new is ugly. Our perception of what is beautiful is a learned response. Someone has noted that there is no record of anyone having said that the Alps were beautiful until the eighteenth century. Until then, the Alps were dangerous and frightening. But a taste for the sublime came in and made them beautiful. A new response was formulated and learned.

The rads among my readers take the opposite view. They can't believe that citizens of Boston are building imitations of nineteenth-century architecture, wrapped in thick blankets of red brick and topped with hats of phony mansard roofs, all in an attempt to "fit into" a historic neighborhood. Why can't we live in our own time, they say. Or better yet, why can't we live in the future? Why can't we use computers to make groovy new shapes – there must be some more contemporary new term than groovy: *awesome* new shapes – that will broadcast our daring, our boldness, our march into the future. We've seen examples of that in recent months in the many idiotic proposals by famous architects for the World Trade Center site.

Here's my main point. The rads and the trads are the same. They're much more like each other than they are different. That's because they both seek to substitute a utopia of another time for the time we actually live in. The trads find utopia in the past; the rads find it in the future. The utopia of the trads is a world of beaten copper and weathered wood and small paned windows and genteel manners. It is a world that, of course, never quite existed. It is a false utopia, a fiction about the past created by the present.

The utopia of the rads, by contrast, is a fiction about the future. This is avant-gardism, the curse of the twentieth century in my opinion. Going back to Hegel and Marx, this view judges the value of anything by its novelty, by whether it's helping to bring into existence a future that is struggling to be born. This kind of futurism expresses itself in the work of my architecture students as a love affair with the unpredictable shapes and collisions they can generate on their computers. You see buildings now that look like an abandoned game of Pick-up-Sticks. The architect of some of those has just won the Pritzker Prize, the highest international award in architecture. Or they may look like inflated muffins that didn't rise quite properly in the oven. That's called "blob architecture" – biomorphic shapes. Or they may look like frozen explosions. Avant-gardism usually rides on some new wrinkle of technology, whether it's the speeding cars of the Italian futurists in the early twentieth century, or the public health and hygiene movement that underlay so much of early modernism. Now it's computers.

What both the rads and the trads ignore, in their love of utopias of the past and the future, is the present. They both try to elbow aside the real world we live in and substitute a world of another era. It's a lot easier to design a utopia than to deal with the complex reality of a present time and place. You don't have to deal with the tension between memory and invention. You just take one or the other. If you do that, you inevitably create architecture that is thin, bloodless, weak, and boring. An example of bad trad is the Darden Graduate School of Business Administration at the University of Virginia by Robert Stern – a kind of cardboard model of Thomas Jefferson blown up like an inflated Michelin Man. All memory and no invention. An example of bad rad would be Frank Gehry's Experience Music Project in Seattle, which is little more than a meaningless free-form sculpture that jumped off a computer screen. Its shapes appear arbitrary and thus lack meaning and significance: it's all invention and no memory.

The dirty secret of avant-garde architecture is that it's *easy* to invent new shapes. Children do it all the time. So do cartoonists. What's hard is to give those shapes and forms any meaning. You can't do that without referring them to some kind of tradition. You can say, I'm within the tradition and I'm innovating within it. You can say, I'm breaking out of the tradition. But if there isn't a tradition, your forms lack an essential frame of reference.

I've spent my life as a critic trying to bridge the rad-trad gap. I've failed so far and I think it's getting worse. So my influence has probably been negative.

I want to give you a couple of quotes – I love to quote people more eloquent than myself. This is from J. M. Richards, a great British architectural scholar and critic:

> Architecture cannot progress by the fits and starts that a succession of revolutionary ideas involves. Nor, if it exists perpetually in a state of revolution, will it achieve any kind of public following, since public interest thrives on a capacity to admire what is already familiar and a need to label and classify.

I think he got that exactly right. If you think of a teenager learning for the first time about baseball or rock music, that's how you move into any new subject, by admiring what's familiar and by labeling and classifying.

Lewis Mumford said that what he valued in architecture is what he valued in life itself: "Balance, variety, and an insurgent spontaneity." But you can't have insurgent spontaneity unless there is some stable frame against which to be insurgent.

Here is a contrasting quote from another architectural theorist, Charles Jencks:

> The architect proceeds as the avant-garde does in any battle, as a provocateur. He saps the edges of taste, undermines the conventional boundaries, assaults the thresholds of respectability, and shocks the psychic stability of the past by introducing the new, the strange, the exotic, and the erotic.

I'm so tired of that kind of language. Every time I pick up an art magazine I read that the latest artist is "challenging my preconceptions." What the artists and the editors don't realize is that my only remaining preconception about art is that my preconceptions will be challenged. Where do you go from there?

My own definition of architecture is simpler: *Architecture is the art of making places*. Places can be corridors or rooms. They can be streets and squares. They can be gardens and campuses. These are all places for human habitation. Architecture is not *primarily* an art of self-expression, nor is it primarily an intellectual activity. Buildings are not dramatic sculptures or amazing site installations. They exist to create places. And you appreciate a work of architecture in only one way, by inhabiting it. It is an art, but it is not an art of painting or sculpture. You can't appreciate it like a painting, by looking at it. You can't appreciate it like a sculpture, by walking around it. You must inhabit it. You don't have to do that physically with your body; you can do it with your imagination. You can look at a building and see a window and imagine yourself inside looking out and imaginatively inhabit that building. That is how you experience architecture.

It's interesting that people have no problems with the contemporary or avant-garde designs of their cars or their sound systems. Those things come and go in our lives. Of architecture we ask, I think, that it provide us with reassurance of stability, that it not change too quickly.

Kenneth Frampton, another great architectural historian at Columbia, once compared the Italian futurists and their love of fast automobiles with architecture in our own time:

> Now once again [as at the time of the futurists] we live in an age in which speed and cybernetic disposability are advanced as the order of the day. But it must be seriously questioned whether speed and ephemerality ever had anything to do with architecture. And further, whether architecture is not, to the contrary, an essentially anachronistic form of art whose fundamental task is to stand against the fungibility of things and the mortality of the species.

I think we have to accept the fact that architecture, like any other language, like the English language, is a language of conventions. We don't write poetry in Esperanto because nobody would understand it. If we invent a new architectural language – and it was the architect Charles Moore who said that "modernist architects designed in Esperanto" – we are separating ourselves from the larger culture. Conventions are arbitrary. A blue rug could perfectly well be a red rug in some other language. The language, the terms, are entirely arbitrary.

Creativity in the absence of convention is a meaningless concept. When Robert Frost said, "For me, writing free verse would be like playing tennis without a net," he was saying, "Without a net and a court and a book of rules, how would I know whether I had made a good shot?" – without iambic pentameter, without some tradition, without some framing. Another favorite quote is from Erik Erikson: "Play needs firm limits, then free movement within those limits." You need both those things. Or as Van Quine, a professor of philosophy at Harvard, once said: "We cannot halt the change of language, but we can drag our feet."

Going back to the tension between memory and invention. I lived in Lowell House at Harvard for three years, and I've never been able to persuade myself that it would have been better if Walter Gropius had come to Harvard ten years earlier than he did and insisted that all the houses be modern. The conventional language did reinforce a sense of place and of time at Harvard, just as does the conventional language of all those little red *Veritas* emblems. Harvard is a stage set, just as is any city. Now it is so into its brand image – red brick, Georgian, all that kind of iconic imagery – that every time Harvard renovates the Faculty Club, it looks older.

