INSTITUTIONAL ARRANGEMENTS FOR WATER RESOURCE DEVELOPMENT

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by VINCENT OSTROM

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INSTITUTIONAL ARRANGEMENTS FOR WATER RESOURCE DEVELOPMENT

THE CHOICE OF INSTITUTIONAL ARRANGEMENTS FOR WATER RESOURCE DEVELOPMENT

--With Special Reference to the California Water Industry

by

Vincent Ostrom
Indiana University

December, 1971

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This report examines the structural elements that have entered into the development of the American water industry, with special reference to the California water industry. A variety of public and private enterprises engaged in water resource development and the rendering of water services are analyzed and evaluated in terms of the theory of organization used by public administration and administrative analysts, and the concepts of political economists. The level of productivity of the American water industry is examined as a consequence of opportunities for public entrepreneurship afforded by a system of overlapping jurisdictions and fragmentation of authority. The report sets forth problems in the assessment of organizational arrangements, examines the terms and conditions of political choice and reviews the choice of institutional arrangements in the development of the California water industry. An assessment is presented of alternative approaches to policy problems in water resource development.

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STATEMENT

This report was prepared under a contract entered into by the National Water Commission to provide background for the Commission's deliberations on the subject of national water policy. It has not been approved by the Commission and the Commission does not guarantee the accuracy or the completeness of the data contained in the report. The report is released at this time through the National Technical Information Service to stimulate public discussion of water resource policy issues. Your comments and suggestions will be appreciated.

National Water Commission
Room 405
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Vincent Ostrom

December, 1971

Bloomington, Indiana

SUMMARY STATEMENT OF PURPOSE, CONCLUSIONS AND RECOMMENDATIONS

This study of the choice of institutional arrangements is an effort to clarify the structural elements which have entered into the development of the American water industry. Primary reference is made to the California water industry in order to reflect the substantial depth and complexity of organizational arrangements which have been developed to supply many different water services. No other state and no other region will have precisely the same structure of institutional arrangements found in the California water industry but all areas of the United States will reflect the same general patterns of organization.

The peculiar structure of institutional arrangements for water resource development in the United States includes a large variety of different forms of both private and public enterprises. Both profitable or commercial utility companies and cooperative, non-profit, mutual water companies provide different types of water services. In addition, municipal water departments, public water districts and agencies of county, state and Federal governments operate as public enterprises in rendering water services.

These agencies relate to one another as so many different firms in an industry. Some operate predominantly as retailers and small-scale producers who also contract with wholesalers and large-scale producers for supplemental water supplies. Others, such as the Metropolitan Water District of Southern California, operate as essentially wholesalers. Still others, such as the

U.S. Bureau of Reclamation and the U.S. Corps of Engineers, operate as large-scale producers. Interrelationships among agencies in a water industry are largely organized through contractual undertakings and interagency agreements supplemented by general provisions of legislation providing for interagency coordination, public regulation and reliance upon courts in adjudicating controversies.

The peculiar structure of public service industries characterizes several different segments of the American system of public administration including public education, public health, police, public welfare, public streets and highways and other types of public services. Yet, this type of structure contradicts the basic theory of organization used by American scholars in public administration and administrative analysts. Such scholars and analysts have followed Woodrow Wilson in holding that all systems of "good" administration will be organized in accordance with hierarchical principles without regard to the patterns of political organization reflected in the constitution of different political systems. Administrative analysts have viewed overlapping jurisdictions and fragmentation of authority as pathological and have consistently recommended that the number of governmental units be radically reduced. Operating agencies within any particular unit of government should from this perspective also be sharply reduced by having a few large departments subject to the administrative command of a single chief executive.

A number of political economists who have been concerned with problems of organization in a public service economy have challenged the principles of organization used by administrative analysts in proposing administrative reorganizations. Relying upon theories of externalities, common property resources and public goods, these political economists have developed theories of organization that are much more congruent with the patterns of American public administration. The basic differences in approach are dramatically illustrated by the report of the Committee for Economic Development on Modernizing Local Government (New York: CED, 1966) and Robert Bish's The Public Economy of Metropolitan Areas (Chicago: Markham Publishing Company, 1971).

Since different concepts give rise to different design possibilities, this study of the choice of institutional arrangements for water resource development has been concerned with 1) elucidating these two different approaches to the theory of organization, and 2) examining the historical development of water institutions in the California water industry in light of those different approaches.

At this juncture, any policy commission concerned with water policy problems will need to consider the theory of organization which it uses in formulating its policy proposals. Reliance upon an inappropriate way of conceptualizing policy problems can lead to proposals which will amplify errors rather than resolve problems. Because of the significance of alternative

theoretical concepts for the formulation of policy proposals, this study emphasizes the logic and criteria which are applicable to organizational analysis.

Since the preferences of any author will influence what he understands and reports, I should indicate that I identify myself with the work of contemporary political economists. My graduate education was largely in the classical public administration tradition. However, my subsequent work on problems of water resource administration seriously challenged many of the theoretical precepts I then held. My effort to understand the logic inherent in the strategies pursued by public entrepreneurs among water agencies, assuming that they were rational and intelligent individuals, led me to reformulate my approach to the study of public administration. This study is a product of that effort.

As a political economist, I would conclude that the system of private and public enterprises which comprise the California water industry, and the American water industry more generally, has developed a high level of productivity. This high level of productivity is a consequence of the extensive opportunities for public entrepreneurship afforded by the system of overlapping jurisdictions and fragmentation of authority inherent in the American political system. When much of the world cries out in want, institutional arrangements which are capable of a high level of productivity can be viewed as important assets in American life. The basic structure of the American water

industry should not be radically altered. Relatively small, but important, changes can, however, be expected to bring distinct improvements in its performance.

The basic shortcoming of the American water industry is one of overinvestment in water resource facilities, overdevelopment of some water services and a correlative neglect of other water services. These patterns of overdevelopment for some uses and misallocation or neglect of other uses is a direct consequence of public policies which subsidize many water resource developments. Public subsidies lead to the provision of water services where service charges do not reflect the costs of production and the social costs of other opportunities foregone. As a consequence, water services are underpriced, excessive amounts of water are used for some purposes and are made unavailable for other purposes. Little incentive exists for developing institutional arrangements for tending to water as a valuable commodity.

Increased public expenditures to subsidize water resource developments without appropriate user charges will exacerbate problems of overdevelopment and misallocation and generate increasing water "crises." Economic efficiency in the water industry would be enhanced if public expenditures were made under a policy of "full" reimbursability for both the costs of water production plus the social costs of other opportunities foregone. Revenues derived from water service charges or taxes levied upon the beneficiaries should be sufficient to cover

both the cost of production and the social cost of other opportunities foregone.

Pricing mechanisms can be introduced through the development of use taxes and user service charges which can cover the provision of most, if not all, water services. Use taxes are now being levied, for example, to cover the costs of ground water replenishment programs in southern California and can be broadly extended to the provision of other water services including the discharge of waste water. Incentives will exist for the reclamation of waste water when such efforts become less costly than alternative patterns of development.

If water is priced to cover full production costs plus the full social costs of other opportunities foregone, then incentives will develop to facilitate institutional arrangements which allow for buying and selling of both short-term rentals or leases and long-term conveyances of water rights among water producers. Such developments will only occur when the value of water is sufficient to cover costs of watermaster services for monitoring water production and for keeping water accounts for each and every water producer within the context of particular basins or hydrographic areas where conditions of supply can be equated with conditions of demand.

Pricing mechanisms based upon user taxes and water service charges are more effective mechanisms for taking account of social costs than are statutory prohibitions which depend upon criminal law procedures backed by penal sanctions for their

enforcement. Large public expenditures to subsidize water resource programs backed by public enforcement programs which rely upon "muscle" or "clout" to enforce standards of public conduct but which fail to cover costs by appropriate user charges can be expected to contribute to increasing problems of misallocation. Misallocations will occur in the provision of water services, in the use of general treasury funds for social bribery where recipients do not bear the relevant costs and in an overloading of the American system of criminal justice as well.

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Part I

INTRODUCTION

Chapter 1

SOME PROBLEMS IN THE ASSESSMENT OF ALTERNATIVE ORGANIZATIONAL ARRANGEMENTS

The Peculiar Structure of the American Water Industry

The organization of institutional arrangements for water resource development challenges much of the conventional wisdom in academic scholarship about efficient organizational structures. Institutional arrangements for water resource development conform neither to the market model traditionally used by economists for conceptualizing efficient organization of economic relationships nor to the bureaucratic model used by administrative analysts for conceptualizing an efficient system of public administration.

Classical economists view competitive market arrangements as necessary conditions for efficient allocation of resources in an economy. Yet the development of water resources is marked by the absence of competitive market arrangements for the distribution of water-related services to ultimate consumers. Where profitable private enterprises have engaged in the provision of water supplies, those enterprises are organized as closely regulated monopolies for supplying water as a public service. Open competition among enterprises providing public water services is generally viewed as deliterious to social welfare. The provision of water supply is a "natural monopoly" where the

addition of a second or third supplier will greatly increase capital costs without compensating benefits for water users. The predominant form of private enterprise providing services to water users is a non-profit, cooperative form of enterprise.

In addition to non-profit, mutual water companies and profitable, public-utility companies, Americans are also provided water services by a host of public agencies organized as departments of municipal governments, public water districts, agencies of county governments, state governments and the Federal government. Water institutions are predominantly public agencies capable of exercising governmental prerogatives in the provision of water as a public service.

Yet, this constellation of public agencies has developed without being integrated into a unitary chain of command accountable to a single chief executive in a hierarchically-ordered system of public administration as would be recommended by traditional scholars of public administration or by administrative analysts. The organization of water resource agencies reflects a fragmentation of authority, an overlapping of jurisdictions, and the pursuit of specialized public interests that have usually been identified as pathological characteristics of American public administration by these same administrative analysts.

This configuration of overlapping water service agencies tends to take on the characteristics of an industry.[1] But in this case, the "industry" is composed predominately of public agencies which do not engage in direct competition for the consumer's dollar. The competitive relationships occur as rivalry among diverse public agencies. In their relationships with one another, some water service agencies function as large-scale producers, others function as intermediate-scale producers and wholesalers, and still others function as small-scale producers and distributors. Indeed, such relationships can be found in most areas of the United States.

The competitive rivalry which does exist among water service agencies within an industry rarely occurs under conditions where water users are provided with direct access to alternative vendors of water supply within any given water service area. Instead, competitive rivalry usually occurs among agencies when alternative sources of supply are being considered and the cost of different alternatives are contemplated not as direct prices but as shadow prices. The existence of shadow prices gives rise to a shadow market where water service agencies can contemplate the cost and choose from the alternative sources of supply that are potentially available to them. In a few limited cases where public water agencies have developed water exchange agreements, water exchanges take on some of the characteristics of a specialized and limited commodity market.

This type of public service industry conforms neither to the market model used in classical economic theory nor to the bureaucratic model for the organization of public services used in the classical theory of public administration. Competition occurs under circumstances which administrative analysts view as pathological; and it fails to occur in the product market. Yet the various institutional arrangements which Americans have devised as a means for undertaking programs of water resource development reflect a long history. These characteristic patterns of organization re-occur throughout the United States with modifications to reflect specialized problems of water resource development existing in particular areas.

The American water industry is a public service industry without a competitive product market but with a competitive rivalry among the principal agencies for the resource supply. This competitive rivalry may provide a coordinating mechanism which substitutes in part for mechanisms of bureaucratic control. Being neither fish nor fowl, this species of organizational arrangement has yet to be properly identified and its behavioral characteristics to be adequately explained.

The persistence of a pattern of organization in the development of water resources which deviates substantially from the market model in classical economic theory and the bureaucratic model in administrative theory calls for

serious reconsideration of the organizational basis for water resource development in the United States. We may be confronted with a choice of institutional arrangements that involve a larger array of alternatives than those which are afforded by models of market organization or models of bureaucratic organization. The primary purpose of this study is to explore the alternative organizational arrangements which have developed as a part of the American water industry.

The Choice of Institutional Arrangements

In the last decade or two, scholars in economics and political science have been developing the theoretical foundations for an analysis of different institutional arrangements. Much of this literature was generated by economists who were concerned with problems of market weakness and market failure. When market organizations manifest substantial deficiencies, recourse to public-sector solutions is an alternative method for securing the provision of goods and services in an economy. Consideration of public-sector solutions, however, has lead to an increasing awareness of problems of institutional weaknesses and institutional failure among public organizations.

I shall assume that no single set of decision rules as reflected in any particular institutional arrangement will be sufficient to sustain productive relationships in water resource development. Any one type of institutional

arrangement will afford certain capabilities for generating a limited range of desired effects. However, every institutional arrangement will be subject to serious limitations. Institutional deficiencies will become apparent if those limits are exceeded.

In short, no form of organization is "good" for all social circumstances.[2] We should not expect a "good" structure of institutional arrangements for water resource development to conform to a simple formula applicable to all different circumstances. Institutional analysis should be able to specify the capabilities and limitations inherent in different types of institutional arrangements and to indicate the consequences which can be expected to follow when those limits are exceeded. On the basis of such analyses, we should be able to estimate the appropriateness of alternative institutional arrangements for a viable system of water resource development in the contemporary scene.

If no form of organization is "good" for all purposes, we should also assume that the terms and conditions inherent in the organization of different institutional arrangements are <u>not</u> a matter of indifference to people attempting to develop appropriate institutions to provide water services under a variety of circumstances. We would expect peoples' preferences to be expressed in their choice from among the alternative institutional arrangements which are available to them. The opportunity to choose from among different

institutional arrangements may indeed be one of the most important choices available to people in a democratic society. A choice of institutional arrangements may be at least as important as the choice from among alternative goods and services available in a market economy. The choice of institutional arrangements is, however, essentially a political choice rather than an economic choice. Political choice is a choice of decision making arrangements for the allocation, exercise and control of decision making capabilities among people.

If we are to clarify the problems involved in the choice of institutional arrangements, we are confronted with the task of specifying the terms on which different institutional alternatives are available. Such an effort will be plagued by substantial difficulties. However, an initial effort can be made by indicating some of the conditions of institutional weakness and institutional failure which are characteristic of the different forms of organizational arrangements that are relevant for organizing human enterprise in water resource development. In exploring some of the sources of organizational deficiencies, we shall first examine the conclusions reach by political economists regarding market weakness and market failure. We shall then turn to the sources of organizational pathologies identified by administrative analysts as contributing to shortcomings in the American public administration. This

approach has served as the basis for most of the efforts to reorganize American public administration during the Twentieth century. Much of the analysis of organizational pathologies made by administrative analysts is now being challenged by contemporary scholars who have identified serious problems of institutional weakness and institutional failure in large-scale public bureaucracies. We shall, thus, examine the issues associated with the shortcomings of large-scale bureaucracies. We are then left with the question of whether the peculiar structure of the American water industry represents a different form of public administration requiring somewhat different modes of analysis for dealing with such a system of organization.

Conditions of Institutional Weaknesses and Institutional Failures

Sources of Market Weakness and Market Failure

In economic theory, market organization is based upon an assumption that individuals are free to enter into transactions with one another to buy and sell various goods and services. Each individual is presumed to be a rational, self-interested person who attempts to maximize his net economic advantage. Buyers and sellers will compete with one another. Where numerous competitors exist among both buyers and sellers in any commodity market, the competitive force of the market will, in the long-run, establish an equilibrium where

supply equals demand at a price which is equal to the cost of producing the marginal product. If all commodity markets were perfectly competitive, the marginal value of each commodity would be equal for each and every commodity.

These conditions can prevail where the goods and services subject to economic transactions are highly separable and homogeneous. Such goods and services can be packaged, contained and measured in discrete units and can be exchanged under circumstances where the potential buyer can be excluded from enjoying the benefit unless he is willing to pay the price. Such commodities should also meet the condition that their consumption is exclusive so that any one person's consumption fully excludes anyone else from enjoying the good. Goods which are fully separable and are subject to exclusion in possession, in exchange and in consumption can be defined as purely private goods.

As the structure of events, which are viewed as "goods" in the sense that people have a value or a demand for such events, begins to depart from conditions of separability and exclusivity in possession, exchange and use, conditions of institutional weakness become apparent in market organization. Economists have broadly characterized three types of events which depart significantly from their conception of a purely private good. These include externalities, common-pool, flow resources and public goods. Problems of institutional failure in market arrangement increase as one

moves from externalities to public goods. Market arrangements will fail to sustain the provision of a purely public good.

Externalities

An externality can be defined as an effect associated with an economic good which cannot be readily contained by those involved in a transaction and spills over in the sense of impinging upon others in the neighborhood.[3] Positive externalities are those which have a beneficial neighborhood effect. Negative externalities are those which have detrimental consequences for others in a neighborhood. Except for the attribute characterized by indivisibilities, other attributes of that economic good may be highly separable and thus have the characteristics of a private good. Most uses of water will, for example, generate negative externalities as the quality of water is likely to diminish after each use. Externalities become problems only as they assume significance in the interpersonal economy of a community of individuals. The problems posed in any effort to control externalities are similar to those involved in events having the attributes of common-pool, flow resources and public goods.

