

Reflections on Fifty Papers from the Ostrom Workshop: A View from the Turn of the Millennium*

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In 1999-2000 the University of Michigan Press published three edited volumes of papers written by scholars associated with the Workshop in Political Theory and Policy Analysis at Indiana University, Bloomington. This document collects together the introductions I wrote for these volumes, slightly rearranged to read as a single narrative thread weaving together the contexts of the fifty chapters included in all three volumes.

In 2012 this interdisciplinary research and teaching center was named in honor of its co-founders, Vincent and Elinor Ostrom. I had the great pleasure of working with them both throughout my professional career. I was serving as Director of the Ostrom Workshop when they both passed away in 2012, and as Co-Director (with James Walker) when Lin was awarded the Nobel Memorial Prize in Economic Sciences in 2009. Looking back on this project from a distance of 15 years, I have to say that organizing these volumes helped me appreciate the breadth and depth of the research projects they had themselves conducted or inspired in others.

Since a lot has happened around the Ostrom Workshop since the publication of these volumes, I have decided to not update this material. Instead, it stands as a summary of my perspective at that time on what is now known as the Bloomington School of political economy. The only changes I have made are integrating references into one list, combining the suggested readings sections from each volume, inserting at the appropriate points in the text a list of titles for chapters in each part, and adding an appendix listing the full citations for each of the 50 papers in their original form.

Our initial plan was for these three volumes to serve as the kick-off for a book series with the University of Michigan Press entitled *Institutional Analysis*, which was intended to publish books by scholars associated with the Ostrom Workshop. For reasons too complicated to explain here, only these three volumes were published in that series. Although the editors at the time of publication insisted that we not number the individual volumes, I have found it useful to add volume numbers for the purposes of this document, with the volumes arranged in the order of their publication in 1999 and 2000. Readers seeking further information about the research projects which might have appeared in this planned book series are encouraged to check for updates at the Ostrom Workshop website <http://www.indiana.edu/~workshop/>.

Series Foreword:

Self-Governance, Institutional Analysis, and the Workshop

From its current location in a few scattered office buildings on the Bloomington campus of Indiana University, the Workshop in Political Theory and Policy Analysis lies at the heart of a worldwide network of scholars who use institutional analysis to understand and to strengthen the foundations of self-governance. Over the past twenty-five years, the political scientists, policy analysts, economists, lawyers, anthropologists, sociologists, psychologists, biologists, ecologists, and policymakers associated with the Workshop have investigated diverse research topics. Results of these research programs have been published in books and journals from several disciplines. A portion of this work has been gathered in this volume; two related volumes are scheduled to be published at approximately the same time.

Each of these edited volumes exemplifies what is special and distinctive about institutional analysis as it has been developed and practiced by Workshop scholars. Institutions are ubiquitous in contemporary society, and the fields of political science and economics have experienced a recent renaissance in the study of institutions. The Workshop approach is uniquely multidisciplinary, drawing on the complementary strengths of a wide range of social science methodologies: laboratory experiments, formal models, comparative case studies, opinion surveys, archival research, philosophical investigations, physical measurements, computer simulations, and, most recently, satellite imagery. Institutions affect all aspects of social life. Major Workshop research programs have focused on (1) police services in metropolitan centers in the United States; (2) the management of fisheries, irrigation systems, forests, and other common-pool resources from California to Nepal (and many places in between); and (3) the macro-structure of constitutional order from Imperial China to the contemporary international system, with particular emphasis given to the nature of American democracy.

Beneath this bewildering variety lies a core message, buttressed by reinforcing methodological and political foundations. Politically, the goal is to establish and sustain capacities for self-governance, by which is meant the structured ways communities organize themselves to solve collective problems, achieve common aspirations, and resolve conflicts. Methodologically, the goal is to understand the institutional foundations of self-governance, that is, to determine which conditions strengthen and which conditions undermine community capacities for self-governance.

In practice, these goals have inspired a series of careful, detailed studies of narrow ranges of empirical phenomena. However, since each study draws on a single framework of analysis, the overall product has import far beyond the confines of these particular settings. The aggregate lesson of these empirical analyses is clear: many, many self-governing communities thrive, in all parts of the world.

By focusing on community efforts to resolve local problems, the writings of Workshop scholars are sometimes misinterpreted as lending credence to the "small is beautiful" slogan. For many

public purposes, local community action will be effective, but other circumstances require coordinated policies at the regional, national, or international levels. It is important to remember that public officials at all levels of aggregation have important roles to play in helping communities provide for their own needs.

Shouting slogans about the desirability of decentralization or civil society contributes little towards the crucially important task of sustaining capacities for self-governance. The challenge of institutional analysis lies in producing solid research findings, based on rigorous empirical tests of hypotheses grounded in carefully articulated theories and models. Institutional analysts have a responsibility to combine policy relevance and scientific rigor.

A basic tenet of institutional analysis is that multiple arenas, or centers, of interaction and participation need to be considered simultaneously. Self-governance works best if the overall governance structure is polycentric. The word itself may be awkward, but it encapsulates a way of approaching the study of politics and policy analysis that stands in sharp contrast to standard modes of thought. Governance does not require a single center of power, and governments should not claim an exclusive responsibility for resolving political issues. Instead, politics should be envisioned as an activity that goes on in many arenas simultaneously, at many scales of aggregation. Implications of polycentric governance for particular empirical and theoretical contexts are detailed in the readings included in these volumes.

To illustrate the coherence of the theoretical approach that underlies applications to a wide array of empirical domains, a selection of previously published articles and book chapters have been collected into three books with similar titles: *Polycentric Governance and Development*, *Polycentric Games and Institutions*, and *Polycentricity and Local Public Economies*. Each book addresses a separate audience of scholars and policy analysts, but each should also be of interest to anyone seeking to understand the institutional foundations of self-governance.

Papers in *Polycentric Governance and Development* demonstrate that empirical analyses of the management of irrigation systems, fisheries, groundwater basins, and other common-pool resources have important implications for development policy. Long before sustainable development became an over-used slogan, scholars associated with the Workshop were trying to understand the myriad ways self-governing communities had already achieved that goal in practice.

After an initial section on the general conceptual framework that has influenced research on the full array of Workshop research topics, *Polycentricity and Local Public Economies* presents papers published from the first major empirical project associated with the Workshop, a comparative study of the performance of police agencies in metropolitan areas of the United States. Although most of the research results included in this volume date from over a decade ago, these results remain relevant today. Recent trends toward community policing, for example, reflect the continuing influence of factors identified in this research program.

In *Polycentric Games and Institutions*, the general concepts that guided these empirical analyses themselves become the focus of analysis. Workshop scholars use game theory and laboratory experiments to understand how individuals behave in the context of diverse political and economic institutions. Results from laboratory experiments and field settings show that

individuals draw upon an extensive repertoire of rules or strategies from which they select different strategies, given their understanding of the nature of the situation at hand.

By collecting readings on similar topics that were originally published in scattered outlets, we hope to highlight the contribution these research programs have made to their respective fields of study. However, any evaluation of the scholarly contribution of institutional analysis as a whole must be partial and incomplete, for the Workshop remains an active place. Each of these research themes is being pursued by scholars who have long been associated with the Workshop and by a new generation of scholars.

Each article or book chapter is reprinted without changes, except for a few minor corrections to the published versions. To avoid duplication of material and improve the flow of this presentation, textual deletions have been made in a few of the selections. In a few instances, short introductions specifically addressed to a single article have been added to draw out the connections among what may appear to be widely divergent material. Reference and footnote conventions used in the original sources are left intact, although footnotes were changed into endnotes.

Selection of an appropriate set of readings was a daunting task, for the list of publications is long and diverse. I enjoyed digging through the extensive files of reprints, and I wish we could have included many more readings. However, that would have defeated the purpose of compiling accessible surveys of selected Workshop research programs. I tried to minimize overlap with the most influential and widely available books that have emerged from these research programs. Each edited volume includes an integrative introductory essay, in which frequent references are made to the many other books and journals in which the results of these diverse research projects are reported. Each book also includes an annotated list of suggested readings.

One final caveat is in order. Vincent Ostrom and Elinor Ostrom are authors or co-authors of a high proportion of the readings included in all three books. Without doubt, these two individuals have been absolutely crucial to the success of the Workshop. Both have served jointly as Co-Directors since its establishment in 1973. Even so, they would be the first to insist that they have not been the only reason for its success. Collaboration has always been a hallmark of the Workshop. Many individuals have made essential contributions, as will be apparent throughout the readings included in these books. Yet, it is impossible to imagine how the Workshop could have been established or sustained without the tireless efforts of Elinor and Vincent Ostrom. Their influence will continue to shape the future direction of the Workshop for years to come.

[Volume 1]
Polycentric Governance and Development
Readings from the Workshop in Political Theory and Policy Analysis

Introduction: From Resource Management to Constitutional Order

Fisheries, irrigation systems, and groundwater basins may seem unpromising subjects for a book on governance and development, but the management of commonly held resources requires political skill. When one person appropriates a portion of a *common-pool resource (CPR)*, that portion is no longer available for another person's use. Efforts to exclude others from appropriation can be very costly in terms of the time and effort required to establish rules, monitor compliance, and sanction rule violators. Thus, any CPR user group faces a basic dilemma of collective action: how can the common goal of sustaining secure access to this resource be realized despite individual incentives to free ride on the efforts of others or to overexploit common resources for private gain? This is an inherently political issue, no matter how narrow the scope of that resource or how small the community affected by it.

Governance is the way society as a whole manages the full array of its political, economic, and social affairs. By shaping the incentives facing individuals and local communities, governance either facilitates or hinders economic development. If the overall governance structure reinforces the capability of local groups to deal with their own problems, then user groups have an incentive to manage their own common-pool resources wisely. Under these circumstances, development is likely to be sustainable. Conversely, if local rules are routinely superceded by the policies of higher authorities, then it will be much more difficult to restrain individual appropriators from engaging in opportunistic behavior. In those circumstances, any effort to develop the national economy as a whole will rest on shaky foundations at the local level.

Over the past few decades, scholars associated with the Workshop in Political Theory and Policy Analysis at Indiana University have studied how CPR user groups in many parts of the world have managed a diverse array of common-pool resources. This volume includes several of these empirical studies, supplemented by a few papers on alternative forms of constitutional order. In this introduction, I explain why analyses of local patterns of resource management can have profound implications for broader issues of development and governance.

The basic lesson of the interrelated research programs conducted by Workshop scholars is that community efforts to manage common-pool resources work best in the context of *polycentric governance*. A political order is polycentric when there exist many overlapping arenas (or centers) of authority and responsibility. These arenas exist at all scales, from local community groups to national governments to the informal arrangements for governance at the global level.

Although originally developed to characterize the nature of governance in metropolitan areas in the United States (Ostrom, Tiebout, and Warren, 1961), polycentricity is a general concept that encapsulates a distinctive way of looking at political, economic, and social order (McGinnis, 1999a,b, 2000; V. Ostrom, 1997). A sharp contrast is drawn against the standard view of

sovereignty as connoting a single source of political power and authority that has exclusive responsibility for determining public policy. The responsibility for development policy, for example, is typically taken to fall within the exclusive purview of national governments or, increasingly, international funding agencies.

Contributors to this volume adopt a different viewpoint. Development must occur at all scales simultaneously, with input from individuals and local communities welcomed at all levels of political interaction. This concern for the "nesting" of local arrangements within the overarching political, economic, and cultural order is distinctive. Many development policy analysts focus on what happens at the national level, especially political developments in national capitals. Workshop scholars agree these activities are important, but primarily for their effects on shaping or constraining the ability of local communities to address their own problems. Free elections may help end a tradition of single-party rule, but serious dangers may arise if elections degenerate into shouting matches dominated by ideologies, ethnic hatreds, or other forms of political symbolism. Similarly, if all community groups are prepared to do is to lobby the government for special privileges or assistance, then the mere existence of civil society may not contribute much toward the solution of practical problems. Only polycentric governance can nurture and sustain the self-governing capabilities of local communities.

Some collective efforts to manage common-pool resources fail. A *tragedy of the commons* (Hardin 1968) occurs when individual appropriators selfishly extract excessive levels from a CPR and thereby undermine the long-term sustainability of that resource. Instances of overuse and destruction of common-pool resources have been well documented, but in other cases local users have effectively managed resources over long periods (Ostrom, 1990; Ostrom, Gardner, and Walker, 1994).

In one sense this observation is hardly surprising. If no communities of fishers or farmers had found a way to cope with practical problems of collective action, then none of them would be around today for us to study. In another sense, this observation is revolutionary, for the ability of local groups to manage their own resources effectively is often overlooked by policy analysts. To an unfortunate extent, the standard literature on development policy fixates on markets and states. By treating privatization and centralized state control as the primary means of responding to problems of CPR management, policy analysts overlook the many alternative institutional arrangements designed and implemented by self-governing communities throughout the world.

An implicit theme in the development policy literature is that if people in the developing world want to emulate the successes of advanced industrial society, then they need to learn how to make efficient use of their physical, human, and institutional resources. But the processes of learning need not be unidirectional. Communities in the developing world can contribute important insights to a developed world that is just beginning to confront severe problems of resource depletion.

Workshop scholars have implemented research programs on the institutional foundations of self-governance in widely scattered locales throughout the world. The diversity of these institutional arrangements can be initially overwhelming, but the readings included in this book develop a means of understanding the factors shared in common by successful efforts. This community of scholars has developed methods of *institutional analysis* (McGinnis, 1999a,b) that help observers

understand the ways in which local communities manage those resources that are most important to their own survival or prosperity.

The first section of this introduction outlines the theoretical framework that has emerged from the collaborative activities of Workshop scholars. This framework draws an explicit connection between micro-level processes of resource management and macro-level structures of constitutional order. The remaining four sections of this introduction provide summaries of the journal articles and book chapters reprinted in this volume. The papers in Part I are arranged chronologically, to illustrate the historical development of the Workshop research program on common-pool resources. Part II shifts to a thematic focus, by specifying alternative forms of constitutional order and illustrating each form with examples from Africa. Papers in Part III use examples from several countries to illustrate the importance of informal institutions and local associations on the prospects for sustainable development. These papers use analytical concepts developed by Workshop scholars, in particular the idea that development needs to be seen as a process of "coproduction" in which local residents take a fully active role. Finally, the volume concludes with two papers in Part IV that highlight the creative nature of the process of institutional design and analysis. The deep philosophical issues raised there have direct and practical consequences, for those policy analysts who restrict their advice to the state-market dichotomy threaten to undermine the very basis for self-governance.

Some readers may be discomforted by the frequent changes in scale and mode of analysis in this book, but Workshop scholars have grown accustomed to juxtaposition of highly detailed, empirical analyses of irrigation systems with broad-ranging, philosophical investigations of alternative forms of constitutional order. Movement up and down levels of aggregation, and movement across standard disciplinary boundaries, is essential if we are to understand the human capacity for self-governance. In short, local self-governance is sustainable only if macro-level political, economic, cultural, and epistemic orders support these practices.

Institutions for Resource Management, Development, and Governance

In polycentric governance, the efforts of user groups to manage common-pool resources are granted the same status as individual or corporate rights to private property. Just as individuals are presumed to be the best judge of their own tastes, user groups should be presumed to be capable of managing their common property. A basic tenet of public policy should be that those groups who are able to manage CPRs effectively should be allowed to do so, if at all possible. In this view, government intervention should be limited to two sets of circumstances: (1) when user groups fail to manage their resources effectively, or (2) if user groups violate basic standards of fairness, accountability, or other issues of concern to society as a whole. Instead of presuming that governmental officials or scientific experts know best how to manage CPRs, user groups should be given the benefit of the doubt, and encouraged to govern their own affairs.

The Workshop approach to institutional analysis complements well-known results from the literature on "new institutional economics" concerning the importance of property rights. Influential research by Douglass North (1981, 1990; North and Thomas, 1973) has demonstrated that a clear definition of private property rights is essential before market processes can operate at anywhere near efficient levels. Economic growth requires investor confidence, because

individuals or private corporations will make investments to improve the productive capacity of their assets only if they can expect to enjoy the benefits of these investments. Rarely, however, is this conclusion extended to a clarification of property rights over commonly held assets, including the common-pool resources that are the subject of most of the research included in this volume (see also Ostrom, 1998).

This analogy between group and private property rights is very close. Those groups of resource users who have successfully managed their common resources have done so at the cost of establishing and enforcing rules that call for significant sacrifices on the part of individual members of that group. They are unlikely to continue to pay those costs if governmental officials are expected to establish or enforce a different set of rules. Without this assurance, group cooperation will break down, and individuals may succumb to the temptations to overexploit the resource. The resulting destruction of the resource will hurt society as a whole. By the same line of argument, then, group rights to common-pool resources need to be just as well-protected as are individual (or corporate) rights to private property.

Protection of group rights is particularly crucial if the policy goal is sustainable development, and not just economic growth per se. Resource sustainability is not a new idea: groups of fishers, farmers, and herders throughout the world have always had to cope with sustainability problems. Governmental officials and policy analysts should remain open to the possibility that they can learn from user groups about the conditions for successful resource management.

The macro-level structure of governance directly impacts the prospects for successful user group management of common-pool resources. Yet, even a detailed picture of the institutional arrangements at all scales of aggregation would not suffice. Workshop scholars have long realized the importance of considering the physical nature of the good, the attributes of the community, and the institutional rules-in-use within that community as they cope with those physical problems. This three-fold structure has been summarized in the *Institutional Analysis and Development (IAD) framework*. Kiser and Ostrom (1982; reprinted in McGinnis, 2000) provide the most extensive discussion of the rationale behind this framework, and Oakerson (1992) uses this framework to organize an extended set of case studies sponsored by the Research Committee of the National Research Council. Because this framework has been discussed in great detail in several sources, only a brief overview is necessary here. Figure 1 (Ostrom, Gardner, and Walker, 1994: 47) illustrates this framework.

The IAD framework differentiates among operational, collective choice, and constitutional levels (or arenas) of interaction. At the operational level, concrete actions are undertaken by those individuals most directly affected or by public officials. These actions directly impact the world in some demonstrable manner, resulting in observable policy outcomes. (In Figure 1, dashed lines with arrows denote feedback from outcomes to all the steps in the process.) The rules that define and constrain the activities of individual citizens and officials in operational arenas have been established at the collective-choice level. The rules by which these rules themselves are subject to modification are determined at the constitutional level of analysis.

At each level, individual and collective choice is constrained to some range of strategic options. The point of this demarcation of levels is to highlight some fundamental similarities among political processes at different levels of analysis. At each level, actors confront an *action*

situation with strategic options and role expectations as defined at higher levels, and the choices of actors at one level jointly produce patterns of interactions and outcomes.

In short, institutions link levels by defining the roles that individual or collective actors fulfill. Clearly, all three levels of interactions are involved in any one particular process. Analysts of development or governance must take factors and processes at all three levels into account, for interactions at the operational, collective choice, and constitutional levels are going on concurrently. In normal circumstances, foundational constitutional questions are not in doubt for routine operational decisions. Yet, this level cannot be entirely ignored, since it determines who has the capability or the responsibility to participate in collective choice and operational decisions.

Furthermore, in many empirical settings these analytical arenas cannot be so clearly demarcated. Consider the activities undertaken by a small group of fishers deciding how to allocate rights to fishing locations. Participants may be simultaneously considering who should be allowed to fish and the quality of the spots to be allocated to each participant. Still, this analytical distinction remains a valuable aid to understanding.

This concern for embedding operational decisions within broader institutional settings, and local studies within larger constitutional orders, is reflected in the organization of this set of readings. Taken as a whole, the research programs of Workshop scholars cover the full spectrum of scales from "nano-level" studies of local irrigation systems to the large-scale organization of the global economy. However, any one research project is, for obvious reasons, focused on a more restricted range. This collection of readings is designed to illustrate how all the pieces fit together, and to suggest connections among multiple levels and modes of analysis that can inspire even more research.

Part I. Resource Management

1. Water and Politics California Style – Vincent Ostrom, 1967
2. Legal and Political Conditions of Water Resource Development – Vincent Ostrom and Elinor Ostrom, 1972
3. Institutional Capacity and the Resolution of a Commons Dilemma – William Blomquist and Elinor Ostrom, 1985
4. Design Principles in Long-Enduring Irrigation Institutions – Elinor Ostrom, 1993
5. Property-Rights Regimes and Coastal Fisheries: An Empirical Analysis – Edella Schlager and Elinor Ostrom, 1993
6. Mobile Flows, Storage, and Self-Organized Institutions for Governing Common-Pool Resources – Edella Schlager, William Blomquist, and Shui Yan Tang, 1994

Papers in Part I show how Workshop research programs on common-pool resource management developed over the span of the last five decades. Although this research program now encompasses research sites dispersed throughout the world, it began close to home. While a Ph.D. student at UCLA and a junior faculty member at the Universities of Wyoming and Oregon, Vincent Ostrom (1953b,c) began his studies of political institutions and the physical nature of water resources in the American West. When Elinor Ostrom completed her Ph.D. dissertation (1965), also at UCLA, her topic was groundwater management in California. Shortly after the Ostroms moved to Indiana University, the Workshop was established to coordinate collaborate

research projects on policing in nearby Indianapolis (and related subjects). Clearly, the importance of local knowledge was recognized from the very start.

The origins of the Workshop approach to institutional analysis can be illustrated with a brief discussion of a paper not included in this volume. In "State Administration of Natural Resources in the West," Vincent Ostrom (1953a) surveys the legal underpinnings of the role of American states in natural resource management. Although the details of his presentation are now dated, it is fascinating to see how the overall structure of the Workshop approach was presaged in this article, published twenty years before its establishment. In the opening paragraphs, V. Ostrom directs attention to the imperatives imposed by the physical nature of the good, i.e., the characteristics of the physical and climatic environment of the American West. The second paragraph bears quoting in its entirety:

American institutional arrangements, sustenance patterns and resource policies were conceived in humid England and developed in the humid regions of the United States. However, the general aridity of the West stands in marked contrast to the humidity that prevailed in the physical environment where American social institutions and traditions were formed. This alteration of the physical environment has caused an important shift in the balance of human ecology requiring significant modification in institutional arrangements and social policy, especially in regard to the control and development of natural resources. (V. Ostrom, 1953a: 478)

He argues that state jurisdictions bear little relationship to natural water management zones, and that institutional arrangements must be selected that are consistent with this physical reality.

As units of government, the states were not conceived in terms that are relevant to resources administration. Only California constitutes an adequate hydrologic unit permitting multiple-purpose administration of an integral watershed area. Major land-use patterns transcend state boundaries and cause the states to determine the nature of their resource programs by a standard of competitive relationships with each other.

The states as constitutional units within the American federal system of government are inclined to conceive of their relationships with one another and, to some extent, with the federal government on the basis of concepts of sovereignty and states' rights which presume inherent authority and power to decide.... Yet the major problems of resource administration require regional solutions that transcend state boundaries. (V. Ostrom, 1953a: 492)

This concern for matching institutions to the physical environment (and to the characteristics of the community) lies at the heart of the IAD framework later developed at the Workshop. Although he discusses the relevant legal context, he places much more emphasis on whether legal rules are in fact consistent with the likely behavior of the relevant actors, that is, with the rules-in-use. This theme recurs throughout the corpus of Workshop research programs.

In this article, Vincent Ostrom pays particular attention to the nature of the property rights in natural resources. He doubts that state governments have the institutional capacity to deal with natural resource issues that transcend the limits of any state's legal jurisdiction. These issues were of more than passing, theoretical interest. In subsequent years, he evaluated resource problems in the transition to statehood in Hawaii, and he helped craft the natural resource article of the Alaskan state constitution.

The first selection included in this volume is taken from a popular magazine published in 1967. In "Water & Politics California Style" [chapter 1], Vincent Ostrom briefly summarizes the historical process by which water rights and resource management patterns were first established in California. He points to the important precedents established when miners simply grabbed all the water they needed for their mining operations. Eventually, the interests of many other segments of the community were integrated into cooperative arrangements of various kinds. This accessible overview should help ease the reader into the more abstract analyses to follow.

In "Legal and Political Conditions of Water Resource Development" [chapter 2], Vincent and Elinor Ostrom provide more detail about the specific actors involved in the West Basin area around Los Angeles. After a brief overview of the technical, economic, and legal context, the authors summarize the results of Elinor Ostrom's doctoral dissertation on the role of public entrepreneurs in devising groundwater institutions in southern California (E. Ostrom, 1965). In this work, Elinor Ostrom concluded that the use of equity proceedings in state courts facilitated the negotiation of complex patterns of interagency arrangements to prevent saltwater erosion from the ocean and to assure the replenishment of groundwater supplies. Through in-depth interviews, archival research, and nonparticipant observation, Elinor Ostrom determined that one factor crucial to this success was the existence of institutional arrangements at the state level that authorized local associations, special districts, and public and private agencies to deal with these problems. Also, effective conflict mechanisms were made available to reach consensual arrangements that secured clear property rights.

Since the next reading in this part was published ten years after the initial establishment of the Workshop in 1973, a brief digression on the intervening years seems in order. Despite their initial interest in natural resources and groundwater management, the first large-scale empirical research program of the Workshop dealt with police services in urban America (McGinnis, 1999b). Upon their arrival in Bloomington, the Ostroms were intrigued by a long-standing political debate over metropolitan organization that had just come to a head. In 1969, city and county governments in the Indianapolis metropolitan area were consolidated into a single government, called "Unigov." However, this consolidation was incomplete, in the sense that a few suburban municipalities elected to remain outside this new arrangement. Thus, these social scientists had a unique opportunity to compare the production of public goods and services by large and small agencies serving consolidated and nonconsolidated communities that were virtually identical in all other ways.

In a long series of related research projects, the Ostroms and their faculty and student colleagues demonstrated that citizens were more satisfied with the performance of smaller or intermediate sized police forces (see McGinnis, 1999b). However, larger-scale operations remained an important aspect of this success, especially for training and crime lab facilities. In short, these research programs demonstrated the benefits of polycentric governance in metropolitan America.

When they returned to the study of the management of natural resources, the Ostroms brought with them a renewed appreciation of the myriad advantages of allowing self-governing communities to address their own collective problems in the way they saw most fit. It is safe to say that they decided to study police not because of an inherent interest in the subject, but because it was a good vehicle to explore theoretical ideas.

On its own terms, this research program on metropolitan governance has been (and still is) very successful (McGinnis, 1999b). For purposes of the present volume, it is important to recognize the methodological legacy of those studies: a unique combination of insistence on scientific rigor and policy relevance, openness to multiple techniques of empirical and formal analysis, and sensitivity to nested levels of analysis. The early Workshop research programs demonstrated that public services can be most efficiently provided under a system of multiple and overlapping jurisdictions, by enabling producers of public services to operate at the scale most efficient for particular activities. These empirical results were consistent with the nature of the American constitutional order, as originally envisioned by the Founders (V. Ostrom, 1987). As they began to examine problems of resource development in more detail, Workshop scholars began to find that polycentric governance was equally effective for empirical settings that could not be further removed from metropolitan centers in the United States, namely, some of the poorest regions of the developing world.

In many ways, common-pool resources turned out to be a more effective focus for empirical explorations of these theoretical concerns. Anyone evaluating police performance in urban areas can scarcely avoid emotion-laden controversies over race relations and welfare policy. Also, one prominent issue concerns the appropriate role for the national government in the fight against urban blight. Not only does the management of fisheries, irrigation systems, and most common-pool resources occupy a lower level of salience, but, in many cases, these resources are physically remote from urban centers or national capitals. In these more isolated communities, it is easier to identify the reasons why some communities manage to solve their own problems while other communities flounder or fail.

Whereas urban politics evoke ideological statements more easily than rigorous analyses, policy analysts often adopt a problem-solving attitude toward CPR management. Ideologically-tinged debates certainly occur between advocates of privatization and centralized management, especially when treated in the abstract. Still, resource management issues lie at the far periphery of most political scientists' range of interests. Thus, for many common-pool resources, it is possible to maintain a focus on practical problems of a manageable scope.

None of this means that CPR management is unimportant. For those whose lives or livelihoods depend on the continued availability of plentiful water or fish stocks, nothing could be more important. Politics is surely involved, but rarely in the form of noisy confrontations between competing ideologies. This latter form of political interaction would most likely result in confusion and destruction.

In recent years, issues of the environment and resource management have gained a new urgency in political debates. Global environmental issues, in particular, have emerged as an important new topic of political contention. Unfortunately, global environmental debates often degenerate into ideological confrontations, far removed from the physical realities they are supposedly meant to address (see McGinnis and Ostrom, 1996).

Many years before sustainable development became a ubiquitous slogan, Workshop scholars were already seeking to understand the conditions under which resources can be managed in a sustainable manner. Now that the world of national and international politics has caught up with the Workshop, it has important insights to offer. As shown in this volume, long-standing and

ongoing research programs on the management of common-pool resources have given us a clearer understanding of the requisites for the successful implementation and sustenance of self-governance.

In "Institutional Capacity and the Resolution of a Commons Dilemma" [chapter 3], Elinor Ostrom, in collaboration with William Blomquist, returned to the issues of groundwater management with which she began her career. Blomquist went on in his own book, *Dividing the Waters* (1992), to compare the institutional arrangements for eight groundwater basins, including one that Elinor Ostrom had examined in depth three decades earlier. Another of his cases had been the focus of Weschler (1968), a dissertation completed by one of Elinor Ostrom's fellow graduate students at UCLA. Comparisons between these two periods are made more explicitly in Blomquist's contribution to E. Ostrom, Gardner, and Walker (1994). Revisiting the sites of earlier research has become a Workshop tradition, one that, if continued over the next few decades, will enable analysts to make valid inferences based on comparison of the same area across multiple time periods.

This 1985 article presages the underlying principles of the design of successful common-pool resource regimes that Elinor Ostrom summarizes in her widely-read and influential book *Governing the Commons* (1990). Her list of eight design principles is probably the most widely-cited aspect of that path-breaking book. At the time of the publication of her article with William Blomquist, these principles had not yet taken their final form. However, the way in which these two authors go through the many informational and other requirements that would have to be satisfied for the successful operation of a market-based resource management scheme should help readers understand how Elinor Ostrom eventually came up with her famous list. She didn't yet have the answer, but she was already asking the right questions.

In her Presidential Address to the International Association for the Study of Common Property, "Design Principles in Long-Enduring Irrigation Institutions" [chapter 4], Elinor Ostrom succinctly states the design principles that encapsulate her extensive comparisons of institutional arrangements in mountain meadows and forests in Switzerland and Japan, irrigation systems in Spain and the Philippines, fisheries in Sri Lanka and Turkey, and groundwater management in California. These design principles have been discussed by a vast array of scholars in diverse areas of study. For example, McGinnis and Ostrom (1996) and the contributors to Keohane and Ostrom (1995) discuss the potential relevance of these design principles to global governance.

Ostrom concludes that all of the successful, long-lasting cases of CPR management included some mechanism for monitoring and sanctioning the behavior of participants in that community. This finding implies that self-governance requires more than a simple agreement to cooperate. Instead, some means must be found to ensure the continuation of cooperative behavior in the face of individual incentives to take advantage of the situation for personal gain. Communities of common understanding can support appropriate monitoring arrangements that help encourage individuals to use these resources in a fair and equitable manner. Self-governance cannot eliminate opportunistic behavior entirely, but it can limit its negative effects.

Ostrom's book synthesizes the results of a vast array of case studies, several of which were still underway at that time. The Workshop has published extensive bibliographies on CPR research (Martin, 1989/1992; Hess, 1996). Also, reference sources are regularly updated on the

Workshop's web page, at <http://www.indiana.edu/~workshop>. The range of empirical cases of common-pool resource regimes studied by scholars associated with the Workshop is far too diverse to cover here. This part concludes with two articles that exemplify development of this research program in recent years.

In "Property-Rights Regimes and Coastal Fisheries: An Empirical Analysis" [chapter 5], Edella Schlager and Elinor Ostrom examine the nature of property rights in fisheries. After laying out the general properties of any property-rights system, they detail the combinations of rules that different groups of fishers have used to satisfy the design principles defined in the previous reading. Their analysis of the legal components of the system of rules that define property rights builds on basic distinctions laid out in the earlier articles also included in this part of this volume. Clearly, many conceptual advances were made as these research programs progressed.

The authors use a comprehensive data set on the physical and institutional characteristics of a set of coastal fisheries to draw conclusions about the determinants of long-term success or failure in the management of this common-pool resource. They conclude that in-shore fisheries characterized by some, but not all, of the attributes of private property are more effective means of governing local fisheries.