At Princeton, the board of trustees and its planners have divided the campus into four quadrants. The old part of the campus is brand-image Princeton, where they're building a Gothic Revival dorm. Princeton existed for 150 years before it ever did any Gothic Revival; that didn't come along until about 1900. Gothic Revival was seen as the Anglophile tradition that America should be following, instead of all those other foreign things. That's brand-image Princeton. Then they're doing another quadrant that opens to the future with buildings by Frank Gehry and other current stars. So at Princeton, the rad-trad conflict is now immortalized by stylistic zoning. It's a new invention.

I'd like to add another point about architecture and the university. Very often, architects build for their peer group, and the hell with the rest of the world. I think that some of my fellow architecture critics – for example Herb Muschamp at *The New York Times* who is brilliant in many ways – believe that architecture is something that is practiced by fifty people around the world for an audience of maybe three thousand. I don't see how you can make that case about architecture when we all have to live in it and experience it; it's got to be part of our lives. This kind of error happens, I believe, partly because architecture schools, which are a new invention – the first one was at MIT in the 1880s – are in universities. University professors of architecture tend to believe, falsely, that architecture is primarily an intellectual activity, just like, say, philosophy. They dream up totally unreadable theories. I don't know what the poor kids do when they come to school to study architecture and run into some kind of buzz-saw verbiage like this:

> A coherent and differentiated special paradigm overlays both the natural and historical determination of places and the homogeneous construction of modern space. Such changes in the nature of contemporary space give rise to the replacement of a long lasting epistemology of conservative systems by non-isolated complex models that approach reality as an unstable set of vaguely delimited locations crossed by flows of energy and matter.

That's a quote from the prospectus of a prominent school of architecture. If you read it over ten times, you can sort of figure out what the author is trying to say, but he has no idea how to say it. Why would someone write this way? I think you all know as well as I do: to send smoke signals to your peers in other places. These bizarre words are tokens that tell everybody that you're in the same in-group that they're in, a kind of international cult of appreciators.

Is it the image or the house that is the end product of the design process? I believe you have to say it's the image. The house becomes merely a means to the image.

I want to say a bit about architecture critics. You may ask yourself, why are there architecture critics? Other critics are consumer guides, telling you whether to buy a ticket. Nobody buys a ticket to see a new building, unless it's a very heavily hyped art museum. Architecture critics merely try to stimulate a conversation about how we should build our world.

I think architecture critics go wrong when they behave like other critics. The experience of works of art other than architecture is normally a framed experience. When you look at a painting, you see it in a frame. It is framed off in space. When you go to a movie, it begins and ends. It is framed off in time. Buildings, however, are framed neither in time nor in space. They exist in a relatively stable relation to their spatial context, especially the context of other buildings. And they exist indefinitely in time.

What makes this easier to understand is that this used to be true of painting too. Before the Renaissance, a painting always existed in some permanent relationship to time and space. It was an altarpiece, or it was a mural, or it was something that was locked into a particular place and had the purpose not of being an artwork to be appreciated, but that of explaining the meaning of Christianity or whatever else. Then it dawned on someone in the Renaissance that you could take the painting off the wall, frame it, sign it, and send it out into the marketplace where it could be sold. Painting changed forever. Now you could talk about an Ucello or a Kandinsky as a commodity, as a brand-name product.

What I'm arguing is that the same thing has happened to architecture. It has become frameable and signable. We've found a way to rip the building out of its context in time and space. And that, of course, is the result of the arrival of photography and other visual media. Photography is the removal of context. You can't define it any better than that. A photograph of a work of architecture frames it off from the world and freezes it at a single moment in time; it frames it in both time and in space.

We now live in a media culture so pervasive that we barely notice it. It is a world of framed visual images in our magazines, on our screens, and increasingly in our imaginations. We have come, therefore, to think of buildings as we think of paintings, not as existing in a specific time and place but in the worldwide stream of images.

A building that always reminds me of the change brought about by photography is a house that I've never seen (and nobody I know has ever seen it) by Richard Meier, called the Smith House in Darien, Connecticut. Every architect of my generation knows the Smith House because of the famous color photographs by the great photographer Ezra Stoller. Here is the question: is it the image or the house that is the end product of the design process? I believe you have to say that it's the image. The house becomes merely a means to the image. The image is a far more potent and influential presence in world culture. Once that's realized, architects begin to design with an eye to the eventual photograph, an eye to the media world, not the physical world. But I'm wandering off my topic. ■

Paul Samuelson (MIT), Risha Samuelson, Robert Campbell, and Robert Bishop (MIT).

Scent Brush of a Male Moth

Bugs, Behavior, and Biomolecules: The Naturalist's Guide to the Future

Thomas Eisner, Jerrold Meinwald, and John Hildebrand

This presentation was given at the 1881st Stated Meeting, held at the House of the Academy on May 12, 2004.

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Thomas Eisner

Exploration and Discovery

My interest in *Utetheisa ornatrix* dates back to an occasion some forty years ago when I saw an individual of this beautiful multicolored moth species fly into a spider's web. I fully expected the spider to make a meal of its catch, but not so. The moment the moth struck the web the spider darted toward it, only to refrain from biting it and to proceed to cut it loose. Systematically, by use of its fangs and palps, the spider cut each of the silken strands that were imprisoning the moth, until the moth fell free.

I was soon to learn that this was no freak event. I offered *Utetheisa* to a diversity of spiders, including orb-weavers, wolf spiders, and jumping spiders, and found that they all rejected the moth. *Utetheisa* was decidedly distasteful, and so was its larva. When I offered *Utetheisa* caterpillars to wolf spiders, the spiders consistently refused to take them.

Eventually, working with my wife Maria and my students, and with my friend Jerry Meinwald and his associates from Cornell's chemistry department, we discovered why *Utetheisa* is unpalatable to spiders. As a larva, *Utetheisa* feeds on leguminous plants of the genus *Crotalaria* that contain highly bitter toxins called pyrrolizidine alkaloids (PAs). *Utetheisa* larvae are unaffected by PAs and are able to incorpo-

rate the compounds without having to detoxify them. They retain the chemicals systemically through metamorphosis, with the result that the adults themselves come to possess the compounds.

We proved that it is the PAs that give *Utetheisa* its bad taste. We were able to raise *Utetheisa* in the laboratory on a PA-free diet, thereby generating moths that lacked PA. Such moths, which were perfectly normal in other respects, proved palatable to spiders. We also showed that crystalline PA, when added to the surface of insects ordinarily eaten by spiders, renders such insects decidedly less acceptable.

Figure 1: A male *Utetheisa* moth wiping its everted scent brushes against the female in courtship.

Utetheisa transmits PAs to its eggs. Eggs laid by *Utetheisa* that we raised on the PA-free diet were themselves PA-free, and, as a consequence, vulnerable to attack. Eggs endowed with PA, in contrast, proved unacceptable to ants, green lacewing larvae, ladybugs, and parasitoid wasps.