Common-Pool, Flow Resources

A common-pool, flow resource can be defined as some set of events where several individuals may make a separate and individual consumptive use of the resource while the supply

of the resource is indivisible and is shared in common.[4] The use or consumption by one may impair its use or consumption by another even though the several users cannot exercise exclusive possession over the supply of the resource. In the event that a common-pool, flow resource is a replenishable or renewable resource, no serious problems of interdependency may be generated until the demands upon the resource begin to exceed the sustainable supply. In exceptional circumstances, use by some can even enhance the utility of others as when the storage of flood waters for dry-season irrigation may reduce flood flows and thus decrease the aggregate amount of potential flood damage.

Where demands exceed the supply of a common-pool, flow resource, serious problems are engendered because each person's use will exclude use by others, but no one user can effectively control other users. Competitive rivalry in the use of a common-pool, flow resource where demand exceeds supplies will engender a deteriorating situation. Every increase in demand leaves the aggregate community of users worse off. The failure of the exclusion principle to operate in the possession of a common-pool, flow resource implies that such a resource must be treated as a common property subject to individual use by many different users having separable interests in that common property. The separability of use also implies that a partial interest may be identified as the basis for a private property. The

partitioning of property rights to a common-pool, flow resource always poses difficulties in dealing with the interdependencies and indivisibilities of supply as against divisibility in demands and uses. The wide range of joint and alternative uses characteristic of many water resources generates substantial impediments to the use of market arrangements for allocating the different goods and services which are inherent in a water supply system. The lack of an exclusion principle applicable to the possession of water at its source and the existence of elements of exclusion in the consumption of water supplies implies that non-market arrangements may be necessary for dealing with many of the common-pool aspects of a water supply system, while aspects of market organization can be utilized in the distribution and sale of some water services.

If a common-pool, flow resource is <u>not</u> subject to direct consumption, then the problem of interdependencies may exist only among producers. Those producers may ultimately be subject to market dynamics in the sale of products made available to ultimate consumers if those products can be packaged into discrete, separable units. The existence of oil supplies in underground pools where the surface rights may be owned by numerous proprietors would be an example of a common-pool resource not subject to direct consumption. Numerous petroleum products can be transformed into relatively discrete packageable units which can then be subject to sale under market conditions.

In the case of water supplies, an intermediate situation exists where the resource may be a common-pool resource which is not directly consumed in its natural state but is subject to intermediate production processes involving storage, diversion, transmission and distribution. The commodity may then be confined and metered for sale but is not subject to distribution by competing vendors. Such water services can be marketed, but the regulatory effect of market competition does not prevail under those circumstances. The potential power of a monopoly water supplier over water consumers would be expected to generate substantial elements of market weakness.

Public Goods

Public goods are similar to the common-pool, flow resources with the important distinction that the ultimate user or consumer cannot be excluded from enjoying the benefit made available to any other consumer.[5] The indivisibilities are such that many persons can relate themselves to a particular set of events and consumption, use or enjoyment by one does not exclude consumption, use or enjoyment by others. An effort to provide a public good for some implies that such a good will necessarily be made available for all who may live within the relevant domain of that set of events, since no one can be excluded from enjoying the benefits which are made available.

The various uses of water range over the spectrum of the above distinctions. The relatively trivial case of bottled water meets the criteria associated with a purely private good. Most uses of water involve significant externalities. The common-pool, flow resource characteristic of most water supply systems implies that common property relationships permeate the field of water resource development. Flood control measures come close to approximating the condition of a purely public good when viewed as a means of reducing a natural threat or hazard which might otherwise cause substantial losses in individual welfare. Each person within a flood plain will benefit without excluding others from also benefiting up to some limit of the regulative capacity of the flood control system. The "good" in this case is a reduction in the cost of a potential "bad."

Since water resource developments are largely confined to the circumstance involving significant externalities, common-pool, flow resources and public goods, reliance upon individualistic choice characteristic of market arrangements for producing and allocating water will generate serious problems of institutional weakness and institutional failure. The characteristic patterns of institutional failure evoked by individualistic choice in the presence of a common-pool, flow resource or a public-good situation will be considered in the following section.

Individualistic Choice and the Tragedy of the Commons

If we assume that each person is free to decide for himself in the pursuit of his individual interest where a community of individuals are concerned with a common-pool, flow resource or a public good, some serious problems follow as a logical consequence. Each individual will maximize his own net welfare if he takes advantage of the common property or public good at minimum cost to himself. When the aggregate demand of all individual users exceeds the available supply an increase in demand by each user, an increase in the number of users, or both, will involve an increasing cost in impaired supply for other users in addition to individual cost that each person bears in making his own use. However, each person will calculate only his individual cost and will ignore the social costs imposed upon others. He will choose a "dog-in-the-manger" strategy of pursuing his own advantage and will disregard the consequences of his actions for others. Furthermore, some individuals will be motivated to conceal information about their own intentions. Should others propose any form of joint action, they might then remain free to take advantage of any opportunities created by the joint actions of others. If voluntary actions were taken to curtail demand, some individuals will pursue a "hold-out" strategy and the hold-outs will be free to capture a lion's share of the benefits derived from the voluntary joint actions of his neighbors. As long as each person is free to decide

his own course of action, the probability of someone pursuing a hold-out strategy is high and the presence of hold-outs will threaten the stability of any joint voluntary solution.

If this competitive dynamic is allowed to run its course, social costs will escalate to a point where the potential economic surplus to be derived from optimal use of a common-pool, flow resource will have been eliminated by excessive investment in individual efforts. Excessive investment in resource use will reach a point where operations are sustained without economic advantage to the community of users Individuals in weaker economic positions will be forced out and the neighborhood effect will be to generate poverty, deprivations, threats, and even violence.

This eventuality has been characterized by Garret Hardin as "the tragedy of the commons."[7] Individualistic decision making applied to common-pool, flow resources will inexorably result in tragedy unless the structure of decision making arrangements can be modified to enable persons to act jointly in relation to those resources as a common property. Potential recourse to coercive measures will also be necessary to preclude a hold-out strategy and regulate patterns of use among all users. Unrestricted individualistic decision making in relation to common-pool, flow resources or public goods will lead to the competitive dynamic of a negative-sum game: the greater the individual effort, the worse-off people become.

The problem arising from the indivisibility of a public good and the structure of individual incentives created by the failure of an exclusion principle is the basic problem examined in Mancur Olson's Logic of Collective Action.[8] Olson concludes that individuals cannot be expected to form large voluntary associations to pursue matters of common or public interest unless special conditions can be met. These conditions will exist only when members can derive a separable benefit of a sufficient magnitude to cover the cost of membership or where they can be coerced into bearing their share of the costs. Thus, we cannot expect people to organize themselves on a voluntary basis to manage a common-pool, flow resource or secure the provision of a public good. Even the articulation of public demands to undertake governmental action can suffer from what might better be called the logic of collective inaction under conditions of individualistic decision making.

When individuals act with the legal independence characteristic of decision making in market structures in relation to the structure of events having the attributes of externalities, common-pool, flow resources or public goods, we can conclude that institutional weaknesses or institutional failures will occur. The magnitude of the shortcomings will depend upon the importance of the externality, or the degree of indivisibility occurring in the common-pool-flow-resource or public-good situation.

The Diagnosis of Organizational Pathologies in American Public Administration

The problems of market weakness and market failure associated with externalities, common-pool-flow resources or public-goods imply that some form of public control and public decision making is necessary to deal with these events. However, American preoccupation with problems of political reform and administrative reorganization clearly point to institutional shortcomings in the public sector. Recourse to non-market arrangements to procure the provision of a variety of public goods and services may be a necessary condition for advancing human welfare but reliance upon governmental organization may, in turn, engender conditions of institutional weakness and institutional failure. These conditions need to be considered in conceptualizing the appropriateness of public organizational arrangements for the provision of goods and services where market conditions fail to provide satisfactory solutions.

Beginning in the late Nineteenth century and early Twentieth century, American political scientists developed a form of institutional analysis which was concerned with the diagnosis of pathological conditions giving rise to serious shortcomings among public organizations. A series of reforms were prescribed as means for correcting these deficiencies.

The initial concern of these political scientists was with the gross patterns of political corruption which had occurred in the post-Civil War period when American social and economic life was undergoing radical transformations. Competitive rivalry among many different units of government often gave the appearance of generating a tragedy of the commons when dealing with problems of public policy. Efforts to initiate reform measures in one state could be frustrated by the propensity of large-scale business enterprises to shift their favors to those states which were less sympathetic to reform. The states which made no efforts at reform functioned as hold-outs to negate the efforts of some states to regulate social problems of concern to people in many states.

The dynamics inherent in the tragedy of the commons, indeed, can apply to rivalry among units of government when they confront interdependencies which are intergovernmental in scope. The United States constitution had been formulated as a means of avoiding such a competitive rivalry among the various American states over problems of collective security, interstate commerce and related matters. The availability of a national government capable of regulating public affairs that impinged upon interstate relationships provided alternative institutional arrangements for dealing with problems of rivalry among the states.

The multiplicity of governmental units in the American system of government and the constitutional separation of powers which divided authority among different branches of government were viewed by political scientists as contributing to other elements of institutional weakness. The long ballot created by the large number of public officials elected in the different jurisdictions was identified as overburdening American voters. The overburdened voter, according to these analysts, was unable to make a discriminating choice in picking candidates for public office and relied instead upon party slates. Political parties, thus, became the instrument for overcoming the fragmentation of authority among the separate decision structures and the different units of government. The active direction of government was assumed by party bosses who controlled affairs behind the facade of numerous offices, decision structures and units of government. From this point of view, reformers argued that the political responsibility of elected officials could be increased only by 1) drastically reducing the number of officials that were popularly elected and 2) developing a responsible party system where the party winning the support of the majority of the electorate--not individually-elected office holders--would assume authority for the conduct of government without being frustrated by a system of checks and balances.[9]

to allocate decision making capabilities sufficient to get a job done but to otherwise restrict the power of command to a minimum. Finally, we would expect the community of people being served by public functionaries to have reserved sufficient decision making capabilities for themselves that they could effectively challenge the operation of those functionaries whenever their performance failed to be satisfactory when measured by a standard of reasonableness shared by practical men.

The Scope of this Inquiry

In pursuing this inquiry into the availability of alternative institutional arrangements and the place that such alternatives have in the choice of institutional arrangements for water resource development, I shall proceed with two levels of analysis. The first level of analysis will be a theoretical inquiry into the terms and conditions of political choice on the assumption that a choice of organizational arrangements or institutional arrangements is essentially a matter of political choice about decision making arrangements rather than an economic choice about goods and services. Part II, thus, will be a theoretical inquiry into the terms and conditions of political choice. Chapter 2 will examine the logic of political choice to a point where conditions affecting alternative political arrangements for different societies are indicated. Since the American political system was conceptualized on the basis of limited constitutional government,

for the organization of public administration in a democratic society.

Perhaps the peculiar structure of American institutions for water resource development represent efforts on the part of Americans to build substantial elements of democratic administration into their system of public administration. Those elements of democratic administration would display characteristics substantially at variance with a hierarchically-ordered system of bureaucratic administration. We would expect to find elements of buroaucratic administration but we would not expect those elements to be the dominant characteristics in a system of democratic administration. Instead of a fully integrated structure of command, we would expect to find substantial dispersion of authority in many different structures of command. The exercise of control over the legitimate means of coercion would not be monopolized by a single structure of authority. We would expect to find persons from diverse backgrounds in communities exercising leadership and entrepreneurial initiative in the development and conduct of public enterprises to provide different types of water services. We would expect such enterprises to be constituted in ways that placed extensive reliance upon decision making mechanisms reserving important decisions for consideration by all of the members of a community and their elected representatives. We would also expect the constitution of such enterprises

> opposite the 'expert' facing the trained official who stands within the management of administration.[30]

While Weber did not view with favor the fate of modern man in a society governed by a fully-developed bureaucracy, he did not perceive any other alternative as being effectively available. In making passing reference to "democratic administration" as a form of public administration to be contrasted with bureaucratic administration, Weber identified democratic administration as being based upon the following defining characteristics: 1) an egalitarian assumption that everyone is qualified to participate in the conduct of public affairs, 2) the reservation of all important decisions for consideration by all members of the community and their elected representatives, 3) restriction of the power of command to a necessary minimum, and 4) modification of the status of administrative functionaries from that of political masters to that of public servants.

Weber identified democratic administration to be "a marginal-type" case which could not be treated as a "historical starting point of any typical (or general) course of development . . . ."[31] He dwelt upon the limitations of democratic administration and indicated that it could only apply to local organizations or organizations with a limited number of members. He did not contemplate the possibility that democratic administration might be juxtaposed to bureaucratic administration as an alternative arrangement

rule of good administration for all governments alike. Instead, I shall follow a suggestion made by Max Weber that an alternative to a bureaucratic structure in public administration may exist in a form of administration which he characterized as "democratic administration."

Weber shared Wilson's presumption that a system of bureaucratic administration provided the basis for a rational legal order that was technically superior to any other form of administration. His judgment about the superiority of bureaucratic administration was, however, accompanied by an ambivalence about the social consequences which would flow from a "fully developed bureaucracy."

"Where the bureaucratization of administration has been completely carried through," Weber anticipated that "a form of power relationship is established which is virtually indestructible."[28] The fully developed bureaucratic machine will harness the professional bureaucrat to his position in the apparatus so that he will function like a cog in a machine. The material fate of the masses of people will depend more and more upon the operation of bureaucratic organization. "The idea of eliminating those organizations," Weber concluded, "becomes more and more utopian."[29] Finally, Weber concluded that:

> Under normal conditions the power position of a fully developed bureaucracy is almost overtowering. The 'political master' finds himself in the position of the 'dilettante' who stands

Substantial agreement exists among economists regarding the conditions of market weakness and market failure. Less agreement exists about the appropriate remedy. An increasing level of agreement is developing among economists, political scientists and sociologists about the existence of bureaucratic dysfunctions in large-scale public bureaucracies. These conclusions point to the need for a critical reassessment of the conditions which traditional students of American public administration have assumed to be pathological factors that contribute to shortcomings in the American system of government. The institutional weaknesses occurring in large-scale bureaucracies imply that the traditional principles of public administration are subject to limits which have not been well articulated. The availability of different organizational arrangements for developing systems of public administration needs to be seriously reconsidered.

The Possibility of Other Alternatives

The primary purpose of this study is to explore the possibility that the peculiar structure of the American water industry may represent an alternative mode of organization for dealing with the range of goods and services associated with water resource developments. In undertaking this study of the choice of institutional arrangements for water resource development, I shall proceed on the assumption that Woodrow Wilson was in error when he assumed that there is but one

presumed to be the beneficiaries (but become subjects), 3) fail to proportion supply to demand, 4) allow the use of public facilities to erode by failing to take actions to prevent one use from dominating other uses, 5) become increasingly error prone and uncontrollable to the point where public actions deviate radically from public rhetoric about organizational goals, and 6) eventually lead to a circumstance where remedial actions exacerbate rather than ameliorate problems. The circumstances which generate organizational dysfunctions in large-scale bureaucracies pose problems which require serious reconsideration of the theory of organizational arrangements applicable to public administration.

A Reconsideration of Organizational Alternatives

Our examination of the efforts of economists and political scientists to assess organizational capabilities and limitations indicates that substantial difficulty will confront those who are concerned with the choice of institutional arrangements for water resource development. A part of this difficulty arises from the basic limitations inherent in the work of social scientists concerned with institutional analysis. Basic contradictions occur in the recommendations made by scholars and administrative analysts using the traditional public administration approach when contrasted with those who are increasingly concerned about the organizational dysfunctions which occur in large-scale public bureaucracies.

in the discretion which users can exercise in relation to common facilities made available to them. The development of such rules and regulations are relevant both to the scheduling of production processes and to the ordering of use patterns by potential users or consumers. These rules and regulations like any set of decision rules are not self-generating, self-modifying, nor self-enforcing. Thus, we are confronted with the basic problems of who shall enact and enforce rules of conduct to govern relations among individuals who use common properties or public facilities. Administrative rules and regulations are not a matter of political indifference to the users of such goods and services.

While bureaucratic organization will contribute significant institutional capabilities in the organization of any enterprise or agency concerned with the control of externalities, the management of a common property resource or the provision of a public good, such a form of organization will also be subject to serious institutional shortcomings. An optimal scale of public enterprise needs to take account of diversity in demands, production economies, relationship of demand to conditions of supply and relationships where one pattern of use may impair other patterns of use. The very large bureaucracy will 1) become increasingly indiscriminate in its response to diverse demands, 2) impose increasingly high social costs upon those who are

those who would make other uses of a water course. What was once a public "good" may now become a public "bad" as pollution precludes a growing number of opportunities for other uses. In short, public services may be subject to serious erosion or degradation under conditions of changing demands.[27] In the absence of a capability to respond with modified supply schedules and regulations for use, a public "good" may come to be a public "bad" and "the tragedy of the commons" may reach critical proportions.