In "Mobile Flows, Storage, and Self-Organized Institutions for Governing Common-Pool Resources" [chapter 6], Edella Schlager, William Blomquist, and Shui Yan Tang shift the focus to a particular characteristic of common-pool resources, namely, the extent to which that resource can be stored for later use. Their comparative analysis of irrigation systems, fisheries, and groundwater basins is based on the application of similar data coding forms to the physical and institutional characteristics of these very different resources. They present a useful taxonomy of different types of CPR problems, and conclude that the same solution cannot be expected to apply to all kinds of common-pool resources.

As discussed earlier, a major goal of institutional analysis has been to break apart the state-market dichotomy that so dominates policy debates. Workshop scholars have clearly demonstrated the effectiveness of alternative institutional forms for the management of common-pool resources. Just as neither markets nor centralized management are appropriate in all circumstances, no single institutional arrangement can work for the full range of common-pool resource problems.

In recent years, many Workshop scholars have begun to study resources governed by multiple user groups. In the *International Forestry Resources and Institutions (IFRI) Research Program*, the IAD framework and multiple modes of empirical analysis are applied to many different uses of forest resources: timber, fuel, food, water, mining, and tourism. With the support of U.N., U.S., and private funding agencies, scholars associated with IFRI have developed and field-tested a rigorous method of measuring the characteristics of resource use and institutions for the management of forested areas (Thomson, 1992). The first fruits of this research program have just been brought together into a book containing research reports from Bolivia, Ecuador, Guatemala, Nepal, Uganda, and the United States, all using the same set of methods (Gibson, McKean, and Ostrom, forthcoming). The central goal of this project is to understand what combinations of institutional arrangements are most likely to allow sustainable development of forestry resources. Again, rigorous comparison lies at the heart of the method, as the coding form

generated for this project includes measures of more than a hundred variables on the physical, economic, and institutional characteristics of specific forested regions. Furthermore, the data and analytical conclusions from the IFRI project are made freely available to local communities, for use in their own development projects. This spirit of collaboration with the communities they study is a long-standing Workshop tradition.

The IFRI project is now associated with an even more comprehensive project. Elinor Ostrom and Emilio Moran, an anthropologist, serve as co-directors of the *Center for the Study of Institutions, Population, and Environmental Change (CIPEC)* at Indiana University. This collaborative undertaking by the Workshop and three other research centers in anthropology, demography, and environmental science is funded by the National Science Foundation as part of its major program on global environmental change. CIPEC research programs combine state-of-the-art satellite positioning and imagery systems with a variety of field methods based on rigorous sampling techniques. In this way, CIPEC scholars increase the rigor of empirical analyses of environmental conditions and institutions specifically related to the management of forests throughout the Western Hemisphere. The work of this center has only just begun, but it promises to make a major contribution to these important areas of research and policy.

Part II. Constitutional Order

7. A Forgotten Tradition: The Constitutional Level of Analysis – Vincent Ostrom, 1982
8. Cryptoimperialism, Predatory States, and Self-Governance – Vincent Ostrom, 1993
9. The Concentration of Authority: Constitutional Creation in the Gold Coast, 1950 – Kathryn Firmin-Sellers, 1995
10. Local Institutes and Development: The African Experience – Dele Olowu, 1989

This brief overview of forestry and global environmental change research programs leads naturally to consideration of the ways in which Workshop scholars approach the study of macro-level political and economic orders. One hallmark of the Workshop has been a sustained effort to integrate factors operating at different scales of aggregation. Detailed examinations of small-scale common-pool resource regimes are undertaken with an eye toward the implications such analysis might have for issues of development and governance. Of particular relevance are conditions conducive to the establishment and maintenance of the local capacities for self-governance and sustainable development. Both the big picture and the details need to be understood.

For example, McGinnis and Ostrom (1996) argue that the same principles of design that make it possible for local communities to manage common-pool resources may also apply to efforts to manage global environmental change. However, this analogy between local and global commons is not exact (Keohane and Ostrom, 1995). The benefits of person-to-person interaction in the management of common-pool resources at the local level, for example, cannot be duplicated at the global level. Gibson, Ostrom, and Ahn (1998) investigate the extent to which behavioral regularities identified at one level can be "scaled up" for application to higher levels of aggregation. They conclude that some extensions are defensible, but caution must be taken against overgeneralization. One principle that does scale up is that both monitoring and sanctioning remain critical for the implementation of international agreements to protect the environment.

Even if different sets of design principles turn out to be most relevant for different levels of aggregation, it is still important to assure that institutional arrangements at different levels reinforce each other rather than working at cross-principles. Elinor Ostrom's list of design principles (see chapter 4) recognizes the importance of the ways in which local rules are "nested" within the context of higher level patterns of governance. For if groups are not given at least a minimal right to organize, then resource management schemes may not be grounded in locally generated knowledge. Elsewhere, Oakerson and Walker (1997) argue that nesting is essential to any meaningful reform of institutional arrangements on the macro level. This concern for nesting is the glue that ties micro-level analyses of resource management to macro-level development policy.

The readings in Part II move the locus of analysis to macro-level concerns about constitutional choice. No matter how closely one scales up the same principles or insists on a consistent nesting of principles at different levels, there is no reason to require institutional analysts to apply the same mode of analysis at all scales of aggregation. As shown in the readings in this part, institutional analysis at the macro-level takes on a more philosophical tenor. No longer is there as much direct concern for the nature of physical goods; instead, focus shifts to efforts to comprehend the overall implications of how a society organizes itself, at the most fundamental level. A certain level of abstraction is required, but these abstractions should not become fodder for vacuous debates over ideological slogans. It may be a different mode of analysis, but the same normative and analytical approach underlies applications at all levels.

In "A Forgotten Tradition: The Constitutional Level of Analysis" [chapter 7], Vincent Ostrom argues that it is important to understand the overall context within which specific policy debates take place, because constitutional order can either support or undermine the foundations for self-governance. Vincent Ostrom has written a series of books (1987, 1989, 1991, 1997) that each, in different ways, offer polycentricity as an alternative to standard notions of sovereignty. Under unitary sovereignty, the government can impose a uniform set of laws that do not take account of local variation in physical conditions. Under polycentricity, different physical realities would be reflected in the rules designed by the affected communities. Diverse sets of local rules set the stage for conflict among alternative world-views and rule systems, but this conflict can be constructive rather than destructive. Indeed, contestation lies at the very heart of polycentricity.

In this article, Vincent Ostrom contrasts the model of polycentric governance in *The Federalist* with a paternalistic vision of public administration closely associated with Woodrow Wilson. For Wilson and other reform-minded politicians and policy analysts, the role of government is to produce public goods in the most efficient manner, as determined by expert opinion. Public opinion plays a role in selecting leaders and setting general guidelines, but beyond that the public is a passive recipient of government policies.

In polycentric governance, political authorities should act to support the capacity of self-governance for groups and communities at all levels of aggregation. Within such a constitutional order, individuals form corporations to produce private goods and join myriad associations to produce public goods and manage common-pool resources. Governmental authorities at all levels play important roles, all of which are supportive in nature. Just as they are expected to provide a stable legal foundation for the smooth operation of economic markets, public officials should also devote themselves to nurturing group capacities for self-governance. Generally,

government officials should concentrate on the *provision* of public goods and services, but they need not be directly involved in the *production* of that good. (The distinction between provision and production is detailed in Ostrom, Tiebout, and Warren, 1961; McGinnis, 1999b.)

Perhaps the most important role of government in a polycentric order is to help local jurisdictions resolve their conflicts of interest in a way that remains consistent with societal standards of fairness. If a CPR user group unfairly restricts access to their resources to a very small group of people who benefit materially from that restriction, then higher political authorities should act to open up the process to broader participation. In other words, public authorities should act to prevent self-governing communities from taking unfair advantage of their ability to coordinate their actions.

Unfortunately, under paternalistic governance, the government itself can become a form of private property. For if sovereignty is assumed to reside in a single center of power, then politics becomes a simple question of determining who wields that power or who "owns" that office. Once the ability to impose laws and regulations becomes a source of revenue for public officials, great importance is attached to winning power and remaining in office. If elections degenerate to a competition among self-interested agents seeking to access the levers of sovereign power, then even a liberal democratic order can become a form of tyranny.

The danger inherent in paternalistic governance can be illustrated by an admittedly loose analogy to problems of common-pool resource management. To some extent, a government's budget, or a nation's entire resource base, can be thought of as a common-pool resource. These resources can be used efficiently, in ways that enhance social welfare, or they can be captured by small groups to satisfy their own narrow interests. The same concern for opportunism that permeates institutional analysis of a CPR user group becomes translated into concerns for predatory behavior by governmental authorities. If too many public officials act too selfishly, then society as a whole can suffer grave consequences.

As discussed above, monitoring and sanctioning are essential activities to effective CPR management. How are governmental authorities to be deterred from engaging in excessive opportunism? This is the key question of governance.

The problems in autocratic political orders are even more extreme. In "Cryptoimperialism, Predatory States, and Self-Governance" [chapter 8], Vincent Ostrom argues that Hobbes's *Leviathan* remains an important influence on contemporary events. Hobbes's vision of a single, overwhelming source of power remains a strong inspiration for rulers in many countries. In particular, Ostrom shows that Lenin's writings contain an especially pure distillation of the logic of Hobbesian sovereignty.

The main point of this paper is to draw attention to a more subtle influence of Hobbes on today's world. Vincent Ostrom introduces the term *cryptoimperialism* to designate the insidious phenomenon by which the rulers of developing countries are influenced by the ideas of the foreign donors upon which they have come to depend so heavily. Since the most influential individuals in governments on both sides of the Cold War, and in international lending institutions, see the paternalistic form of government as natural, this attitude is naturally passed on to their clients. The consequence is a natural tendency toward the establishment of "predatory states" in many parts of the world. Although military force and vast disparities in economic

power play obvious roles in maintaining new forms of imperialism, a more subtle prop is the widespread habit of thinking in terms of Hobbesian sovereignty.

Contemporary problems of governance have deep historical roots. In *The Emergence of Autocracy in Liberia: Tragedy and Challenge* (1992), Amos Sawyer, a former President of Liberia, concurs with Vincent Ostrom's concerns about the dangers of crypto-imperialism. This book, completed while Sawyer was a visiting scholar at the Workshop, documents how a community of freed slaves ironically came to establish a constitutional order that concentrated power in a single position, the President. The tragic civil wars his country experienced in recent years are a direct consequence of the widespread acceptance of this conceptualization of governance as domination.

Sawyer's book is one of several books in which the Workshop approach to the study of governance has been applied to a remarkably diverse set of political regimes. Subjects include constitutional order in Communist regimes (Kaminski, 1989, 1992), Imperial Russia (Obolonsky, 1996), Imperial China (Yang, 1987), and military regimes in Latin America (Loveman, 1993). The same principles have been applied in shorter works on other parts of Africa (Duany, 1992, 1994; Jinadu, 1994). Contributors to Wunsch and Olowu (1995) survey the vast array of problems that can be attributed to the general adoption of the centralized, Hobbesian state throughout post-colonial Africa. In each of these works, the authors have been deeply influenced by the work of Vincent Ostrom.

A related line of research on the nature of governance in Africa has been most closely associated with Robert Bates, whose relationship with the Workshop has been primarily through his doctoral students: Arun Agrawal, Kathryn Firmin-Sellers, and Clark Gibson. Bates (1981, 1983) portrays most post-colonial African regimes as disassociated from their own people. To the extent that these regimes are sustained by foreign aid, the rulers are absolved of any need to provide a full range of public services for their own people. Quite to the contrary, their interests lie in appropriating as many resources as they can for their own personal wealth. At best, they will spread these resources to just enough groups for them to stay in power. Given this proprietary attitude towards government office, it is hardly surprising that the record of African development has been so woeful.

In the next selection, "The Concentration of Authority: Constitutional Creation in the Gold Coast, 1950" [chapter 9], Kathryn Firmin-Sellers shows the process of constitutional choice in action. She shows how the relevant actors were willing to set up a centralized political order because each thought they had a good chance to dominate the system once it was in place. Her interpretation of these events draws on concepts and analytical tools developed in the field of research known as the new institutional economics, especially Knight's (1992) contention that distributional consequences are the most important determinants of institutional change.

The single most important lesson of these analyses of macro-level constitutional order is that national governments can either support and enhance the self-governing capacities of local communities or else they can undermine local capacities by adopting a predatory attitude. In practice, nearly all governments do a little bit of both. Some groups are granted the right to manage their own affairs or to protect their own resources from the encroachments of other groups. Meanwhile, the resources controlled by other groups serve as the target of expropriation.

This article by Kathryn Firmin-Sellers reminds us that constitution making is an inherently political process, in which some groups gain at the expense of others. Similarly destructive conflicts can occur in the operational and collective-choice arenas of interactions whenever participants (and policy analysts) forget that the essential purpose of government is to help peoples solve their problems rather than to select winners and losers. This problem-solving attitude is difficult to sustain given the competitive thrust of much political interaction and policy analysis.

E. Ostrom (1998) notes that strong conceptualizations sometimes make it hard for analysts to even acknowledge the existence of certain kinds of organizations. In "Local Organizations and Development: The African Experience" [chapter 10], Dele Olowu, a Nigerian scholar who has made extended visits to the Workshop, demonstrates that local forms of self-governance are alive and well in many parts of Africa. These organizations tend to be overlooked, however, because they do not fit into the standard categories of state, market, or civil society.

One of the more subtle problems concerns the ways in which policies of decentralization have been applied in several African countries. On the face of it, decentralization seems congruent with calls for self-governance, but in practice all that has changed is the locus of public decision making. Just because a governmental unit is smaller in scope does not necessarily mean that the people are going to be involved in governing their own affairs. Dele Olowu discusses several examples that illustrate the subtle, yet fundamental, differences between decentralized administration and genuine self-governance.

Finally, Dele Olowu concludes that the findings from the studies of metropolitan governance undertaken at the Workshop (discussed above) could be fruitfully applied in the African context. He points to the existence of long-standing traditions of local resource management regimes, while still recognizing the problems of sustaining these traditions in the context of the modern, centralized state imported to Africa from the West.

Part III. Development

11. Institutional Analysis and Decentralization: Developing an Analytical Framework for Effective Third World Administrative Reform – James S. Wunsch, 1991
12. Improving the Performance of Small-Scale Irrigation Systems: The Effects of Technological Investments and Governance Structure on Irrigation Performance in Nepal – Wai Fung Lam, 1996
13. Institutional Design of Public Agencies and Coproduction: A Study of Irrigation Associations in Taiwan – Wai Fung Lam, 1996
14. Informal Credit Markets and Economic Development in Taiwan – Shui-Yan Tang, 1995
15. Crossing the Great Divide: Coproduction, Synergy, and Development – Elinor Ostrom, 1996

This diagnosis of an overreliance on centralized authority might seem to lead directly to the conclusion that efforts must be undertaken to reform the political order as a whole, to remake society from the ground up. But it is not quite that simple, because Workshop scholars tend to be skeptical of grand plans for reform.

Vincent Ostrom (1991, 1997) cautions that many "great experiments," such as those undertaken by Marxist-Leninist regimes, result in the "monumental failures" of war, famine, or repression. Utopian ideals of equality provided the groundwork for the terrible costs of totalitarianism in the

Soviet Union, Eastern Europe, China, and elsewhere in the world. Even the high ideals of democratization and national self-determination can result in terrible suffering for the average person, as was clearly shown in the post-Cold War history of the former republics of Yugoslavia.

The danger of monumental failure does not mean that reform should not be pursued. After all, absence of reform can, in some circumstances, be equally disastrous (see Eggertsson, 1996). Instead, the lesson should be that reform should be undertaken with full acceptance of the limited ability of humans to grasp the full consequences of their actions (see V. Ostrom, 1991, 1997). Rather than try to impose a single utopian ideal on society as a whole, his preferred solution is to design institutions that help local communities help themselves. This attitude leads to a form of policy analysis more concerned with process than with ends. Still, designing open-ended institutions that nurture self-governing capacities should lay a solid foundation for sustainable development. Part III includes several examples of the Workshop approach to the design of development institutions.

In "Institutional Analysis and Decentralization: Developing an Analytical Framework for Effective Third World Administrative Reform" [chapter 11], James Wunsch reiterates Dele Olowu's concerns that decentralization per se does not guarantee self-governance. Just as the state-market dichotomy is unnecessarily limiting, he argues that a similar fixation on a centralization-decentralization dimension will lead policy analysts to overlook potentially relevant alternative institutions. After explaining the implications of all of the major components of institutional analysis in the context of African development, Wunsch uses these methods to explain the general failings of the centralized, administrative state in much of Africa. Wunsch offers suggestions for training future administrators to be more creative and open-ended in their consideration of alternative options. Wunsch also highlights conceptual similarities between the problems of development and the results of previous Workshop research on police service provision in metropolitan areas in the United States (McGinnis, 1999b).

The crucial issue is not the degree of centralization but the configuration of incentives that motivate individual and collective actions. The next paper explicitly compares alternative institutional arrangements for the governance of irrigation systems. In "Improving the Performance of Small-Scale Irrigation Systems: The Effects of Technological Investments and Governance Structure on Irrigation Performance in Nepal" [chapter 12], Wai Fung (Danny) Lam demonstrates that irrigation systems built and managed by the central government or international financial lending institutions tend to be less long-lasting or effective than irrigation systems built and maintained by local farmers. This difference holds even when the government-funded systems are much larger and technologically more sophisticated.

The explanation of this puzzle is simple. Even the latest technology cannot survive without regular maintenance, and the incentives have to be right if local participants are going to exert the effort needed to maintain an irrigation system. Lam examines the problems raised by asymmetries between "headenders" and "tailenders," that is, between farmers whose crops are located close to the headworks of the irrigation system and those who farm areas near the end of the line. As he shows, establishment of sophisticated headworks may exacerbate these asymmetries, and tailenders who benefit little from these improvements may not be willing to help maintain the system as a whole. Conversely, both groups would be motivated to maintain less sophisticated improvements in the lining of the irrigation channels, since their failure to do

so could mean that none of them will receive sufficient water. Lam shows that, counter to the expectations of most external observers, farmers can undertake all the maintenance, monitoring, and sanctioning activities needed for many successful irrigation systems.

This article, if read in isolation, might be misconstrued as supporting an ideological aversion to big government. However, "small is beautiful" is not an appropriate slogan for advocates of polycentric governance. In hopes of belying any misunderstanding, the next selection, by this same author, shows how governmental officials and local farmers can work together toward the common goal of development.

In "Institutional Design of Public Agencies and Coproduction: A Study of Irrigation Associations in Taiwan" [chapter 13], Danny Lam argues that an overlooked source of Taiwan's economic success is the autonomy granted local farmers' associations in managing their own irrigation systems. Governmental officials play generally supportive roles, since aspects of Taiwan's bureaucratic structure limit their incentives to engage in predatory behavior. As a consequence, government authorities act primarily to support the conditions under which local arrangements can be implemented.

Whereas the papers in Part I evaluated the physical properties of a wide array of irrigation systems and other common-pool resource regimes, this paper provides an in-depth analysis of the reasons why local irrigation associations work as institutions. Lam illustrates the ways in which the complementary interests of participants are encapsulated within an effective governance structure. The national governments fulfill several important roles: arbiter of conflicting interests, a source of finance, and "epistemic leader."

The next selection continues with the case of Taiwan, but moves to an examination of other forms of institutions. When Workshop scholars consider problems of the developing world, they focus on the contributions of informal networks of political and economic entrepreneurs typically overlooked by policy analysts. Although typically denounced as illegal "black markets," individual entrepreneurs rarely have much of a choice in the matter. Under conditions of the widespread government corruption and incompetence typical of predatory states, the "informal sector" can be a most effective alternative to officially recognized transactions. De Soto's book *The Other Path* (1989) is the most widely known analysis of the "informal sector" in the developing world. Within the community of Workshop scholars, Landa (1994) places special emphasis on trading networks organized around ethnic identifications.

In "Informal Credit Markets and Economic Development in Taiwan" [chapter 14], Shui-Yan Tang argues that informal credit markets were key to the economic success of Taiwan. One general implication of this analysis is that similar institutional arrangements should be encouraged in other developing countries seeking to emulate Taiwan's economic success. Too often policy analysts fixate on the presence of a secure legal system or the occurrence of regular elections, but Tang's analysis reminds us that development is primarily local in nature.

This article illustrates an important lesson of Workshop research. Although analysts regularly use terms like "the government" to refer to the actions of particular sets of officials, the reality is much more complex. Any analysis of the operation of governments would show that most (if not all) are themselves organized in a polycentric manner. Despite the presumption that top leaders can command subordinates to carry out particular policies, many difficulties are associated with

monitoring the behavior of bureaucratic agents. Also, informal contacts among bureaucratic officials are often crucial to policy implementation. The complexity of the policy implementation process is well-recognized, but the Workshop approach to institutional analysis tries to bring some coherence to our understanding of the interactions that take place in both formal organizations and in more informal settings.

The term "civil society" is often used very loosely, but these articles by Lam and Tang illustrate how the operation of informal organizations can further the process of development. Another now popular term, "sustainable development," is closely related to the concept of "coproduction" developed nearly two decades ago by Workshop scholars investigating the determinants of the successful provision of police services (see McGinnis, 1999b). In a regular production process, a commodity is produced by one actor and consumed by another. Under a process of coproduction, both must interact to produce the desired result. For example, if police officials and neighborhood residents coordinate their efforts to monitor crime in that neighborhood, then public safety results from a process of coproduction. It's not simply a matter of police supplying their customers with a better product, but rather a consequence of continuing cooperation between police officers and members of the community.

Several of the readings included in this volume make use of the concept of coproduction. In the final reading in Part III, "Crossing the Great Divide: Coproduction, Synergy, and Development" [chapter 15], Elinor Ostrom discusses the general implications of conceptualizing development as a process of coproduction. Her discussion of specific examples of development from two different continents supports her contention that participation by local communities is a key to the success of sustainable development.

This article, as well as the earlier articles by Wunsch and Olowu, makes specific reference to specific conclusions from earlier Workshop research programs on public perceptions of policing in metropolitan areas of the United States (McGinnis, 1999b). This convergence demonstrates that the principles of polycentric governance transcend the many obvious differences between rural areas of the developing world and urban America.

Part IV. Polycentric Governance

16. Artisanry and Artifact – Vincent Ostrom, 1980

17. Problems of Cognition as a Challenge to Policy Analysts and Democratic Societies – Vincent Ostrom, 1990

The Workshop approach to development is more fully explicated in a textbook written by Elinor Ostrom, Larry Schroeder, and Susan Wynne (1993). This book places rural infrastructure at the very heart of development issues. E. Ostrom (1992) uses these same principles to guide community "crafting" of institutions for the management of irrigation systems. In Oakerson and Walker (1997), students from two different generations of the Workshop discuss the general implications of Workshop research for the reform of institutions in developing countries. They draw extensively on the IAD framework (Kiser and Ostrom, 1982; Oakerson, 1992; McGinnis, 2000) to illustrate broader issues of development. Walker (1994) uses this framework to examine the gritty details of fertilizer distribution in Cameroon as an example of institutional analysis applied to a practical policy program.

In all of these works the authors stress that policy analysts must approach institutional reform in an open and creative fashion, rather than relying on standard categories. However, it is not just the policy analysts who need to adopt a broader frame of reference. A community's common conceptualization of the meaning of development is a crucial factor in their likely success. The final two readings address these matters directly.

In "Artisanship and Artifact" [chapter 16], Vincent Ostrom reminds institutional analysts that all institutions are social creations, grounded in shared understandings. Just as an individual craftsman or artist must imagine a tool or artwork before he or she can bring that creation to life, communities of individuals cannot govern themselves without some shared set of beliefs and norms, some shared conceptualizations. In an earlier work, Vincent Ostrom (1987; 1st ed. 1971) summarizes the political theory behind the design of the U.S. Constitution. In his more recent work, V. Ostrom (1997) has been concerned about the institutional creations that go on every day, in communities of all sizes. Constitutional order at the macro level is grounded in the conceptualizations and understandings of the ultimate micro-level actor, the individual.

In the final selection in this volume, Vincent Ostrom sounds a cautionary note. Once self-governance has been achieved, there is no reason to assume that the shared understandings that support self-governance will be automatically maintained. Tocqueville, in particular, was gravely concerned that a tendency toward a leveling equality might eventually undermine the spirit of self-governance by the voluntary associations that he saw as the very foundation of American democracy. In "Problems of Cognition as a Challenge to Policy Analysts and Democratic Societies" [chapter 17], Vincent Ostrom reiterates Tocqueville's concern about the difficulties inherent in intergenerational transmission of the "habits of heart and mind" that support a democratic, self-governing society. He calls on institutional analysts to contribute to the maintenance of self-governance by not allowing their analyses and policy recommendations to be colored by an unthinking adherence to the Hobbesian notion of unitary sovereignty. In this way, scholars can make an important, even essential, contribution to the achievement and sustainability of self-governance.

In these works, Vincent Ostrom advises institutional analysts to pay careful attention to language. The IAD framework and the terminology of polycentric governance provide, in effect, a "new language" for the study of the new "art and science of association" that Tocqueville saw as the essential foundation of any understanding of democracy. The terms we use to analyze institutions and policies must, ultimately, be consistent with this vision, or else self-governance cannot be sustained.

The IAD framework (see Figure 1) lays out the magnitude of the task facing institutional analysts. It is no easy matter to match up institutional solutions to the physical realities of the situation, the attributes of the community, and the political relationships defined at the constitutional level. Design and establishment of a polycentric governance structure is not something that can happen overnight. It is not simply a matter of making markets work well, for it is also necessary to facilitate group management of common-pool resources. It is not simply a matter of providing law and order, because communities must be encouraged to take responsibility for their own conditions of life. Public officials must arrange for the provision of public goods, either by producing these goods directly or by contracting with other producers.

Citizens need to be self-reliant, yet also willing to work with government officials to solve collective problems. This balance is very difficult to sustain.

As artisans, institutional analysts need to recognize and appreciate the creative capacity of people to cope with their own collective problems. Rather than relying exclusively on abstract theory to tell us which policy instrument works best in any given situation, policy analysts must familiarize themselves with the diverse array of institutional arrangements that local communities have developed. This book illustrates some of the efforts of this community of scholars to do exactly that, to familiarize themselves with institutions that work.

Their tendency to focus on local solutions has made Workshop scholars deeply appreciative of the remarkable successes achieved by peoples throughout the developing world. It is appropriate to let the founders of the Workshop have the final word in this introduction to a volume of research reports by scholars personally inspired by their own unstinting efforts. In a guest editorial in the January 1994 issue of *Research & Creative Activity* (a publication of Indiana University Graduate School), Vincent and Elinor Ostrom succinctly articulate the guiding vision that has united the diverse strands of research undertaken by scholars associated with the Workshop during the first twenty-five years of its existence:

Once we understood the logic of the use of land and water in paddy agriculture, for example, we came to appreciate the marvel of hillside terraces in Nepal and elsewhere that would justify their being considered among the Wonders of the World. In a contrary way, intelligent people can perversely reduce urban landscapes to rubble. How people think of themselves, structure their relationships with others, and pursue the opportunities that they see as available to them may make the difference between a sustainable and meaningful way of life and one reduced to rubble. Working with others to gain mutual advantage under changing conditions of life requires substantial use of knowledge, moral sensitivity, skills, and intelligence in the exercise of self-organizing and self-governing capabilities.

[Volume 2]
Polycentricity and Local Public Economies
Readings from the Workshop in Political Theory and Policy Analysis

The Workshop in Political Theory and Policy Analysis was established at Indiana University in Bloomington in 1973 to coordinate several ongoing research projects. In the process of implementing this research, Workshop faculty and students began a long (and ongoing) series of discussions about broader conceptual questions and about how to organize multidisciplinary research on institutions. This volume of readings presents an overview of the results of the research program on police services and local public economies, as well as its enduring lessons for institutional analysis and public policy.

One basic presumption shared by the organizers of the Workshop is that theory has important ramifications for the understanding of practical policy problems. This close interaction between theoretical and empirical concerns is reflected in the basic organization of this book, which includes two distinctly different types of chapters: (1) conceptual discussions of federalism and other forms of constitutional order, and (2) empirical analyses of specific aspects of policing and other public services. Within the context of the conceptual framework developed here, even narrow analyses of seemingly mundane events can shed important new light on enduring dilemmas of governance.

Part I of this volume consists of summary statements of basic theoretical concepts and analytical distinctions that apply to the study of institutions generally. In Part II the focus shifts to conceptual pieces that specifically address the nature of governance in metropolitan areas. Part III reports on a series of empirical studies of police performance. The papers included in Part IV outline some of the broader implications of this research tradition for the organization of local public economies as a whole. Part V concludes with two papers summarizing conceptual advances that have continuing relevance for research and policy debates.

In some ways, this research was decades ahead of its time. More recently, scholars associated with the Workshop have documented the ability of self-governing communities to effectively manage common-pool resources (E. Ostrom, 1990; E. Ostrom, Gardner, and Walker, 1994; McGinnis, 1999a). These projects now encompass research sites throughout the world, but the Workshop approach to institutional analysis was developed by scholars confronting the complexities of governance in metropolitan areas in the United States. Similar themes emerge from both areas of research, especially a deep appreciation for the merits of local self-government. Perhaps it is only now, in the current policy context of devolution and decentralization, that the import of this early Workshop research can be fully appreciated. By collecting papers originally published in a wide array of outlets, this volume should help scholars reassess the legacy of these interrelated research programs on the evaluation of police services and the organization of local public economies.

Part I. Conceptual Foundations of Institutional Analysis

1. The Organization of Government in Metropolitan Areas: A Theoretical Inquiry – Vincent Ostrom, Charles M. Tiebout, and Robert Warren, 1961
2. Polycentricity Part I – Vincent Ostrom, 1972
3. Public Goods and Public Choices – Vincent Ostrom and Elinor Ostrom, 1977

Part I includes three statements of fundamental components of the Workshop approach to institutional analysis. The obvious place to begin is with a classic 1961 American Political Science Review article, “The Organization of Government in Metropolitan Areas: A Theoretical Inquiry,” coauthored by Vincent Ostrom, Charles Tiebout, and Robert Warren. Although this article appeared in print more than ten years before the establishment of the Workshop, it was essential to include it as the opening chapter of this volume of readings. The general concept of polycentric order elucidated in this paper is one cornerstone of institutional analysis. The notion that complex systems of overlapping jurisdictions might make more sense than a single center of power was quite novel then, and it still engenders resistance from many scholars more comfortable with simple governance structures.

The existence of multiple jurisdictions gives citizens more choices. In an earlier work, Charles Tiebout (1956) elaborated the implications of multiple jurisdictions for the ability of citizens to “vote with their feet” by moving to jurisdictions whose authorities offer a more desirable mix of public goods and services. Tiebout’s conception remains a core concept of public choice theory (Mueller, 1989). Even though the many costs associated with moving to new jurisdictions and the limited number of relevant jurisdictions may make physical movement impractical, this concept sheds light on important aspects of political economy at many levels of analysis. For example, the ability of private investors to move capital to jurisdictions with more favorable taxing policies limits the ability of political authorities to implement their desired economic policies. Lindblom (1977) decries this as a “market as prison” image, emphasizing the limitations market discipline imposes on the range of public policies that can be implemented. (If leaders impose policies that drive too many investors away, the local economy will suffer and the officials would be likely to lose the next election.) From another perspective, this market discipline may limit the implementation of redistributive policies that would slow economic growth. Under either interpretation, a similar logic applies to interactions among separate municipalities in a metropolitan area, states in a federal system, or countries competing for foreign investment.

A polycentric order generalizes Tiebout’s “voting-with-the-feet” model by enabling individuals or communities to choose among alternative producers of public services, without having to move from one jurisdiction to another. Polycentricity is a fundamental prerequisite of self-governance, that is, the ability of groups of individuals to work out problems for themselves. A community may decide to address some common problems directly. Alternatively, they may decide what they want and contract with some other organization to supply these services, or they may decide that some issues are best left up to more encompassing units of governments or to the creation of market-like arrangements. In general, communities employ all of these options, selecting different means to achieve different ends. Without the full range of options, liberty is stunted.

Polycentric order is also supported by considerations of efficiency. As Ostrom, Tiebout, and Warren argue, different public goods can be most efficiently produced at different scales of organization, ranging from fire protection to national defense. In a polycentric order, communities can organize the production of different kinds of public goods at different scales of aggregation.

These authors introduce a distinction between the production of a public good or service and its provision by public authorities (or by the people themselves). Although these terms are used inter-changeably in common discourse, this distinction between production and provision is crucial to this whole body of research. Production refers to the physical processes by which a public good or service comes into existence, while provision is the process by which this product is made available to consumers. Since we are dealing with public goods or services, the relevant consumption unit is a neighborhood, community, or some other grouping of people.