Utetheisa adults have a life span of three to four weeks. The female, over that period, lays hundreds of eggs. How, we wondered, does she manage to protect them all? Does she have enough PA stored in her body to provision her entire brood? The answer is that she is not, in fact, ordinarily sufficiently endowed, but that she is able to obtain supplementary PA by mating. The *Utetheisa* female is promiscuous, and she receives PA from each male with the sperm package. The number of partners that a female takes over her lifetime is astonishing. Under natural conditions, in established populations of the moth, females mate, on average, with eleven males. Prima donnas may take more than twenty partners. I know this because the female *Utetheisa* keeps a sort of diary of its exploits. The *Utetheisa* female retains a vestige of each sperm package it receives, a small tubular remnant that stays with it for life. These vestiges, each a *carte de visite* from an individual male, can be accessed by dissection of the female, and counted. Having on average as many as eleven partners clearly indicates that the female *Utetheisa* makes every effort to exploit the male's gift-giving capacity.

By mating selectively with strongly scented males, females are assured that their offspring will be larger – that their sons will be more competitive in courtship and their daughters more fecund.

Utetheisa differs in the quantity of PA it sequesters as larvae, and as a consequence has varying PA content as an adult. For the female, which is dependent on receipt of PA from males, it is of some importance to know how much PA a prospective mate holds in store, since this may determine the magnitude of the nuptial gift she receives. Interestingly, the female *Utetheisa* puts the males to the test during courtship. The females assess the males' PA load and mate selectively with males richest in PA, ensuring thereby that they will be more generously provisioned. And how can females tell that a male has a higher quantity of PA? It turns out that the male gives off a scent, a pheromonal signal, by which he reveals his alkaloid load. He emits that signal from two brush-like structures that he everts during close-range precopulatory interaction with the female. The pheromone, hydroxydanaidal (HD), is derived by the male from PA, in quantity proportional to his PA load. Therefore, by favoring males more intensely scented with HD, females are guaranteed receipt of larger amounts of PA. It turns out that males selected for high HD content are also physically the largest, which has important consequences for *Utetheisa*, because body size is heritable in this moth. Thus, by mating selectively with strongly scented males, females are assured that their offspring will be larger – that their sons will be more competitive in courtship and their daughters more fecund. Evidently, by being "choosy," the female *Utetheisa* benefits both phenotypically and genetically.

Interesting also is the mechanism by which *Utetheisa* males and females ensure that they find one another. In *Utetheisa*, as in moths generally, it is the female that attracts the male. She does so in conventional fashion, by emission of a pheromone, a mixture of unsaturated hydrocarbons, that she produces in a pair of glands that open on the abdominal tip. We observed early on that the female *Utetheisa*, during the hour or so after dusk when she broadcasts her pheromone, undergoes a conspicuous throbbing of the abdomen. Thanks to the efforts of Bill Conner, a student in my laboratory at the time, we learned that this throbbing is the visible concomitant of a rhythmic compression and decompression of the pheromonal glands that causes the contained secretion to be emitted in pulses. The advantage that the female derives from such discontinuous delivery of attractant appears to be economic. By pulsing, the female may be able to cut back on the amount of pheromone released.

Figure 2: Caterpillar of *Utetheisa* inside a seed pod of its *Crotalaria* food plant.

Courtship in *Utetheisa* is evidently a fine-tuned affair. Chemical signaling is the rule of the game, both in the initial attractant phase of the behavior, and in the subsequent interactive phase, when the female assesses the male. Is the mating strategy of *Utetheisa* unusually complex? Most probably not. Other insects are bound to be discovered that have equally sophisticated sexual communicative systems. Are chemical signals likely to play major roles in these other species as well? Most probably. Chemical interaction is the most common form of sexual interaction in animals of all kinds. Studies of animal courtship are therefore likely to remain multidisciplinary and to continue to be dependent on the collaboration of behaviorists, ecologists, neurobiologists, and chemists.

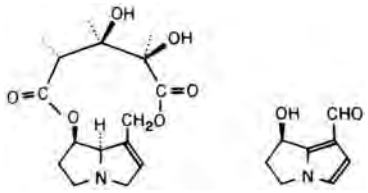


Figure 3: A pyrrolizidine alkaloid (left) and its pheromonal derivative, hydroxydanaidal.

My research on the chemical ecology of insects has been supported since 1959 by the National Institutes of Health (grant AI02908), and more recently also by funds from Johnson & Johnson. A more comprehensive account of our work on *Utetheisa ornatrix* can be found in my recent book, *For Love of Insects* (Harvard University Press, 2003).

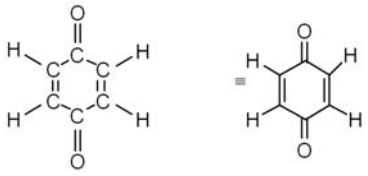
Jerrold Meinwald

Chemical Elucidation

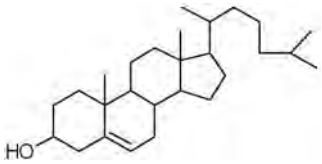
When Tom Eisner walks across the Harvard Yard and through the small patch of woods en route to the Academy, he sees what most of us do not see: a bush with all its leaves perfectly intact; a millipede being attacked by ants, bathing itself in a brown secretion; a spider releasing a beautiful moth from its web. And he asks himself questions that many of us might not ask: Why haven't some herbivores eaten these leaves? Does the millipede's secretion provide a useful defense against ant attacks? Why is this spider forgoing what would appear to be an attractive feast?

These are a naturalist's questions. They can be answered by following up on the field observations, bringing the subjects into the laboratory, and designing appropriate behavioral experiments. Only slightly less obviously do they turn out to be chemical questions as well. Their pursuit at the molecular level can yield unexpected insights into such basic biological phenomena as how organisms defend themselves and how they communicate with one another.

But the chemist's world is not the naturalist's. One important difference is the matter of scale; the chemist's world is very much smaller, in the sense that its basic entities are molecules rather than cells, organisms, populations, or ecosystems. Thus, the molecules of *p*-benzoquinone (hereafter simply "quinone"), which serves to repel ants, or of monocrotaline, a typical plant-produced pyrrolizidine alkaloid that can render *Utetheisa* unpalatable, have dimensions of about a millionth of an inch. The molecular formula of quinone is $C_6H_4O_2$, meaning that its molecules are composed of six atoms of carbon, four of hydrogen, and two of oxygen. But their composition alone does not adequately define what quinone is. It was only in the mid-nineteenth century that chemists realized that molecules also have specific structures and shapes. In order for a molecule to be quinone, its twelve constituent atoms need to be bonded to one another in one specific way. Figuring out how the atoms are connected in any given compound – determining its structure – can be a daunting task. For compounds of the complexity of cholesterol or morphine, it required several chemists' lifetimes of research. In the case of quinone, a relatively simple structure, the process was much quicker. The correct arrangement (of the large number theoretically possible) is an almost regular hexagon of carbon atoms, with one oxygen attached to the carbons at each of two opposite corners, and one hydrogen attached to each of the four remaining carbon atoms. This structure is usually written in a more abstract style, as shown below. For more complex molecules, such as cholesterol, such shorthand representations are easier to write, read, and remember.



quinone



cholesterol

How small these molecules are can be gathered from a simple thought experiment. Imagine an espresso spoon about half full of bright yellow crystals of quinone (approximately 1 gram). A back-of-the-envelope calculation tells us that this sample contains about 6×10^{21} quinone molecules. If we were to count them at a speed of ten per second, it would take us 6×10^{20} seconds. With about 4×10^7 seconds in a year, we would finish counting in $(6 \times 10^{20})/(4 \times 10^7)$ or 1.5×10^{13} years. If we assume the universe is 15 billion (1.5×10^{10}) years old, we conclude that the task of counting a gram of quinone molecules would require *a thousand times the age of the universe!*

The invention of logic capable of determining the structures of molecular entities this small was one of the great intellectual achievements of the nineteenth century. But despite many

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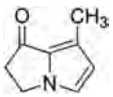
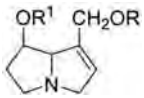
major advances in ultraviolet and infrared spectroscopy, nuclear magnetic resonance spectroscopy, mass spectrometry, and X-ray crystallography during the twentieth century, structure determination remains one of our great challenges. Its importance stems from the fact that the physical, chemical, and biological properties of any compound depend entirely on its molecular structure.