Finally, producer performance and consumer interests are closely tied together when we recognize that the capacity to levy taxes, to make appropriate expenditure decisions and to provide the necessary public facilities is insufficient for optimality in the use of such facilities. One pattern of use may impair the value of a common facility or a public good for another pattern of use. The development of water resource facilities will be insufficient to enhance the welfare of members of a community of users without attention to basic rules and regulations controlling the use of such facilities by different sets of users. Use of project facilities for recreational purposes, for example, may impair use for domestic and municipal water services. One man's recreation may, also, be another man's terror.

Optimal use of public facilities, when each use is not fully compatible with each other use, requires a system of rules and regulations establishing capabilities and limitations

circumstances. From this theoretical perspective, an analyst would not be surprised to find a positive relationship between the professionalization of the public service and the impoverishment of ghettos within big cities.

The inability of users of public goods and services to sustain an arm's length relationship with producers of public goods and services generates further problems when user preferences are subject to change in relation to the available supply of public goods and services. No one can know the preferences or values of other persons apart from giving those persons an opportunity to express their preferences or values. If constituencies and collectivities are organized in a way that does not reflect the diversity of interests among different communities of people, then producers of public goods and services will take action without information as to the changing preferences of the persons they serve. Expenditures may be made with little reference to consumer utility. Producer efficiency in the absence of consumer utility is without economic meaning.

Similar difficulties may be engendered when demands for a public good or service, having the characteristics of a common property resource, increase in relation to the available supply. When demands begin to exceed supply, the dynamics inherent in "the tragedy of the commons" may arise all over again. An increasing pollution load may drive out

The absence of a competitive product market in the provision of public goods and services will engender other sources of institutional weaknesses in large-scale public bureaucracies which arise from disparities between producer interests and user interests in a public service economy. Once a public good is provided, the absence of an exclusion principle means that each individual will have little choice but to take advantage of whatever is provided unless he is either able to move to another jurisdiction or is wealthy enough to make separate provision for himself. Under these conditions, the producer of a public good may be relatively free to induce savings in production costs by increasing the burden or cost to the user or consumer of public goods and services. Shifts of producer costs to consumers may result in an aggregate loss of efficiency if savings on the production side are exceeded by added costs on the consumption side. Public agencies rarely, if ever, calculate the value of a user's time and inconvenience when they engage in studies of how to make better use of their employees' time. If a citizen has no place else to go, and if he is one of a million other citizens, the probability of his interest being taken into account is negligible. The most impoverished members of a community are most exposed to deprivations under these

Efforts to correct the malfunctioning of bureaucracies by tightening control will simply magnify errors by leading to further repression of information. A decline in return to scale can be expected to result. The larger the organization becomes, the smaller the percent of its activities will be directly related to output; the larger the proportion of its efforts will be expended on management, the larger the degree of misinformation and the greater the disparity between organizational goals and organizational performance.

Tullock suggests that the limits upon control in the very large public bureaucracy will engender a "bureaucratic free enterprise" where units or groups within an organization proceed with the formulation of their own missions without reference to policy objectives or organizational goals. Goal displacement, risk avoidance, and inaction motivated by individual self-interest will be covered by elaborate justification through misleading information. Bureaucratic free enterprise may also take a form where public enmployees extract a bribe bargain as a price for public services. The social consequences engendered by bureaucratic action when compared with the public rhetoric of political leaders become increasingly contradictory and unreal to an independent observer. Michel Crozier extends this type of analysis to sustain the conclusion in his study of French bureaucracy that " . . . a bureaucratic organization is an organization that cannot correct its behavior by learning from its errors."[26]

product market is absent in most public organizations. As a consequence, public organizations would be less sensitive to diseconomies in scale which accrue from increasing management costs. Under those circumstances, the increased costs of management might exceed the savings in decision costs, and generate a net loss. In that case, increased centralization in public decision making and continued reliance upon the principles of hierarchical organization in the public sector will lead to increasing inefficiencies as management costs exceed the benefits to be derived from each added employee.

Gordon Tullock in The Politics of Bureaucracy pursues an analysis of the consequences which can be expected to follow when rational, self-interested individuals pursue maximizing strategies in the context of very large public bureaucracies.[25] Tullock's "economic man" is an ambitious public employee who seeks to advance his career opportunities for promotions within the bureaucracy. Since career advancement depends upon favorable recommendations by his superiors, a career-oriented public servant will act so as to please his superiors. Favorable information will be forwarded; unfavorable information will be suppressed. Distortion of information will diminish control and generate expectations which diverge from events sustained by actions. Large-scale bureaucracies will thus become error prone and cumbersome in adapting to rapidly changing conditions.

Coase's theory of the firm gives an explanation of why a business firm would substitute managerial control in the organization of an enterprise in order to reduce decision costs represented by the expenditure of time, effort, and foregone opportunities which would otherwise be spent in negotiating market transactions for aggregating each element among the factors of production. Coase anticipates limits to the size of firms where the costs of using a factor of production purchased in the market would be less than adding a new component to the firm to produce that added factor of production. As more employees are added, management costs would be expected to increase. A point would be reached where the saving on the marginal employee in decision costs would not exceed the added management costs required to supervise that employee; and no net savings would accrue to the entrepreneur. If a firm became too large, an entrepreneur might also fail to see some of his opportunities in the reallocation of his work force. Another entrepreneur with a small, more efficient firm would thus have a competitive advantage over the larger firm which had exceeded the limits of scale economy in firm size.

Coase's analysis gives us reason to believe that bureaucratic organization can be a method for enhancing efficiency in operations by minimizing decision costs within the limits provided by the employment contract and the competitive force of the product market. However, the competitive force of a

as between the top level of command and those at the lower working levels in an organization. Narrowing the command structure at each level of organization would lead to a loss of information and control by increasing the number of levels in an organization. Simon's formulation suggests serious limits to the aggregate size of bureaucratic organization.

R.H. Coase in an article on "The Nature of the Firm" conceptualizes some of the factors which are relevant to determining the optimum size of a bureaucratic organization.[24] According to Coase, rational individuals might be expected to organize a firm on hierarchical principles where management responsibilities would be assumed by an entrepreneur, and others would be willing to become employees if the firm could conduct business under direction of the entrepreneur at a lesser cost than if each and every transaction were to be organized as market transactions. The firm would be organized on the basis of long-term employment contracts, rather than short-term market transactions. The employee would reduce his cost of short-term risks in employment and the entrepreneur could take advantage of reduced decision-making costs in reallocating his work force so as to optimize net return. The long-term employment contract would provide a limit to entrepreneurial discretion. Subject to that constraint, the employee agrees to obey the instructions of an entrepreneur. In the conduct of his enterprise, an entrepreneur is exposed both to market competition and to the long-term satisfaction of employees.

Problems of Dysfunctional Behavior in Large-Scale, Public Bureaucracies

The institutional analysis practiced by American students of public administration and by administrative consultants gave little or no attention to problems of institutional weakness or institutional failure of public bureaucracies. The principle of span of control implied a rather substantial limit upon the capability of any one supervisor to exercise control over a number of subordinates. The more routine and uniform the tasks, the larger the number that any one supervisor might control. However, the numbers were assumed to be small. The figures usually cited were in a magnitude of less than ten.

Within the traditional theory of public administration, the limit on size implied by the principle of span of control was resolved by a vertical extension in the number of tiers in an administrative hierarchy. Limits in the capability of any one person to coordinate and supervise a small number of subordinates could be overcome by adding vertical depth to the administrative structure.

This problem was given critical attention by Herbert Simon when he pointed out that a loss of information and control would apply to the number of tiers in a hierarchical structure as well as to the number of subordinates reporting to any one superior.[23] Thus, increasing the number of tiers in a hierarchy would lead to a loss of information and control

Hoover Commissions and the current Ash Commission are among the more prominent examples of such reorganization surveys. Duplications of services and overlapping jurisdictions are presumed on prima facie grounds to be wasteful and inefficient and, therefore, to be eliminated.

Based upon this diagnostic assessment of organizational pathologies, remedial action is sought by proposing reforms which have the effect of eliminating the proliferation of agencies, fragmentation of authority, overlapping jurisdictions and the duplication of functions. Large jurisdictions are preferred to small. General authority agencies are preferred to limited authority agencies. Centralized solutions are preferred to the disaggregation of authority among diverse decision structures.

The course of reasoning inherent in the traditional theory of public administration has been applied to problems of water resource development.[22] Long-term, comprehensive planning from this theoretical perspective is best facilitated by large-scale jurisdictions with general authority over all aspects of water and related land-use developments. Such developments can be best organized through a Department of Natural Resources with full authority over water and related land resources. Such a department should be headed by a single person who is directly responsible to the chief executive. Boards and commissions composed of representatives of special interest groups should be avoided.

a clear line of responsibility. Boards and commissions from the perspective of this theory are likely to confuse the structure of administrative responsibility.

5. Centralization of Staff and Management Functions in the Chief Executive. Following Luther Gulick's formulation, certain staff and management functions including those of planning, organizing, staffing, directing, coordinating, reporting and budgeting (POSDCORB) were conceived to be the "work of the chief executive"[21] and to be organized as an integral part of the chief executive offices. Control over those functions should be centered in the executive offices apart from the command structure over the so-called line departments which presumably were oriented to the provision of public services rather than to the exercise of management control over public service agencies.

Administrative Analysis and Reorganization

Over the past several decades thousands of administrative surveys and reorganization proposals have been made based upon the theoretical presuppositions and principles of organization inherent in the traditional public administration approach. The standard format of these surveys is a diagnostic assessment of organizational pathologies which are associated with a proliferation of agencies, fragmentation of authority, overlapping of jurisdictions and duplication of services. The Brownlow Commission, the various

is based upon the control of one over a limited number of subordinates, each of whom in turn exercises command over a limited number of subordinates in a unitary structure with a single line of command connecting each person in the administrative apparatus to the chief executive.

3. Departmentalization of Major Functions of Government. Administrative activities following the principle of span of control were to be grouped into a few major departments subject to the political direction of the chief executive. Each department was to be organized by grouping subordinate units in relation to the major function or purpose to be served. Somehow, units were assumed to fall naturally into a set of major purposes or functions.

Luther Gulick, who served as a member of the Brownlow Commission, introduced a major shift in the theory of organization by proposing that organizational structures might be constituted in relation to purpose, process, clientele served and area or place. Instead of a single chain of command, Gulick began to develop reference to primary, secondary and tertiary structures of organization where the concept of unity of command was retained by using the concept of a "holding company" in constituting the Executive Offices of the President.[20]

4. Assignment of Subordinate Authority to Single Heads. Each department or subordinate unit of government should be subject to the direction of a single person so as to sustain

relationship through a number of levels of responsibility reaching from the top to the bottom of the structure."[19]

The Principles of Organization

When applied to the design of public organizational arrangements concerned with the implementation of public policies, the traditional theory of public administration relied upon certain prescribed rules or principles. These principles include the following:

1. Unity of Command. Based upon a presumption that there must be an ultimate authority who assumes responsibility for execution of public policy, reference is had to a single chief executive capable of exercising a unified command. General control over the management of the public service under this principle would be vested in a single chief executive. Most administrative reorganization proposals have been predicated upon an assumption that the authority of the chief executive must be strengthened to give control over all administrative activities subject to governmental authority.

2. Span of Control. This concept is based upon a presumption that any one person can give attention to only a limited range of problems and relate himself to only a limited number of other persons whom he can hold administratively accountable. In the traditional theory of public administration, the structure of administrative organization

administration will be filled by a corps of technically trained civil servants "prepared by a special schooling and drilled, after appointment, into a perfected organization, with an appropriate hierarchy and characteristic discipline . . ."[17] Perfection in administrative organization is attained in a hierarchically-ordered and professionally-trained public service. Efficiency is attained by perfection in the hierarchical ordering of a professionally-trained public service. Efficiency is also conceptualized in economic terms: "[T]he utmost possible efficiency and at the least possible cost of either money or of energy."[18]

Wilson's basic theoretical suppositions can be summarized in the following propositions:

> 1. There is but one rule of good administration for all governments alike.
>
> 2. Perfection in hierarchical ordering of a professionally trained public service is the one rule of good administration.
>
> 3. Perfection in hierarchical ordering will maximize efficiency as measured by least-cost expended in money or effort in realizing policy objectives.

The subsequent study of American public administration developed within the framework proposed by Wilson. Hierarchical organization provided a set of universal principles which could be applied to any administrative situation. Leonard White, for example, asserted that "All large-scale organizations follow the same pattern, which in essence consists in the universal application of the superior-subordinate

Wilson and his contemporaries viewed public administration as being outside the proper realm of politics. Politics was concerned with the formulation of public policy while administration was concerned with its execution. Once politics had set the task of administration, the execution of public policy was a matter calling for professional expertise in the technical details of government.

According to Wilson, governments may differ in the political principles reflected in their constitutions, but principles of good administration will be much the same in any system of government. There is "but one rule of good administration for all governments alike" is the basic axiom in Wilson's theory of administration.[14] "So far as administrative functions are concerned, all governments have a strong structural likeness; more than that, if they are to be uniformly useful and efficient, they must have a strong structural likeness."[15]

Wilson's essay on "The Study of Administration" was a call for American scholars to perfect a science of administration well grounded in theory: "The object of our study is to rescue executive methods from the confusion and costliness of empirical experiment and set them upon foundations laid deep in stable principles."[16] Good administration for Wilson will be hierarchically ordered in a system of graded ranks subject to political direction by heads of departments at the center of government. The ranks of

Theoretical Assumptions

Woodrow Wilson, as one of those who played a leading part in the development of American political science at the turn of the century, can be used to illustrate this mode of analysis. Wilson rested his analysis upon the assumption that "the more power is divided, the more irresponsible it becomes."[10] Wilson's ideal model for political organization was the British parliamentary system. "The natural, the inevitable tendency of every system of self-government like our own and the British," according to Wilson, "is to exalt the representative body, the people's parliament, to a position of absolute supremacy."[11] The forces of reality were, from Wilson's analysis, leading the Americans to adjust their constitution accordingly. "The plain tendency" that Wilson saw, "is toward a centralization of all the powers of government in the hands of federal authorities, and toward the practical confirmation of these prerogatives of supreme overlordship which Congress is gradually arrogating to itself."[12]

Wilson explicitly rejected the political theory that provided the basis for the American constitutional system. The constitutional system of checks and balances, according to Wilson, was based upon "literary theories" and "paper pictures" which concealed the realities of American politics. "Those checks and balances have proved mischievous," Wilson observed, "just to the extent to which they have succeeded in establishing themselves as realities."[13]

Chapter 3 will be concerned with the problem of constitutional choice and how the solution to that problem has affected the terms and conditions of political choice in the American political system.

The second level of analysis will be an empirical inquiry into the choice of institutional arrangements in the development of the California water industry. Chapter 4 provides a brief summary of environmental conditions and patterns of demand which have affected water resource development in California. Chapter 5 will examine the choice of constitutional arrangements for the government of public affairs in California with special relevance for water resource development. Chapter 6 will examine the California law of water rights as a means for allocating rights to the use of water as a common property resource. Chapter 7 will consider the different forms of organization comprising the infrastructure of the California water industry and Chapter 8 will focus upon the superstructure of the industry composed of the large-scale water production agencies of the state and Federal governments. Chapter 9 will examine institutional arrangements for public regulation of elements in the California water industry. Chapter 10 will be concerned with the development of multi-organizational arrangements for proportioning the uses of water to the demands of different communities of water users. Finally, Chapter 11 on the governance of water resource development will examine the realtionship of the choice of

institutional arrangements for water resource development to the political process in a democratic society.

In Part IV, the conclusion, I shall assess the consequences which can be expected to follow from using different forms of institutional analysis to diagnose problems of water resource development and to formulate policy recommendations for dealing with those problems.

FOOTNOTES

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[3]James M. Buchanan and W. Craig Stubblebine, "Externality," Economica, 29 (November, 1962), 371-384. See also R.H. Coase, "The Problem of Social Cost," Journal of Law and Economics, 3 (October, 1960), 1-44.

[4]Vincent Ostrom, "Water Resource Development: Some Problems in Economic and Political Analysis of Public Policy," in Political Science and Public Policy, Austin Ranney, ed. (Chicago: Markham Publishing Company, 1968), 123-150.

[5]Paul A. Samuelson, "Diagrammatic Exposition of a Theory of Public Expenditure," Review of Economics and Statistics, 37 (November, 1955), 350-356. See also Paul A. Samuelson, "The Pure Theory of Public Expenditure," Review of Economics and Statistics, 36 (November, 1954), 387-389.

[6]Jack Hirshleifer, James C. DeHaven and Jerome W. Milliman, Water Supply Economics, Technology, and Policy (Chicago: The University of Chicago Press, 1960).