The distinction between production and provision is unfamiliar because it plays such a minor role in markets for private goods. A consumer who buys, say, a television set at an electronics store is not dealing directly with the firm that built this product. The retail store acts as intermediary between the producer and the consumer, but this store is not providing the good, in the sense used here, because the ultimate decision concerning consumption is made by the individual purchaser. Since the individual consumer is, in effect, also the provider, little is gained by making this distinction.

For the case of public goods, however, the relationship between consumers and providers is steeped in political import. Citizens elect mayors, governors, and other officials in the clear expectation that they will make sure that the community enjoys certain public goods. Citizens will closely monitor the performance of public officials, especially with regard to tax burdens, crime rates, and other salient policy issues. If they are not satisfied, they may move elsewhere (as in Tiebout's model), they may vote to replace the offending officials, or they may find some way to pressure officials into providing a different policy mix. They may even decide to take matters into their own hands.

It is important to remember that groups of individuals can provide for the production of public goods themselves, without relying on the intercession of public authorities. For example, members of a housing association concerned about the poor condition of the medians of their common streets have options beyond petitioning the city for assistance. They could hire a professional groundskeeper; they could even roll up their sleeves and pick the weeds themselves. In either case, the neighborhood association is providing this public good. Political scientists and policy analysts are more familiar with an arrangement in which a public official provides for the production of some public good or service by seeing that all members of the appropriate groups receive or enjoy its benefits, and that there are sufficient resources to pay for its production. But we cannot ignore the possibility that, in some instances, groups can do all this for themselves.

In sum, there are three types of actors involved in this process: (1) a collective consumption unit seeking some public good or service, (2) the entity that produces it, and (3) an intermediary who makes arrangements to connect producers to consumers. This intermediary may be an individual public entrepreneur or, more frequently, a government agency. In some cases, no intermediary is necessary. For example, when members of a new settlement jointly agree to dig and maintain a

well for use by all, then this community has effectively fulfilled all three roles simultaneously. For analytical purposes, however, it is important to keep these distinctions in mind.

The details of the relationship between providers and producers may not always be easily observable by members of the collective consumption unit. Government officials can select from a wide array of options to arrange for the production of public goods and services. They may sign contracts with a private vendor or another public agency to produce the public good or service, or they may prefer to incorporate the production process within the scope of their own authority.

The important point here is that it is not necessary for a public good (or public service) to be produced by the same actors or organizations that make arrangements to provide that good or service to a community of individuals. Thus, there may not be a one-to-one correspondence between collective consumption units and provision units, or between providers and producers. Polycentricity allows considerable mixing and matching of consumption, provision, and production units operating at different scales of aggregation.

One unfortunate consequence of the importance of this subtle distinction between production and provision is that confusion can easily arise when comparisons are made to works in which these terms are used interchangeably. The phrase “service provider” is a good case in point. In common parlance, a church group that gives homeless people a place to sleep and something to eat is a service provider, but in the technical language of polycentricity, these church groups are the producers of welfare services. Increasingly, governments provide for welfare services by contracting with nonprofit organizations. As Salamon (1995) puts it, governments and nonprofits are “partners,” with governments providing the financing and making policy decisions, but with nonprofit organizations actually doing the work. This makes government officials the service providers and nonprofit organizations the service producers, not providers.

Another level of complexity comes from the ability of concerned citizens to form an interest group that lobbies governmental officials on their behalf. Interest organizations seek to provide certain policy outcomes for their contributors, but in this case the production of public policy is carried out by public officials (legislators, executives, or bureaucrats). In polycentric systems, individuals and communities participate in the provision and production of public services in direct and indirect ways.

Clearly, polycentric orders are inherently complex. In its simplest form, a polycentric order must allow public officials or agencies (at various levels of a federal system) to make alternative arrangements for the provision of a public good for members of the collective consumption unit (typically a political jurisdiction of some type) while production takes place at a larger or smaller scale of aggregation, depending on which scale is most efficient for that particular good. The term “polycentric” aptly encapsulates this vision of overlapping scales of production and multiple arenas of political interaction.

Although the word “polycentric” is cumbersome, Workshop scholars can take some comfort from the fact that it is considerably more attractive than “multinucleated political system,” an alternative mentioned in the second footnote in Ostrom, Tiebout, and Warren’s classic article, reprinted here as Chapter 1. Chapter 2 is Part 1 of “Polycentricity,” a paper originally presented by Vincent Ostrom at the American Political Science Association meeting in 1972. This

conference paper was originally written as a critical review of the Ostrom, Tiebout, and Warren article ten years after its publication, but it was never published in that form. It remains the single best clarification of how polycentricity is related to several more familiar terms and concepts.

In this paper, Vincent Ostrom emphasizes that a polycentric order should not be dismissed as a simple market analogy. Obviously, markets per se cannot be expected to result in the production or provision of public goods, since markets are designed to take advantage of the special properties associated with private goods. The whole point of a public economy is that it must include some means by which public goods are produced and provided to collective consumption units. By allowing for the existence of multiple producers of public goods as well as alternative service providers, it becomes possible to approximate the benefits of market competition. However, polycentric orders have their own inherent properties, and cannot be seen as exact analogues of private markets.

Ostrom clarifies how his usage differs from that of Polyani, who used polycentric as a synonym for spontaneous. In the current context, it is important to realize that polycentric orders are created by those who participate in them, and they cannot be sustained as such unless the relevant actors continue to make use of their full range of alternatives. That is, if all authority and responsibility comes to be concentrated in a single political entity, then the system can no longer be described as polycentric.

Another clarification is required, namely, that the mere existence of multiple centers of authority does not immediately convey the full connotations of the analytical term polycentric. The key point is not the number of jurisdictions, but rather the concurrence of multiple opportunities by which participants can forge or dissolve links among different collective entities. In a system composed of many political units, each of which directly produces all the public goods for its own citizens, the full potential of polycentricity would not be realized. Instead, participants must be able to pick and choose those producers and providers that are most appropriate to each specific issue at hand.

Vincent Ostrom emphasizes that if the full potential of polycentricity is to be realized, it must be grounded in mutually supportive institutional arrangements in the economic, legal, constitutional, and political realms. Markets in private goods are needed to provide incentives for efficient production, and public entrepreneurs must have some assurance that their efforts to provide goods and services to various communities are legally recognized. Perhaps the most important factor is that political coalitions must be open to change and to compromise, with political leaders focusing attention on resolving problems rather than scoring partisan victories.

In Chapter 3, "Public Goods and Public Choices," Vincent and Elinor Ostrom develop several analytical distinctions that recur throughout the entire corpus of Workshop research. The first distinction concerns the nature of the good as a private good, public good, toll good, or common-pool resource. The authors argue that we cannot expect the same kinds of institutional arrangements to be appropriate for all kinds of goods or services. The "market" is an efficient institution for production and allocation of private goods (within the context of the existing distribution of resources and assuming the existence of secure property rights and reliable procedures for conflict resolution). However, market mechanisms fail in predictable manners

when they are applied to the production or provision of public goods, or the management of common-pool resources (see Weimer and Vining, 1989; E. Ostrom, 1990).

The Ostroms develop the concept of a “public economy” as analogous but not identical to a market economy. They discuss several examples of complex networks of service provision and the production of public goods. They emphasize the importance of formal and informal mechanisms of conflict resolution, through which conflicts of interest and responsibility among public authorities in overlapping jurisdictions are resolved. They pay particular attention to the important matter of financing. In order for a polycentric system to operate smoothly, there must be some correspondence, however inexact, between the beneficiaries of public goods and services and those who pay for them. If this provision process runs smoothly, the private production of public goods can be made economically efficient. The key element in all this is the ability of service providers to select producers operating at the most efficient scale of production.

Also included in this paper is a brief discussion of the concept of “coproduction.” Chapter 17 develops this concept in detail, but the basic idea behind this important concept deserves mention here. The typical relationship between producer and consumer is one of exchange. That is, the consumer does not contribute in any direct manner to the quality of the good that is produced. (There will be an indirect effect in a competitive market setting, as consumers buy from those producers who offer higher quality products for a given price level.) However, for some kinds of goods and services, those consumers who adopt a passive attitude will not receive a high quality product. The Ostroms discuss education and health as examples of coproduction: in both cases the active involvement of students or patients is essential if they are to enjoy a quality education or good health. Coproduction denotes situations when the active involvement of the consumer is a requisite input for the production of a high quality good or service.

Coproduction is especially important in public economies. Members of a neighborhood seeking safer streets for all to enjoy would, for example, be well-advised to take an active role in monitoring activities rather than passively relying on police patrols. Polycentricity provides an ideal setting for the coproduction of public goods and services. Communities should not be expected to passively await the largesse of political authorities, but should instead take an active role in arranging for the coproduction (and coprovision) of desired public goods and services.

This insistence on the importance of the active involvement of citizens in their own governance is one of the ways in which the Workshop approach to institutional analysis differs, at least in emphasis, from the broader community of public choice scholars (see Mitchell, 1988). Public choice is typically defined as the application of economic modes of analysis to the study of the behavior of political authorities, but institutional analysis casts a wider net. For example, although most of the same analytical presuppositions of rational choice can be applied to individuals, private corporations, and to the office-seeking actions of public authorities, it is not appropriate to assume that markets exist in all arenas of interaction (see V. Ostrom 1993, 1998).

To a great extent, the concept of polycentricity emerges from a deep familiarity with the American political system. In Chapter 2 Vincent Ostrom shows how closely polycentricity is related to the political theory that lay behind the original design of the U.S. Constitution and especially in the defense of that Constitution in *The Federalist* (see V. Ostrom, 1987). This theory of limited constitutions was exemplified in the plentiful examples of self-governance by

voluntary associations that Tocqueville ([1835] 1969) observed in his journey through the United States of America in the early nineteenth century. In his most recent books, Vincent Ostrom (1991, 1997) stresses that self-governance is sustainable only if communities nurture the “habits of heart and mind” that Tocqueville considered the most important contributor to the success of American democracy. Coproduction and polycentricity are modern terms that capture important aspects of Tocqueville’s insights into the proper organization of public affairs, and the Workshop approach to institutional analysis is an extended elaboration on the basic principles of the “art and science of association” that Tocqueville saw as critical to the continued success of democratic governance.

Part II. Frameworks for the Study of Public Economies

4. A Behavioral Approach to the Study of Intergovernmental Relations – Vincent Ostrom and Elinor Ostrom, 1965
5. Polycentricity Part II – Vincent Ostrom, 1972
6. Metropolitan Reform: Propositions Derived from Two Traditions – Elinor Ostrom, 1972

One of the enduring themes of Workshop research has been Vincent Ostrom’s insistence that polycentricity be considered as a viable alternative to standard notions of sovereignty. In his first major book, *The Intellectual Crisis in Public Administration* ([1973] 1989), he critiques the field of public administration for being dominated by a conception of centralized administration inconsistent with the foundational principles of American democracy. In particular, he contrasts the constitutional theory of the Founders with that of Woodrow Wilson, whom he identifies as the central figure in the reform tradition in the first decades of the twentieth century. This influential tradition led to a widely shared consensus on the benefits that would accrue from consolidation of metropolitan areas into single, larger units of governance. The research programs reported in this volume present a fundamental challenge to this consensus.

In Chapter 4, “A Behavioral Approach to the Study of Intergovernmental Relations,” Vincent and Elinor Ostrom conceptualize an area of public service provision and production as an “industry,” akin to an industry in the private sector. They use examples from water supply, electric power, education, and police to illustrate complex patterns of interactions among the diverse actors involved in any single area of public services. A public industry constitutes, in effect, the polycentric order apparent in the specific contexts of public service provision and production.

Since this article predates the establishment of the Workshop by about a decade, it serves as a useful overview of the Ostroms’ general orientation to research. They insist on the need to understand both the physical nature of the good or service being produced as well as the social, political, and economic context of its provision. In subsequent research, scholars associated with the Workshop developed a broad analytical framework based on three sets of factors that jointly contribute to the nature of institutional arrangements. This Institutional Analysis and Development (IAD) framework highlights interactions among (1) the nature of the goods being produced, provided and consumed, (2) the content of “rules in use” in contrast to written laws and constitutions, and (3) overall attributes of the community (Kiser and E. Ostrom, 1982; McGinnis, 1999a,b). A central tenet of institutional analysis is that even detailed analyses of limited aspects of particular institutions must keep this broader range of factors in mind.

Any public service industry necessarily involves actors with common, complementary, and conflicting interests. Patterns of conflict resolution are shaped by the overall configuration of governance. The Gargantua approach critiqued by Ostrom, Tiebout, and Warren (Chapter 1) seeks to resolve conflict by encompassing all of the parties within a single, comprehensive governance structure.

In Chapter 5, Part 2 of “Polycentricity,” Vincent Ostrom elaborates further on the polycentric alternative for the governance of metropolitan areas. He begins by reviewing Tocqueville’s observations concerning the existence of an underlying pattern of order beneath the confusing array of governing bodies in the United States of his day. Ostrom then addresses some difficult problems of language and conceptualization. Although widely used, the phrase “the government” is both imprecise and inappropriate. Since governments are complex networks of interrelated provision units, institutional analysts need to develop more sophisticated methods of analysis. He notes that any complete picture of polycentric governance would have to include consideration of the entire configuration of relevant individuals, their organizational roles, the rules that shape their interactions, and the empirical measures of outcomes that they use to evaluate policies. In subsequent research, Workshop scholars have devised conceptual frameworks that help institutional analysts make sense of these complex relationships (see especially Kiser and Ostrom, 1982, and E. Ostrom, 1986; both reprinted in McGinnis, 2000). For present purposes, the important point is that no one person (whether sovereign, bureaucratic official, or policy analyst) is capable of seeing the whole picture at once.

Ostrom examines the negative consequences of fragmented authority that are most frequently decried in the policy reform literature: uneven service provision, pervasive racial segregation, increased costs, and an unequal distribution of financial burdens between suburbs and the inner city. He argues that analysts should have an open mind on these issues, and that they should use the great natural laboratories of the diverse conditions of life in metropolitan areas throughout the United States as a means to test whether polycentricity actually has these negative effects.

Vincent’s spouse and colleague Elinor Ostrom took the leading role in the empirical evaluation of polycentricity. In Chapter 6, “Metropolitan Reform: Propositions Derived from Two Traditions,” she details an exhaustive list of propositions concerning the contrasting implications of unitary and polycentric systems, when applied to the governance of metropolitan areas. This paper sets out an ambitious research agenda that was only partially fulfilled in the research projects summarized in the remainder of this book.

Scholars in the public administration or reform tradition emphasized the positive benefits of increasing the professionalization of public servants: more professional producers of public services could be expected to produce better public goods or services at a lower cost and with fuller concern for issues of equity and fair distribution of public resources. Since professionalization is easier to achieve in large jurisdictions, the seemingly obvious conclusion is that consolidation should lead to improved public service.

Elinor Ostrom lays out the contrasting views of scholars associated with what she called the “political economy” tradition in this article but would now describe as “institutional analysis.” In a related work, Bish and V. Ostrom (1973) contrast the “public choice” tradition with this reform tradition. Whichever label is used, Workshop scholars stress that the nature of the good or

service is a crucial intervening variable in the relationship between scale of production and citizen evaluation of agency performance. Goods or services that are most efficiently produced at small scales would be hurt by consolidation, whereas larger-scale goods might still be efficiently produced if small jurisdictions were allowed to enter into contracts with larger-scale producers. For example, a small police force might produce better service in terms of patrolling or responding to reports of crimes than a large police force, but both might rely on the same crime lab or training facilities.

In this chapter Elinor Ostrom briefly surveys research findings that support the propositions implied by proponents of polycentric governance. The papers in Part III report on an extensive series of empirical investigations carried out by scholars associated with the Workshop that directly address these issues.

Part III. Empirical Research on Police Services

7. Why Do We Need Multiple Indicators of Public Service Outputs – Elinor Ostrom, 1977
8. Does Local Community Control of Police Make a Difference? Some Preliminary Findings – Elinor Ostrom and Gordon P. Whitaker, 1973
9. Community Control and Governmental Responsiveness: The Case of Police in Black Neighborhoods – Elinor Ostrom and Gordon P. Whitaker, 1974
10. Size and Performance in a Federal System – Elinor Ostrom, 1976

After all this discussion of theories and concepts we finally get to the nitty-gritty of empirical analysis. In preparing this volume of readings it proved useful, for purposes of presentation, to collect theoretical conceptualizations and empirical analyses in separate sections. However, it is important to remember that the actual process of research is one in which conceptualizations and empirical investigations develop simultaneously and interact with each other in a dynamic fashion. For example, E. Ostrom, Parks, Whitaker, and Percy (1979) summarize interactions among inputs, organizational arrangements, activities, and outputs in figures that can be seen as precursors to the Institutional Analysis and Development framework that later emerged as the organizing schema for Workshop research on common-pool resources (see Kiser and Ostrom, 1982, reprinted in McGinnis, 2000).

The first step in the long series of empirical research programs summarized in this section was taken during a graduate seminar on the measurement of public goods. The specific area of application was selected by the students, after the instructor (Elinor Ostrom) vetoed anything to do with water management (which had been the subject of her own dissertation). The students selected police services, and they set out to answer such questions as: What services do police forces produce? How can one measure and evaluate the relative performance of different police forces?

None of the researchers associated with the Workshop began as experts in policing. Instead, they developed expertise in this area as a consequence of applying rigorous methods of social science to this particular area of concern. As suggested above, policing is also an area in which public jurisdictions at all levels of aggregation tend to interact in complex ways, in exactly the manner expected by scholars who think in terms of the polycentric ordering of public service industries.

The discussions begun in this seminar continued in the form of an externally-funded “Measures Project.” Participants in this research project demonstrated a remarkable ability to make effective

use of the complementary strengths of surveys, participant observation, official data, and physical measures. In Chapter 7, “Why Do We Need Multiple Indicators of Public Service Outputs?,” Elinor Ostrom summarizes the many measures used in this project. Since this paper was published later in this project (1977), it also reflects the insights gathered from the other research programs summarized in subsequent readings.

Official police reports are notorious for being recorded so as to make police performance look good. Despite concerns about the self-serving nature of official reports, many policy studies of public service delivery rely heavily on such sources as the FBI crime index. Participants in this Workshop research team developed innovative means to measure actual conditions experienced by the public in their own neighborhoods. In regard to policing, they interviewed random samples of residents of matched neighborhoods, rode with police officers to observe activities directly, recorded calls for services, and used a variety of internal sources. In regard to lighting, rather than merely counting the number of streetlights, the project team used light meters to measure the ambient light at street level. Since this was a physical measure, values for different neighborhoods could be directly compared. The most memorable measuring instrument was a wheeled contraption called a “roughometer,” used to measure the “bumpiness” of urban streets.

The research programs summarized in this volume were, to a great extent, inspired by matters of practical political concern. The Bloomington campus of Indiana University is located about an hour’s drive south of the state capital of Indianapolis. After several years of public debate, Indianapolis city and Marion County governments were consolidated in 1970 to form a unitary governing authority popularly known as Unigov. Here, seemingly, was a clear manifestation of the reform tradition, ready to be tested.

There were some complications, however. This consolidation fell short of completeness because not all of the municipalities within Marion County decided to join this consolidated government. This conjunction of countywide consolidation with local exceptions provided a unique opportunity for social scientists to make direct comparisons between the performance of police forces with small or large scales of operation. Neighborhoods in Indianapolis serviced by the Indianapolis police department were matched up with independent communities that retained their own small police departments. Since these neighborhoods and communities were similar on all other demographic factors, any differences in performance measures could be directly attributed to the difference in the size of these production units.

In Chapter 8, “Does Local Community Control of Police Make a Difference? Some Preliminary Findings,” Elinor Ostrom and Gordon Whitaker summarize results from the study of police services in the Indianapolis metropolitan area. By comparing the performance of small and large police departments serving otherwise comparable middle-class, white neighborhoods directly adjacent to one another, it became clear that “bigger” was not necessarily “better.” Instead, citizens in small communities expressed higher satisfaction with the police than did residents of demographically similar neighborhoods serviced by a larger police force.

It is worth noting that the researchers did not simply ask citizens to give their opinions about the police, but also asked specific questions concerning the personal experiences of individual respondents. Had they ever been stopped by the police? How were they treated by the policemen

in question? Questions of this sort enabled the researchers to go beyond vague measures of citizen satisfaction.

The issues of measurement discussed in the previous reading proved too difficult to solve in their entirety. For example, comparisons of the cost of providing services in small and large police departments were difficult to interpret, since they could be based on alternative means of allocating the expenditures of a large police force to specific neighborhoods (see Ostrom, Parks, and Whitaker, 1973). The overall findings of the Indianapolis study of police performance is reported in more detail in E. Ostrom, Baugh, Guarasci, Parks, and Whitaker (1973).

These researchers also addressed one criticism of this initial research, namely, concern that its findings might not apply to all types of communities. In particular, it has long been recognized that relationships between police forces and residents of primarily black communities are particularly strained. In Chapter 9, "Community Control and Governmental Responsiveness: The Case of Police in Black Neighborhoods," Elinor Ostrom and Gordon Whitaker address the question of whether African-American communities can achieve similar successes by relying on smaller police forces.

For this project Ostrom and Whitaker compared two small independent villages in Cook County, Illinois, with three predominately black neighborhoods in the city of Chicago that were similar to these villages in demographic terms. The results resembled those of the Indianapolis study in the general conclusion that, on most measures of evaluation, residents of the villages expressed more satisfaction with police performance than did residents of the Chicago neighborhoods selected for comparison. However, in this case the difference was attenuated, since overall levels of satisfaction were lower in both contexts than was the case for the predominately white towns and neighborhoods in the Indianapolis study. Even so, the independent villages were able to provide slightly better policing services at a much lower per capita cost than was the more modern and professionalized Chicago Police Department. These differences in cost and performance evaluation stand in direct contrast to the expectations of the reform tradition.

In Chapter 10, "Size and Performance in Federal Systems," Elinor Ostrom summarizes the results of the next major empirical study, focused this time on St. Louis, Missouri. The St. Louis metropolitan area is particularly interesting for its large number of jurisdictions of widely varying sizes. This diversity enabled the researchers to select cases that differed in their racial composition (predominately white, racially mixed, and predominately black), income level, and size of police force (small, medium, and large). The larger number of cases also allowed the use of statistical methods to separate out the effects of these factors. The basic bivariate relationship between size and performance identified in the earlier studies held up for this broader context, but the strength of this relationship was weaker for predominately black communities (for much the same reason as in the Chicago study). In this analysis medium sized police forces proved to have some advantages over the smallest units, but in no instances did the largest units score the highest on measures of citizen satisfaction. The clear implication is that different scales of production are most appropriate for different aspects of the police service industry, exactly as one would expect in a polycentric order.

Part IV. Implications for the Study of Local Public Economies

11. Defining and Measuring Structural Variations in Interorganizational Arrangements – Elinor Ostrom, Roger B. Parks, and Gordon P. Whitaker 1974
12. Neither Gargantua Nor the Land of Lilliputs: Conjectures on Mixed Systems of Metropolitan Organization – Elinor Ostrom and Roger B. Parks, 1987
13. Citizen Voice and Public Entrepreneurship: The Organizational Dynamic of a Complex Metropolitan County – Ronald J. Oakerson and Roger B. Parks, 1988
14. Fiscal, Service, and Political Impacts of Indianapolis-Marion County's Unigov – William Blomquist and Roger B. Parks, 1995
15. Do We Really Want to Consolidate Urban Areas? [It's Like Deja Vu All Over Again] – Roger B. Parks, 1995

Police services are but one aspect of the multifaceted range of public services provided or produced by local governments in the United States. Workshop scholars conducted detailed analyses of police services concurrently with broader investigations of the overall structure of metropolitan governance. Not surprisingly, the latter topic proved more difficult to master. The papers included in Part IV can only illustrate selected aspects of this multifaceted body of research; readers interested in the complete picture are encouraged to consult the Suggested Further Readings.

Early statements of the Workshop perspective on urban political economies include Bish (1971) and Bish and V. Ostrom (1973). Bish (1971) surveys basic aspects of the public choice tradition that underlies the Workshop approach. Bish and V. Ostrom (1973) devote particular attention to transfer payments between authorities serving different-sized jurisdictions and other aspects of the financial arrangements needed to make polycentric governance work. The authors emphasize that conflicts among authorities at different levels are a natural component of such systems, and thus that conflict resolution is an important component of polycentricity.

Much of the later work took the form of case studies, especially under the auspices of the United States Advisory Commission on Intergovernmental Relations (see ACIR 1988, 1992). Important overviews include ACIR (1987), Oakerson (1987), E. Ostrom (1983, 1997), and V. Ostrom, Bish, and E. Ostrom (1988). (This last book was originally prepared for publication by the Olivetti Foundation in Italy; see V. Ostrom, Bish, and E. Ostrom 1984.)

A major component of Workshop research on the organization of local public economies was a survey of the nature of police service delivery in a sample of eighty Standard Metropolitan Statistical Areas. This study investigated several measures of the networks of interrelationships among governmental authorities from different jurisdictions. This project began to explore the benefits (and the difficulties) of policing as a multilevel service industry. E. Ostrom, Parks, and Whitaker (1978) is a book-length treatment of this research project; a shorter overview was prepared as a report for the National Science Foundation (E. Ostrom, Parks, and Whitaker, 1977). The natural way in which the original police studies grew into this larger statistical project is best illustrated in Ostrom and Parks (1973), which combines brief discussions of a few matched case studies (including Indianapolis) with preliminary analysis of comparative measures of citizen evaluation of police performance in communities and departments of varying sizes.

Chapter 11, “Defining and Measuring Structural Variations in Interorganizational Arrangements,” by Elinor Ostrom, Roger B. Parks, and Gordon P. Whitaker, gives a sample of the type of research conducted in this project. The authors discuss the characteristics of the case of Fayetteville, North Carolina, in some detail, and briefly compare it to two other metropolitan areas. They define several measures of the overall structure of the police service industry. In effect, they interpret this public service industry as a network or system and apply aggregate measures to these conglomerations as a whole. Multiplicity, for example, is measured by the number of alternative producers for a particular service, whereas fragmentation refers to the number of consumption units in a given metropolitan area. As discussed earlier, there is no reason to expect a one-to-one correspondence in these two measures under conditions of polycentricity. The authors use a “service structure matrix” to graphically illustrate the complex relationships between consumption units and means of production. These examples of the diverse ways in which public officials in this one metropolitan area have arranged for the production of the full range of police services should bring some concreteness to the abstractions developed in previous chapters of this book.

In this project, attention shifted away from the evaluation of performance to focus instead on descriptive statistics applied to the networks of police service provision and production as found in U.S. metropolitan areas. Unfortunately, the remarkable diversity of modes of institutional arrangements that were identified in this study defy simple description. The capacity of self-governing communities to devise polycentric orders presents a daunting analytical challenge to anyone seeking to understand their properties and consequences.

One effort to bring the power of statistical analysis to bear on these issues is illustrated in Chapter 12, “Neither Gargantua Nor the Land of Lilliputs: Conjectures on Mixed Systems of Metropolitan Organization,” an unpublished convention paper by Elinor Ostrom and Roger Parks. (Similar findings are discussed in Parks, 1985, and Parks and E. Ostrom, 1984.) The authors use data on activities of police forces of various sizes from the sample of eighty metropolitan areas to approximate the shape of the production possibility frontier for different-sized departments (see also Chapter 16). They then separate the cases into those with larger or smaller than average values of the multiplicity and autonomy measures of the overall organization of that metropolitan area. They conclude that the most efficient metropolitan systems combine the production of some services by large-scale police agencies with the production of immediate response services by smaller departments.

This paper ends with a suggestive comparison of the historical development of governance structures that might occur in two hypothetical scenarios. Whether the initial state is one of complete consolidation or total fragmentation, they expect the ultimate result would be similar, namely, a complex arrangement in which the production and provision of public services occurs simultaneously at multiple scales of aggregation. Officials in a consolidated region are likely to discover that some matters are best delegated to smaller scale organizations, whereas managers of initially small jurisdictions are likely to establish institutions operating at a larger scale that can best deal with matters of common concern. This discussion suggests that polycentricity may emerge naturally, provided communities and their agents are given the opportunity to change the scale of their operations when they feel it is appropriate.

The next two chapters evaluate how similar processes of historical development have worked out in practice. In Chapter 13, “Citizen Voice and Public Entrepreneurship: The Organizational Dynamic of a Complex Metropolitan County,” Roger Parks and Ronald Oakerson examine the overall structure of public service provision and production in the St. Louis metropolitan area. The mode of research used here is more informal than was the case in the earlier selections. Since it proved difficult to define summary measures of overall structures or networks of agency interactions, case studies were a more appropriate means to address these research questions. This particular paper is supplemented by a similar study applied to the Pittsburgh metropolitan area (Parks and Oakerson, 1993). In both articles, the authors show that public officials of different jurisdictions are able to work together in a remarkably smooth fashion. (For a similar conclusion with reference to relations among agencies involving in policing in the St. Louis metropolitan area, see McDavid, 1974.)

In the paper included here, Oakerson and Parks place this capacity within a broader framework. They examine the extent to which bureaucratic officials can be treated as entrepreneurs providing a service to their customers. They draw on Tiebout’s (1956) model of voting with the feet, making explicit how polycentricity goes beyond that confining concept. Citizens’ capacity to voice their concerns alleviates any need to explicitly move to new jurisdictions, provided that public officials have the right incentives to provide needed services to their communities. They also note that public entrepreneurs must find some way to coordinate their actions, if they are to effectively address problems of wider concern.

In a related paper, Oakerson and Parks (1989) question the common perception that local governments are merely “creatures of the state,” established at the discretion of state governments. They point out that nearly all local governing authorities have been initiated by the actions of local people. Far from being static and uninteresting, the boundaries of local jurisdictions change as a response to citizen action. Revisions in existing jurisdictions and creation of new municipalities all take place within a broader overarching system of rules and procedures. Interactions between citizens and public authorities are more dynamic than might be expected by the use of the term “constitutional.” Complex local economies are the norm, not the exception. In sum, these authors draw upon a detailed understanding of the diversity of local governing arrangements in United States to reinforce arguments discussed earlier about the centrality of polycentric order to democratic governance.

In Chapter 14, “Fiscal, Service, and Political Impacts of Indianapolis-Marion County’s Unigov,” William Blomquist and Roger Parks remind us that the organization and reorganization of local governance is an inherently political process. In their re-examination of the Unigov consolidation move that first inspired much of the research reported in this volume, they conclude that this reform was less comprehensive than is commonly believed. So many different administrative units continued to exist within Marion County that Unigov may best be interpreted as a political slogan, rather than an accurate representation of the structure of this local public economy. They also suggest purely political reasons for this reform effort. By incorporating suburban voters into city elections, Unigov has had the effect of perpetuating the control of the Republican party over elected offices in the combined city-county administration (see also Blomquist and Parks, 1995).

However one interprets the political fallout from the Unigov reform, it remains clear that police departments in smaller jurisdictions continue to have significant advantages over the larger

Indianapolis police department. In Chapter 15, “Do We Really Want to Consolidate Urban Areas? [It’s Like Deja Vu All Over Again],” Roger Parks briefly reports on a reexamination of this issue. The title of this paper, taken from the June 1995 edition of the Workshop newsletter *Polycentric Circles*, refers back to one of the initial research reports on the Indianapolis police study (Ostrom, Parks, and Whitaker, 1973). The tables included in this paper clearly demonstrate that citizens of smaller communities continue to express higher levels of satisfaction with the performance of their police forces than do citizens of comparable neighborhoods in Indianapolis. In sum, the findings of research originally conducted in the 1970s still hold true today.

Part V. Implications for Research and Policy

16. Complex Models of Urban Service Systems – Roger B. Parks and Elinor Ostrom. 1981

17. Consumers as Coproducers of Public Services: Some Economic and Institutional

Considerations – Roger B. Parks, Paula C. Baker, Larry L. Kiser, Ronald J. Oakerson, Elinor Ostrom, Vincent Ostrom, Stephen L. Percy, Martha Vandivort, Gordon P. Whitaker, and Rick Wilson, 1981

Not everyone is convinced that polycentricity is such a good thing. Some scholars still argue that consolidated government has significant advantages over fragmented governance arrangements. For example, in their systematic comparison of the (fragmented) Louisville and (consolidated) Lexington metropolitan areas, Lyons and Lowery (1989: 537) find that citizens in Louisville are, counter to the supposedly positive benefits of polycentricity, not very well-informed about the “scope and nature of their service packages.” They also fail to find any consistent difference between measures of citizen satisfaction of agency performance in these two metropolitan areas. (See also Lyons et al. 1992.)