Structures also suggest origins and relationships. For example, when we examined the male pheromonal secretion of a Trinidad danaid butterfly, *Lycorea ceres*, we discovered danaidone. We were immediately led to speculate that this compound might be derived from a plant alkaloid, on the basis of the clear architectural similarity of the insect- and plant-derived structures. Subsequent research with related butterflies from Florida and East Africa confirmed this speculation. This research might be considered a prelude to the much richer *Utetheisa* story that Tom Eisner has outlined.



danaidone



pyrrolizidine alkaloids

I want to end by saying a few words about spiders, supporting actors in the *Utetheisa* story. With almost forty thousand described species, spiders constitute the second largest group of terrestrial animals, and they are all thought to be capable of paralyzing their prey with their venoms. Recent drug candidates developed from spider venom components block neuronal nicotinic acetylcholine receptors, increase parathyroid hormone secretion, and inhibit atrial fibrillation, a common chronic cardiac arrhythmia. However, since less than 1 percent of spider venoms have been studied chemically, they present an intriguing opportunity for future research. Doctors Frank Schroeder, An-

drew Taggi, and Matthew Gronquist in my laboratory have been looking recently for novel chemical entities in spider venoms, and they have used a new experimental approach that avoids the loss of information concerning unexpected or unstable components.

Conventionally, natural products are subjected to some sort of chromatographic purification or separation before an attempt is made to determine the structures of the individual components that comprise them. Both gas-liquid chromatography and high-pressure liquid chromatography provide the remarkable ability to separate highly complex mixtures of natural products into dozens or even hundreds of individual components. However, these procedures can also result in the loss or decomposition of some particularly interesting constituents. But with the use of one- and two-dimensional NMR spectroscopic analysis before any separation is attempted, followed by mass spectrometric studies, this loss of information can be avoided. Using this approach, we have characterized a new family of venom components whose molecules are built from nucleic acid bases, sugars, and sulfate groups. It will be exciting to study the biological properties of these novel compounds once we have synthesized them.

A final point to make is that the same chemical principles apply whether we are studying insect pheromones, steroid hormones, neurotransmitters, antibiotics, or flavors and fragrances. That is to say, in chemical research the biological context temporarily vanishes. Chemists studying nature seek to isolate biologically significant substances, to determine their structures, to synthesize compounds of interest, to discover origins and metabolic pathways, and to understand mechanisms of action – all at the molecular level. Ever more powerful experimental techniques have accelerated these endeavors enormously in the last few decades, and have enabled us to do with micrograms or even nanograms of material what might have required gram quantities fifty years ago. The cure for pancreatic cancer that E. O. Wilson muses might turn up in an Andean beetle might be found by analyzing a single specimen. Even the ultimate objective of working with single molecules is coming into sight. It is inevitable that chemists will continue to think smaller and smaller as we progress through the twenty-first century.

We acknowledge with pleasure both the support of our research by a grant from the National Institutes of Health (GM 53850) and the generous hospitality of the American Academy of Arts and Sciences during the preparation of this manuscript.

John Hildebrand

Neural Processing

Since reading the books of Jean-Henri Fabre when I was a schoolboy, I have been fascinated by chemical communication in insects and especially the "perfumes," or sex pheromones, that female moths release to attract mates. Early in my independent research career, I decided to study the behavior of the responding male moths and the sensory neural mechanisms – the "brains" – responsible for it. To facilitate neurobiological explorations, I needed moths that were both easy to rear in the lab and very big. Advice from my colleagues Fotis Kafatos and Jim Truman, then at the Harvard Biological Laboratories, guided me to the ideal species for my purposes: the sphinx moth *Manduca sexta* (tobacco hornworm). As soon as I saw it, I knew that *Manduca* would be good for my purposes, and my coworkers and I have been working on those beautiful creatures since that day thirty-two years ago.

Manduca is a powerful flyer, and its large size and feeding behavior can fool a casual observer into mistaking it for a hummingbird. In the warm, humid evenings of summertime, throughout much of the territory from the northern United States to Argentina, one can observe both male and female *Manduca* hovering near tubular white flowers and feeding on their nectar. That in-flight refueling enables the moths to do what really matters to them: to reproduce. A female needs chemical energy to produce eggs, to synthesize and release the sex pheromone in order to attract a mate, and then to fly to and deposit her fertilized eggs on appropriate host plants. A male has to find a receptive female by means of pheromone-modulated flight to the unseen source of the seductive chemical message.

Much is known about the behavior of male moths in response to the sex pheromones released by conspecific females and about the "calling" behavior of the females. (Behavioral studies of *Manduca* by my group, and especially Wendy Mechaber, Mark Willis, and the late Ed Arbas, have built upon previous masterful work on other species by many leading investigators, including Tom Baker, Ring Cardé, John Kennedy, Ernst Kramer, Wendell Roelofs, and their coworkers.) A calling female, typically positioned on a plant, extends her ovipositor (located at the tip of her abdomen) to expose the intersegmental cuticle from which the sex pheromone, produced in underlying glands, evaporates. That volatile signal is carried downwind, forming a sex-pheromonal plume that may extend many meters from the moth. The pheromone is not uniformly distributed within the plume, nor does it form a concentration gradient. Instead, it is present in filaments and blobs of pheromone-bearing air interspersed with relatively clean air. The pattern is similar to that of a lit incense stick, where one can see the filaments of smoke emanating from the burning tip.

At a time when the boundaries between disciplines are disappearing, it is gratifying and exciting to savor the rich benefits to be derived from the integration of the study of animal behavior, chemical ecology, and neurobiology.

A flying male *Manduca* that happens to intersect the pheromone plume detects the species-specific chemical signal and typically sets out to locate the female releasing it. He does so by orienting and flying upwind in a characteristic zigzagging manner. He receives intermittent stimulation, owing to the discontinuous distribution of the pheromone within the plume, and the resulting spatiotemporal pattern of stimulation is necessary for the male moth to respond to the chemical message. The pheromone activates a counterturning flight program, and with each "hit" from a filament of the pheromone, an upwind thrust is superimposed on that flight pattern. When the male moth inevitably strays out of the invisible and meandering plume, and therefore ceases to receive frequent pulses of the pheromone, the anemotactic zigzagging flight that was triggered and sustained by the pheromone gives way to a different pattern of behavior activated by the loss of the pheromonal stimuli. Upwind flight thus gives way to stationary counterturning that usually brings the moth back into contact with the plume, and then upwind pheromone-modulated flight resumes. The net result of these behavioral responses to detecting, and losing, the pheromone signal is to follow the plume to its source. As the male approaches the calling female, changes in the character of the pheromone filaments let him know that he is close. When he reaches his goal, he hovers near the female, contacting her and landing, and mating at last.