[7]Garrett Hardin, "The Tragedy of the Commons," Science, 162 (December 13, 1968), 1243-1248.

[8]Mancur Olson, The Logic of Collective Action (Cambridge, Massachusetts: Harvard University Press, 1965).

[9]See, for example, Richard S. Childs, Civic Victories (New York: Harper and Brothers, 1952).

[10]Woodrow Wilson, Congressional Government (New York: Meridian Books, 1959), 77.

[11]Ibid., 203.

[12]Ibid., 202.

[13]Ibid., 187.

[14]Woodrow Wilson, "The Study of Administration," Political Science Quarterly, 2 (June, 1887), 218.

[15]Ibid. Wilson's emphasis.

[16]Ibid.

[17]Ibid., 216.

[18]Ibid., 197.

[19]Leonard D. White, Introduction to the Study of Public Administration (New York: The Macmillan Company, 1926), 33.

[20]Luther Gulick, "Notes on the Theory of Organization," in Papers on the Science of Administration, Luther Gulick, Lyndall F. Urwick and James D. Mooney, eds. (New York: Institute of Public Administration, Columbia University, 1947).

[21]Ibid., 13.

[22]See The President's Advisory Council on Executive Organization, Memoranda for the President of the United States. Establishment of a Department of Natural Resources, Organization for Social and Economic Programs (Washington, D.C.: The White House, 1971).

[23]Herbert A. Simon, Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations (New York: The Macmillan Company, 1964).

[24]R.H. Coase, "The Nature of the Firm," Economica, 4 (1937), 386-485.

[25]Gordon Tullock, The Politics of Bureaucracy (Washington, D.C.: The Public Affairs Press, 1965).

[26]Michel Crozier, The Bureaucratic Phenomenon (Chicago: The University of Chicago Press, 1964), 187.

[27]James M. Buchanan, "Public Goods and Public Bads," in Financing the Metropolis, John P. Crecine, ed. (Beverly Hills, California: Sage Publications, 1970).

[28]Hans H. Gerth and C. Wright Mills, eds. From Max Weber: Essays in Sociology (New York: Oxford University Press, 1946).

[29]Ibid., 229.

[30] *Ibid.*

[31] Max Weber, *On Law and Society*, Max Rheinstein, ed. (New York: Clarion Books of Simon and Schuster, 1967).

Part II

THE TERMS AND CONDITIONS OF POLITICAL CHOICE

The choice of institutional arrangements is a choice of decision making arrangements. As such, it is a political choice concerned with the allocation, exercise and control of decision making capabilities rather than an economic choice concerned with the production and distribution of goods and services. The choice of institutional arrangements for water resource development has a significant effect upon the production and distribution of water services, but that choice is one step removed from economic choice. The choice of institutional arrangements established the conditions within which economic choices are made.

The structure of political choice, thus, establishes the conditions relative to the choice of institutional arrangements for water resource development. Consequently, the analysis in Chapter 2 and Chapter 3 will focus upon the conditions of political choice relevant to a choice of decision making arrangements for water resource development. We will not be concerned here with an analysis of economic decisions regarding investments in the production of water services or with pricing and service decisions regarding

the buying and selling of water services.*

Chapter 2 will be concerned with the logic of political choice as that logic is relevant to the choice of institutional arrangements for water resource development. This analysis will proceed in three different parts. First, we shall examine the effect of decision rules upon the organization of social relationships. Second, we shall consider the conceptual validity and empirical warrantability of knowledge of and about decision rules. Third, we shall examine some of the conditions which affect the structure of political choice. Together, these considerations are relevant to a choice of institutional arrangements.

Since the problem of constitutional choice involving the choice of decision rules applicable to the conduct of government is a central feature of the American political system, we shall pursue an analysis of that problem in Chapter 3. The American effort at constitutional decision making also involves efforts to sustain the enforceability of constitutional law in relation to those who exercise

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*Though our problem is one of political analysis, the primary contributors to that analytical tradition have come from many diverse intellectual sources. These include the works of both philosophers and politicians in classical political theory. Thomas Hobbes, Alexander Hamilton, James Madison and Alexis deTocqueville are among those who have made significant contributions relevant to contemporary political analysis. Beyond this tradition of work, we shall draw heavily upon the work of contemporary scholars concerned with Public Choice. Contributors to work on Public Choice have been preponderately economists with political scientists, sociologists and lawyers sharing in those efforts.

the prerogatives of government. This effort has interposed basic constraints upon the structural characteristics of American government. The effect of these constraints upon the terms and conditions of political choice will be summarized in the conclusion to Chapter 3.

Chapter 2

THE LOGIC OF POLITICAL CHOICE

Decision Rules and Social Organizations

Political organization is a means of resolving a seeming paradox in human development. Human beings have capabilities for learning which give them access to very large bodies of knowledge. The accumulated pool of human knowledge in turn gives rise to an extraordinarily large repertoire of potential variety in human behavior. If all of the potential variety in human behavior were to be expressed in a random way, human beings would face a state of affairs approximating chaos.

In such a state of chaos, learning could not occur. Learning requires an understanding of regularities in events. Learning is possible only to the extent that constraint is introduced into the total range of possibilities. Constraint gives rise to regularities which can be observed and acted upon. Thus, humans face a paradoxical situation in which they need order or constraint in their environment as a necessary condition for learning; but learning itself increases the potential variety in human behavior. Increasing potential variety in human behavior threatens the maintenance of a predictable order in which continued learning can occur.

Decision Rules and Predictability

This paradox can be partly resolved by the introduction of a deliberate method for ordering relationships among people. Such ordering can be accomplished by reference to a common set of decision rules. Decision rules enable two or more persons to interact with one another under conditions where some possibilities are excluded and other possibilities are included within the field of choice available to each person in relating himself to others. The excluded possibilities establish the constraints or the limitations upon decision making capabilities. The included possibilities establish the opportunities or capabilities authorized in human conduct. Thus, decision rules introduce constraint into human relationships and establish the basis for social organization. Reference to a common set of decision rules is a necessary condition for establishing ordered social relationships.

If people act with reference to a common set of decision rules, individuals can pursue their interests in relation to one another in an orderly and predictable manner. Human behavior can be baffingly unpredictable to the behavioral scientist interested in formulating universal generalizations without reference to decision rules. Human behavior can, by contrast, also be surprisingly predictable to anyone who acts in relation to a common set of decision rules. An automobile driver, for example, is able to

interact with thousands of other automobile drivers by knowing the common rules of the road. Such knowledge enables him to arrive at his destination with a very high degree of predictability. If, in the absence of a common set of decision rules, all automobile drivers were to act randomly in relation to one another, the potential variety of possible behavior would preclude anyone from being able to reach his destination in an orderly and predictable manner.

Decision rules serve as guides for ordering human behavior. In this sense, we can speak of the rules of a game as "structuring" the play of a game. Decision rules connect the interest of a person in some opportunity or outcome to the interests and opportunities of others. These connections are made by assigning decision making capabilities which enable each individual to pursue his own interest while concurrently exposing him to requirements for taking account of the interests of others. When viewed from this perspective, decision rules are used to "structure" social relationships and to "bias," "rig" or "determine" certain outcomes of any social situation.

Decision Rules and Social Welfare

The effects or outcomes which derive from the structure interposed upon social relationships by a set of decision rules can also be analyzed in relation to welfare criteria as well as criteria pertaining to their predictability.

Any particular set of decision rules can rig or bias human conduct to enhance or diminish human welfare. If each person were authorized within a set of decision rules to pursue those opportunities which would increase his own welfare subject to the condition that he not diminish the welfare of others, and if this condition could be enforced with rigor, then we would expect the game of life to be "biased" or "rigged" in the direction of improving human welfare. If, on the other hand, the law of the highwayman were to prevail and each person were to "take what he could get and defend what he had got" we would infer that human welfare would markedly decline from present levels. Decision rules, thus, can sustain predictability in human relationships, and also order those relationships in a way that will induce either a favorable or unfavorable effect upon the welfare potential of those persons who participate in social relationships.

The Problem of Social Stability and Change

New knowledge gives rise to new possibilities. New possibilities give rise to new opportunities both for good and for bad. No one can know all of the consequences engendered by any new possibility. New knowledge and new possibilities, in turn, lead to the erosion and obsolescence of prior technologies and the appropriateness of prior decision making arrangements for constituting human relationships in the pursuit of mutually-productive relationships.

The development of new knowledge and the creation of new technologies necessarily implies that human efforts to anticipate the future course of events is always subject to limited time horizons. New conception and new technique cannot be anticipated by persons who have not even contemplated the possibility. Thus, all human planning and development efforts will be subject to obsolescence. This leads to two essential conclusions:

1. Under conditions of rapidly expanding knowledge and technological development, long-term, comprehensive planning is an impossibility.
2. Under conditions of rapidly expanding knowledge and technological development, forecasts are subject to an increasing magnitude of error the further projections are made into the future.

If long-term comprehensive planning is an impossibility, human beings are then confronted with the task of moving to second-order solutions in relying upon decision rules as a means for ordering social relationships and for introducing change into that order. These second-order solutions depend upon other sets of decision rules as third-order solutions for changing decision rules which will enable succeeding generations of persons to alter and modify the structure of decision making arrangements to accommodate to new exigencies and circumstances. Where conditions in the environment, technological capabilities, preferences and relationships

among people are subject to change, we can anticipate that a necessary condition of political choice will be a capability to alter decision rules in reallocating decision making capabilities among communities of people. Otherwise, those communities of people would not be successful in adapting to changing conditions. As the magnitude of change in environmental conditions, technological capabilities, preference orderings and relationships among people increases, an increasing capability for altering decision rules among communities of people will be a necessary condition for sustaining stable social relationships.

An important measure of any political system is its relative adaptability to change in being able to modify and alter decision making arrangements. But the adaptability of a political system in modifying and altering institutional arrangements in turn depends upon other criteria. The most important criteria relates to the validity and warrantability of the knowledge of and about decision rules. In addition, three other conditions affect the structure of political choice. These include 1) common understanding, 2) common agreement, and 3) common facilities for determining, enforcing and altering decision rules. We shall pursue each of these topics in turn.

The Validity and Warrantability of Knowledge Of and About Decision Rules

If decision rules evoke predictable consequences, a knowledge about decision rules can exist. Relationships which are knowable to different persons depend upon the use of concepts or terms which identify logical sets and specify postulated relationships. Such concepts can be used to derive inferences leading to logically plausible conclusions. The conceptual validity of knowledge is tested by logical consistency. In addition, knowledge may be subject to a test of its empirical warrantability. Empirical warrantability is established when logically derived conclusions are successfully used to predict the probable consequences of a specifiable set of events.

Since decision rules are human artifacts conceived and articulated in the linguistic form of words and propositions, two different levels of analysis apply in examining their conceptual validity and empirical warrantability. One level of analysis applies to the conceptual terms and relational propositions which are formulated within a set of decision rules. Another level of analysis applies to the conceptual terms and relational propositions which are formulated about systems of decision rules. If these two sets of analysis are linked together, then conclusions derived from one level of analysis have relevance for those concerned with the other level of analysis.

Knowledge of Decision Rules

The first level of analysis presumes that persons can have a knowledge of decision rules. On the basis of that knowledge, persons can 1) make appropriate conceptual distinctions implied by the terms used in formulating decision rules, 2) reason through the logical conditions inherent in such decision rules, and 3) anticipate the structure of consequences which will follow in making a decision to act in accordance with those conditions. We can expect individuals to act rationally within a set of decision rules only if these conditions hold.

Knowledge About Decision Rules

If persons can have a knowledge of decision rules and act rationally within a set of decision rules (by pursuing opportunities which will evoke predicted or anticipated consequences), then it follows that a knowledge about decision rules can also be developed. A knowledge about decision rules may clarify structured relationships which are not apparent to persons whose knowledge is limited to the constraints and opportunities inherent in a set of decision rules. An extension of knowledge about a system of decision rules can, in turn, be used to change a set of decision rules. A change in decision rules will alter the structure of social relationships and evoke a different set of predicted consequences. Experience in altering decision rules provides

an opportunity to test the empirical warrantability of a theory about decision rules used in making alterations in the structure of decision rules.

Presumably people engaged in predictable behavior within a market before Adam Smith formulated a theory about market organization. We would infer that people entering into market transactions developed a knowledge of decision rules appropriate to market transactions, learned how to pursue strategic opportunities in a market and developed reasonably accurate expectations about consequences flowing from market arrangements before a theory about market organization was developed. If we could not presume such knowledge, we would not expect buyers and sellers to act rationally in the pursuit of opportunities available in a market structure.

Classical economists in developing a theory about market organization were able to draw upon the knowledge that people had accumulated in the course of acting within the structure of market decision rules. The work of classical economists in developing a theory about market organization, in turn, was used to alter the structure of institutional arrangements by extending the application of market decision rules to new patterns of economic relationships such as trade among nations.

Multitudes of people can engage in market transactions on the basis of their knowledge of specifiable decision rules

which are largely taken for granted. However, such arrangements can be sustained only under conditions which approximate the terms postulated as necessary conditions in a theory of market organization. Conditions such as the existence of property relationships, a distribution of economic capabilities where each individual will have something of value to exchange with another, and the maintenance of lawful relationships are logically and empirically necessary conditions for market relationships to be sustained. Markets do not work for persons destitute of any resources, for allocating goods not subject to exclusion, or in the absence of a legal order. A theory of market failure takes account of these failings which would also be observable by people operating within a market. If decision rules applicable to market relationships were extended to new areas of economic relationships, and resulted in consequences radically at variance from those anticipated in theory, then doubt would be cast upon the applicability of market arrangements for the new area of economic relationships. Unanticipated consequences would imply a need to formulate non-market theories of economic relationships.

Problems of Validity and Warrantability

If conceptual terms and relational propositions can be expressed in a language of decision rules which are empirically warrantable, we would also anticipate that false or unwarrantable conceptions can also be held. Under such

circumstances we would expect an unwarrantable conception to generate consequences at variance with those which were expected or predicted. Actions taken in such cases could be subject to substantial error.

The possibility of serious error has important implications for problems of policy change and social reform. Reducing public expenditures and increasing taxes to balance a budget during a deflationary trend may be an unwarrantable method for altering such a trend. Such policies would tend to accelerate a deflationary spiral. Or, eliminating fragmentation of authority and overlapping jurisdictions may be an unwarrantable basis for accomplishing political reform in a democratic society with a federal system of government. Elimination of overlap may magnify errors and exacerbate problems of institutional failure.

In considering the conceptual validity and empirical warrantability of knowledge about systems of decision rules, we must be careful not to anticipate an absolute measure of truth. Knowledge of and about decision rules depends not only upon conceptual validity but upon operational effectiveness as well. The social constraint derived from the operation of a decision rule depends upon the exclusion of some possibilities from the field of choice. Such an exclusion is itself always a matter of choice. The possibilities which are excluded through the constraint interposed by decision rules are still within the realm of technically

feasible possibilities. Theft is still technically possible even though the decision rules for sustaining market behavior exclude theft as unlawful conduct.

Economic theory postulates lawful behavior as a logically necessary condition for establishing a theory of market arrangements. As long as the condition of lawful behavior can be postulated, then logical conclusions can be derived about conditions of market equilibrium. However, entrepreneurs may also calculate the strategic opportunities of unlawful conduct. To the extent that unlawful conduct exists, inferences derived from a theory assuming only lawful conduct will not accurately predict consequences.

The Problem of Soft Constraints

Decision rules can be usefully conceptualized as soft or weak constraints. Knowledge based upon soft or weak constraints can only be asserted in probabilistic terms. In probability statements, predictions can be made in the following form: if conditions a, b, and c exist, then events of a particular type x will have an estimated probability of occurring. Propositions in the social sciences can be supported by no more than probability estimates. Propositions in the social sciences cannot be asserted which will meet the necessary and sufficient condition, in the absence of a law and order postulate, so that a specifiable transformation can be predicted to occur and to always occur.

Contrary evidence in a single case is not adequate grounds for empirically falsifying a conclusion derived from theories about systems of decision rules. Knowledge of and about decision rules is based upon the operation of soft constraints which may not be sustained in each and every case. Yet as Herbert Simon has indicated, weak or soft constraints can have a significant effect in structuring events in specifiable directions even though the precise magnitude cannot be predicted.[1]

There may be, however, some propositions in political theory which do function as hard constraints. We would expect such constraints to be outside the domain of choice and, thus, to bound the field of choice. These propositions can be formulated as impossibility statements. Impossibility statements take the following form: If condition h exists (or fails to exist) then a particular type of event x is impossible and will never occur. An impossibility statement can be rejected empirically in a single case.

Impossibility statements are powerful intellectual tools. If a condition is logically necessary in a formulation, then a corollary can be asserted that a transformation is impossible in the absence of that logically necessary condition. For example, a proposition was asserted earlier in this chapter that:

> Reference to a common set of decision rules is a necessary condition for establishing ordered social relationships.

Such a proposition can be reformulated as an impossibility statement which asserts:

> If neither implicit nor explicit reference is made to a common set of decision rules, then social organization will be impossible and ordered social relationships will not occur.