Despite initial appearances, these results do not directly contradict the earlier findings reported by scholars associated with the Workshop. After all, the latter focused specifically on public evaluation of police performance, whereas Lyons and Lowery paint on a broader canvas that encompasses a wide range of public services. Furthermore, there may be a potential common ground between these competing schools of thought. Lyons and Lowery (1989: 541-542) conclude that it is wrong to presume that consolidated governments “present individuals living in all areas and neighborhoods with a uniform tax-service package tailored to the median-voter preference of the entire urban population.” Their analysis demonstrates that consolidated governments are capable of providing differentiated levels of service to different communities within a single large jurisdiction.

This observation is very much in line with the spirit of polycentricity, which acknowledges that integrating multiple scales of service provision and production is the key to increased levels of citizen satisfaction. A polycentric system cannot be completely fragmented, for there remain some services for which higher levels of aggregation are most appropriate.

Part of the problem may be that the contrast between polycentricity and consolidation has been overdrawn. A call for establishment of a polycentric order cannot be reduced to the slogan “small is beautiful.” However, because of the widespread consensus on the benefits of consolidation that was current in the 1970s, scholars associated with the Workshop may have placed more emphasis on the benefits of smaller-scale agencies than would have been the case otherwise. In today’s climate of decentralization and devolution of responsibilities to smaller units of

government, advocates of polycentric order find it necessary to insist on the necessary role played by larger-scale units! Despite this change in the overall framing of contemporary policy debates, the core ideas of polycentricity have remained the same.

Scholars associated with the Workshop continue to pursue studies of police services and other aspects of local public economies. For example, the Indianapolis police department has commissioned surveys of citizen evaluations that have been implemented by faculty and students affiliated with the Workshop and with the Center for Urban Policy and the Environment at the Indianapolis campus of Indiana University (Parks, Quinet, and Schmitt, 1996). Visiting scholars have completed book projects while spending time at the Workshop. Books by Schneider (1989) and Stein (1990) are particularly noteworthy. These works connect to issues of major concern in the broader research community on urban politics, especially the deleterious effects of competition among municipalities to attract business investment. Stein, in particular, has been active in Houston, advising community leaders to find ways to take advantage of the opportunities inherent in polycentricity.

Although research on local public economies continues to be an active part of the Workshop tradition, the single most dominant focus in recent years has been on the study of common-pool resources in countries throughout the world (E. Ostrom, 1990; McGinnis, 1999a,b). The range of local governance structures investigated by scholars associated with the Workshop in Political Theory and Policy Analysis is equally broad-ranging, including Africa (Wunsch and Olowu, 1995), Canada (Bish, 1987, 1996; Sproule-Jones, 1993), Italy (Sabetti, 1984, 1998), the Netherlands (Toonen, 1987), Nigeria (Olowu, 1990), and Scandinavia (Bogason, 1996). Still, no single book on metropolitan governance managed to capture the attention of the scholarly and policy-making communities in quite the same way that Elinor Ostrom's book *Governing the Commons* (1990) encapsulated later research on the management of common-pool resources. Several contributing factors deserve mention.

First, working with complexity is never as appealing as simplicity. The policy issues of police forces turned out to be very complex and difficult to summarize. Books and papers from the later parts of these research programs show evident signs of the difficulties these scholars experienced in trying to come to grips with the complexity of polycentric governance of metropolitan areas.

Second, Workshop scholars have always been reluctant to "blow their own horn," so to speak, preferring instead to produce a steady stream of research results. This attitude stands as a refreshing contrast to the all-too-frequent tendency of research institutes or think tanks to trumpet their accomplishments. However, when it came time to sum it all up, under conditions of overwhelming complexity, the researchers were unable to do so in a sufficiently compelling manner. In collecting the papers for this volume, I have benefitted greatly from the clarity of hindsight, as well as my own personal distance from these research programs.

A third important factor is that two of the major players, Vincent and Elinor Ostrom, eventually moved on to other research projects. Both had begun their professional careers with research on groundwater or natural resources, and Elinor Ostrom's later research, in particular, came to focus on a myriad of issues related to resource management.

In many ways, the study of the management of common-pool resources turned out to be a more productive empirical focus for exploration of the implications of polycentricity and self-

governance. Anyone evaluating police performance in urban areas can scarcely avoid emotion-laden controversies over race relations and welfare policy. Also, one prominent issue concerns the appropriate role for the national government in the fight against urban blight. Needless to say, the management of fisheries, irrigation systems, and most common-pool resources typically evokes a considerably lower level of ideological salience. Furthermore, these resources are, in many cases, physically remote from urban centers or national capitals. In these more isolated communities, it is easier to identify the reasons why some communities manage to solve their own problems while other communities flounder or fail.

Perhaps the most fundamental reason, however, concerns the theme of the importance of local solutions to complex policy problems that recurs throughout the entire corpus of Workshop research. This attitude did not comport well with the prevailing inclination towards large-scale governmental intervention throughout society and in nearly all sectors of the economy. The relevant policy-making communities are now more open to a wider range of alternative approaches, partially as a response to the disappointing record of national policy initiatives. In short, the contrast between these two views of governance has taken on more prominence in contemporary debates over public policy. This volume of readings is intended as a contribution to these ongoing debates, and as a spur towards more rigorous evaluation of the consequences of alternative institutional arrangements.

This volume concludes with two papers that present continuing challenges for research and policy. In Chapter 16, "Complex Models of Urban Service Systems," Roger Parks and Elinor Ostrom stretch the standard mode of neoclassical economic theory to cover the behavior of public service producers. They argue that public bureaus, unlike firms, must be judged on multiple dimensions of outputs. That is, there is no single criterion equivalent to profits upon which bureau performance can be judged. They suggest that bureau managers might be modeled as if they maximize a two-component utility function that combines a measure of net community benefits (what they call the "benefits residuum") and personal gains in terms of status or budgetary discretion (measured by the number of specialized personnel in that agency). Managers of different bureaus would place different relative weights on these two considerations. For example, local service producers who actually reside in the area might put more emphasis on the net community benefits, since they themselves would share in these benefits.

In this way they generalize Niskanen's (1971) well-known model of bureau managers as budget-maximizers. Competitive markets exert a strong selective pressure on firms that do not maximize their profits, but no similarly stringent selection process can be said to operate in the public sector. However, Parks and Ostrom argue that if a large number of alternative service producers are available for a given public industry (or if entry is relatively easy), then quasi-market competition can be said to exist. Under conditions of high multiplicity of service producers, bureau managers will put more weight on net community benefits as opposed to personal gain in those local public economies characterized by high values of multiplicity (as defined in earlier works also included in this volume). In effect, then, the existence of multiple service producers can closely approximate the positive benefits of competitive markets, as suggested in the classic APSR article leading off this set of readings.

This paper stands as a challenge to future researchers. Workshop scholars have made important contributions toward expanding the scope of game theory (McGinnis, 2000). For example, chapters in Kaufmann, Majone, and Ostrom (1986) explore alternative approaches to the formal analysis of rational behavior in the context of hierarchies or networks of interaction. Is it possible to represent the behavior of public services producers and providers as rational agents pursuing multiple objectives, in a way that also takes account of the complex interrelationships among different public agencies and private organizations? This remains an open question.

Given the fundamentally collaborative nature of the research programs summarized in this volume, it seems particularly appropriate to conclude with an article written by ten coauthors. In Chapter 17, “Consumers as Coproducers of Public Services: Some Economic and Institutional Considerations,” this team of Workshop scholars emphasizes that certain public services (especially health, education, public safety) should be considered not as products produced by public authorities or professionals (physicians, teachers, police) but rather as the result of a process of interaction among these authorities or experts and the people themselves. The coauthors were participants in an informal seminar addressing citizen participation in community affairs. Similar interactions between faculty and students recur throughout the history of the Workshop, where instruction of graduate students is seen as a continual process of the coproduction of scholarly knowledge.

Coproduction has a close affinity to self-governance, and its importance for the evaluation of public policy deserves to be more widely appreciated. (That coproduction is equally important for development throughout the world is argued in Lam 1996 and E. Ostrom 1996, both reprinted in McGinnis 1999a.) Unfortunately, as this paper demonstrates, analyses of coproduction may require the use of more complicated modes of formal analysis than is the case for single-source production. In this particular paper, the authors specify two forms of public goods production. One form is the standard sense in which “regular” producers exchange goods or services for monetary remuneration; the other is “consumer producers” in which citizen-customers directly participate in the production process. They use simple diagrams to illustrate situations in which tradeoffs between these two kinds of production are useful. In some cases each form of production can be directly substituted for the other, but the more interesting cases are ones in which both forms of production interact in an interdependent manner.

Workshop scholars have published several other papers related to coproduction. Whitaker (1980) makes the important point that widespread use of the term “service delivery” conveys the misleading impression that the public must adopt an attitude of passive reception of goods and services produced by professional experts. Citizens can directly participate in the production of public services, and he emphasizes the extent to which such participation is crucial for the survival of a democratic, self-governing people. Voting and forming interest groups to lobby legislators may be important forms of political action, but if that is all we think of as political participation, then we are overlooking the important ways in which people can directly contribute to their own betterment. Sharp (1980) emphasizes the participatory attitude that the term coproduction conveys. Citizens of a democratic society need access to information that enables them to evaluate the performance of public officials, but citizens also need to actively engage in their own governance. She also argues that public officials need to see their role as creating the circumstances that encourage citizen participation, and not just as providing public

services in exchange for votes. Officials need to nurture citizen's capacity for self-governance and their experience at coproduction.

Many public officials have come to appreciate the benefits of actively involving communities in their own governance. For example, police departments throughout the country have implemented policies of "community policing" that reduce the distance between police officers and community members by encouraging informal contacts, removing patrolmen from their cars, and supporting community efforts to monitor and report suspicious behavior in their neighborhoods. At least some police officials realize that the public good of neighborhood safety is coproduced by communities and police acting together.

One prominent example of coproduction is the patrol-intensive and community-friendly "production strategy" that tends to be pursued by smaller police forces, primarily out of necessity. The long series of research programs summarized above demonstrated the relative effectiveness of this production strategy (see especially E. Ostrom, Baugh, Guarasci, Parks, and Whitaker, 1973). Community policing can be seen as an effort of large police forces to mimic the behavior of small forces, in order to capitalize on the many advantages of this production strategy. However, the results reported by Roger Parks in Chapter 15 of this volume demonstrate that this mimicry strategy has been less than completely successful, at least initially. Despite implementation of a community policing program in 1992, the Indianapolis police force still scored lower on measures of overall citizen satisfaction than did the smaller police forces servicing the nonconsolidated communities.

The conclusions and the methods of the interrelated research programs on the organization of local public economies in metropolitan areas of the United States continue to shape the Workshop approach to institutional analysis (see McGinnis, 1999a,b). The methodological legacy of these metropolitan studies is a unique combination of insistence on scientific rigor and policy relevance, openness to multiple techniques of empirical and formal analysis, and sensitivity to nested levels of analysis.

The crux of this contribution is succinctly summarized in the following comment from Roger Parks, who has been associated with the Workshop from the very beginning, first as a graduate student and later as a faculty member at Indiana University's School of Public and Environmental Affairs.

The Workshop evolved from a collaboration among Elinor and Vincent Ostrom and their students that began in the late 60s in a small suite of offices in IU's Woodburn Hall. Although not formally designated as an Indiana University Research Center until 1973, most of the elements of the Workshop were in place by 1970. These included a strong commitment to theory-grounded empirical research, the inclusion of students as full colleagues in research and publication, and a rich intellectual experience anchored around regular colloquia where ideas were tabled and debated vigorously. The early Workshop built its reputation on a series of studies of police service delivery in neighborhoods served by small, medium, and large police departments. The results of these studies directly challenged the "bigger is better" philosophy of would-be police reformers in the early- and mid-70s. Not only did they demonstrate that small- and medium-sized departments performed as well or better than large departments when serving matched neighborhoods, they elucidated a logic grounded in polycentricity that explained why this outcome was to be expected. (Parks, 1998, personal communication)

[Volume 3]

Polycentric Games and Institutions

Readings from the Workshop in Political Theory and Policy Analysis

People establish and use institutions to help them achieve a vast array of individual and collective goals. As a consequence, an understanding of institutions is crucial to any social science. In recent years, game theory, formal models, and experimental research have become valued components of the methodological tool-kit used by political scientists, policy analysts, economists, and other scholars interested in the analysis of institutions. These analytical tools are particularly useful for highlighting the basic structure of decision problems facing individuals and collective groups. Game models, in particular, direct attention to the basic configuration of common, conflicting, and complementary interests facing participants in different settings. Simplicity in representation is key to the success of game theory, but this strength comes with inherent limitations (McGinnis 1991). For example, simple formal representations of institutions are too abstract to capture all of the important aspects of inherently complex institutional arrangements.

Several scholars affiliated with the Workshop in Political Theory and Policy Analysis at Indiana University have made important contributions towards bringing a richer empirical content to formal models and experimental analyses of institutions. The readings collected in this volume illustrate several varieties of institutional analysis as exemplified in the research of Workshop scholars. Each reading builds upon the foundation of game theory to use different levels of formal or experimental rigor to address similar sets of questions concerning institutions and governance.

Contributors address such factors as the physical nature of goods, the relationship of majority voting to other procedures by which collective choices are made, the normative foundations of utility functions, alternative legal doctrines and property rights systems, the effects of government regulations on markets, the incentives facing actors engaged in monitoring and sanctioning activities, and the origins of the normative expectations upon which individuals base their choices in field settings and in laboratory experiments. Each reading illustrates different ways in which the basic principles of game theory can be used applied to deepen our understanding of particular empirical situations or to clarify the meaning of such important analytical concepts as norms, rules, and institutions. In totality, these readings illustrate the range of the contribution of scholars affiliated with the Workshop in Political Theory and Policy Analysis.

Polycentric Games

I coined the term polycentric games for use in the title of this volume to capture the distinctive nature of the Workshop approach to formal models of institutions. This term extends the logic behind the widely-known and influential concepts of two-level games (Putnam 1988) and nested games (Tsebelis 1990). Putnam's model emphasizes that potential problems with the domestic ratification of international agreements can affect the process by which those agreements are reached in the first place. Tsebelis demonstrates that actions that seem irrational in one context may be perfectly understandable once analysts incorporate that actor's strategic interactions with

other actors. In both cases, the important point is that analysts must expand the scope of their models to consider the cross-effects of concurrent games.

Polycentric games encompass an even wider array of interactions. A basic presumption is that actors involved in any single interaction can draw on a vast array of informational cues to help them understand the behavior of other actors. In particular, they can draw on commonly understood norms or rules, and they can use institutional procedures to organize their interactions. But it's not enough to say that many games are occurring simultaneously; it's also essential to provide some guidance concerning how to handle the resulting complexity. As the readings included in this volume demonstrate, Workshop-affiliated scholars have developed conceptual frameworks and analytical tools that bring some coherence to the study of polycentric games.

Levels of Analysis and Arenas of Choice

Research on two-level or nested games directs attention to connections across domestic and international levels of analysis, defined in terms of scales of aggregation, from individuals to small groups to organizations to national governments to international systems (see Russett and Starr 1996). International relations scholars use these levels to differentiate among supposedly distinct sets of explanatory factors, each of which brings a unique perspective to the study of international relations (see Waltz 1959). In this way, personality or perceptual factors at the individual level of analysis can be kept distinct from the general characteristics of organizational behavior as well as the contrasting tendencies of democratic and autocratic governments, and other factors operating at the systemic level tend to maintain a balance of power among contending Great Powers. Even though, as suggested in the emerging literature on two-level or nested games, it may be essential that any complete explanation incorporates factors at different levels of analysis, the basis of separation among levels of aggregation seems solid.

To study polycentric games requires a shift of focus to different arenas of choice: operational choice, collective choice, and constitutional choice. The distinction between these three *arenas of choice* is an essential component of the Institutional Analysis and Development (IAD) framework, which is explained more fully in Chapter 2 of this volume (and in Ostrom, Gardner, and Walker 1994).

In the operational choice arena, concrete actions are undertaken by those individuals most directly affected or by public officials. The outcomes of these actions directly impact the world in some demonstrable manner. The rules that define and constrain the operational activities of individual citizens and officials have been established by processes occurring in arenas of collective choice, and the rules by which these rules themselves are subject to modification are determined in the arena of constitutional choice. In some circumstances, constitutional choice results in preparation of a written constitution, but more generally communities develop informal shared understandings about the ways in which that community organizes itself to make collective decisions. These shared understandings are an essential component of the decisional context for collective choice and operational activities.

Authors of the essays reprinted in this volume originally used the term "level of analysis" to differentiate among what I am calling different "arenas of choice." However, levels of analysis are closely associated with scales of aggregation in other research literatures, and the IAD

framework points towards distinctions that need not be limited to scales of aggregation. The interactions characteristic of any single arena of choice can occur at different scales of aggregation or among the same group of individuals at different points in time.

For example, constitutional choice typically involves a wider range of participants than routine operational choices. But even the same set of individuals may interact in one way when they are deciding how they will make future decisions and in quite another (more competitive) manner when deciding the allocation of scarce resources in a single time period. In other words, constitutional choice can be analytically distinguished from times when participants are simply debating the application of commonly-held principles or rules to the current situations. The crucial point is not the number of people involved, but rather the mode of activity occurring in different settings or time periods. These distinctions are explained more fully in later chapters.

Important analytical similarities apply to all three arenas of choice. In each arena, individual and collective choice are constrained to some range of strategic options. Actors confront an *action situation* with strategic options and role expectations as defined during periods of more encompassing interactions (analogous to “higher” levels of analysis). In each arena, the choices of actors jointly produce patterns of interactions and outcomes which shape the nature of their interactions in the other arenas (especially in those corresponding to “lower” arenas). Influences move back and forth across arenas in complex but understandable patterns.

In short, institutions matter because they link arenas of choice by defining the roles that individual or collective actors fulfill. If one looks at political situations in this manner, it is clear that all three arenas (or centers) of choice are involved in any one particular application. The term “polycentric” (originally coined by Ostrom, Tiebout, and Warren 1961) nicely conveys an image of a network of overlapping and inter-linked arenas of choice. The essence of a “game” in the technical sense lies in the nature of interactions among participants with at least some difference of interest. Since games of operational choice, collective choice, and constitutional choice are occurring concurrently, the term “polycentric games” seems particularly apt as a summary statement.

This broad conceptual framework provides an overall context for each of the more specialized analyses included in this volume. Foundational constitutional questions are rarely in doubt during the routine operational decisions that are most often the subject of game models, and yet the outcome of processes of constitutional choice cannot be ignored, for such deliberations determine who has the capability or the responsibility to participate in operational decisions. Such situations are too complex to model in their entirety, but the essays collected here demonstrate that important insights can be garnered from partial models of specific situations, provided ample consideration is given to concurrent or supplementary processes in other arenas of choice.

Organization of This Volume

The readings collected in this volume are organized into five parts. The essays in Part I lay out inter-related frameworks for analysis: the IAD framework mentioned above, a fuller representation of the action situations occurring in each arena of choice, and a conceptual grammar that differentiates among strategies, norms, and rules. Each of the remaining Parts directs attention to particular empirical settings or types of institutional arrangements. Part II

focuses on voting institutions and other ways in which the interests of principals and agents can be reconciled. Part III investigates particular configurations of rules and regulations, especially related to the management of natural resources. Workshop scholars have demonstrated the crucial importance of monitoring and sanctioning in maintaining effective systems of resource management and of governance, and the chapters included in Part IV use different game models to investigate the expected performance of monitors with different incentive structures. The two essays in Part V provide overviews of an extensive body of experimental research that indicates that the behavior of rational individuals is more nuanced and varied than is generally appreciated. The final essay in this part, Elinor Ostrom's recent Presidential Address to the American Political Science Association, serves as a concluding essay. In this address she points toward future development of a "second generation" of rational choice models capable of more fully incorporating the behavioral determinants of individual action, and thus of the consequences of institutions.

As noted in the Series Foreword, this volume has been compiled in conjunction with two other edited volumes of previously published research by scholars affiliated with the Workshop in Political Theory and Policy Analysis. This particular volume includes some of the more technical pieces of research selected from a much broader array of research methodologies used by Workshop scholars. It is primarily intended for use by scholars and students with some expertise in game theory and experimental research.

One unfortunate consequence of this decision to concentrate technical readings in a separate volume is that it may appear as if this formal or experimental work was tangential to the development of the extensive empirical research programs also associated with the Workshop. Nothing could be further from the truth, for game models and laboratory experiments have played important roles in the evolution of Workshop research programs on metropolitan governance, common-pool resources, and development (see McGinnis 1999a,b). Formal models have helped focus attention on the fundamental nature of the action situations relevant in each of these areas of application, whereas the relatively controlled environment of the laboratory setting allows researchers to isolate the effects of particular factors on the ability of groups of individuals to cooperate for their common good. The benefits of cross-fertilization across formal models, experiments, and field research have been demonstrated in Ostrom, Gardner, and Walker (1994). Formal and experimental methods supplement the strengths of field research; no one method can tell us everything we need to know. Readers of this volume are encouraged to keep in mind the broader context of the formal and experimental research reported here.

Because of the diversity of topics covered in this volume, each Part begins with an introductory essay that places the works included in that Part within the broader context of the multi-faceted research programs implemented by Workshop-affiliated scholars. These brief introductions focus on the essays included in this volume, along with a few closely associated works that could not be included here. The remainder of this general introduction provides a quick tour of the vast expanse of the field of modern political economy. This sketch cannot hope to be comprehensive; its only purpose is to locate the unique contributions of institutional analysis within the broader context of other analytical approaches to the study of institutions, public policy, and constitutional order.

Institutional Analysis and Related Areas of Research

Methodological Individualism, Markets, and Games

Institutional analysis builds on the basic principles of methodological individualism. The individual is taken to be the foundational point of analysis, since individual choice is crucial to all social outcomes. But it is equally important to understand the institutional context within which individual choices occur, as well as the ways in which individual choices shape these institutional contexts. Institutions matter, in many different ways, but, ultimately, their impacts are filtered through the choice of individuals.

This emphasis on the joint importance of individual choice and institutions can be usefully contrasted to the common (but by no means universal) attitude among economists that markets are a natural phenomenon. In other words, a presumption is often made that, if you provide individuals with endowments of goods or skills, then they will automatically begin to engage in mutually beneficial exchanges. In the proper circumstances, voluntary exchanges of private goods do indeed result in collectively beneficial outcomes, as if guided by an “invisible hand” (Smith 1976 [1776]). But markets are themselves institutions that operate at optimal efficiency only if the goods subject to exchange are private goods and only in the context of supporting political and legal institutions. In other words, markets are themselves potential subjects of institutional analysis, even though their existence and their efficiency are typically taken for granted.

For the most part, however, Workshop-affiliated scholars have investigated situations in which market exchanges are inappropriate or ineffective. Individuals are still presumed to be the best judge of their own interests, but they also have a much wider array of options from which to choose. Communities of individuals may establish diverse institutions to help achieve their common goals. Even in the context of cooperative institutions, however, individuals may still have an incentive to engage in opportunistic behavior.

This ever-present tension between the potential benefits of cooperation and the temptations of individual opportunism is the central problem of modern political economy. In recent years, economists, political scientists, other social scientists (and even a few natural scientists) have come to rely on game theory as a fundamental tool for the analysis of interactions among individuals with common, conflicting, and complementary interests (see Kreps 1990a,b). By focusing attention on strategic interactions among actors who pursue their own interests, game theory helps clarify how the independent actions of individual or other actors may result in collective outcomes that none would have preferred.

Schelling (1960) defines game theory as a “theory of interdependent decision,” but it is better seen as a set of tools that can be applied to model a wide array of situations. The content of the game theoretic tool-kit has changed over time, in the sense that alternative solution concepts have been developed for application to different types of games, based on different conceptualizations of the nature of human cognition and decision. Workshop scholars have contributed to this ongoing dynamism in ways that are illustrated in the works included in this volume.

Market Failure and the Hierarchical State

The standard departure point for modern political economy is to treat governments as a response to market failures (see, for example, Weimer and Vining 1989: chapter 3). Markets are an efficient way to organize the production and exchange of private goods, but it is widely recognized that competitive markets may have less desirable consequences for the production of public goods or for the management of a common-pool resource.

Workshop scholars have contributed to extensive (and on-going) empirical research programs on the provision of public goods and services in metropolitan areas and on the management of common-pool resources in mostly rural settings throughout the developing world (see McGinnis 1999a,b). In the process of these empirical investigations, Workshop scholars have also investigated the ways in which formal models can be used to expand the analytical repertoire of institutional analysts. The present volume focuses on these conceptual contributions.

The canonical alternative to privatization is to rely on “the government,” conceptualized as a Hobbesian sovereign capable of imposing its policy decisions on recalcitrant individuals. Those who might seek to free ride on the contributions of others can, in this way, be forced to contribute in the form of taxes or similar extractions. But hierarchical structures have their own dilemmas, specifically related to agent-principal relations. How can the ruler (as principal) insure that its agents have the proper incentives to gather accurate information or to implement the sovereign’s decisions properly? Such problems are impossible to resolve completely. Miller (1992) surveys the dilemmas of hierarchical rule, and concludes that it is important for top officials to exert leadership if they are to elicit productive effort from their subordinates. Leadership by itself is not enough, but neither is reliance on contracts or coercion. (Lichbach 1996, arrives at a similarly eclectic decision in his comprehensive survey of the literatures on collective action theory.)

From the point of view of political science, the limited ability of citizens to monitor or sanction their own rulers presents the fundamental problem of governance. Without this capacity, rulers have a tendency to shirk their responsibilities and to extract excessive amounts of resources for their own personal use. Liberal democratic institutions attempt to make rulers accountable to the general population via the mechanism of elections. The basic idea sounds simple enough: those public officials who fall short of public expectations can be removed from office in the next election. As often happens, however, this idea does not turn out to be so simple in application.

The Limitations of Voting as a Method of Collective Choice

Much of the modern political economy literature deals with various aspects of voting institutions. Social choice theorists (see Arrow 1963, Riker 1982) have demonstrated that there is no assurance that consistent policy will emerge from processes of majority vote, or, for that matter, from any means of aggregating individual preferences into social outcomes in a way that satisfies basic criteria of fairness. If candidates are only interested in obtaining and retaining office, then in some contexts (specifically, when the relevant policy issues can be represented on a single dimension) competing candidates will tend to offer nearly identical positions, in hopes of winning the approval of the “median voter” (Downs 1957). Conversely, under conditions of multidimensional issue spaces practically any outcome could emerge as a result of agenda manipulation or strategic voting (McKelvey 1976, Schofield 1978, Riker 1982). Myriad

institutional arrangements have been devised to limit the volatility of majority rule. For example, committees may achieve coherence by limiting the range of alternatives considered (Shepsle 1979) and the nature of committees may help structure overall legislative outcomes (Krehbiel 1991).

From the Workshop perspective, voting is only one way in which collective decisions may be made. And in many of the empirical contexts studied by Workshop scholars, specifically the management of common-pool resources, majority rule plays at best a minor role. Some Workshop scholars have focused on the implications of voting institutions (see Part II below), but, overall, a distinctive aspect of institutional analysis is the relatively low profile given to studies of voting systems. Voting is treated in the context of other institutional rules, and not as an end in itself.

As mentioned above and detailed more fully in Chapter 2, operational choice games are directly affected by the accepted procedures for collective choice processes, which were in turn determined by some process of constitutional choice. Buchanan and Tullock (1962) suggest one distinction between constitutional and operational choice, arguing that constitutional choice requires unanimity (at least in broad outlines) whereas choices in different issue areas might be determined according to majority vote or extraordinary majority rules. But there is no reason to restrict attention to voting as a means of making collective decisions in any of these arenas.

However decisions are arrived at, one key issue is the process by which subsequent behavior is monitored and rule violations sanctioned. Principals have to be able to monitor the behavior of their agents before they can sanction them for poor performance; monitoring is equally essential in the context of interpersonal interactions within a given community. But agents typically serve multiple principals with divergent interests, which means that decisions by political agents will help some groups and harm others.

Successes and Failures of Collective Enterprise

Principal-agent problems can be ameliorated (but never completely eliminated) if the social distance between principals and agents is reduced. This can occur most easily in the context of a local community or a small group of people who share some intense interest in common. For example, local communities of farmers or fishers share a common interest in maintaining the quality of their farmland or fisheries, but each of them may also seek to maximize their own income. Although these problems might seem mundane to outside observers, these are matters of life and death to the people directly involved. Thus, analysis of community efforts to manage these common-pool resources can provide important insights into the basic dilemmas of collective action.

The Workshop approach to institutional analysis is based on the assumption that group efforts to manage common-pool resources should be granted the same status as individual or corporate rights to private property. Just as individuals are presumed to be the best judge of their own tastes, user groups should be presumed to be capable of managing their common property. A basic tenet of public policy should be that those groups who are able to manage CPRs effectively should be allowed (and encouraged) to do so, with government intervention undertaken only when user groups fail to manage their resources effectively, or if user groups violate general standards of fairness, accountability, or other widely shared concerns. Instead of presuming that

governmental officials or scientific experts know best how to manage CPRs, user groups should be given the initial benefit of the doubt.

Workshop-affiliated scholars have demonstrated that many self-governing communities in all parts of the world have proven themselves capable of managing their common-pool resources in an effective and sustainable manner (see Ostrom 1990; Ostrom, Gardner, and Walker 1994; McGinnis 1999a). Such efforts are not always successful, as there are certainly examples that more closely resemble a “tragedy of the commons” (Hardin 1968). In cases of community failure, government intervention may be essential. Furthermore, the capacity of some user groups to manage their common-pool resources in an effective manner does not imply that governmental intervention is never appropriate. Whether that intervention should come in the form of centralized management by governmental authorities or dividing up the resource into privately managed segments (or by some other institutional arrangement) is a question that can only be determined by careful consideration of the details of particular cases. The general point is that no one institutional solution will work in all empirical settings.

How are we to determine when different policy instruments are most appropriate? As discussed above, the “market failure” model is commonly used to determine the circumstances under which government intervention is most appropriate. The basic idea is that since market exchange is an efficient way to organize the production and allocation of private goods, governments should intervene only in those circumstances for which private markets are unable to cope. Thus, governments should be responsible for providing public goods (such as national defense), which would be under-provided by private markets. Another responsibility of government is to provide the legal framework within which economic exchange occurs, to limit the exercise of private coercion and to ensure that contracts can be enforced at a relatively low cost.

In effect, Workshop scholars assert that an analogous model of governmental intervention as response to “group failure” should be accorded comparable status. The rights of user groups to manage common property and individual (or corporate) rights to private property should have equal status in law and policy. Just as individuals are presumed to be the best judge of their own tastes, the initial presumption should be that user groups are capable of managing common property. Government intervention should occur only to correct problems of “group failure,” defined in terms directly analogous to “market failure.”

One immediate objection to this assertion is that there is no reason to be sure that groups will manage their resources in an equitable manner. This is certainly a valid concern, for one of the most effective ways to facilitate cooperation among a group is to exclude from membership those people who have significantly different interests. It is certainly reasonable to allow government intervention to prevent gross violations of general standards of fairness, but exactly the same restrictions are typically applied to markets in private goods. Governments routinely prohibit certain kinds of exchanges in the interest of supporting community standards of morality. For example, in virtually all cultures private markets in sex services are made illegal or restricted in some fashion.

In sum, the analogy between “market failure” and “group failure” is quite close. In both cases the initial presumption argues against government intervention, but allows such action to prohibit certain actions deemed unfair by society at large. Considerable room for debate remains open in

the determination of which practices should be prohibited, and it is the responsibility of institutional analysts to provide a solid empirical foundation for these collective deliberations.

Markets, states, and user groups should be seen as complementary institutions. None can live up to their potential without support from the others (see Lichbach 1996). Unfortunately, markets and states have received the bulk of attention in the policy literature, and the record of research by Workshop-affiliated scholars serves as a corrective to this imbalance.

Transaction Costs, Property Rights, and the International System

By building on an extensive set of case studies completed by scholars from all parts of the world, Ostrom (1990) demonstrated that communities throughout the world have made use of many, many alternatives to market exchange and hierarchical organizations. The diversity of institutional arrangements cannot be dismissed as a consequence of the low level of sophistication among user groups. In his extended analyses of the basic institutions of modern capitalism, Williamson (1975, 1985, 1996) has demonstrated that different kinds of nonmarket, nonhierarchical institutions are most appropriate for different empirical contexts. For Williamson, the crucial factor is the extent to which different institutional forms minimize the costs of transacting between individuals or corporate actors. The basic problem is that potential gains from trade may not be realized if the actors do not have sufficient confidence that the other side will refrain from taking advantage of any temporary or limited dependency this exchange might imply.