The sex pheromone that exerts such powerful control over the male's behavior is a mixture, and the essential signal is the blend of components. Chemical analyses performed by our colleagues Karl Dahm and James Tumlinson and their coworkers revealed that the sex pheromone of *Manduca sexta* is a mixture of as many as eight 16-carbon aldehydes. Of those, two are necessary for the oriented flight from a distance, and although not optimal for eliciting that behavior, an appropriate mixture of those two components is sufficient to do so. They are E10,Z12-hexadecadienal and E10,E12,Z14-hexadecatrienal. For simplicity, hereinafter I will refer to these components as *A* and *B*.

My coworkers and I are especially interested in trying to understand how moths detect a behaviorally significant volatile chemical stimulus like this simple pheromone mixture and how they process sensory information about it in the central nervous system (CNS), eventually to generate the observed behavioral responses. From previous pioneering research by Dietrich Schneider and his protégés, particularly Jürgen Boeckh, Karl-Ernst Kaissling, Ernst Priesner, and R. Alexander Steinbrecht, we knew that the antennae of male moths possess male-specific sensory hairs, or sensilla, innervated by olfactory receptor cells (ORCs) that are exquisitely narrowly and sensitively "tuned" to detect the components of the conspecific female's sex pheromone. That has proved to be the case for *Manduca* as it is for the species they studied. A large fraction of the approximately three hundred thousand ORCs in one male *Manduca* is dedicated to the detection of sex-pheromone components. Action potentials (spikes) in activated ORCs signal the presence of components *A* and *B* to the brain. The temporal pattern of pulses of the pheromone received by the ORCs is represented by bursts of spikes, and information about the concentration (intensity) of each component is encoded in the instantaneous frequency of spiking in those bursts in the responding ORCs.

For us, a particularly interesting challenge is to unravel the neural circuitry and physiological mechanisms responsible for processing sensory information about chemical – and in the present case, sex-pheromonal – stimuli in the CNS, and ultimately to explain how those messages influence behavior. (Many coworkers have contributed to my group's efforts along these lines over many years, among them, notably, Scott Camazine, Tom Christensen, Bill Hansson, Thomas Heinbockel, Uwe Homberg, Ryohei Kanzaki, Jane Roche King, Hong Lei, Steve Matsumoto, Wolfgang Rössler, Josh Sanes, Anne Schneiderman, Leslie Tolbert, and Brian Waldrop.)

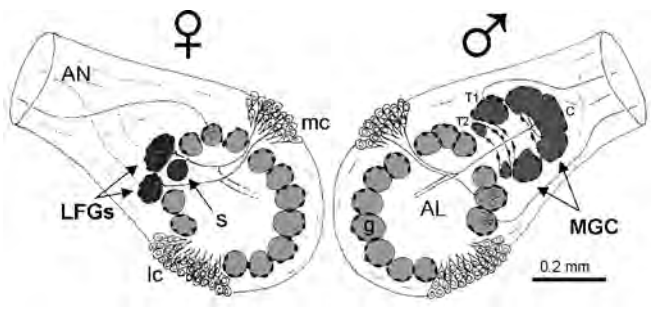


Figure 1. Diagrammatic representations of an antennal lobe (AL) of female (left) and male (right) adult *Manduca sexta*, showing the antennal nerve (AN), the lateral (lc) and medial (mc) groups of neuronal cell bodies, "ordinary" glomeruli (g), and the sexually dimorphic glomeruli – the macroglomerular complex (MGC) in the male AL, including cumulus (C) and toroids (T1, T2), and the three female-specific glomeruli (LFGs and S).

Antennal ORCs send their axons through the antennal nerve into the antennal lobe (AL) of the deutocerebrum in the brain (figure 1). The neuropil of each AL contains a characteristic array of glomeruli, which are condensed knots of neurites and synapses and the sites of massive convergence of ORC axons on far fewer AL neurons. Indeed, the primary olfactory centers in the brains of most animals that have differentiated olfactory systems – from arthropods such as *Manduca* to mammals including mice and mankind – characteristically exhibit glomeruli. In insects, there is a species-specific number of glomeruli, and in moths the array includes sexually dimorphic glomeruli. Flanking the glomerular neuropil of the AL are groups of neuronal cell bodies; in *Manduca*, there are three such groups (lateral, medial, and anterior) totaling about twelve hundred neurons. All the glomeruli (sixty-three in *Manduca* ALs, including three sexually dimorphic glomeruli) and some of the AL neurons are identifiable in an insect's AL, which contributes to making insects experimentally favorable for studies of olfaction and olfactory control of behavior.

Each ORC axon projects to and terminates within a single glomerulus, where it makes synaptic connections with neurites of AL neurons. Thus the glomeruli are the sites of primary synaptic processing of sensory information about olfactory stimuli. AL neurons belong to three broad classes: local interneurons (LNs), projection or output neurons (PNs), and centrifugal modulatory neurons. Each of those classes is further divisible into a variety of types of neurons based on attributes such as cellular morphology, physiological functions, and neurochemical phenotype. Most LNs have wide-field arborizations in most or all glomeruli, most lack axons extending outside the AL, and most, if not all, mediate inhibitory synaptic interactions within and among glomeruli. The most thoroughly studied PNs have arborizations confined to a single glomerulus and an axon projecting to higher-order olfactory centers in the protocerebrum.

ORCs in the male moth's antenna tuned to sex-pheromone components *A* and *B* send their axons to two of the three male-specific glomeruli, which in *Manduca* are large and characteristically shaped and together are called the macroglomerular complex (MGC). *A*-specific ORCs project to "toroid I," a donut-shaped glomerulus, while *B*-specific ORCs send their axons to the "cumulus," which is a globular, multi-lobed structure resembling a cumulus cloud. When the male's antenna intersects a filament of pheromone-laden air, both *A*- and *B*-specific ORCs are stimulated essentially simultaneously, so that primary afferent information about these two essential components reaches the MGC glomeruli at the same time.

We have learned a great deal about neural processing of sex-pheromonal information in *Manduca* and certain other species of moths by means of intracellular recording from, and staining of, individual neurons associated with the MGC and higher-order way stations in the olfactory pathway of the brain. In particular, "listening in" to the responses of MGC PNs to antennal stimulation with *A* or *B* or with mixtures of *A* and *B* has informed us about what is accomplished through synaptic processing in a given glomerulus. We have learned, for example, that although "the mixture is the message," sensory information about the qualitative presence and concentration of the individual pheromone components is processed through parallel labeled lines in the AL and onward into the protocerebrum. At the same time MGC PNs and, more strikingly, certain protocerebral neurons exhibit dramatically blend-specific responses that signal the salience of each component, *A* or *B*, when in the presence of the other. Particular MGC PNs of this kind have an enhanced ability to follow the discontinu-

ous pulses of pheromone that occur because of the filamentous nature of the plume, and are essential for triggering and sustaining the male moth's characteristic behavioral responses.

Our explorations of the male-specific olfactory pathway dedicated to the sex pheromone have taught us much about how that critically important natural signal is detected and processed through the CNS, ultimately to influence the flight behavior of the receiver. At the same time, we have used this specialized olfactory subsystem as a sort of keyhole through which to view a bigger landscape of olfaction. We expect that the principles and mechanisms we have uncovered in studying the MGC will prove to be exaggerated versions of the principles and mechanisms that operate in and among other glomeruli, and therefore will guide us to greater understanding of general issues in olfaction in insects and other animal taxa alike.