This proposition can be rejected as empirically unwarrantable by the location of a single contrary example. We shall proceed in our analysis to indicate conditions which are either logically necessary or which affect the probable consequences resulting from the use of specific decision rules within a political community. We can, thus, begin to specify some of the elements which enter into the logic of political choice. We will then be able to indicate some of the consequences which can be expected to follow in light of the relative softness or hardness of constraints. We shall now turn to an examination of conditions affecting the structure of political choice.

Conditions Affecting the Structure of Political Choice

The term "political" was defined earlier as being concerned with the allocation, exercise and control of decision making capabilities. The allocation, exercise and control of decision making capabilities are all decision making functions defined in relation to decision rules. Consequently, we can build upon our previous analysis in specifying some of the conditions affecting the structure of political choice.

Decision rules become operative by assigning decision making capabilities to two or more persons acting in relation to one another. Decision rules define correlative relationships by assigning reciprocal sets of capabilities and limitations to different persons or actors. The decision making capabilities and limitations assigned to different positions enable each person to attempt to coordinate his actions with others. Individual interests, are, thus, bounded by elements of commonality which bring the particularized interests into relationship with one another. The decision rules assigning capabilities and limitations to different types of positions establish an orderly pattern as each participant comes to share in the community of relationships established by decision rules. The essential conditions affecting the structure of political choice are defined by the commonalities established in reference to a common set of decision rules shared by any community of persons as the basis of their social organization. For the purposes of this discussion, we will examine three of these conditions affecting the structure of political choice: 1) common understanding, 2) common agreement, and 3) common facilities for determining, enforcing and altering decision rules.

Common Understanding

Sharing decision rules as a basis for social organization depends upon a common body of understanding. Individuals

within a social organization must share common terms, definitions and expectations. Some degree of common understanding is a necessary condition for sustaining the effectiveness of decision rules in ordering social relationships. Complete or perfect understanding is not, however, necessary. Ordered social relationships can be based upon common understanding of partial sets of decision rules. Substantial redundancy among persons sharing a common knowledge of partial sets of decision rules is required. Consequently, the following impossibility statement can be derived: If persons share no common understandings including no common terms, definitions nor common expectations, a political community will be impossible and social organization will not exist.

Within the domain of common understanding, we can anticipate other types of relationships. Where collective action is highly fragmented among many interdependent decision structures, we would expect that relatively high levels of common information and understanding are required for people to be able to pursue opportunities in the context of different decision structures. Persons without access to such information would suffer a serious disability in not being able to take advantage of the opportunities available to them. Such persons would appear to be both irrational and helpless when viewed by others with the requisite information and capabilities to make strategic calculations. Similarly, persons holding invalid conceptions regarding

decision making arrangements, such as the myth of omniscient rulers or the myth of evil men, would appear to be comparably helpless in controlling their fate. Such conditions may apply to whole societies of people who drift helplessly in "anticipating the impending doom of their race" while unable to conceptualize political solutions appropriate to their exigencies.[2]

We might anticipate that the choices people make about institutional arrangements for water resource development will be based upon conceptualizations which they hold about the political process and of the opportunities which they can make available to themselves through the political process. If they proceed in a way that enables them to move in directions where consequences conform to their expectations, and if they can avoid circumstances that serve to amplify their own helplessness and wretchedness, then we should entertain the possibility that such people are acting rationally whether or not their behavior conforms to the prescription of academic scholars.

Common Agreement

In addition to the calculation of probable consequences inherent in human understanding, human choice is also dependent upon a weighing of the preferredness of events in terms of human values. The capacity to evoke a particular set of consequences can be contemplated independently of human

evaluation of those consequences as being "good," "bad" or "indifferent." However, when we consider human choice and postulate action by rational self-interested individuals, we expect individuals to enhance their relative advantage in making choices from among events evaluated as "goods" or "bads." Thus, we would expect individual decision makers to have a preference for outcomes evaluated as "good" as against outcomes evaluated as "bad" and to have preferences as among different potential "goods" or "bads." Each individual will select what he considers the "greater" good or the "lesser" bad in a choice as among "goods" or "bads."

To the extent that decision rules bias social relationships to enhance the probability that some individuals will always win and be able to impose costs upon losers, we would expect losers either to attempt to withdraw from those social relationships or to develop ancillary strategies which minimize their costs. In short, we would expect such a structural relationship to be relatively unproductive. Losers will attempt to restructure the game of life toward minimizing their exposures to the play of a game in which they cannot hope to win. Peasants and common soldiers in many areas of the world have learned how to pursue such strategies with substantial skill where the political game is overwhelmingly rigged against them.

Common agreement is not a necessary condition for a political association to exist. Coercive capabilities can

be exercised in a way that rigs the structure of individual incentives toward conformity to extremely repressive measures. But, such arrangements will not provide the basis for mutually productive relationships which enable people to move toward the maximization of net social welfare as reflected in both their individual and common wealth. Thus, common agreement is a necessary condition for sustaining a political association which is capable of approximating optimality in social relationships.

If mutually productive relationships are to be sustained in the constitution of decision making arrangements, we would anticipate that such arrangements must meet a condition of being mutually agreeable to the persons involved. Where disagreements are evoked in the course of making particular decisions or in enforcing or altering decision rules, we would expect an essential residue of agreement to apply to the choice and application of decision rules for the processing of conflicts or disagreements. If people can sustain disagreement in relation to decision making arrangements which enable them to process their conflicts in a reasonable and agreeable way, then an essential bond of common agreement can be sustained. If there is no common agreement upon the appropriateness of decision rules for resolving conflict, then we would not expect people to be able to sustain mutually productive relationships.

Common Facilities for Determining, Enforcing and Altering Decision Rules

Since decision rules are not self-generating nor self-enforcing, any pattern of social organization established by reference to decision rules must have reference to a set of decision making arrangements which is concerned with determining, enforcing and altering decision rules. This condition is the basis for distinguishing governmental institutions from other institutional arrangements in any society. Governmental institutions are those decision making arrangements which are specialized to determining conflicts, enforcing decisions, and altering decision rules that affect patterns of social organization.

Even if we assume the warrantability of decision rules in the sense that decision rules are appropriate means for realizing some specifiable set of consequences or ends and if we further assume common understanding and common agreement, we cannot infer that the conditions for sustaining the operability of a set of decision rules will be met without postulating a set of common institutional facilities for determining, enforcing and altering decision rules. As conditions of common understanding and of common agreement are subject to measures of misunderstanding and disagreement, then increased reliance is placed upon recourse to common facilities for determining, enforcing and altering decision rules either as a means of attempting to re-establish the commonality of understanding and agreement

or as a means for sustaining the operability of decision rules under conditions of partial misunderstanding and disagreement.

In addition, a source of potential conflict may arise from circumstances where persons act upon different decision rules which may be potentially applicable to a particular situation. Where the consequences of acting upon contrary decision rules place persons in a position of asserting mutually exclusive and contradictory claims, conflict will arise. Each cannot attain a solution where each can have his own way. Recourse must be had to some type of common decision making facility where both can present their respective causes and rely upon the decision making capabilites of a third party to render a judgment on what rule shall be given precedence in the particular circumstance.

The commonality of the sets of decision rules involved in different institutional contexts is maintained by recourse to specialized institutional facilities for resolving conflicts by determining which one from a set of conflicting rules will apply in particular types of situations. The exercise of this decision making capability can in turn have the consequence of reducing contradictions and inducing an increasing measure of consistency or coherence in the logical structure of a system of decision rules. Both the professional practice of law and judicial decision making

focus especially upon problems of potential conflict of laws and upon criteria for decision making concerned with logical consistency and coherence in the diverse system of decision rules which comprise a legal system.

If a condition of human fallibility is assumed to exist, common understanding and common agreement will be insufficient to foreclose the possibility that the pursuit of one's advantage within a logically coherent set of decision rules may lead to unanticipated consequences and cause injury to others. Some measure of political constraint sustained by common facilities to determine, enforce and alter legal relationships is essential for assuring resolution of conflicts deriving even from unintentional injuries or harms that may be inflicted upon others. Persons may not necessarily be prepared to right wrongs when the righting of a wrong involves the payment of costs that leave the party at error worse-off than better-off in the short run.

Unequal Distribution of Decision Making Capabilities

Recourse to decision makers who have authority to determine, enforce and alter legal relationships affecting the interests of others implies that any political association must be based upon an unequal assignment of decision making capabilities as a necessary condition for the maintenance of decision making capabilities in accordance with operable decision rules. Some decision makers must be able

to take decisions which can determine and enforce legal relationships affecting the interests of others. Some decision makers will thus exercise decision making capabilities that are unequal with others.

A special condition relative to the inequality of decision making capabilities exercised by persons assigned the extraordinary authority or power to determine and enforce decisions in relation to others also necessarily requires the potential use of coercive sanctions to support behavior based upon lawful conduct and to remedy wrongs associated with unlawful conduct. Thus, patterns of political organization necessarily depend upon the potential exercise of coercive capabilities. Coercive capabilities involve the lawful exercise of unequal decision making capabilities and have the consequence of leaving some persons worse-off rather than better-off at least in the short run. Any system of government involves the assignment of extraordinary authority or decision making prerogatives to some officials who are able to determine, enforce and alter the legal relationships affecting others within that society and who are lawfully empowered to use coercive sanctions in the discharge of their official responsibilities.

These conditions inherent in the logic of political choice leave us with a fundamental difficulty. On the one hand, an inequality of decision making capability and a

structure of social relationships is subject to a contingency calculation. Actions in one context are contingent upon whether each person may have recourse to alternative decision making arrangements to determine, enforce or alter legal relationships.

The structure of legal relationships establishing the basis for social and economic transactions among individuals provides only a first order of approximation in creating decision making arrangements. If dysfunctional conflict arises, further determinations may depend upon the various governmental decision makers in exercising their functions of enforcing or modifying legal relationships. Recourse to governmental decision making capabilities will, in turn, involve contingency calculations about the actions which officials may take in the different decision making arenas or structures inherent in the process of government.

John R. Commons, drawing upon the earlier work of Wesley N. Hohfeld, distinguished between these two sets of legal relationships in characterizing "authorized transactions" as those relationships which allocate primary or substantive authority for persons to act in relation to one another; and "authoritative transactions" as those relationships which allocate secondary or remedial authority to determine, enforce and alter legal relationships.[3]

Within the context of any operative set of decision rules, authority to act in social or economic relationships involves the assignment of a capability or a right to act to some actor with a correlative obligation or duty on the part of others to act in accordance with the rights being asserted. Rights are subject to limits. Limits upon a right define the area of decision making where a claimant stands exposed. Thus, Commons defined the limit of a right as an exposure. The correlative of an exposure is beyond the limit of a duty. A person who is no longer under duty is at liberty to act. Thus, the correlative of an exposure is a liberty.

The structure of legal relationships involved in authorized transactions can be plotted as represented in Figure 1. The correlatives refer to interdependencies among two different legal parties or sets of legal parties acting on the basis of a common set of decision rules. The limits apply to the respective parties. The diagonals represent reciprocal relationships. Rights and liberties define the sum of legal capabilities assigned to both parties; and duties and exposures establish the limitations assigned to both parties. Limitations function as constraints upon action, and capabilities imply opportunities to act.

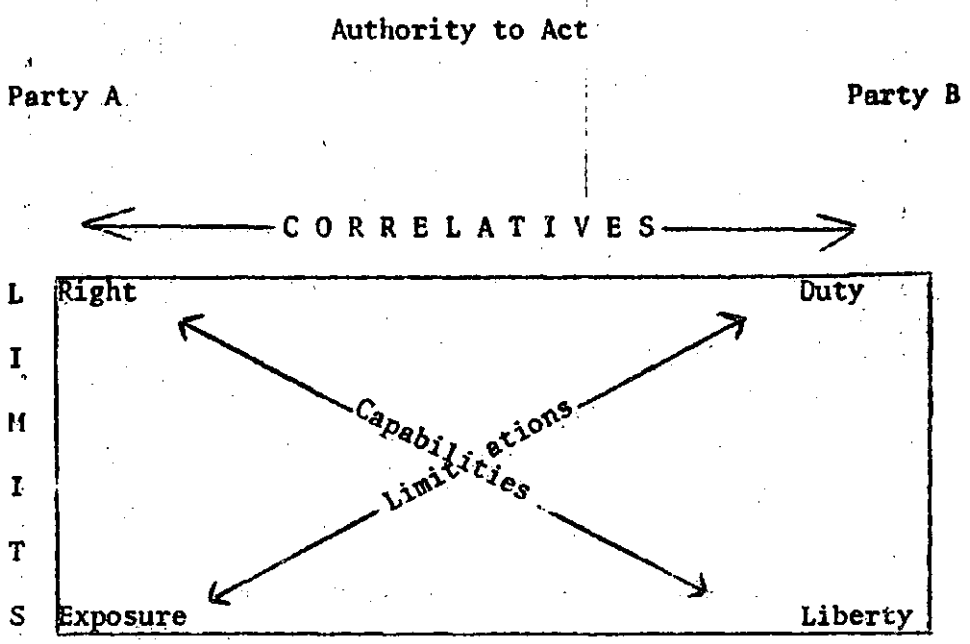


Figure 1. Structure of Authorized Transactions

A similar structure of relationships is applicable to authoritative transactions but the terminology is changed. The assignment of authority to determine, enforce and alter legal relationships is defined as a "power" relationship. The correlative of a power implies that other persons have an obligation or a liability in such a relationships. The limit of a liability is an immunity and the limit of a power is a disability. These relationships are plotted in Figure 2.

Authority to determine, enforce and alter legal relationships may vary from contractual relationships to a variety of governmental decision making arrangements. Under contractual arrangements, individuals may participate in a mutually agreeable arrangement to redefine or

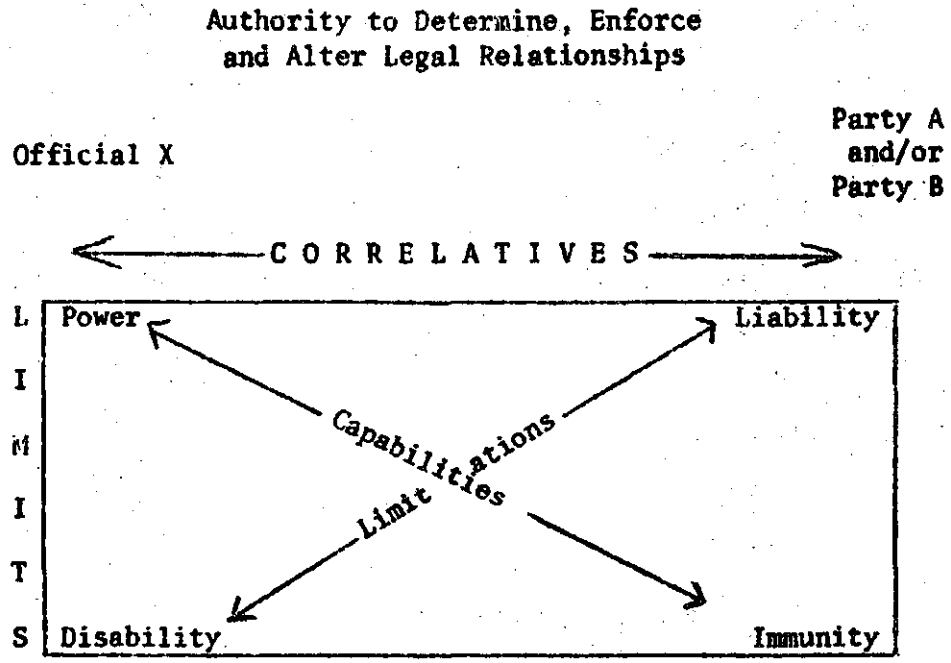


Figure 2. Structure of Authoritative Relationships

alter legal relationships to realize some mutual interest. Governmental decision making arrangements inherent in the operation of courts, executive agencies and legislative bodies provide specialized facilities for determining, enforcing and altering decision making arrangements under conditions which imply a radical inequality of decision making capabilities. Authorized relationships in the absence of agreement among the parties involved, depend upon authoritative relationships to either enforce or alter those relationships. Power relationships, thus, establish the general scenario for all decision making. The game of life is one where each player pursues his strategic opportunities and is potentially exposed to

the strategic actions of others in a series of interdependent games where the rules of the game are themselves subject to change during the course of play.

The Organization of Government

The existence of governmental institutions is a general scenario for all decision making. The radical inequalities inherent in the organization of any system of government, create a difficult question of whether the institutions of government can be the subject of rational choice or whether the condition of government is one which must be endured as the price of human civilization. This is a critical issue in political theory. Different resolutions of the issue have established the basis for organizing different systems of government among different societies of people.