Williamson was reacting to a tendency in the economic literature to focus on markets as spontaneous and firms as hierarchical forms of organization. A similar distinction has played a prominent role in defining the terms of discourse in the field of international relations. Waltz (1979) asserts that international systems are anarchical, and that these systems are composed by hierarchical states. A balance of power then emerges at the systemic level, in much the same way that economic efficiency is an automatic consequence of market competition. The Workshop perspective on international relations can be illustrated by reference to the works of Bull (1977) and Berman (1983). Bull demonstrates that the international system can be interpreted as a form of social order, in which the members of that society, sovereign states, effectively manage their own affairs. Bull does not use the term self-governance, but he clearly lays out a vision of a self-governing society of sovereign states.

However, Bull's near-exclusive focus on sovereign states causes him to downplay the importance of other forms of collective actors and other forms of international interaction. Berman's (1983) analysis of the nature of Western legal systems in the early medieval period is more congruent with the logic of institutional analysis as developed in this volume. For Berman emphasizes the multiplicity of legal orders that were under development at that time, and that have continued to exist to the present day. From this perspective, the international order has always been polycentric.

Contemporary events in the emerging markets of the former Soviet bloc have clearly demonstrated that markets do not emerge automatically, but must instead be located within a supporting institutional context. This is not a new problem. Milgrom, North, and Weingast (1990) use a game model of the medieval "law merchant" to illustrate the ways in which traders managed to overcome their dilemmas of collective action and thus facilitate long-distance trade,

without establishing a central governing authority. Rulings by law merchants gave traders sufficient confidence to engage in trades. Without a similar level of confidence, any effort to establish markets will be particularly problematic.

Potential trades may not be consummated when one party may not be convinced that the other has clear title to the goods about to be exchanged, or, more generally, whether the property rights of all relevant parties will be respected by their respective governments. Without this assurance, foregone trades will make it impossible for the economy as a whole to perform up to its potential, and economic growth will be slowed. Influential research by Douglass North (1981, 1990; North and Thomas 1973) has demonstrated that a clear definition of property rights is essential before market processes can operate at anywhere near efficient levels. Economic growth requires investor confidence, for individuals or private corporations will make investments to improve the productive capacity of their assets only if they can reasonably expect to enjoy the benefits of these investments. Governments have to convince potential investors that their property will not be confiscated without adequate compensation by some later regime.

One theme common to Williamson's micro-level investigations of alternative organizational forms and North's macro-level examination of property rights and economic growth is that efficiency is the single most important criterion to be used in evaluating institutions (see also Eggertsson 1990). Research by Workshop scholars has demonstrated that more than efficiency is needed for the successful management of public economies, especially over long periods of time. Instead, as discussed throughout this volume, modelers must take into account the common cultural norms and practical knowledge shared by the participants in any ongoing game.

Transaction Costs in Civil Society

Institutional analysis complements well-known results from the literature on "new institutional economics" concerning the importance of property rights and transaction costs, by emphasizing the importance of clarification of property rights over commonly held assets, including the common-pool resources that have been the subject of most of the research included in this volume.

Self-governing groups are an important component of "civil society," which is taken to cover all activities not obviously part of either the private or public sector. However, the term civil society is limiting, for it conveys connotations of special interest groups organizing to articulate their interests to public authorities. Such activities are important, but Workshop scholars have been more interested in demonstrating the ability of groups, particularly CPR user groups, to govern their own affairs rather than simply lobbying for policy changes from the government.

Group rights in civil society and private property rights in markets share many important characteristics. Those groups of resource users who have successfully managed their common resources have done so at the cost of establishing and enforcing rules that often call for self-sacrifice on the part of individual members of that group. They are unlikely to continue to pay those costs if there is sufficient concern that governmental officials will intervene to establish or enforce a different sets of rules. Without this assurance, group cooperation will break down, as individuals succumb to the temptations to over-exploit this resource or engage in other forms of opportunistic behavior.

Williamson (1996) defines governance as the efforts of public authorities to shape the transactions facing individuals in market exchange. Laws make some transactions easier to arrange, while at the same time making other, socially undesirable interactions, more difficult for private actors to implement. In exactly the same way, public laws and policies shape the transactions costs facing elements of civil society. By enforcing laws and punishing the private use of coercion, governments can play an essential role in laying the foundation for successful group management of common-pool resources. In short, an effective governance structure must be supportive of group rights.

Protection of group rights is particularly crucial if the policy goal is sustainable development, and not just economic growth per se. Resource sustainability is not a new idea: groups of fishers, farmers, and herders throughout the world have coped with sustainability problems throughout human history. Governmental officials and policy analysts should remain open to the possibility that they may be able to learn from user groups about the conditions for successful resource management.

Rent-Seeking and Social Welfare

In a liberal democracy, governments should be supportive of group efforts at self-governance. Unfortunately, in much of the world, governments actively undermine group efforts to organize their own activities. In totalitarian states the assertion of state control is taken to its logical extreme, but even in the petty autocracies so common in the developing world, governmental officials assert the right to grant permits that individuals, corporations, or groups need to operate as a private business or as a user group. This right to grant permits is, of course, a lucrative source of bribes and corruption. In effect, governmental office is treated as a private resource.

Whether political authorities or bureaucratic officials are granted exclusive rights to the writing or enforcement of laws and regulations, the potential for rent creation is unavoidable. In this usage, rents are created whenever political authorities create artificial scarcities (by restricting production or entry into a market to a certain type of individuals, requiring permits, or putting restrictions on imports). Those who stand to benefit from such restrictions will engage in costly activities to obtain these benefits, and this “rent-seeking behavior” detracts from the overall welfare of society. The terms rents and rent-seeking are used to cover a multiple of sins, and space does not permit a full discussion of the associated controversies (see Mueller 1989: 229-246; Tollison 1982, 1997). The key point is that rents prevent a market economy from attaining the efficiency of perfect competition. The recipient of the specific rents will benefit, certainly in the short term, but in the long term society as a whole will suffer.

The specific nature of the rents differs for different types of political order. In an autocratic regime, for example, the recipients of rents are likely to be members of the ruler’s family or others with a close personal connection to the ruler. Those groups (such as the military or domestic security forces) upon which the ruler is most dependent may benefit greatly from the ruler’s policies (see, for example, Wintrobe 1998). In liberal democratic regimes, the recipients of protection tend to be interest groups that reward public officials in the form of votes or campaign contributions (see, for example, Magee et al. 1989).

Rents and other distortions to the operation of private markets are important topics for the field of public choice. In brief, public choice can be defined as the application of economic methods

of analysis to the behavior of public officials. Public choice is an important corrective to the still influential tradition of welfare economics, in which a “benevolent social planner” is presumed to be willing and able to implement policies that are in the best interest of society as a whole (see Mueller 1998: chapter 19). In the public choice tradition, elected and appointed officials are presumed to be motivated by their own selfish interests, whether or not they are interested in maximizing social welfare. Niskanen (1971), for example, argues that agency heads act to maximize their agency’s budgetary resources whenever possible. Such assumptions, while simplistic, can bring important insights to the interactions of public and private actors.

Public choice modelers often use the preferences of the “median voter” as an indicator of the likely outcome of democratic processes. In effect, the preferences of this decisive voter stand as a surrogate for the social welfare function that was so deeply undermined by Arrow’s Theorem. In this way, modelers retain the ability to make assertions concerning the relative desirability of alternative policies or institutional structures for society as a whole.

Those of us who’ve spent time at the Workshop tend to be deeply skeptical whenever an administrator or policy analyst claims to understand or implement policy for the greatest good of society. Vincent Ostrom (1989) identifies the pernicious effects of this widely shared attitude on the field of public administration, while laying out an alternative vision of public administration within the context of polycentricity (to be discussed more fully below).

Institutional analysis shares many of the characteristics of public choice, but its scope is wider. Self-governing groups may or may not delegate authority to particular individuals, since they may be capable of handling the relevant tasks themselves. In other circumstances, delegation may be crucial, especially for the services of monitoring and sanctioning rule violators. Concerns about rent-seeking or agent-principal relations are essential in the latter context, but may not be relevant in the former. Institutional analysis can be seen as a form of public choice where the focus is not restricted to the behavior of public officials, and citizens are not treated merely as voters or campaign contributors.

Efficiency and Self-Governance

Public choice theory brings to the study of politics a relentless focus on the importance of efficiency in public policy. Clearly, the efficient allocation of resources to production or consumption is a goal worthy of careful pursuit. However, individuals or communities may decide, for whatever reason, to sacrifice efficiency for the pursuit of other goals, such as accountability, fairness, or sustainable development (however these terms are understood within the relevant communities).

One reaction is to expand the definition of efficiency to incorporate these additional goals into the underlying utility or production functions being modeled. This practice can be very useful for models of the long-term sustainability of resource management practices (see Dasgupta and Heal 1979). Workshop-affiliated scholars have tended to take a more indirect approach, to define economic efficiency more narrowly and to supplement their analyses with explicit consideration of other collective goals. For example, Ostrom (1990) lays out eight “design principles” that were common to a large number of instances of the successful long-term management of common-pool resources. Economic efficiency is not specifically included in this list, although it is implicit in the requirement for congruence between the rules-in-place and the physical nature

of the goods. But the focus of her description of this congruence principle lies instead on the importance of a meaningful correspondence between the rules-in-use and the normative beliefs of that community. That is, participants must feel that the rules are “fair” according to the standards of the relevant community, or else they will not put forth the effort required to overcome their dilemmas of collective action. This is not to say that economic efficiency is irrelevant. In some institutional arrangements, especially when competitive markets in private goods are available, the criterion of efficiency takes on a unique prominence. In general, however, multiple evaluate criteria must be given equal consideration.

The ability of self-governing groups to resolve their own practical problems, as they themselves define the problem, is the central theme that unifies all of the many research programs undertaken by Workshop scholars. But self-governance is not a simple matter of groups with homogeneous tastes forming a “club” (Sandler and Tschirhart 1980). Nonprofit organizations, for example, are an important expression of self-governance and an essential component of civil society. Hansmann (1980), Weisbrod (1977, 1988), and Salamon (1987, 1995) treat the nonprofit sector as a third sector of the economy that fills important roles left open by both the private and public sectors. From this point of view, nonprofit organizations are granted tax-exempt status in order to facilitate their contribution to collectively desired goods and services that can be most efficiently provided in that manner.

Even so, nonprofit organizations cannot be fully understood when considered solely in efficiency terms. Individuals may receive direct benefits from participation in such groups, including the resolution of important problems. Nonprofit and nongovernmental organizations have long been of considerable interest to Workshop scholars, as expressions of the natural human tendency to form groups and to solve problems.

Collective Action, Community, and Networks of Organizations

Whenever assets are held in common, or maintained by some communal activities, it is necessary to make some arrangements for the monitoring of individual behavior and for the sanctioning of those individuals who do not fulfill their obligations under the agreed-upon rules. At this point a contrast with perhaps the best known approach to the study of collective action is in order. Olson (1965) argues that selective incentives are the key inducement for individual participation in collective action. This may be true for the types of groups Olson has in mind, which tend to be groups that lobby the government for the provision of some service. (Alternatively, groups may form in order to overthrow the existing government or to express their displeasure; incentives for group formation in this context are surveyed by Lichbach 1995, 1996.) In other words, these are voluntary groups that individuals may form if they choose to do so, and they may or may not choose to contribute towards the production of the collective good in question. Workshop scholars tend to focus on groups (farmers, fishers, etc.) whose very livelihood is dependent on the success or failure of their efforts to manage a salient resource collectively.

Such groups often see themselves as a community, which shares common understandings and values even if individuals have conflicting interests. A sense of communal belonging can make an important contribution towards group success, but it must be consistent with the rational pursuit of individual interests (Hechter 1987). Lichbach (1996) demonstrates that community can

play a contributing role in resolving dilemmas of collective action, but that markets, contracts, and coercion also play essential roles. No one mode is sufficient unto itself.

March and Olsen (1984, 1989) emphasize one way in which a sense of shared understandings contribute towards the smooth operation of collective action. They stress that each institution (or organization) has associated with it a “logic of appropriateness,” meaning that only certain kinds of actions are deemed to be acceptable or appropriate for the agents of particular organizations or for interactions among members of that organization. This logic is part of the overall cultural context within which organizations and individuals interact. In this sense, then, the set of organizations in existence at any given time can be seen as a concrete embodiment of the cultural understandings shared by members of that community.

It is also important to realize that no one organization stands completely on its own. Instead, organizations are linked together in complex networks. So are the individual members of a community. Thus, one important path towards an understanding of social interactions is to understand these networks, their inherent dynamics, and the nature of their underlying structure (Nohria and Eccles 1992).

Market Competition and Democratic Governance

This concern for institutional context leads us back to the issue of market failures with which this section began. If a community finds that market processes are unable to produce the kinds and levels of public goods and services that they need, but they are also reluctant to cede all authority and sanctioning power to an unresponsive Leviathan, then they will need to make some other arrangements. What types of arrangements will be made, and how will they monitor the outcomes of these arrangements and apply sanctions to their representatives who do not deliver the goods? These are the basic questions confronting Workshop scholars.

In Tiebout’s (1956) “voting-with-the-feet” model, public entrepreneurs offer packages of public goods to their communities. Those individuals dissatisfied with the mix of public goods and services provided by their local officials have the option of moving to the jurisdiction of another group of public authorities whose policy package is more desirable than the first. If the costs of moving are relatively low, and the range of alternative officials or jurisdictions is sufficiently wide, then the result would be a close approximation of the model of market provision of private goods. That is, groups of individuals with similar tastes for public goods and the taxes needed to finance them would gather together in relatively homogeneous communities serviced by public officials who best provide for their needs.

There are, of course, significant problems with the application of this principle in practice. Individual tastes are diverse, and there exist far more public goods or services than jurisdictions, so the match between community preferences and public goods provision is sure to be inexact. Yet, this simple model does have some important implications. Capital, for example, is typically more mobile than labor, and so the owners of capital can exert considerable control over the policies of public officials. Lindblom (1977) argues that the ability of business leaders to credibly threaten to move their capital elsewhere places severe restraints on the types of taxing and other economic policies that public officials can implement. For those officials who enact especially distasteful policies will find their economic base undermined by capital flight, which will lead to a worsening of economic conditions, which is likely to lead to the removal of the

offending officials in the next election. Since public officials are rational, they will be deterred by this prospect of losing office and not enact policies too distasteful to the private sector. This situation can set up a “race to the bottom” as separate jurisdictions compete to provide favorable conditions for business. Lindblom is very concerned about this “market as prison” effect, because it greatly limits the ability of democratic officials to provide the policies desired by a majority of the public. Alternatively, this effect can be seen in a positive light, in the sense that it precludes the implementation of particularly ineffective economic policies.

Polycentricity and Self-Governance

In general, individuals should not have to move to other jurisdictions (or threaten to relocate their capital assets) to garner the benefits of competition among the providers of public goods or services. Ostrom, Tiebout, and Warren (1961) introduce the alternative conceptualization of a “polycentric political system” in which public officials representing a community (or the members of that community themselves) can select from alternative mechanisms for the production of public goods or services. These producers may be private firms, public agencies, or some other entity entirely. In this system the “providers” of public goods and services can make arrangements with those “producers” of the good or service that operate at the most efficient scale of production. This enables the system to achieve a degree of efficiency while still allowing communities a much wider range of choice. Ostrom and Ostrom (1977) use the term “public service industry” to denote the network of large and small organizations that are involved in the production and provision of any particular type of public good or service. In effect, then, a polycentric order consists of networks of interacting organizations.

Another way in which polycentric order may lead to improved efficiency is by lowering rents. When multiple political authorities must interact to implement restrictions, then it will be more difficult for any one group to protect their position against market and other pressures. Conversely, agents who have a monopoly on authority in a given issue area are likely to induce significant levels of rent-seeking behavior. Recently, Wagner (1997), writing from outside the circle of Workshop scholars, provides a succinct statement of the implications of polycentric order for the study of public finance.

But efficiency is not the primary reason to advocate establishment and maintenance of a polycentric system of interacting authorities and citizens. Instead, polycentricity is a fundamental pre-requisite for individual liberty and the ability of groups to govern their own affairs (V. Ostrom 1987, 1991, 1997). It is this connection between polycentricity and self-governance that lies at the very core of all of the theoretical and empirical research programs implemented by Workshop scholars.

The centrality of this concept inspired use of the term “polycentric games” in the title of the current volume. The implications of polycentricity for modeling should be evident: it is not ideal to model any one game in isolation. Simple models remain useful, especially for highlighting crucial components of particular empirical settings. However, when models are based on majority voting, economic efficiency, or any other single criterion, then it is too easy to lose sight of other equally essential aspects of the institutional context.

Self-governance at the local level is sustainable only in the context of a supportive political and cultural environment at the constitutional level. Market exchange can lead to efficient outcomes

only when political and legal institutions guarantee secure property rights and provide general access to low-cost and effective means of conflict resolution. Even the coercion so often taken as the defining characteristic of the “state” can lose its effectiveness if the rulers lose contact with local traditions and expectations, or if productive assets flow across national borders in search of more promising opportunities abroad. Markets, states, and user groups should be seen as complementary institutions. Each has its proper role to play in polycentric governance, its own unique configuration of strengths and weaknesses.

Institutional Analysis and Inductive Research

Research conducted by Workshop-affiliated scholars has made important contributions towards establishing the legitimacy of group management of common-pool resources. For the most part, this research has been inductive in nature, using successful instances of self-governing groups as an “existence proof” of the reality of successful CPR management. Claims are not made that user groups always achieve “efficient” outcomes, but rather that the remarkable thing is that groups are able to manage common-pool resources over long periods of time, thereby avoiding the dire straits predicted by Hardin’s (1968) tragedy of the commons.

Ostrom (1990) is the most widely-cited summary of these research programs. Mathematical models and experimental settings have been used to complement the findings of field research (see Ostrom, Gardner, and Walker 1994; McGinnis 1999a). One way that Workshop scholars have kept the broader institutional context in view is by making use of inductive modes of research. Even simple models tend to be inspired by observation of the ingenious solutions devised by specific communities to address particular problems, rather than being derived from first principles.

The inductive thrust of Workshop models was noted in Mitchell’s (1988) comparative analysis of what he calls the Bloomington school, defined in contrast to the Rochester school of social choice (with its emphasis on formal models of voting) and the Virginia school of public choice (with an emphasis on rent-seeking and economic efficiency). However, it is also important to keep in mind the broader institutional context that lies behind specific models in the Workshop tradition. The three arenas of choice encompassed by the IAD framework, as well as linkages among physical, cultural, and institutional factors highlighted by that framework, are two key aspects that have shaped institutional analysis.

Introduction to Part I: Developing a Framework for the Analysis of Institutions

1. Public Choice: A Different Approach to the Study of Public Administration – Vincent Ostrom and Elinor Ostrom, 1971
2. The Three Worlds of Action: A Metatheoretical Synthesis of Institutional Approaches – Larry L. Kiser and Elinor Ostrom, 1982
3. An Agenda for the Study of Institutions – Elinor Ostrom, 1986
4. A Grammar of Institutions – Sue E.S. Crawford and Elinor Ostrom, 1995

In “Public Choice: A Different Approach to the Study of Public Administration” (Chapter 1), Vincent Ostrom and Elinor Ostrom survey the analytical foundations of the Workshop approach to institutional analysis. In this essay from *Public Administration Review*, first published in 1971, they lay out a general method of analysis that has some important differences from the

mainstream approach to public choice. Mueller (1989: 1), defines public choice as “the economic study of nonmarket decision making, or simply the application of economics to political science.” Although this ever-growing body of public choice research has always been an important source of inspiration for scholars associated with the Workshop, there have been many other sources that push in somewhat different directions.

For example, Workshop scholars are skeptical of claims that a single model of rational behavior is valid for all individuals in all institutional contexts. Rational choice theory, grounded in methodological individualism, provides the general approach to research, but different models may be relevant for different situations. For example, the same individual might follow Simon’s (1957, 1997) satisficing procedure in one decision context while engaging in more extensive information search and evaluation in other situations. Selective pressures may be strong enough to eliminate habit-driven behavior in some contexts but not in another. There is no reason to presume that any one individual acts exactly the same in all circumstances; still, there is merit in trying to locate the relevant range of decisional procedures within the context of a common explanation.

In Chapter 1 the Ostroms review alternative approaches to the study of public administration. They begin by critiquing the standard view of public administration as an exercise in planning, a view most clearly articulated by Woodrow Wilson and other major figures in the American reform tradition (see E. Ostrom 1972; V. Ostrom 1989). They then discuss Herbert Simon’s (1957, 1964) influential critique of the assumption that individuals or organizations can reasonably be expected to have the capacity to plan at the necessary level of detail and comprehensiveness. They also discuss efforts by Tullock (1965) and other public choice theorists to interpret the behavior of bureaucratic officials as driven by an unremitting pursuit of their own selfish interests in power, prestige, or resources. However, they argue that the same official, if placed in a different institutional context, might be less inclined (or less able) to take advantage of that position.

The authors argue that the “nature of the good” is an important analytical category that cannot be overlooked in political discourse or empirical evaluation. Different institutional arrangements will be most effective for the resolution of problems associated with the production, provision, or allocation of private goods, public goods, common-pool resources, and toll goods. (For an extended discussion of these distinctions and their implications for institutional analysis, see Ostrom and Ostrom 1977a and other essays reprinted in McGinnis 1999b.)

The authors conclude with a brief overview of the merits of polycentricity as an alternative approach to public administration. Rather than seeing governance as a question of the implementation of a single, uniform law, allowance should be made for local communities to form associations at whatever scale of aggregation that they feel is most appropriate for the solution of their common problems. Public officials are then seen as providers of public goods and services to these communities. As providers, they do not need to produce the goods or services themselves, but can instead choose to make arrangements with private producers, other public agencies, or even encourage the communities to produce the relevant goods or services themselves. The potential benefits of such a system of polycentric order are described in more detail elsewhere (see especially Ostrom, Tiebout, and Warren 1961).

In Chapter 1 the Ostroms briefly discuss their interpretation of the classic dilemmas of collective action as laid out by Olson (1965) and Hardin (1968). They emphasize the importance of including constitutional order within the purview of the analysis of particular policy problems, and insist that voting is only one of many ways in which communities can arrive at collective decisions. All in all, they sketch institutional analysis as a distinctive approach to the study of public policy and political economy (see Mitchell 1988).

The Institutional Analysis and Development Framework

One of the distinctive emphases in institutional analysis is the recognition that rational choice theory is not the only way in which collective choices can be conceptualized. In addition, there may not be a single process of “rational choice” that applies equally to all institutional contexts. Because of these complexities, an institutional analyst seeking to model or analyze a particular empirical setting must first determine what explanatory factors are most likely to be useful in those circumstances. Through a long series of ongoing discussions among faculty, students, and practitioners, an overall “framework” of analysis has been developed. This framework lays out a general conceptual schema that encompasses all of the factors most relevant to alternative theories of choice and to particular models of specific empirical situations.

This sequence of framework-theory-model helps clarify the scope of disputes between advocates of different modes of analysis. In some cases analysts may share the same theory but disagree over what particular assumptions should be built into a model of a specific situation. Similarly, analysts who are less comfortable with rational choice theory as it is typically conceptualized may still share a common framework of analysis with rational choice modelers.

To craft this framework of analysis, emphasis has been placed on an understanding of the overall *action situation* confronting individuals and groups. In “The Three Worlds of Action: A Metatheoretical Synthesis of Institutional Approaches” (Chapter 2), Larry Kiser and Elinor Ostrom summarize the *Institutional Analysis and Development (IAD) Framework*, an organizing schema that emerged out of extensive discussions at the Workshop. Two later formulations (Oakerson 1992 and Ostrom, Gardner, and Walker 1994: chapter 2) include further refinements, but this chapter remains the canonical presentation of the IAD framework precisely because it portrays it as a work in process. A wide array of factors must be included in any full-scale analysis of the implications of particular institutions, and keeping a handle on this diversity is an ever-shifting task.

Distinctions among *action situations* in arenas of operational, collective, and constitutional choice recur throughout all Workshop research programs, as do discussions of interactions among physical or material conditions, attributes of the community, and the *rules-in-use* that shape the behavior of individuals or organizations. The IAD framework provides a shared language for a wide array of institutional analyses, thus facilitating comparisons among more specific theories and models of particular phenomena.

However, one aspect of this language can be potentially confusing. As discussed in the general introduction to this volume, the term “levels of analysis” should be reserved for processes operating at different scales of aggregation, as in international relations theory (Waltz 1959; Russett and Starr 1996). The term “arena of choice” seems a better reflection of the basic idea behind the “three worlds” in the title of this essay.

Outcomes in one arena of choice define the nature of the games being played concurrently in other arenas. For example, constitutional decisions define the processes by which organizations are expected to interact. Similarly, collective choices specify the operational rights and responsibilities of specific actors. All three arenas interact in any one situation.

A Subtle Difference of Emphasis

In her Presidential Address to the Public Choice Society, “An Agenda for the Study of Institutions” (Chapter 3), Elinor Ostrom provides a fuller explanation of the “action situation” that lies at the core of the IAD framework. In doing so, she lays out a research program meant to generalize standard conceptualizations of game models. Rather than assuming that all actors are identical in interests or capabilities, Ostrom lays out a set of categories that jointly define the roles different types of players fill as well as the rules by which their interactions are structured. Although much of game theory has been focused on models of actors with symmetric interests or capabilities, Elinor Ostrom argues that it is crucially important to incorporate at least some of the ways in which actors differ. In particular, institutions define new roles, thus imparting to certain individuals a set of interests, capabilities, and responsibilities that should be incorporated in any effort to model the effects of institutional arrangements. She argues that all institutions share some foundational set of components; any one institution’s consequences are determined by the configuration of these structural elements. In this way she hopes to move the field beyond a preoccupation with supposedly “institution-free” settings to fuller and more useful formal representations of institutions.

Ostrom presents her concept of an “action situation” as a generalization of standard game models. However, a typical reaction of game theorists is that they also have to define each of the components that Ostrom lists in her framework, or else their game models would not be fully specified. Technically speaking this is correct, but there remains an important difference in emphasis. For Ostrom, and for other Workshop scholars, it is essential to keep in mind the extent to which actors’ preferences as well as the choice options available to them are determined by the institutional arrangements that define their position or that shape their perceptions and options. It is essential to remember that concurrent games in other arenas of choice interact in subtle ways with any ongoing process of interaction. The payoffs and menu of choices available to participants in operational games have been defined by collective choice processes. Games over collective deliberations are in turn shaped by the positions and interests defined or manifested in the constitutional choice arena. In a strict sense this may be no different from a complete specification of a game model, but in practice this concern with simultaneous consideration of multiple choice arenas inspires Workshop-affiliated scholars toward a more inductive mode of analysis.

Specifically, Ostrom calls for a shift away from the analytical practice of considering changes in the rules of the game in isolation. She argues that the implications of sets of rules must be understood, since they act together in a configural manner. Interactions among rules were emphasized in classic work by John R. Commons (1959), and Ostrom applies this idea to contemporary game theory. In this essay she develops several examples from the theoretical and experimental literature on public choice to illustrate the configural nature of rule changes.

This general point that rules need to be explicitly specified in game models is developed further in Roy Gardner and Elinor Ostrom (1991), in which several game models are used to represent the implications of a series of alternative rules for the assignment of fishing spots (see also Ostrom, Gardner, and Walker 1994). They begin by laying out Hobbes' conceptualization of a "state of nature" as a "default condition" which might apply to some situations, but in nearly all social settings there are differences among actor interests and capabilities which can be attributed to the existence of institutional rules. This essay serves as a great follow-up piece to the more abstract presentation of the abstract principles laid out in Elinor Ostrom's "Agenda for the Study of Institutions," but because the specific models discussed there were incorporated into the analysis presented in Ostrom, Gardner, and Walker (1994), it did not seem appropriate to reprint that material here.

Ostrom (1989) delves deeper into the nature of the actors who interact to form action situations. She assumes that individuals can learn, but only imperfectly. Individuals are subject to a multitude of influences, but individuals located within the supportive environment of polycentric order are more likely to successfully adapt to their situations. In effect, this essay can be seen as a more micro-level investigation of the core components of the IAD framework. Elinor Ostrom re-visits these issues in a more comprehensive manner in her Presidential Address to the *American Political Science Review*, included as the last selection in the present volume.

These essays on interactions between institutions and individuals also reflect the influence of a community of scholars at the Center for Interdisciplinary Research at Bielefeld University in Germany, where the Ostroms served as visiting scholars during 1981. Elinor Ostrom later spent a semester there studying game theory with Reinhard Selten, a Nobel Prize laureate with a long-standing interest in innovative ways of interpreting the behavioral basis of game theory. His influence can be seen especially in the game models section of E. Ostrom, Gardner, and Walker (1994) and in essays Elinor Ostrom co-authored with Franz Weissing (including chapter 13 of this volume). A collection of essays edited by Kauffman, Majone, and Ostrom (1986) includes chapters by several policy analysts (including Paul Sabatier) and prominent game theorists Reinhard Selten and Martin Shubik. It includes two chapters by Elinor Ostrom laying out the IAD framework as it was understood at that time and three chapters by Vincent Ostrom (including the essay co-authored with Roberta Herzberg reprinted in this volume) on voting systems and the nature of constitutional order. This Bielefeld volume is a fascinating illustration of diverse but related efforts to comprehend interactions among systems, networks, hierarchies, institutions, and norms.

Incorporating Normative Considerations

Another distinction from the international relations literature is useful at this point. In the constructivist approach to international relations, a distinction is made between obligatory and constitutive norms (see Katzenstein 1996). Obligatory norms are moral prescriptions that specify what individuals or organizations *should* do in specific empirical contexts, whereas constitutive norms *define* the very nature of these organizations. In this sense both the organizations and the nature of their interactions are "socially constructed." In terms of the IAD framework, these constitutive norms are equivalent to the interactions between arenas of choice discussed above, whereas obligatory norms are manifested in the ways in which actors interact in any single choice arena. However, Workshop scholars would cringe at the term "obligatory," since no norm

is self-enforcing but must instead be supported by some form of monitoring and sanctioning (see Ostrom 1990).

V. Ostrom (1976) summarizes one of the most important inspirations behind this effort to bring normative expectations within the purview of institutional analysis. John R. Commons (1959) was concerned about directing attention to what he calls “going concerns” rather than remaining fixated on the details of organization charts or constitutional provisions. In a “going concern” individuals are engaged in a series of transactions, which are shaped by the overall structure of legal rules and moral expectations. Commons’s basic framework has recently inspired an extensive body of research on the ways in which the costs associated with any form of transaction between two or more actors can be reduced in order to facilitate the likelihood that mutually beneficial transactions would be undertaken. This area of “transition cost economics” is most closely associated with Williamson (1975, 1985, 1996); related areas of “new institutional economics” are surveyed in Eggertsson (1990).

Vincent Ostrom asks us to step back to re-examine the “old institutional economics” of John R. Commons. Ostrom draws on distinctions Commons makes concerning relationships between the rights and responsibilities of individuals serving in different legal capacities. For example, any provision that a public official “must” take a certain action necessarily implies a responsibility for some other official, or for the citizenry as a whole, to undertake an effort to monitor the behavior of the first official, to make sure the original provision is being satisfied (see also Ostrom and Ostrom 1972). Without this additional structure, the first legal provision stands in isolation and cannot be expected to be realized in actual conditions. Mutually reinforced sets of rules, rights and responsibilities constitute what Commons calls “working rules,” and it is to this type of rules that Workshop scholars have directed their attention. Knowing the law is not enough -- it is also essential to understand how those rules are implemented in specific action situations.

In “A Grammar of Institutions” (Chapter 4), Sue Crawford and Elinor Ostrom push this line of argument further. They use a sequence of definitions to try to make sense out of the multiple meanings of such conceptually slippery terms as institutions, rules, and norms. This conceptualization builds on many sources, including the deontic logic of von Wright (1951) and the legal framework of John R. Commons (1959). One important component concerns the consequences of the extent to which individuals internalize the norms of their community. This internalization makes certain socially undesirable actions costly to the relevant individuals, but these internal costs are rarely sufficient to prevent completely the occurrence of prescribed behavior. Thus, finding some way to monitor and sanction rule-breaking behavior remains essential to the maintenance of social cooperation. In this way this conceptualization provides a logical foundation for the observed importance of monitoring and sanctioning in successful CPR regimes (E. Ostrom 1990; McGinnis 1999a).