It is also clear that investigations of olfactory neurobiology and neuroethology sometimes can lead to discoveries in the realm of chemical ecology; we think of the approach as "reverse chemical ecology." By first probing the olfactory "tuning" of ORCs and their CNS targets, we can identify compounds in the environment – derived from conspecifics, hosts, or other sources of importance to the animal in question – that are likely to be behaviorally significant for that creature. Probing the brains behind behaviors influenced by chemosensory stimuli in the environment can teach us how the chemical components of a stimulus contribute to an animal's behavior, and how sensory signals can exert control over motor outputs of the animal. Neurobiological explorations can even lead to discovery of unforeseen stories in chemical ecology. At a time when the boundaries between disciplines are disappearing, it is gratifying and exciting to savor the rich benefits to be derived from the integration of the study of animal behavior, chemical ecology, and neurobiology.

The exciting and important advances that have been achieved through the application of contemporary tools of molecular genetics and cell biology to olfactory systems in the last two decades have explained, or confirmed earlier findings about, early events in chemosensation at the level of receptor cells and their projections to the CNS. Much of what has been learned through that approach, however, has reinforced and extended earlier findings made by means of powerful physiological and anatomical methods. Now the challenge is to understand how the inputs are processed by higher-order neural circuits to achieve recognition, comparison, integration, and learning of and adaptive behavioral responses to olfactory stimuli in the environment. The effort to discover how the brain works with the inputs will benefit greatly from molecular approaches, but must also emphasize experimentation with other powerful tools such as the methods of imaging, single- and multi-unit physiological recording, neural circuit analysis, computational modeling, and rigorous behavioral studies. Although Yogi Berra unquestionably got it right when he observed that "there's nothing as hard to predict as the future," we can predict with assurance that what lies ahead in this domain of science will be exciting.

My group's research has been supported by funding from NIH, NSF, USDA, DoD, and Monsanto, and most recently by NIH grant DC-02751 and NSF grant IBN-0213032. For further reading on this subject, see the following publications and the references cited in them: T. A. Christensen and J. G. Hildebrand, "Pheromonal and host-odor processing in the insect antennal lobe: how different?" *Current Opinion in Neurobiology* 12 (2002): 393 – 399; T. A. Christensen and J. White, "Representation of olfactory information in the brain," in T. E. Finger, W. L. Silver, and D. Restrepo, eds., *The Neurobiology of Taste and Smell*, 2nd ed. (New York: Wiley-Liss, 2000), 201 – 232; J. G. Hildebrand, "King Solomon Lecture – Olfactory control of behavior in moths: central processing of odor information and the functional significance of olfactory glomeruli," *Journal of Comparative Physiology A* 178 (1996): 5 – 19; J. G. Hildebrand and G. M. Shepherd, "Molecular mechanisms of olfactory discrimination: converging evidence for common principles across phyla," *Annual Review of Neuroscience* 20 (1997): 593 – 631; and T. D. Wyatt, *Pheromones and Animal Behaviour: Communication by Smell and Taste* (Cambridge: Cambridge University Press, 2003). ■

Jerrold Meinwald, John Hildebrand, Academy President Patricia Meyer Spacks, and Thomas Eisner

Frank Westheimer and Rose Frisch (both, Harvard University)

Around the World

Accademia Nazionale dei Lincei, Rome

In May 2004, the American Academy of Arts and Sciences and the Accademia Nazionale dei Lincei held a joint meeting in Rome. In their opening remarks, President of the Academy Patricia Meyer Spacks (University of Virginia) and President of the Lincei Giovanni Conso (University of Turin) spoke of the long history and common purpose of the two organizations. One of the oldest learned societies in the world, the Lincei celebrated its fourth centenary last year; the American Academy will mark its 225th anniversary in 2005 – 2006. Both academies encourage international cooperation in science and scholarship by bringing together members of the learned community and the professions to share their perspectives on social and scholarly issues.

The focus of the meeting was a symposium on "Changing Perceptions of Art in History." At the opening session, moderated by the Editor of the Academy Steven Marcus (Columbia University), three Academy Fellows discussed a group of artists who abandoned classical ideals of beauty and developed a radical new approach to art in the 1860s and 1870s. Drawing upon the paintings of Eduard Manet, James Cuno (Art Institute of Chicago) described the emergence of modern concepts of beauty in mid-eighteenth-century Paris. Philip Gossett (University of Chicago) reflected on the development of freer and more open forms of musical aesthetics, citing Verdi's three revisions of *La Forza del Destino* as an example of how composers struggled with the new approach to the beautiful in music. Rosanna Warren (Boston University) considered the evolution of free verse and the prose poem as seen through the work of Rimbaud.

Salvatore Settis (Scuola Normale Superiore di Pisa) chaired the second session, featuring presentations by members of the Lincei. Lina Bolzoni (Scuola Normale Superiore di Pisa) described the association of words and images in the art of memory – a technique invented in ancient Greece, taught as part of rhetorical training well into the seventeenth century, and still in use today. Writer and scholar Daniele Del Giudice (Venice) examined the Greek word *poiein*, which means "to do or make" but which also lies at the root of "poet" and "poetry," arguing that the practice of science creates its own kind of poetry. Concluding the session, Ingrid Rowland, a Fellow of the Academy and the Andrew W. Mellon Professor in the Humanities at the American Academy in Rome, provided a commentary on the text and illustrations of one of the most beautiful books in the Lincei collection: a facsimile of the first printed edition (1486) of the *Ten Books on Architecture*, written for Emperor Augustus by the architect Vitruvius in about 20 B.C.

The Academy also visited a number of sites throughout the city. Ingrid Rowland graciously welcomed Fellows to the American Academy in Rome and provided lively and informative commentary for tours of Baroque Art in the Piazza Navona, a palazzo at the Lincei, and Etruscan sites at Tarquinia and Cerveteri. The U.S. Ambassador to the Holy See, R. James Nicholson, extended greetings at the Pontifical Academy.

The meeting was organized by the Secretary of the Academy Emilio Bizzi (MIT) and the Co-President of the Lincei Lamberto Maffei (Instituto di Neirofisiologia del CNR, Italy). ■

Philip Gossett (University of Chicago)

Rosanna Warren (Boston University)

James Cuno (Art Institute of Chicago)

Lincei members Lina Bolzoni and Salvatore Settis (both, Scuola Normale Superiore di Pisa) and Daniele Del Giudice (Venice)

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1.
Ingrid Rowland (American Academy in Rome) addressing members and guests of the Academy and the Lincei on the steps of the Villa Farnesina.

2.
Secretary of the Academy Emilio Bizzi (MIT) and President of the Lincei Giovanni Conso (University of Turin).

3.
Academy Treasurer John Reed (New York Stock Exchange), Executive Officer Leslie Berlowitz, and Vice President Louis Cabot (Cabot-Wellington LLC)

4.
Elio Raviola (Harvard Medical School) and David Sabatini (NYU School of Medicine)

5.
Members and guests of the Academy and the Lincei at the opening session of the conference.

6.
Co-President of the Lincei Lamberto Maffei (Istituto di Neurofisiologia del CNR) and Academy President Patricia Meyer Spacks (University of Virginia)

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Noteworthy

Select Prizes and Awards

John Adams (Berkeley, California) is the recipient of the $100,000 Michael Ludwig Nemmers Prize in Musical Composition, awarded by Northwestern University.

Mina Bissell (Lawrence Berkeley National Laboratory) has received a Discovery Health Channel Medical Honor.