The conclusion that the condition of government is one which must be endured as the price of human civilization is perhaps best formulated by Thomas Hobbes.[4] A stable and peaceful human society based upon lawful relationships required recourse, according to Hobbes, to a commanding power which can articulate and enforce a common system of law. For a community to share a common system of law in Hobbes' theory requires a single center of authority capable of exercising the prerogatives of government. To do less, in Hobbes' formulation, is to invite conflict and to threaten the peace of the community.

Under such an approach to the organization of government, the person or agency vested with sovereign prerogative is the ultimate source of law. As the ultimate source of law, a sovereign is above the law and cannot be held accountable to the law through legal remedies before a court of law. The peace and stability of such a society depends upon a deferential acceptance of one's social obligation to obey the governing authority on the assumption that stable social relationships will necessarily require the existence of some center of ultimate authority. Obedience to authority in such a theory is the price of human civilization.

Political systems organized on the basis of such a conception of sovereign prerogative can vary in how a sovereign body is constituted. Sovereignty may reside in an elected legislative assembly, in a self-perpetuating body of men who recruit new members to their ranks, or in a single person. In any of these cases, the exercise of sovereign prerogative is fully monopolized by a single center of authority.

Where the institutions of government are organized on the basis of a single center of government exercising supreme authority, all other social institutions become dependent upon the decisions taken by those who exercise sovereign prerogatives. Over the long run, such systems of political organization will accomodate to change in

ways that give political analysts little capability to anticipate the consequences which will flow from such a structure of relationships except that members of a ruling class will, over time, act on behalf of their self-interest and use the coercive capabilities of government to their advantage. Such regimes can rarely provide the political and legal basis for highly productive relationships.

Where sovereign prerogative is vested in a single body which has ultimate authority over the governance of a society, principles of constitutional law can serve only as moral principles for the guidance of the government rather than as legal principles which can be enforced in relation to governmental actions. On the basis of this distinction, John Austin characterized constitutional law as positive morality not positive law.[5] Positive law for Austin is law that can be sustained as enforceable law. Positive law depends upon the availability of legal remedies to enforce claims to rights through the courts of law or other instrumentalities for the enforcement of law.

The impossibility of sustaining a system of constitutional law in a political system where the exercise of sovereign prerogative is monopolized by a single center of authority presents an anomoly for Americans who assume that constitutional law is the basic foundation for their jurisprudence. The existence of a political system

where constitutional law is presumed to be positive law rather than unenforceable moral prescriptions implies that the American political system was fashioned on the basis of concepts that depart radically from most other political systems in the world. Such a political system would imply that the exercise of governmental prerogative is subject to rules of constitutional law where those who govern are controlled by constitutional rules which they cannot alter upon their own initiative. Further, such a political system would imply that the prerogatives of government are distributed in a way that actions by one set of governmental authorities will limit and bound the exercise of discretion by other governmental authorities. If limits are interposed upon the exercise of governmental prerogative by each instrumentality of government, then the actions of any one instrumentality of government will be limited by the authority exercised by other instrumentalities of government. So long as no one instrumentality of government is able to dominate other instrumentalities of government or no political coalition is able to gain dominance over all instrumentalities of government, then the authority of each set of governmental decision makers can be used to impose limits upon other sets of governmental decision makers. Each will then be bound by the rules of constitutional law that govern those who exercise the prerogatives of government.

Necessary Conditions for the Development and Maintenance of Optimal Decision Making Arrangements

The discussion of the logic of political choice in this chapter enables us to specify several conditions as being necessary for the development and maintenance of optimal decision making arrangements. These include the following:

1. Reference to a common set of decision rules is a necessary condition for sustaining ordered social relationships.

2. The maintenance of the commonality of decision rules will necessarily depend upon a common understanding of the terms and relationships inherent in a set of decision rules.

3. The maintenance of the commonality of a set of decision rules will necessarily depend upon a set of institutional facilities capable of determining, enforcing and altering decision rules.

4. A set of institutional facilities capable of determining, enforcing and altering decision rules will necessarily depend upon an unequal assignment of decision making capabilities where some decision makers will be able to impose their decisions upon others and use coercive sanctions to do so.

5. A set of institutional facilities capable of determining, enforcing and altering decision rules can be subject to enforceable constitutional rules only where governmental authority is allocated to diverse sets of decision makers who can exercise only limited decision making capabilities and can establish limits to the exercise of authority by each other set of decision makers.

6. The maintenance of a political association capable of approximating optimal or mutually productive relationships will necessarily depend upon common agreement among the individuals comprising such an association.

Implications for the American System of Government

The American political system is based upon a presumption that the institutions of government which afford common decision making facilities for determining, enforcing and altering decision rules will be subject to an enforceable system of constitution law. Such a system of constitution law will define both the decision making capabilities and limitations of those who exercise the prerogatives of government and of those who function as persons or citizens in a political community. Processes of constitutional decision making exist apart from processes of governmental decision making. Constitutional law is unalterable by a government on its own motion without reference to constitutional decision making processes which occur outside those institutions of government. The exercise of prerogative by each unit of government is subject to limits which establish its relationships with other units of government in a federal system.

Within each unit of government, the exercise of decision making capabilities bearing upon the alteration of decision rules is separated from other decision making functions bearing upon the determination and enforcement of legal relationships. The separation of powers inherent in the American constitutional system is a necessary structural condition for enforcing a system of constitutional law. If legislative bodies were free to judge

their own constitutional competence, no limits could be imposed upon legislative authority. If the executive were free to claim inherent powers to govern and to defend its "right" to govern by the use of unconstitutional means to do so, then police power and military force would prevail. Only by interposing constitutional limits upon legislative and executive authority which are enforceable by other decision structures is it possible to have a system of positive constitutional law.

The conditions of political choice in the American political system include the possibility that the terms and conditions of decision making in governmental institutions will themselves be the subject of political choice exercised through processes of constitutional decision making. However, the political choice of constitutional arrangements is subject to the severe constraint that only a political system which is subject to substantial fragmentation of authority can maintain a system of positive constitutional law. Fragmentation of authority as between persons and governmental officials, as among units of government and as among different decision structures within any particular unit of government, is a necessary condition for enforcing a system of constitutional law. If these structural limits or constraints are abandoned, the force of constitutional law as positive law will also have to be abandoned, and constitutional law would

then become nothing more than moral prescriptions. A system of constitutional rule requires a conscious awareness that political choice must necessarily be constrained within limits. If those limits are abandoned, then the possibility of constitutional government will be foreclosed.

The problem of constitutional choice in a political community which aspires to the possibility of using the rules of constitutional law to govern the actions of those who exercise governmental prerogatives will have ramifications which affect the structure of all other social institutions in that society. Because of the importance of the problem of constitutional choice to the choice of institutional arrangements in American society, we shall turn to a further consideration of that problem in Chapter 3.

FOOTNOTES

[1]Herbert A. Simon, The Sciences of the Artificial (Cambridge, Massachusetts: M.I.T. Press, 1969).

[2]Tocqueville, Democracy in America I: 239-240 observes: ". . .[D]emocracy cannot profit from past experience unless it has arrived at a certain pitch of knowledge and civilization. There are nations (i.e., people sharing a common culture but not necessarily a common political organization) whose first education has been so vicious and whose character present so strange a mixture of passion, ignorance and erroneous notions upon all subjects that they are unable to discern the causes of their own wretchedness, and they fall a sacrifice of the ills of which they are ignorant."

Tocqueville's observation need not be limited to American Indians but can be applied in the same terms to the fate of modern man and his inability, for example, to formulate political solutions appropriate to collective security among nations.

[3]John R. Commons, Legal Foundations of Capitalism (Madison, Wisconsin: University of Wisconsin Press, 1959).

[4]Thomas Hobbes, Leviathan or the Matter, Forme and Power of A Commonwealth Ecclesiastical and Civil, Michael Oakeshott, ed. (Oxford: Basil Blackwell, 1960).

[5]John Austin, The Province of Jurisprudence Determined H.L.A. Hart, ed. (London: Weidenfeld and Nicolson, 1955).

Chapter 3

THE PROBLEM OF CONSTITUTIONAL CHOICE

Introduction

In chapter 2 we examined some of the conditions which apply to the structure of political choice. Six conditions were specified as necessary conditions for the development and maintenance of political decision making arrangements capable of approximating optimality:

> 1. Reference to a common set of decision rules is a necessary condition for sustaining ordered social relationships.
>
> 2. The maintenance of the commonality of decision rules will necessarily depend upon a common understanding of the terms and relationships inherent in a set of decision rules.
>
> 3. The maintenance of the commonality of a set of decision rules will necessarily depend upon a set of institutional facilities capable of determining, enforcing and altering decision rules.
>
> 4. A set of institutional facilities capable of determining, enforcing and altering decision rules will necessarily depend upon an unequal assignment of decision making capabilities where some decision makers will be able to impose their decisions upon others and exercise coercive sanctions to do so.
>
> 5. A set of institutional facilities capable of determining, enforcing and altering decision rules can be subject to enforceable constitutional rules only where governmental authority is allocated to diverse sets of decision makers who can exercise only limited decision making capabilities and can establish limits to the exercise of authority by each other set of decision makers.

6. The maintenance of a political association capable of approximating optimal or mutually productive relationships will necessarily depend upon common agreement among the individuals comprising such an association.

The basic problem in constituting political decision making arrangements is how to reach a solution that will meet each of these conditions. The conditions of common understanding and common agreement (Conditions 2 and 6) can be collapsed and treated as though they were a single condition which we might term "consensus." The several conditions bearing upon the establishment and provision of common facilities for determing, enforcing and altering decision rules (Conditions, 1,3 and 4) can be collapsed and characterized as the condition of "political constraint." The problem of constitutional choice then is how to allocate decision making capabilities in a society so that conditions of consensus and of political constraint can be realized under a set of constitutional decision rules which can be maintained as an enforceable system of constitutional law (Condition 5).

If both the conditions of consensus and political constraint can be met under a system of constitutional rule, then actions to enforce the maintenance of a system of decision rules can be sustained with minimal recourse to coercive capabilities. When such actions are taken they will be recognized as reasonable or legitimate. Legitimacy of political authority depends upon sustaining consensus

regarding the reasonableness of actions by those assigned authority to determine, enforce and alter legal relationships.

An appropriate solution will also require these conditions to be met through time. A solution which meets the conditions of consensus and political constraint under constitutional law at one point in time is clearly insufficient if these conditions cannot be maintained through time. Yet, if we assume human fallibility, self-interestedness and a substantial heterogeneity of human preferences, we would anticipate recurrent patterns of disequilibrium. At times of disequilibrium, consensus gives way to fundamental disagreement and conflict. Human capabilities to determine, enforce and modify decision rules are subject to substantial limitations under such conditions. Where such disequilibrium occurs, can we expect that the structure of collective decision rules will be biased or rigged in the direction of re-establishing such an equilibrium? Or would we expect a stable disequilibrium to persist where the structural conditions inherent in political constraint became dominant through the exercise of political power sustained by coercive force? Political dominance by coercive force may preclude the re-establishment of the condition of consensus unless the constitutional remedies inherent in a system of constitutional law provide members of a political community with the means for altering political arrangements and of securing consensus within reasonable political constraints.

The problem of constitutional choice provides an opportunity to test the usefulness of political analysis. Can political analysis help us reach warrantable conclusions regarding the choice of decision rules which will increase the probability that a political community can be organized to meet simultaneously the conditions of consensus and political constraint under a system of constitutional law? If and when disequilibrium were to occur, can we further anticipate the existence of a set of constitutional decision rules which will bias the political process in the direction where governmental decision makers would search out bases for re-establishing the condition of consensus? A political system predicated upon such decision rules presumably will have long-term stability. Such a system would be capable of adapting to a variety of circumstances and doing so under conditions where the legitimacy of political choice would be sustained by a general consensus of the people comprising that political community. If this problem can be solved in general terms, then that solution should be of considerable significance for application to the choice of institutional arrangements for water resource development.

The Choice of Constitutional Arrangements

The Buchanan and Tullock Analysis of the Problem of Constitutional Choice

James Buchanan and Gordon Tullock, in The Calculus of Consent, provide us with a theoretical basis for deriving an affirmative solution to the problem posed in the introduction of this chapter.[1] Buchanan and Tullock use an economic model in which they make a number of basic assumptions about the nature of individual men and the environment in which they find themselves.

Some legal arrangement is assumed to exist in the larger environment in which individuals find themselves. At least some of the basic rights, duties, privileges and responsibilities of individual men have already been established. Law and order exists.

Individuals are assumed to be self-interested. A self-interested individual makes his own calculations about the desirability (benefits and costs) of different outcomes by reference to his own preferences. The word "self-interest" is not by definition equal to the word "selfish." A self-interested individual may weigh outcomes which benefit others more heavily than outcomes which benefit himself. The assumption of self-interest primarily implies that individuals have their own preferences which affect the decision they make.

Individuals are assumed to be rational. Rational individuals are able to rank alternatives available to them in a transitive manner. Ranking implies that a rational individual either values alternative A more than alternative B, or that he preferes alternative B to alternative A, or that he is indifferent as between them. Transitivity means that if he prefers alternative A to alternative B, and B is preferred to C, then A is necessarily preferred to C.

Individuals are assumed to adopt maximizing strategies. Maximization as a strategy implies consistent choice of those alternatives which an individual thinks will provide the highest net benefit as weighed by his preferences.

Constitutional choice is assumed to be made under conditions of risk. Under conditions of risk, individuals are able to specify the long-run effects resulting from alternative institutional arrangements even though they are not able to predict the political outcome of any specific future decision. Individuals cannot tell if they will be on the winning or losing side in any particular decision made <u>within</u> a particular institutional arrangement once it is established. By assuming risk, Buchanan and Tullock are asserting that individuals are able to calculate the probable long-run benefits and costs of different forms of decision rules. The choice of constitutional decision rules is made in light of long-term anticipated consequences in an extended series of decisions.

A final assumption is made that if each individual participating in a process of constitutional choice has an equal probability with all others that his interests will be taken into account in future decisions (i.e., an equal probability of being among winners and losers over the long run), then each individual will have an incentive to select that set of constitutional decision rules which will maximize his own utility. By so doing, each individual will necessarily act so as to maximize the net welfare for a community of similarly-situated individuals making a constitutional choice.

Under these conditions, Buchanan and Tullock conclude that a community of individuals who have an equal probability of being among the winners and losers over the long run can use substantial unanimity as the basic decision rule for considering decisions at the constitutional level. Substantial unanimity is congruent with the basic economic criterion of Pareto optimality in modern welfare economics. The rule of Pareto optimality defines a social optimum as existing where no change can be made in resource allocation or in institutional arrangements which will enable some persons (or persons) to improve his position without leaving someone worse off. If a change would result in an improvement for some without leaving anyone worse off, then that improvement should be taken as an appropriate move toward the attainment of Pareto optimality. Reasonable men

motivated by self-interest would have an incentive to vote for a set of decision rules that would enable a community of people to move toward Pareto optimality, and would not cast a negative vote if their own welfare were not adversely affected.

John Rawls uses a similar course of reasoning to develop a concept of justice as a basis for chosing institutional arrangements in constituting a democratic society.[2] Rawls indicates that the choice of institutional arrangements for constituting a democratic society will be "just" if 1) each person participating in an institution or affected by it has an equal right to the most extensive liberty compatible with a like liberty for all other persons and 2) where inequalities are necessary conditions for institutional arrangements: a) those inequalities must work to everyone's advantage and b) the positions or offices to which inequalities attach must be open to all. Rawls' analysis implies that an equality of opportunity is an essential characteristic of a democratic society. The constitution of a democratic society would carefully delineate the prerogatives of individuals as against the prerogatives of governmental officials. The extraordinary prerogatives of governmental officials in maintaining, enforcing and altering decision rules in a democratic society can only be justified when those prerogatives are exercised to everyone's advantage. A constitutional choice of decision

rules applicable to the exercise of governmental prerogative, if to everyone's advantage, could be expected to win support from everyone. A rule of substantial unanimity would, thus, tend to bias constitutional decision making toward a formulation which would work to everyone's advantage and meet the conditions of Rawls' concept of justice.

Buchanan and Tullock also introduce a cost calculus that is appropriate to a choice of constitutional decision rules. They present two cost functions which are inherent in the organization of any decision making arrangements. The first is defined as external cost or the cost that the individual expects to endure resulting from the actions of other individuals over which he has no direct control. External costs might also be characterized as deprivation costs. External or deprivation costs occur both in a circumstance where an individual's actions may impose costs upon another in the absence of collective action (i.e., costs associated with negative externalities), or where an official's actions may impose costs upon others when taken in the course of collective action (i.e., costs which reflect deprivations imposed upon others.) Conversely, costs which an individual can be expected to bear in the expenditures of resources, time and effort upon decision making are defined by Buchanan and Tullock as decision making costs. When these two sets of costs are summed, Buchanan and Tullock characterize the total as interdependency costs.