The internal costs included in their representation of actor incentives act like the “obligatory norms” discussed above, in the sense that they help define what actors consider to be acceptable and unacceptable behavior. Meanwhile, broader institutional arrangement (from other arenas of choice) define the options available to the actors themselves, by specifying which acts are prohibited, permitted, or required. In game models analysts select which actions are available to the various actors included in the model, but institutional analysts build on the realization that the

set of options available to actors in any action situation is determined in games in other arenas of choice. Similarly, game theorists can posit whatever incentives they want for their modeled individuals to pursue, but in applications it is important to understand the source of those payoffs. Hence the need to consider the broader context of “polycentric games.”

Introduction to Part II: Voting, Conflict, and Leadership

5. Votes and Vetoes – Roberta Herzberg and Vincent Ostrom, 1986
6. Negative Decision Powers and Institutional Equilibrium: Experiments on Blocking Coalitions – Rick Wilson and Roberta Herzberg, 1987
7. Policy Uncertainty and Two-Level Games: Examples of Correlated Equilibria – Michael D. McGinnis and John T. Williams, 1993
8. Shepherds and their Leaders Among the *Raikas* of India: A Principal-Agent Perspective – Arun Agrawal, 1997

Essays in Part II show how the general frameworks presented in Part I can be used to address specific questions of voting, conflict, and leadership. Despite their many differences in substance and method, all of these essays deal with important aspects of the problems faced by any community seeking to agree upon some collective decision.

Voting and Constitutional Order

When North Americans of the revolutionary era engaged in an explicit exercise in constitutional choice, they designed a multi-faceted system of checks and balances. Vincent Ostrom (1987) details the basic conceptual framework upon which the Founders built this constitution as an act of creative artisanship (Ostrom 1980). In “Votes and Vetoes” (Chapter 5), Roberta Herzberg and Vincent Ostrom demonstrate the natural connection between voting as a positive act and the many veto points included in the constitutional order of checks and balances. They argue that the ability of diverse minority interests to block the implementation of policies which they strongly oppose has played an important role in sustaining the American experiment.

Voting is typically taken to be the defining characteristic of modern democracy. Several voting institutions are included in the U.S. constitution, but the essential foundation for the subsequent success of the American experiment in democracy lies in the polycentric nature of the American constitutional order (Ostrom 1991, 1997). Voting institutions, per se, receive considerably less attention in this book than would be expected by most political scientists. Voting is one important way in which individual preferences can be said to be aggregated into public policy, but communities need not rely on formal mechanisms of voting. Normative theorists have long emphasized that an attitude of respect towards the perceptions and interests of other citizens is a fundamental requisite of a sound democracy, and discussions in informal settings are often sufficient for small groups to arrive at a consensus. In short, democratic governance requires more than voting procedures and representative institutions.

One of the most important lessons of the Workshop for political science in general has been to highlight the importance of forms of political interaction that do not involve voting. The point is

not that voting is inconsequential, but rather that it may have received proportionally too much attention by political scientists (see McGinnis 1996).

Reliance on majority rule has a tendency to direct political agents to conceptualize politics in terms of a contest in which one either wins or loses, rather than approaching politics from a problem-solving orientation. In so doing, political scientists run the risk of losing sight of the ways in which real communities of people manage to work out their own problems. It is this later form of politics that lies at the core of the Workshop approach to policy analysis.

An over-emphasis on majority voting can contribute to the reinforcement of a Hobbesian conceptualization of sovereignty that is fundamentally at odds with sovereignty as conceptualized by the founders of the American republic. As Vincent Ostrom (1987, 1991, 1997) emphasizes, the capacity of self-governing communities of individuals to resolve their own problems is the key ingredient in the perpetuation of a democratic system of governance. Still, voting remains one way in which groups can make collective decisions, and as such voting institutions are fully deserving of careful analysis. And, indeed, voting has played a central role in the research programs of several scholars associated with the Workshop. Full consideration of this topic would take us too far from the central theme of this volume, but to ignore it entirely would result in an incomplete portrayal of Workshop research programs.

Social Choice and Laboratory Experiments

The central result of social choice theory identifies the problems of logical coherence that plague any effort to use majority voting to resolve questions of public policy. Arrow's (1963) Theorem tells us that voting cycles can occur in any system of aggregating preferences that satisfies the full set of fairness conditions laid out in that work. Another central result of social choice theory concerns the instability of majority voting processes (see Riker 1982). This instability can result from the general ability of participants to find some policy proposal that will defeat the status quo.

Since very little in the real world of legislative behavior corresponds to this impression of endless chaos, many researchers have sought to uncover the ways in which chaotic outcomes are avoided. Perhaps the most well-known effort is the "structure-induced equilibrium" of Shepsle (1979) in which specific legislative rules are shown to limit the ability of agenda setters to raise certain issues. Those scholars who study voting institutions from the Workshop perspective have focused on more subtle forms of institutional arrangements that might have many of the same effects as the details of legislative procedures.

In "Negative Decision Powers and Institutional Equilibrium: Experiments on Blocking Coalitions" (Chapter 6), Rick Wilson and Roberta Herzberg represent negative voting power in terms of a spatial voting model. They report on laboratory experiments that demonstrate that giving one individual blocking power tends to help that individual get a more desirable outcome from the voting game. They did not detect any evidence that blocking power was able to uniquely define any particular point in the policy space as the "natural" outcome of the game, except to reinforce a tendency to remain at the status quo point. For if the individual with blocking power prefers the status quo to any offered alternative, then the status quo is going to be preserved. In this way they were able to demonstrate, in a laboratory setting, the import of the factors emphasized in the preceding selection.

In another work, Herzberg (1992) uses a spatial voting model to explore the logical consistency of an argument made by John Calhoun concerning the effects of concurrent majorities. That essay stands as a good example of the ways in which formal game representations can help clarify the strengths and weaknesses of arguments typically made in a more informal manner. Jillson and Wilson (1994) apply modern spatial voting models to the decisions made by the first American congress, during the Articles of Confederation era, thus demonstrating that these technical advances can also help improve our understanding of our past historical eras.

In a series of related works, Herzberg and Wilson used laboratory experiments to explore several other aspects of voting institutions. Herzberg and Wilson (1991) demonstrate that the potential for agenda manipulation can be limited if legislators incur costs by adding issues to the agenda. By treating the gathering of certain kinds of information as costly, a degree of stability can be imposed on collective outcomes. It is often argued that the capacity of individuals to misrepresent their preferences via strategic or sophisticated voting can serve to counteract the manipulations of agenda setters (see Riker 1982). The experimental results of Herzberg and Wilson (1988) show how difficult it is for experimental subjects to achieve their desired results via sophisticated voting. Of course, this result does not necessarily imply the nonexistence of sophisticated voting in other contexts, when participants have at their disposal a wider range of ways to gather information or to coordinate their behavior on matters of great concern to them at the time. Still, these results do point out the difficulty of sophisticated behavior in a relatively sparse institutional context. In a related vein, Haney, Herzberg, and Wilson (1992) explore some of the difficulties associated with the efforts of leaders to garner useful advice from a small group of advisors. Again, however, the specific nature of the laboratory setting may not have captured the rich institutional context of foreign policy making in the real world. Nonetheless, laboratory experiments have proven to be a very useful means of investigating the implications of alternative institutional arrangements.

Conflict and Governance

The dilemmas of collective action in the international arena take center stage in the next selection. In “Policy Uncertainty and Two-Level Games: Examples of Correlated Equilibria,” (Chapter 7), John T. Williams and I examine situations in which a diverse array of information is readily available for policy makers to consider. We argue for a broader interpretation of relationships between national and international politics, by justifying a formulation of “two-level games” that differs in substantial ways from Putnam’s (1988) more influential formulation. Whereas Putnam specifies a particular sequence of events in which the results of international negotiations are presented to domestic legislative institutions for approval or ratification, we argue that policy advocates in all states involved in international interactions are going to have access to extensive amounts of information that should help them predict the likely behavior of other governments. As a consequence, we argue that Aumann’s (1987) correlated equilibrium may be a more appropriate tool for modeling the outcomes of these two-level interactions. This essay differs from much of the game theoretic tradition by not specifying the steps by which individuals obtain information, but it does present an interesting alternative to more standard representations based on games of incomplete information (or signaling games).

Aumann’s notion is disarmingly simple. Even though game theorists may be uncertain which of the many possible equilibria will be selected by the players, the participants have access to a wide

array of informational cues that they can use to help them coordinate on a particular solution. This is not to say that coordination problems are trivial; far from it. As we show in this chapter, a failure of coordination may occur with some positive probability even for the case of correlated equilibrium.

We do not specify the sources of informational cues in our general analysis of the relevance of correlated equilibrium to two-level games, precisely because the nature of the relevant cues will differ in different contexts. However, we could have placed more emphasis on the importance of institutions as providing cues to the players as they seek to coordinate their behavior, either explicitly or implicitly. For example, CIA estimates of Soviet military spending played a very important (and controversial) role in helping sustain the behavior patterns underlying rivalry between the two superpowers during the Cold War (see McGinnis and Williams 2001).

The concept of correlated equilibrium is equally relevant at both of the levels of analysis included in a domestic-international game. Competing policy advocates within any one country have a common interest in arriving at a collectively sound policy, but conflicting interests over the content of that policy. A similar mixture of common and conflicting interests recurs at the level of international interactions, for the leaders of rival powers may share a common interest in avoiding war or excessively high arms expenditures. Elsewhere (McGinnis and Williams 2001), we demonstrate that under conditions of international rivalry we can expect the efficient use of information in policy debates to resolve domestic coordination problems while simultaneously exacerbating problems of international cooperation. From the perspective of polycentric games, it is important to understand multi-level dilemmas of collective action and other cross-level linkages.

Under our interpretation of Aumann's correlated equilibrium solution concept, participants are conditioning their behavior on the common signals generated from the vast amount of information that becomes available in debates over contentious public issues. No one individual has access to all relevant information, and reasonable people are likely to interpret this same information as support of contradictory policy initiatives. Still, at the aggregate level, there may be circumstances under which information use may be so efficient as to approximate the behavior expected of a unitary rational actor. Game models in the international relations literature often make this assumption, and our research was one effort to delineate the circumstances under which that assumption is most warranted.

On the other hand, if very little information is generated, then we are inclined to be much more skeptical of the appropriateness of treating collective entities as fully rational actors. There are also reasons to wonder whether individual humans are fully capable of the prodigious feats of rational calculation routinely attributed to them by many game theorists. Under conditions of competitive markets it may prove reasonable to assume that only the most efficient actors survive, but in many other decisional contexts there remains plenty of room for individuals to indulge other predilections.

The potential instability of processes of majority voting (Arrow 1963; Riker 1982) are a particularly pernicious source of coordination dilemmas in democratic polities. For this reason, we focused on voting examples in our discussion of the implications of correlated equilibria in two-level games.

Voting Over Resource Management Issues

A natural next step at this point would be to draw out explicit linkages between voting institutions and the management of common-pool resources. Vincent and Elinor Ostrom (1977) apply Buchanan and Tullock's (1962) classic analysis of constitutional choice to the management of common-pool resources. Their basic question is this: If a community is confronted with the problem of managing a CPR, how might they go about setting up a means of voting on these collective problems? Buchanan and Tullock point out the costs associated with finding out the preferences of all individuals (as is necessary under a rule of unanimity) and the dangers of having a collective decision imposed against one's will (as happens to minorities under a system of majority rule). It turned out that voting per se played a more minor role in the CPR management than was originally expected. Instead, a wide array of cases studied by field researchers demonstrated that communities used other, less formal mechanisms to arrive at collective decisions.

After investigating many cases from the field and from laboratory experiments, it became apparent that majority voting may have even more negative connotations than was originally suggested in this early work. In Walker, Gardner, Herr and Ostrom (1997), the authors report on an experimental analysis of the ways in which majority voting schemes can be used to resolve the distributional conflicts associated with the management of common-pool resources. The results of these experiments are troubling, for those subjects who were in the minority felt they were dealt with unfairly. Basically, members of a winning coalition divided all of the positive gains amongst themselves, leaving nothing for the other players. Subject comments make it clear that the ways in which majority voting was used in this experimental setting violated deeply felt notions of fairness and justice on the part of many of the participants. These experiments demonstrate that simple, majority rule voting is not the best way to deal with some problems.

Leadership and Principal-Agent Relations

Disputes concerning which rules are appropriate for application to specific decisions are an important component of interactions in all arenas of collective choice. In the specific context of groups dealing with the management of common-pool resources, discussions often center on which of the relevant allocation schemes is most appropriate or fair in any given situation. In more fully articulated constitutional orders, alternative allocation schemes are enshrined into law (see Chapter 10 below). Concern for interactions between law and alternative institutions for resource management harkens back to research completed by Workshop scholars long before the Workshop was even established (e.g., Ostrom 1953, 1976, Ostrom and Ostrom 1972).

In the developing world, legal arrangements are less well established, but many of the same concerns are relevant. In "Shepherds and their Leaders Among the Raikas of India: A Principal-Agent Perspective" (Chapter 8), Arun Agrawal shows how a self-governed group of pastoralists structure the process of choosing and monitoring an individual to act in the group's behalf. This agent is authorized to select times and locations for temporary settlement and migration patterns and other matters for which some means of coordination is required. Agrawal uses a normal-form game matrix to examine the circumstances under which the group as a whole will be able to monitor the activities of this agent. He concludes that situations that facilitate direct monitoring

by the group as a whole are most conducive to long-term success of the group, both in economic terms and in terms of fostering the sense of community that such groups need.

It may be useful to conclude the introduction to this part by acknowledging the diversity of the essays included here. The substantive topics of these essays range from majority voting (primarily in the United States) to leadership of pastoral communities (in India) to the multi-level nature of international relations (throughout the world). The methods include formal models illustrated with abstract examples, laboratory experiments, field research, and philosophical investigations. As a set, these essays represent a microcosm of the Workshop approach to institutional analysis. Despite this diversity in methods and substantive topics, certain common concerns permeate all of these works. How do groups make collective decisions? What information is relevant to making these decisions? How are the interests of potentially aggrieved groups taken into account when evaluating policy changes? And, especially, how can communities restrain the opportunistic behavior of their leaders and agents? None of these questions is answered fully in any of these readings, but each provides a piece of the overall picture.

Introduction to Part III: Rules, Regulations, and Resource Management

9. Heterogenous Players and Specialized Models – Eric Rasmusen, 1992
10. Governing a Groundwater Commons: A Strategic and Laboratory Analysis of Western Water Law – Roy Gardner, Michael Moore, and James Walker, 1994
11. Bottlenecks and Governance Structures: Open Access and Long-Term Contracting in Natural Gas – Thomas P. Lyon and Steven C. Hackett, 1993

This Part combines a general defense of game theory with two models of the ways in which rules and regulations shape community efforts to manage their natural resources.

Games and Models

In “Heterogenous Players and Specialized Models” (Chapter 9), Eric Rasmusen defends game theory as a method that introduces analytical discipline into the efforts of social scientists to understand specific situations. (This essay was originally included in a special issue of *Rationality and Society* on “The Use of Game Theory in the Social Sciences.”) Game theory is often dismissed as being unable to handle situations in which the participants have heterogenous interests or capabilities. Rasmusen argues that only those overly simple game models that claim comprehensive coverage fall victim to this complaint. He argues that the real strength of game theory lies in its ability to trace out the implications of interactions among actors with divergent interests and capabilities, provided that each model is designed specifically to apply to particular empirical situations. With such detailed models analysts can investigate the likely consequences of changes in the parameters of that situation.

Although this chapter’s running example of teams choosing between offensive and defensive strategies in a football game may seem trivial, the general point is an important one. Rasmusen wrote this essay before he became closely associated with the Workshop, but his comments

reveal an attitude very much in line with the characteristic Workshop emphasis on models and empirical analyses of narrowly defined empirical situations. For it is only in the context of rich empirical settings that the implications of alternative institutional arrangements can be fully understood. The other two selections in this part of the volume present detailed models (formal or informal) of particular empirical contexts related to resource management.

Evaluating Alternative Legal Doctrines

In “Governing a Groundwater Commons: A Strategic and Laboratory Analysis of Western Water Law” (Chapter 10), Roy Gardner, Michael Moore, and James Walker use game models and laboratory experiments to investigate the differing implications of alternative legal doctrines. Their specific empirical referent is governance of groundwater resources in the western United States. They define four legal doctrines that are in place for different groundwater systems in these states. Each legal doctrine defines the rights that participants have to extract water from these systems. The prior appropriation doctrine, for example, asserts that those users who have already been using the water have established the right to continue to extract water in the future. For the state of California, this system was described by Vincent Ostrom (1967) as an after-effect of the practices adopted by miners during the era of the gold rush in the mid-eighteenth century.

The authors interpret each of these legal doctrines in terms of the concepts used to model different common-pool resources. For example, the prior appropriation doctrine amounts to a restriction on entry. Thus, the crucial aspect of this legal doctrine is its value on the entry rule dimension of the rule configuration, as presented by Elinor Ostrom in chapter 3. The authors argue that this entry restriction should act to mitigate the negative consequences of strategic and stock externalities. (See also Schlager and Ostrom 1993 and Schlager et al. 1994.)

The authors next formulate a model of the extraction of water by homogenous users. The “optimal” level of water that would be allocated by a “benevolent central planner” is used to define the benchmark of an “efficient” outcome. This outcome is unlikely to be achieved in real-world settings, because each participant is directly concerned other with their own payoffs, and does not take into account the external effects of their own actions on other players. The subgame perfect (Nash) equilibrium predicted by this noncooperative game version results in a less-efficient outcome, in the sense that more water is extracted from the system than can be sustained over the long term.

Finally, the authors use different experimental settings to represent the implications of alternative legal doctrines. For example, the effect of entry restrictions (as implicit in the prior appropriation doctrine) is implemented in the laboratory by comparing the levels of the common-pool resource appropriated by groups of 5 or 10 subjects. The other parameters of the game are adjusted to isolate a pure size effect. The procedures followed in these experiments are discussed more fully in Ostrom, Gardner, and Walker (1994) and in Part V of this volume. The results of these experiments clearly demonstrate that institutions matter, in the sense that the systematically different outcomes are observed from the different experimental treatments representing different legal doctrines. In particular, subjects in the experimental treatment corresponding to limited

entry obtained a higher level of efficiency than the unlimited entry treatment, even though in both cases the results were even worse than those predicted by the subgame perfect (Nash) equilibrium. Stock quotas had a more demonstrable positive effect, but were still well short of the overall optimum. These results are quite similar to those produced by other experiments on common-pool resources; see Ostrom, Gardner, and Walker (1994) and Part V of this volume.

Governance and Transaction Costs

The next chapter moves us to the private sector. In “Bottlenecks and Governance Structures: Open Access and Long-Term Contracting in Natural Gas” (Chapter 11), Thomas Lyon and Steven Hackett build upon influential research by Oliver Williamson (1975, 1985, 1996) on the many ways in which firms strive to the transaction costs of conducting business in sectors where long-term contracting is an appealing alternative to spot markets. One major solution is to engage in vertical integration. That is, by incorporating more aspects of the sequence by which raw materials are transformed into products made available to customers, a firm can lower its danger of being taken advantage of by suppliers or distributors at each step of this process. Williamson details the transition from long-term contracting to vertical integration, which incorporates both parties to these contracts within the same organization.

The authors examine a sector in which vertical integration has obvious advantages to the firm, namely, the production and delivery of natural gas. In particular, long-term contracts are very common in the operation of gas pipelines. However, the energy industry has also been an area of active intervention by the United States government, seeking to limit the extent of vertical integration. Lyon and Hackett begin by stating that the basic problem confronting government regulators is how to keep this market as competitive as possible while still assuring the enforcement of the long-term contracts that are necessary for firms to invest in this inherently risky sector.

Firms (or governments) that have frequent interactions with each other may agree to designate each other as most-favored customers (or nations). In this way each is assured that they will not be hurt by any subsequent contracts (or treaties) signed with other corporations (or governments). As Besanko and Lyon (1993) demonstrate, such arrangements can sustain an oligopoly’s domination of an industry. However, in an empirical analysis of the natural gas industry, Crocker and Lyon (1994) conclude that the reduction of transaction costs is the major reason behind most-favored nation clauses in natural gas contracts.

Lyon and Hackett focus their attention on the conditions under which owners of natural gas pipelines implement a policy of open-access, which in this context means that pipelines should be treated as common carriers rather than being dedicated to the use of a single firm. (In common-pool resource settings, open-access refers to the absence of restrictions on the number of users, as discussed above.) They argue that government regulators have given insufficient consideration to the transaction cost benefits of discriminatory policies (that is, the opposite of open-access rules). They investigate a series of hypotheses concerning the relative magnitude of spot markets and long-term contracting in this sector of the economy that should occur under

different regulatory conditions. They conclude that although an increased reliance on open-access policies does reduce the threat of opportunism by those controlling the pipelines, these policies also increase the costs of transacting in this sector.

This analysis by two Workshop-affiliated scholars draws on the standard presumption that governments should act to reduce the costs of economic transaction, and thereby contribute to the public good of economic growth. In practice, however, the rules and regulations enforced by governmental authorities have exactly the opposite effect. For example, Eggertsson (1992, 1996) investigates an “equilibrium trap” that Icelanders experienced for an incredibly long time period. Despite the ready availability of fish in Icelandic waters, a sophisticated fishing industry never arose in Iceland until well after the establishment of comparable industries elsewhere. In the intervening years, fishers from many parts of Europe came thousands of miles to Icelandic waters while local fishers stayed closer to shore.

The title of Eggertsson’s 1996 essay alludes to the phrase “great experiments and monumental disasters” that Vincent Ostrom (1991, 1997) uses to describe the experience of the great revolutions of the twentieth century. In countries such as the Soviet Union and China revolutionary movements intended to create a more egalitarian system instead ended up increasing the misery of ordinary people. Ostrom uses this phrase to sound a cautionary note in response to repeated calls for wide-ranging and immediate reform. He argues that policy analysts, while remaining open to exploring the potential benefits of institutional change, should remain restrained in their ambitions. By trying to do too much all at once, would-be revolutionaries may make things worse.

Eggertsson uses his trademark gentle humor to remind us that the absence of reform can have equally detrimental consequences. The inability of Icelandic fishers to exploit readily available resources so close to home significantly stunted their economic development. He shows how difficult it was for Icelandic fishers to step outside their assigned role within the closed political system of governance in Iceland. External factors also contributed, especially the interest of the Danish crown in providing certain towns with monopoly rights to trade with Iceland. In effect, then, Iceland’s equilibrium trap is an example of a “two-level game” (see Chapter 7) in which the interests of internal and external actors reinforced each other to produce a stable policy outcome. Eventually, however, Iceland emerged as a major fishing nation.

The topic of the longer-term consequences of large-scale fishing in the North Atlantic lies outside the scope of this volume, but the chapters in this part clearly demonstrate the importance of understanding the institutional context of resource management. Similar concerns must be addressed whether the resource is managed primarily via private ownership (as in the natural gas industry) or by public agencies (as in the case of watershed management in the Western United States). Depending on its nature, the existing structure of governance can facilitate more efficient management of resources, speed the destruction of that resource, or delay development indefinitely (as in Icelandic fisheries). As Rasmusen argues, game models of specific situations can help us understand the consequences of alternative institutional arrangements. Such an understanding is a crucial part of the process of institutional design and policy evaluation.

Introduction to Part IV: Models of Monitoring and Sanctioning

12. Transforming Rural Hunters into Conservationists: An Assessment of Community-Based Wildlife Management Programs in Africa – Clark C. Gibson and Stuart A. Marks, 1995
13. Irrigation Institutions and the Games Irrigators Play: Rule Enforcement on Government- and Farmer-Managed Systems – Franz J. Weissing and Elinor Ostrom, 1993
14. Coping with Asymmetries in the Commons: Self-Governing Irrigation Systems Can Work – Elinor Ostrom and Roy Gardner, 1993

One of the major points made by Elinor Ostrom in Chapter 3 is that institutional analysts need to incorporate the particular roles filled by different actors in empirical situations; Eric Rasmusen's argument in Chapter 9 leads to a similar conclusion. Workshop scholars have demonstrated the central importance of monitoring and sanctioning to the successful operation of any form of governance, ranging all the way from micro-level irrigation systems to issues of global environmental change (see McGinnis 1999a). The chapters included in Part IV model the process of monitoring and enforcement in different ways and in different contexts.

Models of Rule Enforcement

In “Transforming Rural Hunters into Conservationists: An Assessment of Community-Based Wildlife Management Programs in Africa” (Chapter 12), Clark Gibson and Stuart Marks use extensive form game models to represent the fundamental dilemmas of wildlife management in Africa. This essay is especially useful as an illustration of the interactions among the diverse factors discussed throughout this volume of readings. Their model highlights, for example, the central question of whether actors have the requisite incentives and capabilities to carry out the monitoring and sanctioning activities needed for a successful wildlife preservation program. The advantages of having locally managed preservation schemes come through loud and clear. Yet local self-governance is by no means automatic, for local farmers have multiple incentives, many of which are in conflict with the goal of wildlife management.

The next selection develops an abstract representation of an irrigation system to explore the implications of different forms of monitoring behavior. In “Irrigation Institutions and the Games Irrigators Play: Rule Enforcement on Government- and Farmer-Managed Systems” (Chapter 13), Franz Weissing and Elinor Ostrom build on a previous model (Weissing and Ostrom 1991). In that model, no separate roles for monitors or sanctioners are included. The implications of that analysis serve as a benchmark for comparison with models including two different types of monitors. In particular, the authors identify conditions under which farmers should be expected to have the appropriate incentives to carry out monitoring activities. As is typical in any reasonably complex model, different equilibrium conditions apply for different configurations of parameters. Without going through all the equilibria conditions here, one implication deserving emphasis is that it is indeed possible for rational actors to monitor and sanction each other, at least under some conditions. In short, this model serves as a formal demonstration that self-governance is indeed possible.

At the same time, these models always predict a nonzero level of stealing in equilibrium. That is, some participants will, at least some of the time, violate the rules governing levels of water to be

drawn from an irrigation system. In the follow-up essay included in this volume, these same authors investigate alternative means to lower the probability of rule violations.

Weissing and Ostrom introduce distinctions between two different types of monitors: “integrated” guards whose payoffs are directed related to the physical success of the local farmers and “disassociated guards” whose payoffs are determined by some measure of violations detected. Integrated guards represent monitors who are themselves part of the community managing the irrigation system, whereas disassociated guards represent the incentives facing monitors appointed by the central government or some other authority not so directly concerned with the long-term viability of this irrigation system.

By comparing the equilibria conditions for models of irrigation systems in which the necessary monitoring and sanctioning tasks are carried out by integrated or disassociated guards, they demonstrate that under a reasonable range of conditions the farmer managed systems are more efficient and sustainable than are systems managed by governmental agents. This result comports nicely with the observation of Lam, Lee, and Ostrom (1997) of exactly this difference between effective farmer-managed and ineffective government-managed irrigation systems in Nepal. Thus, Ostrom and Weissing have provided a formal game theoretic representation of results observed in field studies of actual irrigation systems.

Both essays were based on a relatively simple addition to a standard model of an irrigation system, namely, the incorporation of actors who received benefits from detecting cheating. This seemingly simple change, however, necessitated a complicated series of analytical steps for the derivation of equilibria conditions. To cope with the multiplicity of possible equilibria solutions to these games, the authors chose to rely on the equilibrium selection criterion introduced by Harsanyi and Selten (1988). Not all game theorists are convinced that this particular process of selecting a unique equilibrium is valid in all empirical contexts. It is difficult to understand why actual game players should be expected to follow this excruciatingly logical thought process required to arrive at this specific criterion. At least as far back as Schelling’s (1960) classic depiction of the power of “salient” solutions or focal points, it has been widely recognized that the existence of multiple equilibria presents a difficult challenge to game theorists, specifically in understanding the ways in which the players themselves cope with the complexity of multiple solutions (see also Kreps 1990). A few alternative formulations that incorporate limitations on human cognition are discussed in Ostrom, Gardner, and Walker (1994) and in Part V of this volume.

Rule Enforcement in Asymmetric Games

The first two essays in this Part demonstrate that it is possible to build tractable game models in which the parameters of the model bear a clear connection to important aspects of the related real-world phenomenon. The Workshop research program on common-pool resources has been truly unique in its ability to draw close and complementary interconnections among formal game models, laboratory experiments, and field research.

In “Coping with Asymmetries in the Commons: Self-Governing Irrigation Systems Can Work” (Chapter 14), Elinor Ostrom and Roy Gardner combine a simple model with the results of field research to demonstrate that farmer-managed irrigation systems can be sustained even when the community includes two groups of farmers with conflicting interests. In this case, farmers

located at the head or tail end of an irrigation system have different interests. Specifically, “headenders” appear to have an inherent advantage, because they can extract their needed water before the downstream “tailenders” get a chance. But in the situations modeled here, the headenders are themselves unable to shoulder the burden of maintenance of the entire irrigation system. Thus, headenders must find a way to encourage tailenders to contribute to the system’s maintenance, which can only happen if the headenders can restrain themselves from extracting too much water. This is a very powerful form of asymmetry, one that is often found in real-world irrigation systems.

That particular model is less elaborate in a technical sense than the other models included in this part, but it implies a very important conclusion. Despite a fundamental asymmetry in interests, there are conditions under which we can expect rational individuals of both actor types to cooperate in the maintenance of this irrigation system. Too often formal models or laboratory experiments assume or impose a condition of symmetry on participants, and this chapter is a good illustration of the potential benefits of an alternative mode of analysis in which more of the most important aspects of actual situations can be incorporated into formal models or experimental studies. In addition, this essay demonstrates that formal models and field research can be cross-integrated in productive ways. Similar results have been observed in experimental studies, which is the topic of the concluding part of this volume. (See also Ostrom, Gardner, and Walker 1994).

Introduction to Part V: Continuing Challenges for Research and Policy

15. Neither Markets Nor States: Linking Transformation Processes in Collective Action Arenas – Elinor Ostrom and James Walker, 1997
16. A Behavioral Approach to the Rational Choice Theory of Collective Action – Elinor Ostrom, 1998

The two readings in Part V provide general overviews of a large number of laboratory experiments that have investigated the ability of groups of experimental subjects to achieve a collectively desirable outcome. The relatively controlled environment of a laboratory experiment allows researchers to isolate the effects of particular factors on the ability of groups of individuals to cooperate for their common good. In effect, these laboratory settings can be seen as experiments in self-governance: under what conditions can a group of individuals brought together on a relatively random basis learn to cooperate to achieve a common goal? From this perspective, an experimental laboratory is a reflection in microcosm of the dilemmas faced by groups of humans throughout history and throughout all realms of social life.

Cooperation in Laboratory Experiments

In “Neither Markets Nor States: Linking Transformation Processes in Collective Action Arenas” (Chapter 15), Elinor Ostrom and James Walker survey a long series of research reports prepared by Workshop scholars and their collaborators, especially related to the behavior of experimental subjects in public goods settings. They compare experimental treatments that vary the size of the group, the magnitude of their endowments, the similarity or heterogeneity of interests among participants, and especially the amount of information available to the experimental subjects as they make their decisions.

In a typical baseline laboratory set-up, subjects have no opportunity to communicate or make any kinds of deals with other participants. The authors' review of a large body of evidence highlights the ability of groups of experimental subjects to achieve better outcomes simply by being allowed to talk with each other, even if only briefly at the beginning of the play of the game. This result would be considered surprising by many game theorists because rational actors should not consider costless communication, so-called "cheap talk," to be effective when each individual can obtain a higher payoff (at least in the short run) by ignoring these signals. Yet, these experiments provide rigorous and replicable evidence that even cheap talk does seem to help in social dilemma situations. Laboratory subjects can do even better if they are given the opportunity to make arrangements to sanction the behavior of others. Since this experimental treatment comes the closest to reflecting the basic structure found in field settings, it should not be surprising that these results sound so similar to the field research reported elsewhere.

These experimental results address the central concern of politics: the nature of governance. Ostrom, Walker, and Gardner (1992) use a series of laboratory experiments to investigate the ability of experimental subjects to devise their own means of governance. (The results of this and related essays are summarized in Chapter 16.) One might think that it should come as no surprise to American political scientists that self-governance is possible; after all, that is the whole basis for the American system of constitutional order. Yet, what was surprising is how easily a modicum of self-governance could be introduced into the admittedly artificial situations of a laboratory experiment. Even in these stark situations, where long-term considerations were absent, experimental subjects demonstrated an ability, even an eagerness, to form their own system of governance, to monitor each other's behavior (to the limited extent made possible by the experimental design), and to enforce their agreement by punishing transgressors. What was remarkable was that all this was so easy to achieve, simply by allowing the subjects a limited opportunity to communicate and to sanction each other. If self-governance is possible in such a starkly limited environment, then it is certainly relevant to more consequential interactions in the real world. These experimental results remind us of the crucial importance of self-governance.