Edward W. Brooke (Warrenton, Virginia), **Vartan Gregorian** (Carnegie Corporation of New York), and **Walter B. Wriston** (New York, New York) are recipients of the 2004 Presidential Medal of Freedom.

Mary-Dell Chilton (Novartis Ag Biotechnology) was inducted in the 2004 Hall of Fame of the Women in Technology International Foundation.

M. Judah Folkman (Harvard University), **Tony Hunter** (Salk Institute for Biological Sciences), **Joan Massague** (Memorial Sloan-Kettering Cancer Center), **Bert Vogelstein** (Johns Hopkins University), and **Robert Weinberg** (MIT) have received Prince of Asturias prizes (Spain) for science.

Andrea Ghez (University of California, Los Angeles) was awarded the 2004 Gold Shield Faculty Prize for Excellence in Teaching, Research, and Service by the University of California, Los Angeles.

Jürgen Habermas (University of Frankfurt), **Alan Curtis Kay** (Viewpoints Research Institute), and **Alfred George Knudson, Jr.** (Fox Chase Cancer Center) are recipients of the 2004 Kyoto Prize, awarded by the Inamori Foundation.

Friedrich Katz (University of Chicago) was honored by the University of Chicago, which named its Mexican Studies Center the Friedrich Katz Center for Mexican Studies.

Simon Levin (Princeton University) has been awarded the 2004 Dr. A. H. Heineken Prize for Environmental Sciences by the Royal Netherlands Academy of Arts and Sciences.

Kenneth M. Ludmerer (Washington University in St. Louis) received the 2004 William Welch Medal of the American Association for the History of Medicine and the 2003 Abraham Flexner Award for Distinguished Service to Medical Education from the Association of American Medical Colleges.

Sigrid Nunez (New York, New York) has been awarded a Berlin Prize in Literature from the American Academy in Berlin.

New Appointments

Robert Birgeneau (University of Toronto) has been appointed chancellor of the University of California, Berkeley, effective October 1, 2004.

Nancy Cantor (Syracuse University) has been named chancellor and president of Syracuse University.

Steven Chu (Lawrence Berkeley National Laboratory) has been appointed director of the Lawrence Berkeley National Laboratory and a member of the Board of Directors of NVIDIA Corporation.

Ralph Cicerone (University of California, Irvine) has been nominated as president of the National Academy of Sciences.

Jacob Frenkel (Merrill Lynch & Co.) has been named Vice Chairman of American International Group, Inc.

Charles B. Harris (University of California, Berkeley) will become dean of the College of Chemistry at the University of California, Berkeley in July 2005.

Marc Kirschner (Harvard University) and **Douglas Lauffenburger** (MIT) have been appointed to the Research and Development Advisory Board of Beyond Genomics, Inc.

Robert B. Laughlin (Stanford University) was named president of the Korea Advanced Institute of Science and Technology.

Arthur H. Rubenstein (University of Pennsylvania) has been elected to the Board of Directors of Laboratory Corporation of America Holdings.

Select Publications

Poetry

Chinua Achebe (Bard College). *Collected Poems*. Anchor Books, August 2004

Fiction

Russell Banks (Princeton University). *The Darling*. HarperCollins, October 2004

Maureen Howard (Columbia University). *The Silver Screen*. Viking, August 2004

Cynthia Ozick (New Rochelle, New York). *Heir to a Glimmering World*. Houghton Mifflin, September 2004

Philip Roth (New York, New York). *The Plot Against America*. Houghton Mifflin, October 2004

John Updike (Boston, Massachusetts). *Villages*. Knopf, October 2004

Non-Fiction

Stephen L. Adler (Institute for Advanced Study). *Quantum Theory as an Emergent Phenomenon*. Cambridge University Press, September 2004

Lucian Bebchuk (Harvard Law School) and Jesse M. Fried (Boalt Hall School of Law, University of California, Berkeley). *Pay Without Performance: The Unfulfilled Promise of Executive Compensation*. Harvard University Press, September 2004

Richard H. Brodhead (Duke University). *The Good of this Place: Values and Challenges in College Education*. Yale University Press, July 2004

Urie Bronfenbrenner (Cornell University). *Making Human Beings Human*. Sage Publications, July 2004

Arthur C. Danto (Columbia University), Timothy Hyman (London), and Marco Livingstone (London). *Red Grooms*. Rizzoli, July 2004

S. N. Eisenstadt (Hebrew University of Jerusalem). *Explorations in Jewish Historical Experience: The Civilizational Dimension*. Brill Academic Publishers, May 2004

Morris P. Fiorina (Stanford University), Samuel J. Abrams (Harvard University), and Jeremy C. Pope (Stanford University). *Culture War? The Myth of Polarized America*. Pearson Longman, July 2004

Stephen Greenblatt (Harvard University). *Will in the World: How Shakespeare Became Shakespeare*. W.W. Norton, September 2004

Lyle V. Jones (University of North Carolina at Chapel Hill) and Ingram Olkin (Stanford University), eds. *The Nation's Report Card: Evolution and Perspectives*. Phi Delta Kappa International, April 2004

Deborah Jowitt (New York University). *Jerome Robbins: His Life, His Theater, His Dance*. Simon & Schuster, August 2004

Jerome Kagan (Harvard University) and Nancy Snidman (Harvard University). *The Long Shadow of Temperament*. Harvard University Press, September 2004

Garrison Keillor (Minnesota Public Radio). *Homegrown Democrat: A Few Plain Thoughts from the Heart of America*. Viking, July 2004

Benoit B. Mandelbrot (Yale University) and Richard L. Hudson (*Wall Street Journal*). *The (Mis)Behavior of Markets: A Fractal View of Risk, Ruin, and Reward*. Basic Books, August 2004

Ernst Mayr (Harvard University). *What Makes Biology Unique? Considerations on the Autonomy of a Scientific Discipline*. Cambridge University Press, August 2004

Mary Jo Nye (Oregon State University). *Blackett: Physics, War, and Politics in the Twentieth Century*. Harvard University Press, October 2004

Arthur M. Schlesinger (New York, New York). *War and the American Presidency*. W.W. Norton, September 2004

Janos Starker (Indiana University). *The World of Music According to Starker*. Indiana University Press, October 2004

Helen Vendler (Harvard University). *Poets Thinking: Pope, Whitman, Dickinson, Yeats*. Harvard University Press, September 2004

M. Norton Wise (University of California, Los Angeles). *Growing Explanations: Historical Perspectives on Recent Science*. Duke University Press, August 2004

Exhibitions

John Baldessari: *Beyond Geometry*, Los Angeles County Museum, through October 3, 2004.

Louise Bourgeois: *Noah's Ark*, National Gallery of Canada, through October 3, 2004.

Anthony Alfred Caro: *Caro in Focus: Sculptures 1942 – 2003*, Kunsthalle Würth, Germany, through October 3, 2004.

Chuck Close: *Chuck Close: Process and Collaboration*, Miami Art Museum, through August 22, 2004.

Lucian Freud: *The Great Parade: Portrait of the Artist as a Clown*, National Gallery of Canada, through September 19, 2004.

David Hockney: *Art and the 60's*, Tate Britain, London, through September 26, 2004.

Anselm Kiefer: *Annali delle Arti*, Naples National Archaeological Museum, Italy, through September 6, 2004.