Buchanan and Tullock then ask what effects the choice of collective decision rules would have upon the two cost functions. A collective decision rule would establish what proportion of the members of any collectivity which must agree to the actions taken on behalf of that collectivity. The proportions can range from one to all; with a rule of one represented at one end of the scale and a rule of unanimity at the other end of the scale. The choice of an optimal proportion of individuals to be included in collective decision making would be the choice of an optimal decision rule for the constitution of such a collectivity. A choice of a constitutional decision rule is always a choice based upon future expectations. All cost estimates must be stated as expected costs.

If the expected external or deprivation costs are estimated for any representative individual within a future collectivity, Buchanan and Tullock would anticipate that such costs will be at the highest point if one person were able to take actions affecting the other members of the collectivity. Expected external or deprivation costs would decline as an increasing proportion of the collectivity were required to participate in decisions taking actions affecting all members of the collectivity. If all members in the collectivity participated in taking decisions, then any one person could preclude action having an adverse effect upon him. Thus, the expected external or deprivation cost

would approximate zero for a decision rule of unanimity. Buchanan and Tullock plot this relationship in the representation contained in Figure 1.

A contrary trend occurs in plotting the shape of the expected decision making or transaction costs. The amount of resource, time and energy devoted to the making of collective decisions would be at their relative minimum if one of the members of the collectivity were able to take decisions affecting others. As increasing proportions of the members of the collectivity participate in taking a decision affecting all members of the collectivity, we would expect the decision costs to increase and reach their highest point where unanimity would be required. Figure 2 plots a representation of relationships between expected decision costs and the proportion of individuals required to take action in a collectivity. If these two cost functions are then combined we would expect the total interdependency cost curve to have a U-shape. The point of least cost would be at the low-point of the total cost curve represented by some point K as in Figure 3.

We now assume that the individuals comprising a collectivity could, by taking joint action in relation to some set of decision rules, realize some joint benefit equally available to all members of the collectivity as represented by the line B (Figure 4). We would expect them to select a decision rule to authorize action by a vote of some

Figure I

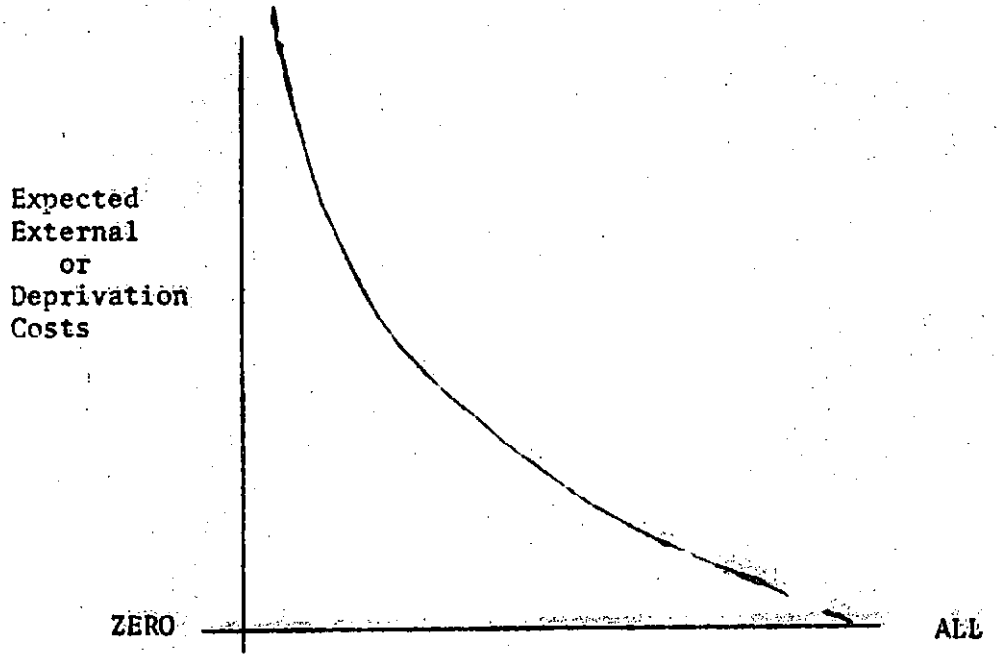


Figure II

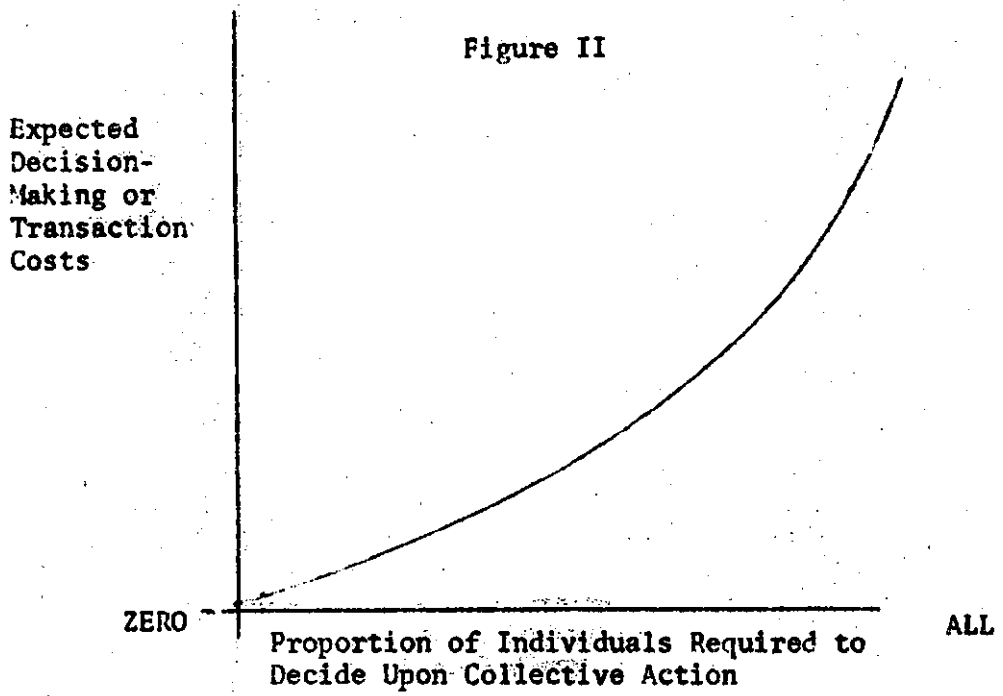


Figure III

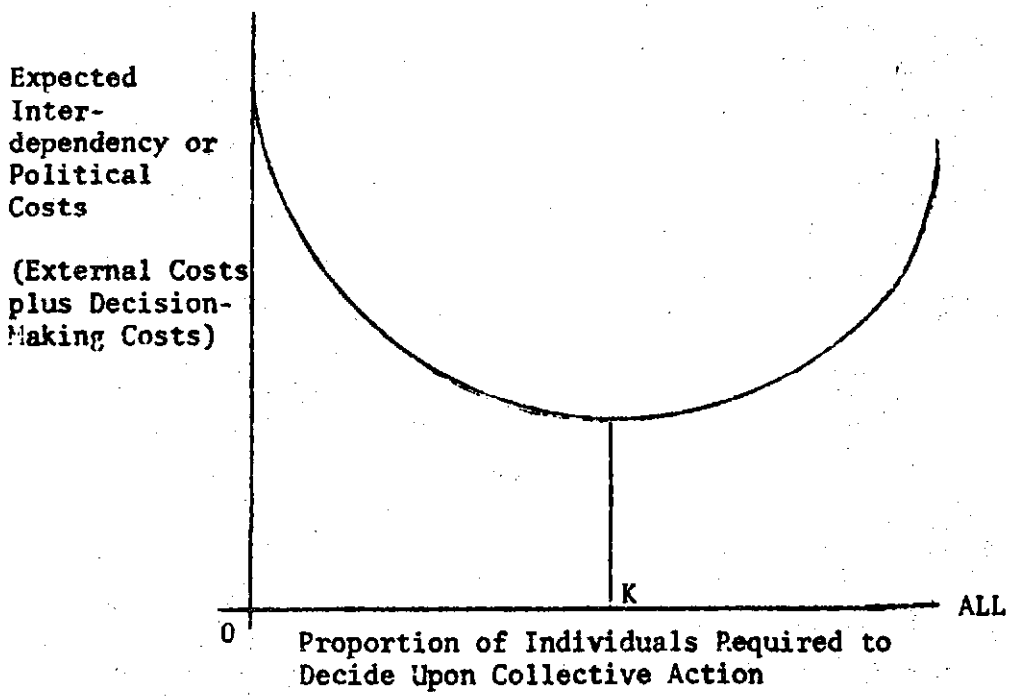
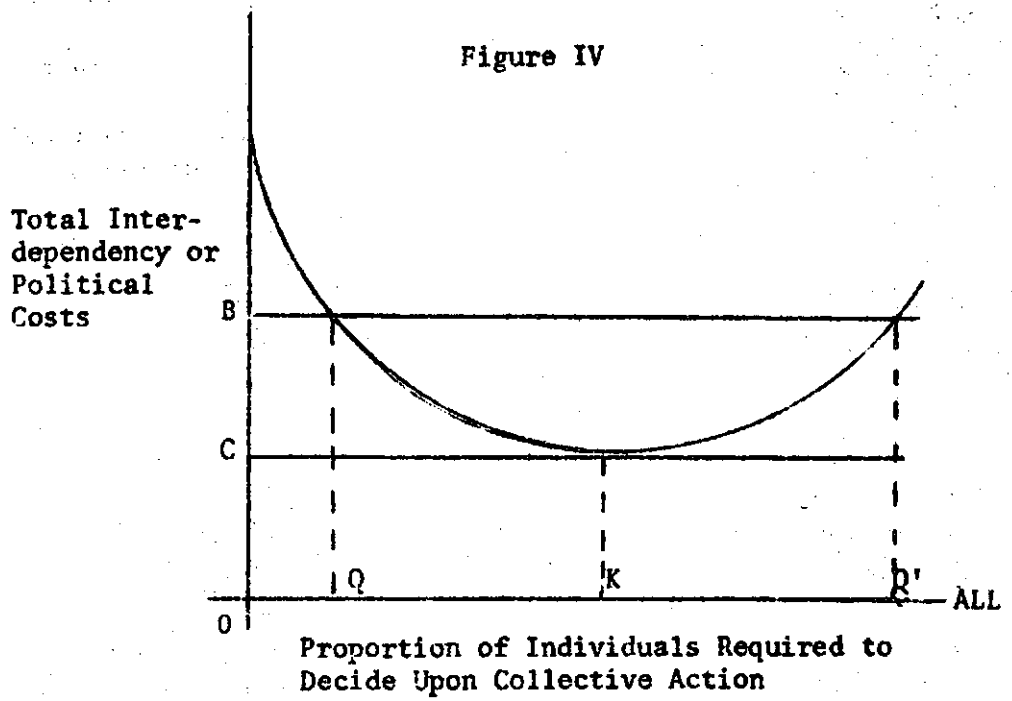


Figure IV



proportion of the group lying between points Q and Q'. Any decision rule between Q and Q' will realize more benefits than costs. The greatest surplus of benefit over cost would be realized at point K. If the cost at K were to be generalized and be allocated equally among all members of the collectivity, we would expect benefits to exceed costs in the magnitude of CB. If, however, a rule of unanimity were to be used we would expect the costs to exceed benefits by a substantial margin. The same would be true for the decisions made by a single person for the collectivity. We would not expect the collectivity to be able to realize potential benefits if more or less inclusive decision rules were required than those within Q-Q'.

The Buchanan and Tullock analysis has several important implications for problems of institutional weakness and institutional failure considered in Chapter 1. First, efforts to reduce transaction or decision making costs must be carefully weighed as against an increase in potential deprivation costs. Reliance upon a hierarchically-organized management structure may reduce transaction or decision making costs as Coase has suggested. However, gains realized by reduced decision making costs may simply be off-set by an increase in potential deprivation costs.

Second, the potential costs inherent in one set of decision rules may be limited by the constraint imposed by other sets of decision rules. Coase's theory of the firm,

for example, implies that the management structure used by an entrepreneur to reduce his transaction or decision making costs is limited by two other decision structures: the employment contract and the product market. If the employment contract can be used to minimize the potential deprivation costs which an employer might impose upon his employees and if the product market were sufficiently competitive to prevent an entrepreneur from exercising power over a market and imposing substantial deprivation upon the consuming public, then reductions in transaction or decision making costs can yield a net improvement in social welfare. However, if an employer dominates a labor market and/or a product market, reductions in decision making costs may be more than off-set by increased deprivation costs and lead to a deterioration in social welfare.

Similarly, in a system of public administration where users of public goods and services may have relatively little opportunity to articulate their individual preferences and where an employer, as in the case of the armed services, may be able to exercise substantial coercion over employees, potential deprivation costs can reach very substantial proportions. In such circumstances, constitutional rules which provide for equal protection of the laws, a right to due process of law subject to independent judicial consideration, legislative control and oversight of executive actions and popular election of governmental officials may be appropriate

means for limiting potential deprivation costs. If such constitutional arrangements can be used to reduce potential deprivation costs, then efforts to minimize transaction or decision making costs within such constraints may contribute to a net improvement in social welfare.

Third, the sets of events which require recourse to collective action in the provision of public goods and services and in the management of common property resources may implicate different domains or fields of effects and require the organization of collective enterprises which reflect different scales of operation. Each such enterprise may pose special problems in constitutional decision making. The particular shape of cost curves may vary with the type of public goods or services being provided. Problems of ground water basin management would, for example, have a relatively flat decision making cost curve when compared with management of a river subject to severe flooding. The constitution for a ground water replenishment district would facilitate the interest of water users if its decision rules were biased toward unanimity. Flood control agencies, on the other hand, would run great risks in flood damage, if large numbers of persons were required to take decisions in responding to a deluge. A reasonable constitution for a flood control agency would make provision for emergency action where decision costs would be held to a minimum by authorizing some one official to take emergency action.

However, exclusive reliance upon one-man rule in the constitution of a flood control agency would be expected to create very high deprivation costs.

A theory of constitutional choice will require reference to diverse decision rules which permit different responses to varying situations. Events which portend sudden disaster imply different constitutional considerations than those which persist with only small increments of change through time. Problems having varying domains or fields of effects may be appropriately disaggregated to allow for the constitution of separate communities of interest. In addition, advantage may be taken of one type of decision rule which will reduce decision costs only if constrained by the operation of another type of decision rule which will limit potential deprivation costs. Otherwise savings in decision costs may be more than off-set by increases in deprivation costs.

The Buchanan and Tullock analysis also implies that the process of constitutional choice can be disaggregated and conducted under decision rules that vary from those required to take collective action in determining and enforcing decision rules in a society. Constitutional decision making then would involve a choice of rules binding upon the conduct of governmental officials but would preclude the taking of operable decisions which apply to particular cases. If constitutional choice can be disaggregated from processes of governmental decision making, then the possibility exists

that remedies may be available at the constitutional level for re-establishing conditions of consensus through the re-formulation of constitutional decision rules should the circumstances arise where those who exercise the coercive capabilities inherent in governmental authority come to disregard the interests of substantial segments of the population in a political community.

One of the central features of the American political system is its use of processes of constitutional decision making to deal with problems of governmental organization as distinguished from the exercise of governmental decision making within the framework of constitutional rules. The method of analysis developed by Buchanan and Tullock is highly congruent with theoretical arguments sustained by Alexander Hamilton and James Madison regarding the U.S. Constitution in The Federalist. Both provide us with foundations for a political analysis to examine the choice of institutional arrangements for water resource development systems which is explicitly related to the terms and conditions of political choice prevailing in the American political system.

Hamilton and Madison provide us with a theoretical analysis of how the problem of constitutional choice was resolved in the formulation of the U.S. Constitution. We can use their analysis to determine the extent to which the American constitutional system was used to allocate

decision making arrangements to meet the conditions of consensus and the conditions of political constraint under a system of positive constitutional law. A system of constitutional rule which can meet these conditions will, in turn, impose substantial constraints upon political decision making. Following an examination of Hamilton and Madison's analysis of the problem of constitutional choice in the formulation of the U.S. Constitution, we shall turn, in conclusion, to an indication of the terms and conditions of political choice which are derived from the structure of American constitutional arrangements.

The Hamilton and Madison Analysis of the U.S. Constitutional Arrangements

The Hamilton and Madison analysis in The Federalist assumes that matters of constitutional choice can be subject to rational analysis by interested individuals who wish to advance their own welfare and who are prepared to recognize their own fallibility. The initial question for Hamilton was " . . . whether societies of men are really capable or not of establishing good government from reflection and choice, or whether they are forever destined to depend for their constitutions on accident and force."[3]

The analytical task confronting Hamilton and Madison was first to diagnose the sources of institutional failure of the government under the previous American constitution

formulated in the Articles of Confederation. On the basis of that diagnosis they were then confronted with the task of conceptualizing a solution that would be sufficient to meet both the conditions of consensus and the conditions of political constraint under a limited constitution.