Rethinking the Nature of Rational Choice

Although often dismissed as merely a technical tool, game theory can force scholars to confront foundational issues of the nature of human cognition and common understandings. One important outgrowth of this use of game theory to understand cognition is the alternative version of game rationality presented in the conclusion of Ostrom, Gardner, and Walker (1994). In an effort to explain the results of their laboratory experiments, they introduce a "measure-for-measure" behavioral strategy in which individuals react in a measured way to the rule violations of other participants. (This strategy was also influenced by field research demonstrating the importance of graduated sanctions as a contributor to successful management of common-pool resources; see Ostrom 1990.)

Several game theorists have been struggled to develop more realistic models of the cognitive processes of real strategic players, as an alternative to the "hyper-rationality" characterizing the standard approach to game theory (Binmore 1990; Gardner 1995; McGinnis 1992; Rubinstein 1998; Samuelson 1997; Scharpf 1997). This remains very much a work-in-progress, but it is likely that future game models are likely to become much more sophisticated and realistic in their depictions of individual cognition and institutional arrangements.

In her Presidential Address for the American Political Science Association, “A Behavioral Approach to the Rational Choice Theory of Collective Action” (Chapter 16), Elinor Ostrom uses the results of experimental research to suggest a new conceptualization of the nature of individual actors. In what she describes as a “second generation model” of rational choice, she assumes that most individuals are predisposed to use reciprocity norms in many circumstances and to pay careful attention to the behavior of other individuals in all circumstances. Thus, their interactions unfold in different directions depending on the nature of these initial expectations and the intermediate play of the game. Nonetheless, certain regularities of behavior emerge from years of experimental research, regularities that do not always comport with the expectations of rational choice theorists.

Much remains to be done to formalize this “second generation” behavioral model of rational choice and to fully test its implications in diverse institutional settings, but even at this preliminary stage it is clear that the type of individual actors posited in this speech sound very much like the farmers, fishers, and other groups of individuals who have been found to have the capacity to organize themselves to achieve common goals in real-life situations. If we can find even a glimmer of a capacity for self-governance among anonymous individuals randomly thrown together in the confines of a computer laboratory, then we should hardly be surprised when communities of individuals who have come to know each other well are able to cooperate on tangible and important problems. Unfortunately, many social scientists continue to be puzzled by the human capacity for collective self-governance in the absence of governmental direction or coordination. Familiarity with the research reported in this book should suffice to dispel that sense of puzzlement.

REFERENCES

- Arrow, Kenneth J. 1963. *Social Choice and Individual Values*, second edition. New Haven: Yale University Press.
- Aumann, Robert J. 1987. "Correlated Equilibrium as an Expression of Bayesian Rationality" *Econometrica* 55:1-18.
- Bates, Robert H. 1981. *Markets and States in Tropical Africa: The Political Basis of Agricultural Policies*. Berkeley: University of California Press.
- _____. 1983. *Essays on the Political Economy of Rural Africa*. Cambridge: Cambridge University Press.
- Berman, Harold. 1983. *Law and Revolution: The Formation of the Western Legal Tradition*. Cambridge: Harvard University Press.
- Besanko, David, and Thomas P. Lyon. 1993. "Equilibrium Incentives for Most-Favored Customer Clauses in an Oligopolistic Industry," *International Journal of Industrial Organization*, 11: 347-367.
- Binmore, Kenneth G. 1990. *Essays on the Foundations of Game Theory*. Cambridge, MA: Blackwell.
- Bish, Robert L. 1971. *The Political Economy of Metropolitan Areas*. Chicago: Markam.
- _____. 1987. *Local Government in British Columbia*. Richmond, B.C.: Union of British Columbia Municipalities in cooperation with the University of Victoria School of Public Administration.
- _____. 1996. "Amalgamation: Is it the Solution?" Paper prepared for The Coming Revolution in Local Government conference, Atlantic Institute for Market Studies, Halifax, Nova Scotia, March 27-29, 1996.
- Bish, Robert, and Vincent Ostrom. 1973. *Understanding Urban Government: Metropolitan Reform Reconsidered*. Washington: American Enterprise Institute for Public Policy Research, Domestic Affairs Studies, Vol. 20
- Blomquist, William. 1992. *Dividing the Waters: Governing Groundwater in Southern California*. San Francisco: ICS Press.
- Blomquist, William, and Roger B. Parks. 1995. "Unigov: Local Government in Indianapolis and Marion County, Indiana." *In The Government of World Cities: The Future of the Metro Model*, ed. L. J. Sharpe, 77-89. New York: John Wiley.
- Bogason, Peter, editor. 1996. *New Modes of Local Political Organizing: Local Government Fragmentation in Scandinavia*. Commack, NY: Nova Science Publishers.
- Buchanan, James M., and Gordon Tullock. 1962. *The Calculus of Consent: Logical Foundations of Constitutional Democracy*. Ann Arbor: University of Michigan Press.
- Bull, Hedley. 1977. *The Anarchical Society*. New York: Columbia University Press.
- Commons, John R. 1959. *The Legal Foundations of Capitalism*. Madison: University of Wisconsin Press
- Dasgupta, Partha S., and G. M. Heal. 1979. *Economic Theory and Exhaustible Resources*, Cambridge: Cambridge University Press.
- Crocker, Keith J., and Thomas P. Lyon. 1994. "What do 'Facilitating Practices' Facilitate?: An Empirical Investigation of Most-Favored Nation Clauses in Natural Gas Contracts," *Journal of Law and Economics*, 36: 297-322.
- De Soto, Hernando. 1989. *The Other Path: The Invisible Revolution in the Third World*. Translated by June Abbott. New York: Harper & Row.
- Downs, Anthony. 1957. *An Economic Theory of Democracy*. New York: Harper & Row.
- Duany, Wal. 1992. "The Nuer Concept of Covenant and Covenantal Way of Life." *Publius* 22(4): 67-89.
- _____. 1994. "The Problem of Centralization in the Sudan." *Northeast African Studies* 1(2-3):75-102.

- Eggertsson, Thráinn. 1990. *Economic Behavior and Institutions*. Cambridge: Cambridge University Press.
- _____. 1992. "Analyzing Institutional Successes and Failures: A Millenium of Common Mountain Pastures in Iceland," *International Review of Law and Economics*, Vol. 12: 423-437.
- _____. 1996. "No Experiments, Monumental Disasters: Why it Took a Thousand Years to Develop a Specialized Fishing Industry in Iceland." *Journal of Economic Behavior and Organization* 30(1) (July): 1-24.
- Gardner, Roy. 1995. *Games for Business and Economics*. New York: Wiley.
- Gardner, Roy and Elinor Ostrom. 1991. "Rules and Games." *Public Choice*, Vol. 70, No. 2 (May), 121-49.
- Gibson, Clark, Margaret McKean, and Elinor Ostrom, editors. Forthcoming. *Forest Resources and Institutions*. Cambridge: MIT Press.
- Gibson, Clark, Elinor Ostrom, and T. K. Ahn. 1998. "Scaling Issues in the Social Sciences." Report for the International Human Dimensions Programme (IHDP) on Global Environmental Change, IHDP Working Paper no. 1, Bonn, Germany, May.
- Haney, Patrick J., Roberta Herzberg, and Rick K. Wilson. 1992. "Advice and Consent: Unitary Actors, Advisory Models, and Experimental Tests." *Journal of Conflict Resolution* 36(4):603-633.
- Hansmann, Henry B. 1980. "The Role of Nonprofit Enterprise," *Yale Law Review*. 89 (5): 835-901.
- Hardin, Garrett. 1968. "The Tragedy of the Commons." *Science* 162:1243-48.
- Harsanyi, John C., and Reinhard Selten. 1988. *A General Theory of Equilibrium Selection in Games*. Cambridge, MA: MIT Press.
- Hechter, Michael. 1987. *Principles of Group Solidarity*. Berkeley: University of California Press.
- Herzberg, Roberta. 1992. "An Analytic Choice Approach to Concurrent Majorities: The Relevance of John C. Calhoun's Theory for Institutional Design." *Journal of Politics*, 54 (1): 54-81.
- _____. and Rick K. Wilson. 1988. "Results of Sophisticated Voting in an Experimental Setting." *Journal of Politics* 50(2):471-486.
- _____. 1991. "Costly Agendas and Spatial Voting Games: Theory and Experiments on Agenda Access Costs." In *Laboratory Research in Political Economy*, ed. Thomas R. Palfrey, 169-99. Ann Arbor: University of Michigan Press.
- Hess, Charlotte. 1996. *Common-Pool Resources and Collective Action: A Bibliography*, vol. 3. Bloomington: Indiana University, Workshop in Political Theory and Policy Analysis.
- Hobbes, Thomas 1651. [1651] *Leviathan or the Matter, Forme, and Power of a Commonwealth Ecclesiasticall and Civil*. Michael Oakeshott, ed. New York: Collier Books.
- Jillson, Calvin, and Rick K. Wilson. 1994. *Congressional Dynamics: Structure, Coordination, and Choice in the First American Congress, 1774-1789*. Stanford University Press.
- Jinadu, L. Adele. 1994. "Federalism and the Structure of the Nigerian Federation: Some Recurrent Issues." *The Nigerian Journal of Federalism* 1(2) (Dec.): 57-66.
- Kaminski, Antoni. 1989. "Coercion, Corruption, and Reform: State and Society in Soviet-type Socialist Regime." *Journal of Theoretical Politics* 1(1) (Jan.): 77-102.
- _____. 1992. *An Institutional Theory of Communist Regimes: Design, Function, and Breakdown*. San Francisco: ICS Press.
- Katzenstein, Peter J., ed. 1996. *The Culture of National Security*, New York: Columbia University Press
- Kaufmann, Franz-Xaver, Giandomenico Majone, and Vincent Ostrom, eds. 1986. *Guidance, Control, and Evaluation in the Public Sector*. Berlin and New York: Walter de Gruyter
- Keohane, Robert O., and Elinor Ostrom, eds. 1995. *Local Commons and Global Interdependence: Heterogeneity and Cooperation in Two Domains*. London: Sage.

- Kiser, Larry L., and Elinor Ostrom. 1982. "The Three Worlds of Action: A Metatheoretical Synthesis of Institutional Approaches." In *Strategies of Political Inquiry*, ed. Elinor Ostrom, 179-222. Beverly Hills, CA: Sage. Reprinted in McGinnis 2000.
- Knight, Jack. 1992. *Institutions and Social Conflict*. Cambridge: Cambridge University Press.
- Krehbiel, Keith. 1991. *Information and Legislative Organization*. Ann Arbor: University of Michigan Press.
- Kreps, David M. 1990a. *A Course in Microeconomic Theory*. Princeton, NJ: Princeton University Press.
- _____. 1990b. *Game Theory and Economic Modelling*. New York: Oxford University Press.
- Lam, Wai Fung. 1996. "Institutional Design of Public Agencies and Coproduction: A Study of Irrigation Associations in Taiwan." *World Development* 24(6):1039-54. Reprinted in McGinnis 1999a.
- Lam, Wai Fung. 1998. *Governing Irrigation Systems in Nepal: Institutions, Infrastructure, and Collective Action*. Oakland, CA: ICS Press.
- Lam, Wai Fung, Myungsuk Lee, and Elinor Ostrom. 1997. "The Institutional Analysis and Development Framework: Application to Irrigation Policy in Nepal." In *Policy Studies and Developing Nations: An Institutional and Implementation Focus*, vol. 5, ed. Derick W. Brinkerhoff, 53-85. Greenwich, CT: JAI Press.
- Landa, Janet T. 1994. *Trust, Ethnicity, and Identity: Beyond the New Institutional Economics of Ethnic Trading Networks, Contract Law, and Gift-Exchange*. Ann Arbor: University of Michigan Press.
- Lichbach, Mark I. 1996. *The Cooperator's Dilemma*. Ann Arbor: University of Michigan Press.
- _____. 1995. *The Rebel's Dilemma*. Ann Arbor: University of Michigan Press.
- Lindblom, Charles E. 1977. *Politics and Markets: The World's Political Economic Systems*. New York: Basic Books.
- Loveman, Brian. 1993. *The Constitution of Tyranny: Regimes of Exception in Spanish America*. University of Pittsburgh Press.
- Lyons, William E., and David Lowery. 1989. "Governmental Fragmentation Versus Consolidation: Five Public-Choice Myths about How to Create Informed, Involved, and Happy Citizens." *Public Administration Review* 49:533-43.
- Lyons, William E., David Lowery, and Ruth Hoogland DeHoog. 1992. *The Politics of Dissatisfaction: Citizens, Services, and Urban Institutions*. Armonk, NY: M.E. Sharpe.
- Magee, Stephen P., William A. Brock, and Leslie Young. 1989. *Black Hole Tariffs and Endogenous Policy Theory: Political Economy in General Equilibrium*. Cambridge: Cambridge University Press.
- March, James G., and Johan P. Olsen. 1984. "The New Institutionalism: Organizational Factors in Political Life," *American Political Science Review*, 78: 734-749.
- _____. 1989. *Rediscovering Institutions: The Organizational Basis of Politics*. New York: Free Press.
- Martin, Fenton. 1989/1992. *Common-Pool Resources and Collective Action: A Bibliography*, vols. 1 & 2. Bloomington: Indiana University, Workshop in Political Theory and Policy Analysis.
- McDavid, James C. 1974. "Interjurisdictional Cooperation Among Police Departments in the St. Louis Metropolitan Area." *Publius* 4(4):35-58
- McGinnis, Michael D. 1991. "Richardson, Rationality, and Restrictive Models of Arms Races," *Journal of Conflict Resolution*, 35: 443-473.
- _____. 1992. "Bridging or Broadening the Gap? A Comment on Wagner's 'Rationality and Misperception in Deterrence Theory'." *Journal of Theoretical Politics* 4(4):443-57.
- _____. 1996. "Elinor Ostrom: A Career in Institutional Analysis," *PS: Political Science & Politics*, 29 (4), 737-741.
- _____, ed. 1999a. *Polycentric Governance and Development: Readings from the Workshop in Political Theory and Policy Analysis*. Ann Arbor: University of Michigan Press.

- _____, ed. 1999b. *Polycentricity and Local Public Economies: Readings from the Workshop in Political Theory and Policy Analysis*. Ann Arbor: University of Michigan Press.
- _____, ed. 2000. *Polycentric Games and Institutions: Readings from the Workshop in Political Theory and Policy Analysis*. Ann Arbor: University of Michigan Press.
- McGinnis, Michael, and Elinor Ostrom. 1996. "Design Principles for Local and Global Commons." In *The International Political Economy and International Institutions*, vol. II, ed. Oran Young, 464-93. Cheltenham, UK: Edward Elgar.
- McGinnis, Michael D., and John T. Williams. 2001. *Compound Dilemmas: Democracy, Collective Action, and Superpower Rivalry*. University of Michigan Press.
- McKelvey, Richard D. 1976. "Intransitivities in Multi-dimensional Voting Models and Some Implications for Agenda Control," *Journal of Economic Theory*, 12: 472-482.
- Milgrom, Paul, Douglass North, and Barry Weingast. 1990. "The Role of Institutions in the Revival of Trade: The Law Merchant, Private Judges, and the Champagne Fairs," *Economics and Politics*, 2:1-23.
- Miller, Gary J. 1992. *Managerial Dilemmas: The Political Economy of Hierarchy*, New York: Cambridge University Press.
- Mitchell, William C. 1988. "Virginia, Rochester, and Bloomington: Twenty-Five Years of Public Choice and Political Science." *Public Choice* 56:101-19.
- Mueller, Dennis C. 1989. *Public Choice II*. Cambridge: Cambridge University Press.
- Netting, Robert McC. 1993. *Smallholders, Householders: Farm Families and the Ecology of Intensive, Sustainable Agriculture*. Stanford University Press.
- Niskanen, W. A., Jr. 1971. *Bureaucracy and Representative Government*. Chicago: AVC.
- Nohria, Nitin, and Robert G. Eccles, ed. 1992. *Networks and Organizations: Structure, Form, and Action*. Boston: Harvard Business School Press.
- North, Douglass C. 1981. *Structure and Change in Economic History*. New York: Norton.
- _____. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.
- North, Douglass C., and Robert Paul Thomas. 1973. *The Rise of the Western World: A New Economic History*. Cambridge: Cambridge University Press.
- Oakerson, Ronald J. 1987. "Local Public Economies: Provision, Production, and Governance." *Intergovernmental Perspective* 13(3/4):20-25. [ACIR]
- Oakerson, Ronald J. 1992. "Analyzing the Commons: A Framework." In *Making the Commons Work: Theory, Practice, and Policy*, ed. Daniel W. Bromley et al., 41-59. San Francisco: ICS Press.
- Oakerson, Ronald J., and Roger B. Parks. 1989. "Local Government Constitutions: A Different View of Metropolitan Governance." *American Review of Public Administration* 19(4) (Dec.): 279-94.
- Oakerson, Ronald J., and S. Tjip Walker. 1997. "Analyzing Policy Reform and Reforming Policy Analysis: An Institutionalist Approach." In *Policy Studies and Developing Nations: An Institutional and Implementation Focus*, vol. 5, ed. Derick W. Brinkerhoff, 21-51. Greenwich, CT: JAI Press.
- Obolonsky, Alexander. 1996. *The Drama of Russian Political History: System Against Individuality*. Bloomington: Indiana University, Workshop in Political Theory and Policy Analysis.
- Olowu, Dele. 1990. *Lagos State: Governance, Society, and Economy*. Lagos: Malthouse Press Limited.
- Olson, Mancur. 1965. *The Logic of Collective Action*. Harvard University Press
- Ostrom, Elinor. 1965. *Public Entrepreneurship: A Case Study in Ground Water Management*. Ph.D. dissertation, University of California at Los Angeles.
- _____. 1972. "Metropolitan Reform: Propositions Derived from Two Traditions." *Social Science Quarterly* 53 (Dec.): 474-93. Reprinted in McGinnis 1999b.

- _____. 1983. "A Public Service Industry Approach to the Study of Local Government Structure and Performance." *Policy and Politics* 11:313-341.
- _____. 1986. "An Agenda for the Study of Institutions." *Public Choice* 48:3-25. Reprinted in McGinnis 2000.
- _____. 1989. "Microconstitutional Change in Multiconstitutional Political Systems." *Rationality and Society*, 1(1), (July), 11-50.
- _____. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press.
- _____. 1992. *Crafting Institutions for Self-Governing Irrigation Systems*. San Francisco: ICS Press.
- _____. 1996. "Crossing the Great Divide: Coproduction, Synergy, and Development." *World Development* 24(6):1073-87. Reprinted in McGinnis 1999a.
- _____. 1997. "The Comparative Study of Public Economies." Acceptance paper for the Frank E. Seidman Distinguished Award in Political Economy, presented at Rhodes College, Memphis, Tennessee, September 26, 1997.
- _____. 1998. "Coping with Tragedies of the Commons." *Annual Review of Political Science* 2, forthcoming.
- Ostrom, Elinor, William H. Baugh, Richard Guarasci, Roger B. Parks, and Gordon P. Whitaker. 1973. *Community Organization and the Provision of Police Services*. Sage Professional Paper in Administrative and Policy Studies 03-001. Beverly Hills and London: Sage Publications.
- Ostrom, Elinor, Roy Gardner, and James Walker, with Arun Agrawal, William Blomquist, Edella Schlager, and Shui-Yan Tang. 1994. *Rules, Games, and Common-Pool Resources*. Ann Arbor: University of Michigan Press.
- Ostrom, Elinor, and Roger B. Parks. 1973. "Suburban Police Departments: Too Many and Too Small?" In *The Urbanization of the Suburbs*, ed. Louis H. Masotti and Jeffrey K. Hadden. Urban Affairs Annual Reviews Vol. 7, 367-402. Beverly Hills, CA: Sage.
- Ostrom, Elinor, Roger B. Parks, and Gordon P. Whitaker. 1973. "Do We Really Want to Consolidate Urban Police Forces? A Reappraisal of Some Old Assertions." *Public Administration Review* 33 (Sept./Oct.): 423-32.
- _____. 1977. *Policing Metropolitan America*. Washington: U.S. Government Printing Office.
- _____. 1978. *Patterns of Metropolitan Policing*. Cambridge, MA: Ballinger.
- Ostrom, Elinor, Roger B. Parks, Gordon P. Whitaker, and Stephen L. Percy. 1979. "The Public Service Provision Process: A Framework for Analyzing Police Services." In *Evaluating Alternative Law-Enforcement Policies*, ed. Ralph Baker and Fred A. Mayer, Jr., 65-73. Lexington, MA: Lexington Books.
- Ostrom, Elinor, Larry Schroeder, and Susan Wynne. 1993. *Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective*. Boulder, CO: Westview Press.
- Ostrom, Elinor, James Walker, and Roy Gardner. 1992. "Covenants with and without a Sword: Self-Governance is Possible." *American Political Science Review*, 86: 404-17.
- Ostrom, Vincent. 1953a. "State Administration of Natural Resources in the West." *American Political Science Review* 47(2) (June): 478-93.
- _____. 1953b. *Water and Politics: A Study of Water Policies and Administration in the Development of Los Angeles*. Los Angeles: The Haynes Foundation.
- _____. 1953c. *Water Supply*. Los Angeles: The Haynes Foundation. (Metropolitan Los Angeles: A Study in Integration, vol. 8).
- _____. 1967. "Water and Politics California Style." *Arts and Architecture*, 84 (July/August), 14-16, 32. Reprinted McGinnis 1999a.

- _____. 1976. "John R. Commons's Foundation for Policy Analysis." *Journal of Economic Issues* 10(4) (Dec.): 839-57.
- _____. 1980. "Artisanship and Artifact." *Public Administration Review* 40(4) (July-Aug.): 309-17. Reprinted in McGinnis 1999a.
- _____. 1987. *The Political Theory of a Compound Republic: Designing the American Experiment*. 2d rev. ed. San Francisco: ICS Press [first edition 1971].
- _____. 1989. *The Intellectual Crisis in American Public Administration*. 2d ed. Tuscaloosa: University of Alabama Press [first edition 1973].
- _____. 1991. *The Meaning of American Federalism: Constituting a Self-Governing Society*. San Francisco: ICS Press.
- _____. 1993. "Epistemic Choice and Public Choice." *Public Choice* 77(1) (Sept.): 163-76.
- _____. 1997. *The Meaning of Democracy and the Vulnerability of Democracies: A Response to Tocqueville's Challenge*. Ann Arbor: University of Michigan Press.
- _____. 1998. "Some Developments in the Study of Market Choice, Public Choice, and Institutional Choice." In *Handbook of Public Administration*, ed. Jack Rabin, W. Bartley Hildreth, and Gerald J. Miller, 1,065-87. 2d ed. New York: Marcel Dekker.
- Ostrom, Vincent, Robert Bish, and Elinor Ostrom. 1984. *Il governo locale negli Stati Uniti*. Milano, Italy: Fondazione Adriano Olivetti.
- _____. 1988. *Local Government in the United States*. San Francisco: ICS Press. Ostrom, Vincent, David Feeny, and Hartmut Picht, eds. 1993. *Rethinking Institutional Analysis and Development*. 2d ed. San Francisco: ICS Press.
- Ostrom, Vincent, and Elinor Ostrom. 1965. "A Behavioral Approach to the Study of Intergovernmental Relations." *The Annals of the American Academy of Political and Social Science* 359 (May): 137-46. Reprinted in McGinnis 1999b.
- _____. 1971. "Public Choice: A Different Approach to the Study of Public Administration." *Public Administration Review* 13 (Mar./Apr.): 203-16. Reprinted in McGinnis 2000.
- _____. 1972. "Legal and Political Conditions of Water Resource Development." *Land Economics* 48(1) (Feb.): 1-14. Reprinted in McGinnis 1999a.
- _____. 1977. "A Theory for Institutional Analysis of Common Pool Problems." In *Managing the Commons*, ed. Garrett Hardin and John Baden, 157-72. San Francisco: W. H. Freeman.
- _____. 1977. "Public Goods and Public Choices." In *Alternatives for Delivering Public Services. Toward Improved Performance*, ed. E. S. Savas, 7-49. Boulder, CO: Westview Press. Reprinted in McGinnis 1999b.
- Ostrom, Vincent, Charles M. Tiebout, and Robert Warren. 1961. "The Organization of Government in Metropolitan Areas: A Theoretical Inquiry." *American Political Science Review* 55 (Dec.): 831-42. Reprinted in McGinnis 1999b.
- Parks, Roger B. 1985. "Metropolitan Structure and Systemic Performance: The Case of Police Service Delivery." In *Policy Implementation in Federal and Unitary Systems*, ed. Kenneth Hanf and Theo A.J. Toonen, 161-91. Dordrecht, the Netherlands: Martinus Nijhoff.
- Parks, Roger B., and Ronald J. Oakerson. 1989. "Metropolitan Organization and Governance: A Local Public Economy Approach." *Urban Affairs Quarterly* 25(1) (Sept.): 18-29.
- _____. 1993. "Comparative Metropolitan Organization: Service Production and Governance Structures in St. Louis (MO) and Allegheny County (PA)." *Publius* 23(1) (Winter): 19-39.
- Parks, Roger B., and Elinor Ostrom. 1984. "Policing as a Multi-Firm Industry." In *Understanding Police Agency Performance*, ed. Gordon P. Whitaker, 7-22. Washington, DC: U.S. Department of Justice, National Institute of Justice.

- Parks, Roger B., Kenna Davis Quinet and Tamara Schmitt. 1996. *Indianapolis Police Department Community Policing: Citizen's Perspectives*. Indianapolis: Center for Urban Policy and the Environment, School of Public and Environmental Affairs.
- Putnam, Robert D. 1988. "Diplomacy and Domestic Politics: The Logic of Two-Level Games," *International Organization*, 42, 427-460.
- Riker, William H. 1982. *Liberalism Against Populism: A Confrontation Between the Theory of Democracy and the Theory of Social Choice*. San Francisco: W. H. Freeman.
- Rubinstein, Ariel. 1998. *Modeling Bounded Rationality*. Cambridge, MA: MIT Press.
- Russett, Bruce, and Harvey Starr. 1996. *World Politics: The Menu for Choice*, 5th edition. San Francisco: W. H. Freeman.
- Sabetti, Filippo. 1984. *Political Authority in a Sicilian Village*. New Brunswick, NJ: Rutgers University Press.
- _____. 1998. *The Search for Good Government: Understanding Italian Democracy*. Book manuscript.
- Salamon, Lester M. 1987. "Partners in Public Service: The Scope and Theory of Government-Nonprofit Relations," in Walter W. Powell, ed., *The Nonprofit Sector: A Research Handbook*, New Haven: Yale University Press, pp. 99-117.
- _____. 1995. *Partners in Public Service: Government-Nonprofit Relations in the Modern Welfare State*. Baltimore: Johns Hopkins University Press.
- Samuelson, Larry. 1997. *Evolutionary Games and Equilibrium Selection*. Cambridge, MA: MIT Press.
- Sandler, Todd, and John T. Tshirhart. 1980. "The Economic Theory of Clubs: An Evaluation Survey," *Journal of Economic Literature*. 18: 1488-1521.
- Sawyer, Amos. 1992. *The Emergence of Autocracy in Liberia: Tragedy and Challenge*. San Francisco: ICS Press.
- Schneider, Mark. 1989. *The Competitive City: The Political Economy of Suburbia*. Pittsburgh: University of Pittsburgh Press.
- Scharpf, Fritz Wilhelm. 1997. *Games Real Actors Play: Actor-Centered Institutionalism in Policy Research*. Boulder, CO: Westview Press.
- Schofield, Norman. 1978. "Instability of Simple Dynamic Games." *Review of Economic Studies*, 45: 575-594.
- Schelling, Thomas C. 1960. *The Strategy of Conflict*. New Haven: Harvard University Press.
- Schlager, Edella, William Blomquist, and Shui Yan Tang. 1994. "Mobile Flows, Storage, and Self-Organized Institutions for Governing Common-Pool Resources." *Land Economics* 70(3) (Aug.): 294-317. Reprinted in McGinnis 1999a.
- Schlager, Edella, and Elinor Ostrom. 1993. "Property-Rights Regimes and Coastal Fisheries: An Empirical Analysis." In *The Political Economy of Customs and Culture: Informal Solutions to the Commons Problem*, ed. Terry L. Anderson and Randy T. Simmons, 13-41. Lanham, MD: Rowman & Littlefield. Reprinted in McGinnis 1999a.
- Sharp, Elaine B. 1980. "Toward a New Understanding of Urban Services and Citizen Participation: The Coproduction Concept." *Midwest Review of Public Administration* 14(2) (June): 105-18.
- Shepsle, Kenneth. 1979. "Institutional Arrangements and Equilibrium in Multi-dimensional Voting Models," *American Journal of Political Science*, 23: 27-59.
- Simon, Herbert A. 1957. *Models of Man*. New York: Wiley.
- _____. 1964. *Administrative Behavior: A Study of the Decision-Making Processes in Administrative Organizations*. New York: Macmillan.
- _____. 1997. *Models of Bounded Rationality: Empirically Grounded Economic Reason*. Cambridge, MA: MIT Press.

- Smith, Adam. 1976 [1776] *An Inquiry into the Nature and Causes of the Wealth of Nations*, ed. Edwin Cannan, Chicago: University of Chicago Press.
- Sproule-Jones, Mark. 1993. *Governments at Work: Canadian Parliamentary Federalism and Its Public Policy Effects*. Toronto: University of Toronto Press.
- Stein, Robert. 1990. *Urban Alternatives: Public and Private Markets in the Provision of Local Services*. University of Pittsburgh Press.
- Tang, Shui Yan. 1992. *Institutions and Collective Action: Self-Governance in Irrigation*. San Francisco: ICS Press.
- Thomson, James T. 1992. *A Framework for Analyzing Institutional Incentives in Community Forestry*. Rome, Italy: Food and Agriculture Organization (FAO) of the United Nations.
- Tiebout, Charles M. 1956. "A Pure Theory of Public Expenditures." *Journal of Political Economy* 64 (October): 416-24.
- Tocqueville, Alexis de. 1969 [1835]. *Democracy in America*. Edited by J.P. Mayer, translated by George Lawrence, Anchor Books.
- Tollison, Robert D. 1980. "Rent Seeking: A Survey." *Kyklos* 35 (4): 575-602.
- _____. 1997. "Rent Seeking." In Dennis C. Mueller, ed., *Perspectives on Public Choice: A Handbook*, Cambridge: Cambridge University Press, pp. 506-525.
- Toonen, Theo A. J. 1987. *Denken over Binnenlands Bestuur: Theorieën van de gedecentraliseerde eenheidsstaat bestuurskundig beschouwd (Conceptual Analysis of Intergovernmental Relations: A Public Administration Perspective on Theories of the Decentralized Unitary State)*. Ph.D diss., Erasmus Universiteit Rotterdam.
- Tsebelis, George. 1990. *Nested Games*. Berkeley: University of California Press.
- Tullock, Gordon. 1965. *Politics of Bureaucracy*. Washington, DC: Public Affairs Press.
- United States Advisory Commission on Intergovernmental Relations (ACIR). 1987. *The Organization of Local Public Economies*. ACIR Report A-109. Washington, DC. [Author: Ronald J. Oakerson]
- _____. 1988. *Metropolitan Organization: The St. Louis Case*. ACIR Report M-158. Washington, DC. [Coauthored by Ronald Oakerson and Roger B. Parks with the assistance of Henry A. Bell]
- _____. 1992. *Metropolitan Organization: The Allegheny County Case*. ACIR Report M-181. Washington, DC.
- von Wright, Georg H. 1951. "Deontic Logic," *Mind*, 60: 58-74.
- Wagner, Richard E. 1997. "Reconsidering the Fiscal Role of Government," *American Economic Review*, 87 (2): 160-.
- Walker, James, Roy Gardner, Andy Herr, and Elinor Ostrom (1998) "Collective Choice in the Commons: Experimental Results on Proposed Allocation Rules and Votes." Re-submitted to *The Economic Journal*, Dec. 1998. Paper presented at: (1) the 1997 Annual Meeting of the Western Political Science Association, Tucson, AZ, March 13-15, 1997; (2) the Department of Economics, Krannert School of Management, Purdue University, Lafayette, IN, March 27, 1996; and (3) Conference on "Game Theory in the Behavioral Sciences," Tucson, AZ, October 11-12, 1995. Working Paper, Workshop in Political Theory and Policy Analysis, Indiana University.
- Walker, S. Tjip. 1994. "Crafting a Market: A Case Study of USAID's Fertilizer Sub-Sector Reform Program." *Decentralization: Finance & Management Project Report*. Burlington, VT: Associates in Rural Development, Inc.
- Waltz, Kenneth N. 1959. *Man, the State, and War*, New York: Columbia University Press.
- _____. 1979. *Theory of International Politics*. Reading, MA: Addison-Wesley.
- Weimer, David L., and Aidan R. Vining. 1989. *Policy Analysis: Concepts and Practice*. 2d ed. Englewood Cliffs, NJ: Prentice-Hall.