Bruce Lee Nauman: *Animals: 17 Artists Explore the Otherness of Animals*, Haunch of Venison, London, through September 11, 2004; and *Art and Utopia. Limited Action*, Museu d'Art Contemporani de Barcelona, through September 12, 2004.

Claes Thure Oldenburg: *Pop!* San Francisco Museum of Modern Art, through September 19, 2004.

Robert Rauschenberg: *Art and Utopia. Limited Action*, Museu d'Art Contemporani de Barcelona, through September 12, 2004.

Gerhard Richter: *Gerhard Richter: Printed!* Kunstmuseum Bonn, Germany, through September 5, 2004; and *German Art: An American View on German Art*, Staedel Museum, Germany, through November 14, 2004.

Ed Ruscha: *Cotton Puffs, Q-Tips, Smoke and Mirrors: The Drawings of Ed Ruscha* and *Ed Ruscha and Photography*, Whitney Museum of Art, New York, through September 26, 2004; and *Pop!* San Francisco Museum of Modern Art, through September 19, 2004.

Robert Ryman: *Robert Ryman: Works on Paper*, Peter Blum Gallery, New York, through September 25, 2004.

Sebastiao Salgado: *Sebastiao Salgado: Migrations and the Children*, South Texas Institute for the Arts, through November 28, 2004.

Cindy Sherman: *The Great Parade: Portrait of the Artist as a Clown*, National Gallery of Canada, through September 19, 2004.

Antoni Tapies: *Art and Utopia. Limited Action*, Museu d'Art Contemporani de Barcelona, through September 12, 2004.

James Turrell: *Some Things Happening: 25 Years of Herron Gallery Exhibitions*, Indiana State Museum, through September 5, 2004.

Andrew Newell Wyeth: *Andrew Wyeth: Watercolors, Temperas and Drawings*, Farnsworth Museum, Maine, through October 31, 2004.

Performances

John Adams: *Fearful Symmetries*, State Theatre, Melbourne Arts Center, Melbourne, Australia, September 10 – 21, 2004; *Tromba Lontana*, Jacoby Symphony Hall, Jacksonville, FL, September 30 – October 2, 2004; *Naïve and Sentimental Music*, Davies Symphony Hall, San Francisco, October 20 – 23, 2004.

Mikhail Baryshnikov: *Forbidden Christmas or The Doctor and the Patient*, Tryon Festival Theatre, Krannert Center for the Performing Arts, Champaign-Urbana, IL, September 17 – 19, 2004; Belding Theater, Bushnell Memorial Hall, Hartford, CT, October 13 – 17, 2004; Polsky Theatre, The Carlsen Center, Overland Park, KS, October 20 – 24, 2004; The Power Center for the Performing Arts, University Musical Society, Ann Arbor, MI, October 27 – 31, 2004.

Merce Cunningham: *Suite for Five/Fluid Canvas/Sounddance*, Sarratt Student Center, Vanderbilt University, Nashville, TN, September 14, 2004; *How to Pass, Fall, Kick and Run*, City Center, New York, September 28, 2004; *How to Pass, Fall, Kick and Run/Split Sides/Ground Level Overlay*, Barbican Centre, London, October 5 – 9, 2004.

Placido Domingo: *Die Walkure*, Lincoln Center, New York, September 25 – October 12, 2004; *Andrea Chenier* (conducting), Kennedy Center, Washington, D.C., September 26 and October 2, 2004; *Carmen* (conducting), Lincoln Center, New York, October 13 – 30, 2004.

Yo-Yo Ma: *Yo-Yo Ma Gala Opening Night*, Civic Center of Greater Des Moines, IA, September 27, 2004; *NAC Gala with Yo-Yo Ma*, National Arts Centre, Ottawa, Ontario, October 2, 2004; *Philadelphia Orchestra Opening Night Gala*, Carnegie Hall, New York, October 6, 2004.

Wynton Marsalis: *The Duke and the Count*, The Allen Room, New York, October 25, 2004; *Let Freedom Swing*, Rose Theater, New York, October 28 – 30, 2004; *Jazz in Motion*, Rose Theater, New York, November 3 – 5, 2004.

We invite all Fellows and Foreign Honorary Members to send notices about their recent and forthcoming publications, scientific findings, exhibitions and performances, and honors and prizes to bulletin@amacad.org. Please keep us informed of your work so that we may share it with the larger Academy community. ■

Alexander Graham Bell: *Researches in Telephony*

Alexander Graham Bell's paper "Researches in Telephony" was presented at a Stated Meeting of the Academy on May 10, 1876. In it he considers the "three varieties of currents" – intermittent, pulsatory, and undulatory – that produce telephonic effects, and he also describes one of his experiments. Two months before the presentation, on March 7, 1876, Bell received Patent Number 174,465, often called the most valuable single patent in history.

(Reprinted from the *Proceedings of the American Academy of Arts and Sciences*, 1876, volume 12).

When a permanent magnet is caused to vibrate in front of the pole of an electro-magnet, an undulatory or oscillatory current of electricity is induced in the coils of the electro-magnet, and sounds proceed from the armatures of other electro-magnets placed upon the circuit . . . . Two single-pole electro-magnets, each having a resistance of ten ohms, were arranged upon a circuit with a battery of five carbon elements. The total resistance of the circuit, exclusive of the battery, was about twenty-five ohms. A drumhead of gold-beater's skin, seven centimetres in diameter, was placed in front of each electro-magnet, and a circular piece of clock-spring, one centimetre in diameter, was glued to the middle of each membrane. The telephones so constructed were placed in different rooms. One was retained in the experimental room, and other taken to the basement of the adjoining house.

Image donated by Corbis-Bettmann

Alexander Graham Bell opening the New York – Chicago telephone line.

Upon singing into the telephone, the tones of the voice were reproduced by the instrument in the distant room. When two persons sang simultaneously into the instrument, two notes were emitted simultaneously by the telephone in the other house. A friend was sent into the adjoining building to note the effect produced by articulate speech. I placed the membrane of the telephone near my mouth, and uttered the sentence, "Do you understand what I say?" Presently an answer was returned through the instrument in my hand. Articulate words proceeded from the clock-spring attached to the membrane, and I heard the sentence: "Yes; I understand you perfectly."

The articulation was somewhat muffled and indistinct, although in this case it was intelligible. Familiar quotations, such as "To be, or not to be; that is the question," "A horse, a horse, my kingdom for a horse," "What hath God wrought," (*ampersand*)c., were generally understood after a few repetitions. The effects were not sufficiently distinct to admit of sustained conversation through the wire . . . . Occasionally, however, a sentence would come out with such startling distinctness as to render it difficult to believe that the speaker was not close at hand. No sound was audible when the clock-spring was removed from the membrane.

The elementary sounds of the English language were uttered successively into one of the telephones and the effects noted at the other. Consonantal sounds, with the exception of L and M, were unrecognizable. Vowel-sounds in more cases were distinct. Diphthongal vowels, such as *a* (in ale), *o* (in old), *i* (in isle), *ow* (in now), *oy* (in boy), *oor* (in poor), *oor* (in door), *ere* (in here), *ere* (in there), were well marked.

Triphthongal vowels, such as *ire* (in fire), *our* (in flour), *ower* (in mower), *ayer* (in player), were also distinct. Of the elementary vowel-sounds, the most distinct were those which had the largest oral apertures. Such were *a* (in far), *aw* (in law), *a* (in man), and *e* (in men). ■

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