- Weisbrod, Burton A. 1977. *The Voluntary Nonprofit Sector: An Economic Analysis*. Lexington, Mass.: D.C. Heath.
- _____. 1988. *The Nonprofit Economy*. Cambridge: Harvard University Press.
- Weissing, Franz J., and Elinor Ostrom. 1991. "Irrigation Institutions and the Games Irrigators Play: Rule Enforcement without Guards." In *Game Equilibrium Models II: Methods, Morals, and Markets*, ed. Reinhard Selten, 188-262. Berlin: Springer-Verlag.
- Weschler, Louis F. 1968. *Water Resources Management: The Orange County Experience*. Davis: University of California, Davis, Institute of Governmental Affairs, California Government Series no. 14.
- Whitaker, Gordon P. 1980. "Coproduction: Citizen Participation in Service Delivery." *Public Administration Review* 40(3):240-46.
- Williamson, Oliver E. 1975. *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: Free Press.
- _____. 1985. *The Economic Institutions of Capitalism*. New York: Free Press.
- _____. 1996. *The Mechanisms of Governance*. New York: Oxford University Press.
- Wintrobe, Ronald. 1998. *The Political Economy of Dictatorship*. Cambridge: Cambridge University Press.
- Wunsch, James S., and Dele Olowu, ed. 1995. *The Failure of the Centralized State: Institutions and Self-Governance in Africa*. 2d ed. San Francisco: ICS Press.
- Yang, Tai Shuenn. 1987. *Property Rights and Constitutional Order in Imperial China*. Ph.D. dissertation, Indiana University, Department of Political Science.

Appendix One: Suggested Further Readings

[Volume 1] *Polycentric Governance and Development*

The best place to start is Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge University Press, 1990). This award-winning book summarizes a large amount of field research and lays out the "design principles" shared by all the cases in which communities successfully managed their common-pool resources over long periods. *Rules, Games, and Common-Pool Resources* (University of Michigan Press, 1994), written by Elinor Ostrom, Roy Gardner, and James Walker with the assistance of four Workshop colleagues, is a truly unique book that fully integrates field research, formal models, and laboratory experiments, all focused on the management of common-pool resources.

Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective (Westview Press, 1993), by Elinor Ostrom, Larry Schroeder, and Susan Wynne, is a textbook that emphasizes the importance of common-pool resources for development policy, with particular emphasis on the development and sustainability of rural infrastructures. Steven Hackett's *Environmental and Natural Resources Economics: Theory, Policy, and the Sustainable Society* (M.E. Sharpe, 1998) is a basic text on environmental economics by a Workshop-affiliated scholar.

The study of irrigation systems has played an important role in developing and extending the Workshop approach to institutional analysis. Two books which emerged from doctoral dissertations on this subject are Shui Yan Tang, *Institutions and Collective Action: Self-Governance in Irrigation* (Institute for Contemporary Studies [ICS] Press, 1992) and Wai Fung Lam, *Governing Irrigation Systems in Nepal: Institutions, Infrastructure, and Collective Action* (ICS Press, 1998). The general implications of Workshop research for the practical establishment and maintenance of irrigation systems are summarized in Elinor Ostrom, *Crafting Institutions for Self-Governing Irrigation Systems* (ICS Press, 1992). William Blomquist, *Dividing the Waters: Governing Groundwater in Southern California* (ICS Press, 1992) provides a good overview of problems relating to water management, including the systems that Elinor Ostrom studied in her doctoral dissertation, long before the Workshop was established.

Readings in this volume have concentrated on irrigation systems, watershed management, and fisheries, but Workshop affiliated scholars have investigated many other types of common-pool resources. *Making the Commons Work: Theory, Practice, and Policy* (ICS Press, 1992), edited by Daniel W. Bromley et al., collects papers that apply the Institutional Analysis and Development framework to several different substantive examples of common-pool resource management. Clark Gibson, *Peasants, Poachers, and Politicians: The Political Economy of Wildlife in Africa* (Cambridge University Press, forthcoming) examines the controversies associated with wildlife management in Zambia. Arun Agrawal, *Greener Pastures: Politics, Markets, and Community among a Migrant Pastoral People* (Duke University Press, forthcoming), evaluates the efforts of pastoral groups in Nepal and Northern India to manage a diverse range of common-pool resources, not all of which are under their exclusive control. Robert McC. Netting, *Smallholders, Householders: Farm Families and the Ecology of Intensive, Sustainable Agriculture*. (Stanford University Press, 1993) demonstrates the effectiveness of the many techniques that peasants in all parts of the world adopt in order to cope with their uncertain environment.

Forestry resources are the focus for much of the research currently underway at the Workshop, as part of the International Forestry Resources and Institutions (IFRI) Program. A brief volume that lays out the overall structure of the IFRI research program is James T. Thomson, *A Framework for Analyzing*

Institutional Incentives in Community Forestry (United Nations Food and Agriculture Organization [FAO], 1992). The first major edited volume to emerge from this extensive research program is Clark Gibson, Margaret McKean, and Elinor Ostrom, editors, *Keeping the Forest: Communities, Institutions, and the Governance of Forests* (MIT Press, forthcoming).

By this point it should be apparent that the single most important influence on the Workshop approach to institutional analysis has been Alexis de Tocqueville's *Democracy in America*, the classic work on self-governing associations in democratic societies. A modern classic on the crucial roles played by informal institutions in development is Hernando De Soto, *The Other Path: The Invisible Revolution in the Third World*, (Harper & Row, 1989). Janet T. Landa, *Trust, Ethnicity, and Identity: Beyond the New Institutional Economics of Ethnic Trading Networks, Contract Law, and Gift-Exchange* (University of Michigan Press, 1994) applies institutional analysis to the informal networks formed by diverse ethnic groups.

In *The Meaning of Democracy and the Vulnerability of Democracies: A Response to Tocqueville's Challenge* (University of Michigan Press, 1997), Vincent Ostrom examines the prospects for developing self-governing societies in all the major world civilizations. The informational problems inherent in autocratic rule are scrutinized by Antoni Kaminski in *An Institutional Theory of Communist Regimes: Design, Function, and Breakdown* (ICS Press, 1992). T. S. Yang's *Property Rights and Constitutional Order in Imperial China* (1987) is an award-winning (but as yet unpublished) Ph.D. dissertation that explicates the basic structure of Chinese society over several centuries.

Kathryn Firmin-Sellers, *The Transformation of Property Rights in the Gold Coast: An Empirical Analysis Applying Rational Choice Theory* (Cambridge University Press, 1996) covers a specific example of the historical development of the centralized constitutional order typical of post-colonial Africa. The general problems of governance in contemporary Africa are surveyed in *The Failure of the Centralized State: Institutions and Self-Governance in Africa*, 2nd edition, (ICS Press, 1995), edited by James S. Wunsch and Dele Olowu. Contemporary crises in Liberia are placed in historical perspective in *The Emergence of Autocracy in Liberia: Tragedy and Challenge* (ICS Press, 1992) by Amos Sawyer, a former president of that country.

The benefits of polycentric governance are most apparent when analysts draw explicit connections between local and national governments. The best and most succinct summary of the Workshop perspective on metropolitan governance remains *The Organization of Local Public Economies*, a 1987 Advisory Commission on Intergovernmental Relations [ACIR] report written by Ronald J. Oakerson. *Local Government in the United States* (ICS Press, 1988), by Vincent Ostrom, Robert Bish, and Elinor Ostrom, is an overview of the U.S. political system that was originally written for an Italian audience. Mark Sproule-Jones, *Governments at Work: Canadian Parliamentary Federalism and Its Public Policy Effects* (University of Toronto Press, 1993), shows that institutional analysis works north of the border as well, in this integrative evaluation of the constitution of order in Canada at the local and national levels.

The broader implications of Workshop research for development issues are explored in *Rethinking Institutional Analysis and Development*, 2d ed. (ICS Press, 1993), edited by Vincent Ostrom, David Feeny, and Hartmut Picht. This book also includes a mixture of micro-level and macro-level applications. The Workshop approach to institutional analysis is one of several analytical approaches to the study of governance included in *The Public Sector-Challenge for Coordination and Learning* (Walter de Gruyter, 1991), edited by Franz-Xaver Kaufmann.

The current volume was prepared in conjunction with two other volumes of previously published articles and book chapters by Workshop scholars. *Polycentricity and Local Public Economies* (University

of Michigan Press, 1999) includes classic works on the nature of polycentric order and a series of research reports comparing the performance of large and small police agencies in selected metropolitan areas of the United States. *Polycentric Games and Institutions* (University of Michigan Press, 1999) includes technical papers that develop formal models and experimental tests of the conditions under which self-governance is likely to be successful. This latter book nicely complements the current volume because most of the models and experiments developed there are based on a generic representation of the problems associated with managing common-pool resources.

[Volume 2] *Polycentricity and Local Public Economies*

The best place to begin is with a report published by the U.S. Advisory Commission on Intergovernmental Relations (ACIR). *The Organization of Local Public Economies* (1987), written by Ronald J. Oakerson, provides a clear and succinct summary of the Workshop approach to understanding local government. This report has been substantially revised and will be published in 1999 as *Governing Local Public Economies: Creating the Civic Metropolis* (Institute for Contemporary Studies [ICS] Press). For detailed applications of these analytical concepts to specific cases, see *Metropolitan Organization: The St. Louis Case* (1988), and *Metropolitan Organization: The Allegheny County Case* (1992).

Local Government in the United States (ICS Press, 1988), by Vincent Ostrom, Robert Bish, and Elinor Ostrom, is a textbook that provides an overview of the Workshop perspective on the study of local government. The authors devote considerable effort to locating local government within the context of the overall structure of American government, because this book was originally prepared for publication in Italian. An earlier monograph that provides a clear discussion of the financing arrangements needed to make polycentric governance work is *Understanding Urban Government: Metropolitan Reform Reconsidered* (American Enterprise Institute for Public Policy Research, Domestic Affairs Studies, Vol. 20, 1973), by Robert Bish and Vincent Ostrom. For a survey of the basic principles of rational choice theory upon which the Workshop approach to institutional analysis is built, see Robert Bish, *The Political Economy of Metropolitan Areas* (Markam, 1971).

Patterns of Metropolitan Policing (Ballinger, 1978), by Elinor Ostrom, Roger B. Parks, and Gordon P. Whitaker, covers the full range of research findings from the survey of 80 metropolitan areas. This book provides a considerable amount of detail on how these metropolitan areas line up on the values of several measures of overall governance structure. Descriptive summaries of a good portion of this material is presented in a pamphlet by the same authors, *Policing Metropolitan America* (U.S. Government Printing Office, 1977). The contributors to F.X. Kufmann, G. Majone, and V. Ostrom, eds. *Guidance, Control, and Evaluation in the Public Sector*, (de Gruyter, 1986) suggest several related approaches towards resolution of the conceptual difficulties involved in modeling large-scale systems.

There is no single book that provides an explicit comparison of the results of the evaluation of police performance in the Indianapolis, Chicago, St. Louis, and other metropolitan areas. Indeed, this lack of a book-length treatment was one of the inspirations behind the current volume. One important monograph is *Community Organization and the Provision of Police Services* (Sage Professional Paper in Administrative and Policy Studies 03-001, 1973), by Elinor Ostrom, William H. Baugh, Richard Guarasci, Roger B. Parks, and Gordon P. Whitaker. This monograph summarizes results from the earlier part of these projects, and it includes a clear statement of the components of the “production strategy” that smaller police forces rely upon to obtain such good results. Papers related to this project were included in *The Delivery of Urban Services: Outcomes of Change* (*Urban Affairs Annual Review*, Volume 10, 1976),

edited by Elinor Ostrom, *Comparing Urban Service Delivery Systems: Structure and Performance* (Urban Affairs Annual Review, Volume 12, 1977), edited by Vincent Ostrom and Frances Pennell Bish, and special issues of *Publius* (Volume 4, Fall 1974, "The Study of Federalism at Work," edited by Vincent Ostrom) and *Policy Studies Review* (Volume 7, 1978, "Symposium on Police and Law Enforcement Policy," edited by Fred A. Meyer, Jr., and Ralph Baker).

The implications of polycentric order for the study of public administration are detailed by Vincent Ostrom in his first major book, *The Intellectual Crisis in Public Administration* (2nd edition University of Alabama Press, 1989, 1st edition 1973). The field of public administration has been defined as an attempt to realize the aspirations of the reform tradition (as exemplified by the classic work of Woodrow Wilson), even though this mode of thinking was inconsistent with the structure of the American constitutional system as set up by the Founders. The underlying principles of design that the Founders used to set up a limited constitution are detailed in Vincent Ostrom's *The Political Theory of a Compound Republic* (2nd edition, ICS Press, 1987, 1st edition 1971). In his two most recent books, *The Meaning of American Federalism* (ICS Press, 1991) and *The Meaning of Democracy and the Vulnerability of Democracies* (University of Michigan Press, 1997), Vincent Ostrom further expounds on the continuing relevance of Tocqueville's understanding of self-governance as the foundation of American democracy. All of the research reported here has dealt with the U.S. context. Mark Sproule-Jones, *Governments at Work: Canadian Parliamentary Federalism and Its Public Policy Effects* (University of Toronto Press, 1993) and Robert L. Bish, *Local Government in British Columbia* (Union of British Columbia Municipalities in cooperation with the University of Victoria School of Public Administration, 1987) both demonstrate that institutional analysis and self-governance works north of the border as well. The latter book is nicely complemented by Robert L. Bish, *Governing Puget Sound* (University of Washington Press, 1982), which investigates all levels of governance in the neighboring state of Washington, including Native American governments. This same scholar prepared a summary statement of *Basic Principles of Political Decentralisation to Local Authorities* (University of Pretoria, 1983) as a contribution to constitutional reform in South Africa. Another country in Africa with a federalist governance structure is Nigeria, and Dele Olowu's *Lagos State: Governance, Society, and Economy* (Malthouse Press Limited, 1990) provides a comprehensive analysis of local governance in Nigeria. Dele has co-edited several volumes dealing with issues of local and national governance in Africa, including *The Failure of the Centralized State: Institutions and Self-Governance in Africa*, 2nd edition, (ICS Press, 1995), edited by James S. Wunsch and Dele Olowu.

Two books completed by scholars from other institutions while they were visitors at the Workshop are worth careful examination, because they demonstrate how Workshop research can be connected to broader issues of import in literature on urban politics more generally. Robert Stein's *Urban Alternatives: Public and Private Markets in the Provision of Local Services* (University of Pittsburgh Press, 1990) evaluates the effects on public policy of the ways in which municipal governments are organized. Mark Schneider's *The Competitive City: The Political Economy of Suburbia* (University of Pittsburgh Press, 1989) examines competition among suburban communities as a form of market in public goods. Neither of these scholars adopts the Workshop perspective in toto, but they address many of the same dilemmas of local governance.

The current volume was prepared in conjunction with two other volumes of previously published articles and book chapters by Workshop scholars. Both of these books focus on research conducted by Workshop scholars after the bulk of the research projects summarized in the current volume were completed. *Polycentric Development and Governance* (University of Michigan Press, 1999) focuses on

the management of common-pool resources by self-governing communities throughout the world. This book also includes early statements of the Workshop perspective, dating back before the initiation of the police studies reported here. Both of the co-founders of the Workshop completed Ph.D. dissertations on resource use in the Western United States, and it was only after they moved to Indiana University that they developed an interest in evaluation of police services. *Polycentric Games and Institutions* (University of Michigan Press, 1999) includes technical papers that develop formal models and experimental tests of the conditions under which self-governance is likely to be successful. These two volumes complement each other well, because most of the models and experiments developed there are based on a generic representation of the problems associated with managing common-pool resources. It remains to be seen whether simple game models can be equally successful in helping us to understand the foundations of effective public service provision in metropolitan areas as the empirical studies brought together in this volume.

[Volume 3] *Polycentric Games and Institutions*

The best place to begin is *Rules, Games, and Common-Pool Resources* (University of Michigan Press, 1994), written by Elinor Ostrom, Roy Gardner, and James Walker with the assistance of four Workshop colleagues. This is a truly unique book that fully integrates field research, formal models, and laboratory experiments, all focused on the management of common-pool resources. In short, this book exemplifies the Workshop's multi-faceted approach to institutional analysis. Field research is the primary topic of Elinor Ostrom's award-winning book *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge University Press, 1990), but this book also includes a brief introduction to the use of Prisoner's Dilemma games and other formal representations of social dilemmas.

As readers of this volume are well aware, the Workshop approach to institutional analysis draws inspiration from a wide variety of sources. For influential overviews of the closely related fields of research known as public choice, social choice, new institutional economics, and constitutional economics, readers should consult (respectively) Dennis C. Mueller, *Public Choice II* (Cambridge University Press, 1989), and William H. Riker, *Liberalism Against Populism: A Confrontation Between the Theory of Democracy and the Theory of Social Choice* (W.H. Freeman, 1982), Thráinn Eggertsson, *Economic Behavior and Institutions* (Cambridge University Press, 1990), and James M. Buchanan and Gordon Tullock, *The Calculus of Consent: Logical Foundations of Constitutional Democracy* (University of Michigan Press, 1962). *Perspectives on Public Choice: A Handbook* (Cambridge University Press, 1997), edited by Dennis C. Mueller, includes excellent overviews contributed by most of the major players in the public choice tradition.

Three Workshop-affiliated scholars have written textbooks on game theory or environmental economics: Roy Gardner, *Games for Business and Economics* (Wiley, 1995), Eric Rasmusen, *Games and Information: An Introduction to Game Theory*, 2nd edition (Blackwell, 1994), and Steven Hackett, *Environmental and Natural Resources Economics: Theory, Policy, and the Sustainable Society* (M.E. Sharpe, 1998). John Williams and Kenneth Bickers are writing a general textbook on policy analysis, *Public Policy Analysis: A Political Economy Approach* (Houghton-Mufflin, forthcoming), that incorporates the Workshop perspective. Textbooks focusing on particular policy areas include *Local Government in the United States* (Institute for Contemporary Studies [ICS] Press, 1988), by Vincent Ostrom, Robert Bish,

and Elinor Ostrom, and *Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective* (Westview Press, 1993), by Elinor Ostrom, Larry Schroeder, and Susan Wynne.

Workshop-affiliated scholars have also contributed to several edited volumes in which game models have been applied to a diverse array of empirical settings, including *Games in Hierarchies and Networks: Analytical and Empirical Approaches to the Study of Governance Institutions*, edited by Fritz W. Scharpf (Westview Press, 1993), *Social Dilemmas and Cooperation*, edited by Ulrich Schulz, Wulf Albers, and Ulrich Meuller (Springer-Verlag, 1994), *Understanding Strategic Interaction: Essays in Honor of Reinhard Selten*, edited by Wulf Albers, Werner Guth, Peter Hammerstein, Benny Moldovanu, and Eric van Damme (Springer-Verlag, 1997), and a four-volume set edited by Reinhard Selten, *Game Equilibrium Models I-IV* (Springer-Verlag, 1991).

Empirical applications and laboratory experiments have played important roles in the development of the research programs surveyed in this volume. Examples of such applications are collected in *Laboratory Research in Political Economy*, edited by Thomas R. Palfrey (University of Michigan Press, 1991) and *Empirical Studies in Institutional Change*, edited by Lee J. Alston, Thráinn Eggertsson, and Douglass C. North (Cambridge University Press, 1996). Calvin Jillson and Rick K. Wilson, *Congressional Dynamics: Structure, Coordination, and Choice in the First American Congress, 1774-1789* (Stanford University Press, 1994) shows how the findings of experimental research on voting systems can inform our understanding of important historical processes.

Earlier versions of essays included in this volume can be found in several edited volumes that also include contributions by scholars from other research institutes. The contributors to Franz-Xaver Kaufmann, Giandomenico Majone, and Vincent Ostrom, eds. *Guidance, Control, and Evaluation in the Public Sector*, (Walter de Gruyter, 1986) suggest several related approaches towards resolution of the conceptual difficulties involved in modeling large-scale systems. A shorter version of this report on the results of the Bielefeld interdisciplinary project was later published as *The Public Sector-Challenge for Coordination and Learning* (Walter de Gruyter, 1991), edited by Franz-Xaver Kaufmann. The broader implications of Workshop research for development issues are explored in *Rethinking Institutional Analysis and Development*, 2d ed. (ICS Press, 1993), edited by Vincent Ostrom, David Feeny, and Hartmut Picht. This book includes a mixture of micro-level and macro-level applications.

The current volume was prepared in conjunction with two other volumes of previously published reports on research by Workshop-affiliated scholars. *Polycentric Development and Governance* (University of Michigan Press, 1999) focuses on the management of common-pool resources by self-governing communities throughout the world. This book includes early statements of the Workshop perspective, dating back before game theory had made much of an impact on the study of institutions. This volume complements the current one very well, because most of the models and experiments developed here are based on a generic representation of the problems associated with managing common-pool resources.

It remains to be seen whether simple game models can be equally successful in helping us to understand the complexities of public service provision in metropolitan areas, which is the primary focus of *Polycentricity and Local Public Economies* (University of Michigan Press, 1999). This work includes classic essays on the nature of polycentric order and a series of research reports comparing the performance of large and small police agencies in selected metropolitan areas of the United States.

Appendix Two: Full citations for original publications included in these volumes

[Volume 1] *Polycentric Governance and Development*

1. Ostrom, Vincent. 1967. "Water and Politics California Style." *Arts and Architecture*, 84 (July/August), 14-16, 32.
2. Ostrom, Vincent, and Elinor Ostrom. 1972. "Legal and Political Conditions of Water Resource Development." *Land Economics* 48(1) (Feb.): 1-14.
3. Blomquist, William, and Elinor Ostrom. 1985. "Institutional Capacity and the Resolution of a Commons Dilemma." *Policy Studies Review* 5(2) (Nov.): 383-93.
4. Ostrom, Elinor. 1993. "Design Principles in Long-Enduring Irrigation Institutions." *Water Resources Research* 29 (7) (July): 1907-12.
5. Schlager, Edella, and Elinor Ostrom. 1993. "Property-Rights Regimes and Coastal Fisheries: An Empirical Analysis." In *The Political Economy of Customs and Culture: Informal Solutions to the Commons Problem*, ed. Terry L. Anderson and Randy T. Simmons, 13-41. Lanham, MD: Rowman & Littlefield.
6. Schlager, Edella, William Blomquist, and Shui Yan Tang. 1994. "Mobile Flows, Storage, and Self-Organized Institutions for Governing Common-Pool Resources." *Land Economics* 70(3) (Aug.): 294-317.
7. Ostrom, Vincent. 1982. "A Forgotten Tradition: The Constitutional Level of Analysis." In *Missing Elements in Political Inquiry: Logic and Levels of Analysis*, ed. Judith A. Gillespie and Dina A. Zinnes, 237-52. Beverly Hills, CA: Sage Publications.
8. Ostrom, Vincent. 1993. "Cryptoimperialism, Predatory States, and Self-Governance." In *Rethinking Institutional Analysis and Development: Issues, Alternatives, and Choices*, ed. Vincent Ostrom, David Feeny, and Hartmut Picht, 43-68. San Francisco: ICS Press.
9. Firmin-Sellers, Kathryn. 1995. "The Concentration of Authority: Constitutional Creation in the Gold Coast, 1950." *Journal of Theoretical Politics* 7(2) (April): 201-22.
10. Olowu, Dele. 1989. "Local Institutes and Development: The African Experience." *Canadian Journal of African Studies* 23(2):201-31.
11. Wunsch, James S. 1991. "Institutional Analysis and Decentralization: Developing an Analytical Framework for Effective Third World Administrative Reform." *Public Administration and Development* 11:431-51.
12. Lam, Wai Fung. 1996. "Improving the Performance of Small-Scale Irrigation Systems: The Effects of Technological Investments and Governance Structure on Irrigation Performance in Nepal." *World Development* 24(8) (Aug.): 1,301-315.
13. Lam, Wai Fung. 1996. "Institutional Design of Public Agencies and Coproduction: A Study of Irrigation Associations in Taiwan." *World Development* 24(6):1039-54.
14. Tang, Shui-Yan. 1995. "Informal Credit Markets and Economic Development in Taiwan." *World Development* 23(5):845-55.
15. Ostrom, Elinor. 1996. "Crossing the Great Divide: Coproduction, Synergy, and Development." *World Development* 24(6) (June): 1073-87.
16. Ostrom, Vincent. 1980. "Artisanship and Artifact." *Public Administration Review* 40(4) (July-Aug.): 309-17.
17. Ostrom, Vincent. 1990. "Problems of Cognition as a Challenge to Policy Analysts and Democratic Societies." *Journal of Theoretical Politics* 2(3):243-62.

[Volume 2] *Polycentricity and Local Public Economies*

1. Ostrom, Vincent, Charles M. Tiebout, and Robert Warren. 1961. "The Organization of Government in Metropolitan Areas: A Theoretical Inquiry." *American Political Science Review* 55 (Dec.): 831-42.
2. Ostrom, Vincent. 1972. "Polycentricity," paper presented at the Annual Meeting of the American Political Science Association, Washington, D.C., September 5-9, 1972. Part I.
3. Ostrom, Vincent, and Elinor Ostrom. 1977. "Public Goods and Public Choices." In *Alternatives for Delivering Public Services. Toward Improved Performance*, ed. E. S. Savas, 7-49. Boulder, CO: Westview Press.
4. Ostrom, Vincent, and Elinor Ostrom. 1965. "A Behavioral Approach to the Study of Intergovernmental Relations." *The Annals of the American Academy of Political and Social Science* 359 (May): 137-46.
5. Ostrom, Vincent. 1972. "Polycentricity," paper presented at the Annual Meeting of the American Political Science Association, Washington, D.C., September 5-9, 1972. Part II
6. Ostrom, Elinor. 1972. "Metropolitan Reform: Propositions Derived from Two Traditions." *Social Science Quarterly* 53 (Dec.): 474-93.
7. Ostrom, Elinor. 1977. "Why Do We Need Multiple Indicators of Public Service Outputs?" In *National Conference on Nonmetropolitan Community Services Research*, 277-86. Washington, D.C.: U.S. Government Printing Office.
8. Ostrom, Elinor, and Gordon P. Whitaker. 1973. "Does Local Community Control of Police Make a Difference? Some Preliminary Findings." *American Journal of Political Science* 17(1) (Feb.): 48-76.
9. Ostrom, Elinor, and Gordon P. Whitaker. 1974. "Community Control and Governmental Responsiveness: The Case of Police in Black Neighborhoods." In *Improving the Quality of Urban Management*, ed. David Rogers and Willis Hawley, 303-34. Urban Affairs Annual Reviews, Vol. 8. Beverly Hills, CA: Sage Publications.
10. Ostrom, Elinor. 1976. "Size and Performance in a Federal System." *Publius* 6(2): 33-73.
11. Ostrom, Elinor, Roger B. Parks, and Gordon P. Whitaker. 1974. "Defining and Measuring Structural Variations in Interorganizational Arrangements." *Publius* 4(4) (Fall): 87-108.
12. Ostrom, Elinor and Roger B. Parks (1987) "Neither Gargantua Nor the Land of Lilliputs: Conjectures on Mixed Systems of Metropolitan Organization." Presented at the 1987 Midwest meetings, Chicago, April 9-11.
13. Oakerson, Ronald J. and Roger B. Parks. 1988. "Citizen Voice and Public Entrepreneurship: The Organizational Dynamic of a Complex Metropolitan County." *Publius*, 18: 91-112.
14. Blomquist, William, and Roger B. Parks. 1995. "Fiscal, Service, and Political Impacts of Indianapolis-Marion County's Unigov." *Publius* 25 (4): 37-54.
15. Parks, Roger. 1995. "Do We Really Want to Consolidate Urban Areas? [It's Like Deja Vu All Over Again]," *Polycentric Circles*
16. Parks, Roger B., and Elinor Ostrom. 1981. "Complex Models of Urban Service Systems." In *Urban Policy Analysis: Directions for Future Research*, ed. Terry N. Clark, 171-99. Urban Affairs Annual Reviews, Vol. 21. Beverly Hills, CA: Sage Publications.
17. Parks, Roger B., Paula C. Baker, Larry L. Kiser, Ronald J. Oakerson, Elinor Ostrom, Vincent Ostrom, Stephen L. Percy, Martha Vandivort, Gordon P. Whitaker, and Rick Wilson. 1981. "Consumers as Coproducers of Public Services: Some Economic and Institutional Considerations." *Policy Studies Journal* 9 (Summer): 1001-11.

[Volume 3] Polycentric Games and Institutions

1. Ostrom, Vincent, and Elinor Ostrom. 1971. "Public Choice: A Different Approach to the Study of Public Administration." *Public Administration Review* 13 (Mar./Apr.): 203-16.
2. Kiser, Larry L., and Elinor Ostrom. 1982. "The Three Worlds of Action: A Metatheoretical Synthesis of Institutional Approaches." In *Strategies of Political Inquiry*, ed. Elinor Ostrom, 179-222. Beverly Hills, CA: Sage.
3. Ostrom, Elinor. 1986. "An Agenda for the Study of Institutions" *Public Choice* 48:3-25.
4. Crawford, Sue E.S., and Elinor Ostrom. 1995. "A Grammar of Institutions." *American Political Science Review* 89(3) (Sept.): 582-600.
5. Herzberg, Roberta and Vincent Ostrom. 1986. "Votes and Vetoes." In *Guidance, Control and Evaluation in the Public Sector*, ed. F. X. Kaufmann, G. Majone, and V. Ostrom, 431-43. Berlin and New York: Walter de Gruyter.
6. Wilson, Rick, and Roberta Herzberg. 1987. "Negative Decision Powers and Institutional Equilibrium: Experiments on Blocking Coalitions." *Western Political Quarterly* 40(4) (Dec.): 593-609.
7. McGinnis, Michael D., and John T. Williams. 1993. "Policy Uncertainty and Two-Level Games: Examples of Correlated Equilibria." *International Studies Quarterly* 37(1): 29-54.
8. Agrawal, Arun. 1997. "Shepherds and their Leaders Among the Raikas of India: A Principal-Agent Perspective." *Journal of Theoretical Politics* 9(1):235-63.
9. Rasmusen, Eric. 1992. "Heterogenous Players and Specialized Models," *Rationality and Society*, 4 (1): 83-94.
10. Gardner, Roy, Michael Moore, and James Walker. 1994. "Governing a Groundwater Commons: A Strategic and Laboratory Analysis of Western Water Law." *Economic Inquiry* 35 (April): 218-34.
11. Lyon, Thomas P., and Steven C. Hackett. 1993. "Bottlenecks and Governance Structures: Open Access and Long-Term Contracting in Natural Gas," *Journal of Law and Economic Organization*, 9: 380-398.
12. Gibson, Clark C. and Stuart A. Marks. 1995. "Transforming Rural Hunters into Conservationists: An Assessment of Community-Based Wildlife Management Programs in Africa." *World Development* 23(6):941-57.
13. Weissing, Franz J., and Elinor Ostrom. 1993. "Irrigation Institutions and the Games Irrigators Play: Rule Enforcement on Government- and Farmer-Managed Systems." In *Games in Hierarchies and Networks: Analytical and Empirical Approaches to the Study of Governance Institutions*, ed. Fritz W. Scharpf, 387-428. Frankfurt: Campus Verlag; Boulder, CO: Westview Press.
14. Ostrom, Elinor, and Roy Gardner. 1993. "Coping with Asymmetries in the Commons: Self-Governing Irrigation Systems Can Work." *Journal of Economic Perspectives* 7(4) (Fall): 93-112.
15. Ostrom, Elinor, and James Walker. 1997. "Neither Markets Nor States: Linking Transformation Processes in Collective Action Arenas." In *Perspectives on Public Choice: A Handbook*, ed. Dennis C. Mueller, 35-72. Cambridge: Cambridge University Press.
16. Ostrom, Elinor. 1998. "A Behavioral Approach to the Rational Choice Theory of Collective Action." *American Political Science Review* 92(1) (March): 1-22.