Diagnosis of Institutional Failure

Hamilton and Madison found that the constitutional arrangement of the Articles of Confederation had failed to meet the conditions of political constraint. Congress could not act directly upon individuals but was required to act through the collective instrumentality of the states. Thus, the condition of political constraint was not operable in national affairs since national policies did not impinge directly upon the interests and actions of individuals. In turn, individuals could not articulate their interests, their "hopes and fears" through persons of their own choosing who could represent them in national councils capable of deliberating about and deciding upon common national policies. It was this failure to relate actions directly to the interests of individuals that Hamilton and Madison conceived to be the "erroneous principle," "the great and radical vice" of the then prevailing constitutional arrangement.

Individual Participation in Diverse Governments

Hamilton, following a diagnosis of the causes of institutional failure, formulated the conceptual basis for remedying that failure in the following terms:

> . . . . The government of the Union, like that of each State, must be able to address itself immediately to the hopes and fears of individuals; and to attract to its support those passions which have the strongest influence upon the human heart. It must, in short, possess all the means, and have a right to resort to all the methods, of executing the powers with which it is entrusted, that are possessed and exercised by the governments of the particular States. [4]

This solution is apt to strike a familiar ring to any American as pointing the way toward the federal structure of the American political system. A federal system allows individual persons in American society to participate in several units of government. A national government is available for dealing with problems that extend beyond the domain of the states. Each state, in turn, is a government capable of dealing with the problems of people within the domain of that state. In addition, Hamilton made explicit reference to "the system of each State within that State" on the assumption that other political arrangements exist within the American system of local government which enable people to tend to their collective interests in the context of local communities and neighborhoods. Thus, each person has the opportunity to pursue solutions to problems of social concern through several units of government with

diverse decision making capabilities. Should one fail to respond to demands, others would be available for seeking resolutions to common problems. Each person faces an oligopoly of governmental units rather than a monopoly of political authority.

While a national government was an essential instrumentality for being able to deal with problems of continental proportions, Hamilton and Madison recognized that the states and the "system of each state within that State" enhanced the capability of the Americans for treating joint problems through a diversity of institutional arrangements which was appropriate to variations in the local conditions existing among the several American states. In response to allegations that concurrent jurisdiction in taxation would lead to "double sets of revenue officers and a duplication of the peoples' burden by 'double taxation,'" Hamilton responded by indicating that patterns of reciprocal forebearance and mutual cooperation could be expected to develop which would best answer the needs for revenue, save expenses in tax collection, and "avoid any occasion of disgust to the State governments and to the people."[5]

Hamilton and Madison anticipated that because of the diverse nature of events, the powers of the national government could be administered advantageously within certain spheres and that other problems would be more advantageously administered in a context more closely related to the

ordinary routines of daily life. If people should become more partial to the national government than the states, Madison anticipated that such a change "can only result from such manifest and irresistable proofs of a better administration, as will overcome their antecedant propensities" to favor the states. People should not be precluded from having the opportunity for making such a choice.[6]

Constitutional Rule and the Separation of Powers

The opportunities afforded by a system of concurrent regimes at the national, state and local levels did not, however, assure that such a system could be maintained in essential equilibrium without careful attention to the constitutional structure of the national government itself. "Parchment barriers" to use Madison's term, were insuffient to prevent "the encroaching spirit of power."[7] "[I]n every political institution a power to advance the public happiness involves a discretion that can be misapplied and abused."[8] Means must be provided within the structure of government for enforcing the rules of constitutional law.

In analyzing the choice of constitutional decision rules appropriate to the government of national affairs, Hamilton and Madison considered the principle of majority vote to be clearly insufficient to sustain conditions of consensus and political constraint under the rules of constitutional law. The principle of majority rule provided no remedy against

the possibility that a majority, motivated by a "common interest adverse to the rights of other citizens or to the permanent and aggregate interest of the community" might arise and usurp political authority for its own advantage and at the expense of "both the public good and the rights of other citizens."[9] Tyranny of the majority was a persistent cause of the republican disease which led democratic republics to become "the wretched nurseries of unceasing discord."[10]

The organization of a national government was subject to the radical limit that deliberation about national affairs could be conducted only under circumstances where an audience could listen to one speaker at a time. Deliberative bodies must be relatively small. If this principle is violated, an oligarchy of a few will emerge to direct and run the machinery of deliberation. By increasing the number of representatives beyond rather limited numbers, Madison warned that "the countenace of the government may become more democratic, but the soul that animates it will be more oligarchic. The machine will be enlarged, but the fewer and often the more secret, will be the springs by which its motions are directed."[11] Control over the government of national affairs could reside in only a relatively few hands. How was that authority to be assigned to provide safeguards against dominance by a majority faction, provide information relevant to public deliberation, and sustain government under rules of constitutional law?

The solution was devised within the framework of what Hamilton called "the general theory of a limited Constitution."[12] The general theory of a limited constitution implied that a constitution would contain a set of decision rules which would be subject to formulation and alteration by special processes of constitutional decision making but unalterable by the instrumentalities of government which were subject to those rules. Processes of constitutional decision making were subject to invocation under extraordinary decision rules applicable to constitutional amendments and the call of constitutional conventions. Decision rules controlling the terms and conditions of government are, under this theory of constitutional decision making, not alterable by agencies of government acting only upon their derived authority. An act of government contrary to the constitution was assumed to be void and the capacity to make such determinations was presumed to reside with the judiciary.[13] Hamilton's "general theory of the limited Constitution" is a statement of the conditions necessary for maintaining an enforceable system of constitutional law as specified in Condition 5.

The constitutional assignment of decision making capabilities for the governance of national affairs was made by establishing separate decision structures for three major departments of government. Each was capable of acting within a restricted domain but subject to a potential veto in relation to each other. Each decision structure was assigned

veto capabilities to limit or constrain the potential actions of each other decision structure.

Within these presumptions, legislative powers were vested in a Congress composed of two separate assemblies and with the President. Representation and voting rules were formulated so that the House of Representatives would reflect local constituencies in each state; the Senate would reflect the states as constituencies and the President would reflect a national constituency. Since the President was elected under conditions which required him to address himself to the national constituency as a whole, he was assigned responsibility for formulating his assessment of the State of the Union and for recommending a legislative program of action. Initiative in formulating and presenting issues for consideration was vested with the official most exposed to conceptualizing issues in national terms. But such proposals were required to stand the scrutiny of those who were exposed to election procedures requiring them to take account of local and state interests. The formulation of national legislation was thus required to stand scrutiny in light of local, state and national interests.

The concurrence of each (the House of Representatives, the Senate and the President) was required to enact legislation except that a veto by the President could be overridden by a two-thirds majority of each house of Congress. Legislation could be enacted into law by a majority of members in each house of Congress so long as a quorum were

present and the President approved. Given the concurrent nature of these majorities, something more than simple majority would be implied among the aggregate national constituencies. However, the minimal requisite for taking collective action was based upon presumptions which closely approximated a decision rule of simple majority vote. A Presidential veto, however, would interpose the extraordinary requirement of a two-third majority.

Explicit efforts were made to minimize the opportunities for establishing a stable coalition capable of domination of the diverse decision structure provided for in the U.S. Constitution. Terms of office varied with different modes of election applicable to each decision structure. Members of Congress and persons holding office under the United States, for example, were explicitly disqualified from serving as electors entitled to participate in the election of the President. Persons holding other positions of office or trust in the national government were specifically excluded from becoming members of Congress. The prospects of long-term dominance of Congress by the President or of the Presidency by Congress were minimized under such conditions.

Executive powers were vested in the President, including special prerogatives to function as commander-in-chief of the armed forces, to conduct relationships with other nation-states, to commission officers of the United

States and to take care that the laws of the United States be faithfully executed. The Senate was assigned special prerogatives to function as an executive council where confirmation of executive actions was required. Subject to the provisions of the U.S. Constitution and to the laws enacted by Congress, the President was vested with authority which permitted sole discretion (i.e., one-man rule) in matters pertaining to military affairs where elements of surprise involved the greatest risk to national welfare. In terms of Buchanan and Tullock's cost calculus, there may be circumstances where considerations of "speed and dispatch" are sufficiently urgent that a constitutional decision rule authorizing one man to take actions committing all others may be a least-cost solution. The potential external or deprivation costs associated with such a decision rule would correlatively be expected to be of a very large magnitude even though total costs are least at this point.

Hamilton's analysis of the organization of the executive establishment implies that the President would function as a single chief executive possessed of a unified command over a national administrative establishment. Hamilton gives no consideration to problems of institutional failure which may arise within a hierarchical structure. As long as the terms of national legislation established programs of action of common benefit to the people of the United States, then a pattern of organization administered by a

unified chain of command and providing a uniform level of service would be rational form of organization. Where a partial benefit would be acquired by taking collective action at the national level subject to substantial variations in local circumstances in order to take advantage of that partial benefit, then such actions may require a mixed strategy allowing for joint action by federal, state and local authorities. Such circumstances would not be subject to a unified chain of command except for such partial conditions as were to be realized as a matter of national policy. The second alternative would presumably be most applicable to problems of water resource development which involve substantial variations in conditions from one locality or region to another.

If collective action leads to the provision of public services of common benefit to a community of people where the provision of such a service to be uniformly provided for any and all persons comprising such a collectivity, then it is rational to establish the capability for <u>any</u> person to enforce his rightful claim to a reasonable share of the public service. This is the theoretical rationale for the constitutional prerogatives assigned to individual persons and the correlative limitations placed upon the governmental authority in the provisions of the Bill of Rights. These provisions establish a constitutional prerogative which enables <u>any person</u> to challenge the actions

of public authorities; and thus serve as means for determining constitutional limits upon the discretion exercised by public authorities in the American constitutional system.

Finally, the constitution of the judiciary plays an especially important role in a political regime where constitutions are presumed to have the force of law in limiting the prerogatives assigned to governmental authorities. The extent that persons are entitled to due process of law establishes an entitlement to a judicial determination of any conflict over the authority of a person as against the authority of a public officer. Under such circumstances, a judiciary can function as a constitutional court in determining the constitutional prerogatives of conflicting claimants as well as an ordinary court of law concerned with conflicting interests of persons arising under the rules of ordinary law.

Given the system of concurrent regimes reflected in the diverse units of government in the United States and the separate decision structures capable of both exercising and limiting the exercise of authority within each unit of government, Madison anticipated that the net effect of these various arrangements would lead to the consequence that " . . . a coalition of the whole society could seldom take place on any other principles than that of justice and the general good."[14] This was Madison's way of concluding that the American constitutional arrangements provided

for a political solution which would be able to meet and sustain the conditions of consensus and conditions of political constraint under a system of constitutional rule which could be enforced as positive law. The design of the American constitutional system, thus, was formulated to meet the necessary conditions of consensus, political constraint and constitutional rule specified in the introduction to this chapter.

The Terms and Conditions of Political Choice in the American Political System

The American solution to the problems of constitutional choice and constitutional law have a wide variety of implications for the terms and conditions of political choice which apply to choice of institutional arrangements for water resource development. Where circumstances of institutional weakness and institutional failure begin to manifest themselves in any particular structure of institutional arrangement used for water resource development, we would expect the terms and conditions of political choice to affect the calculations that people would make in searching out alternative arrangements. Within the latitude of these terms and conditions, we would expect individuals to pursue maximizing strategies in the choice of particular institutional arrangements.

The following statement of the terms and conditions of political choice are some of the principal conclusions which can be drawn from our previous analysis. These conclusions, in turn, will provide us with the basis for sustaining our subsequent analysis of the choice of institutional arrangements for water resource development.

Conclusion One: The American Political System Will Afford Several Alternative Forms of Collective Action When the Pursuit of Individual Initiative Generates Consequences Which Are Harmful to a Community of Individuals. There Will Not Be a Single Hierarchy of Public Service Agencies in the American System of Public Administration.

When Alexis de Tocqueville wrote his account of Democracy in America he characterized the American system of public administration, in contrast to the French system, as having no single hierarchy of administrative authorities.[15] This is a structural consequence that would be expected to flow directly from a system of concurrent regimes in a federal republic. If we follow the implication of Hamilton's allusion to "the system of each State within that State," we might infer the existence of several concurrent regimes or several overlapping governmental jurisdictions. Each jurisdiction could be relatively autonomous of others in the sense that it could take collective decisions on behalf of constituents but would be subject to being governed by the general rules of law operable in the more inclusive

regimes or units of government. Each political regime might provide elements of political constraint in which enterprises undertaking programs of water resource development could be organized. Each such enterprise could have as much legal autonomy as a private corporation in its relations with other enterprises and governmental decision structures.

We would expect such a system of concurrent regimes to take account of diverse economies of scale in the organization of collective enterprises. Agencies most closely associated with meeting the ultimate demands of consumers for water services can be organized to reflect consumer preferences and scales of operation that are relatively independent of large-scale agencies engaged in the regulation of river systems. In turn, each can be held accountable to different constituencies' interests to meet a diversified schedule of demand within broad operating constraints. Conclusion Two: The Operation of Any Particular Public Enterprise Will Reflect 1) The Legal Opportunity and Constraints Inherent in Its Charter, 2) Its Economic Exposure to the Operation of Other Enterprises and 3) Its Political Exposure to Relevant Decision Structures.

If we operate on the assumption that the American system of public administration will be composed of a large number of relatively autonomous public enterprises, we would also assume that the assignment of legal capabilities and constraints reflected in the charter of any particular

enterprise will be only one condition affecting the exercise of discretion in the pursuit of economic opportunities.

We would expect two other types of institutional constraints to be operable. One would derive from the structure of economic opportunities inherent in supplying a service to meet demands. Such opportunities would be defined in relation to alternative sources of supply and the degree of competitive exposure existing among agencies having access to those alternatives. The options available to one public enterprise will be affected by those which are made available by other public agencies.

In addition, any public enterprise may find its opportunities significantly influenced by governmental decision structures not having direct authority to alter its charter or statutory status. Diverse forms of law apart from an agency's charter will impinge upon the operational capabilities of water agencies; the several decision structures capable of enacting law and establishing public policy in the context of different regimes can affect the operating potential of any one agency. Changes in local policy may affect the viability of large-scale federal agencies as well as changes in federal or state policies affecting the operation of local agencies.

Conclusion Three: Each Agency Will Take Account of a Particular Constituency of Interest in the Conduct of Its Enterprise and That Constituency Will Be Organized in

Relation to Decision Structures Which Control the Operational Decisions of the Agency.

Each agency either is constituted as a unit of government or functions as an agency of some more general unit of government. Each unit of government in the American political system is tied to the individual interests of citizens. The prerogative of the person, and the representation of his interests in the councils of government is provided for in the structure of collective decision making arrangements in each separate unit of government. Under these circumstances we can expect persons pursuing entrepreneurial responsibilities associated with any agency to carefully cultivate support from those who will dominate decisions regarding allocations of resources affecting his entrepreneurial opportunities. So long as elections are relatively open and no single political faction gains dominance over the political process we would expect public entrepreneurs to relate themselves to their constituency in consciously organized ways in order to reduce their relative exposure to the rivalry of other agencies. Among many agencies the representation of constituent interests will be an integral part of an agency's charter. Among other agencies, we would expect such relationships to develop as a stable alliance between administrative entrepreneurs and formal representatives of constituency interests included in regulatory commission and/or legislative committees.

Conclusion Four: Each Agency Will Attempt to Maintain Substantial Unanimity or Consensus Among Its Immediate Constituency of Interests. Agencies Will Have a Strong Clientele Orientation.

When each agency is potentially exposed to a variety of external decision structures which may have an adverse affect upon its operations we would expect those in leadership positions to attempt to maintain essential unanimity in its immediate political constituency. Latent conflict can be transformed into open controversy in an enlarged political arena. An absence of unanimity within a constituency would greatly enhance the prospects of adverse decisions by external decision structures. Such risks can be substantially reduced by sustaining a position of essential unanimity among an agency's clientele. An immediate consequence of these considerations is that any agency will be expected to have a strong clientele orientation.

Conclusion Five: Any Fundamental Alteration of Agency Policy Affecting Interests of Those Outside Its Immediate Political Constituency Will Depend Upon the Capability of Those Adversely Affected by Existing Policies to Establish a Potential Veto Position in Some External Decision Structure.

Those outside the immediate political constituency of an agency must have recourse to some alternative decision

structure if they are to establish any basic alteration in policy. Once a potential veto position is firmly established any agency is then confronted with a new constraint in its operating environment and will begin to establish new operating arrangements to take account of the new limit or constraint. Adjustments in working arrangements will not be automatic but will depend upon extended negotiation involving a reformulation of conditions of technical, economic, financial, legal and political feasibility affecting the continuity of the enterprise.

In the absence of a single hierarchy of administrative authority, basic changes in public policy can be accomplished by reference to different decision structures at various levels of government. Any person with general administrative responsibility for the operation of a water resource development program will be required to participate in many different decision-making processes. He will calculate his strategy and take actions in light of the opportunities available to himself and others in alternative decision structures. The effects of each course of action will be calculated as if it were a move in a series of simultaneous games.

Conclusion Six: In the Absence of a Single Hierarchy of Administrative Authorities, Agencies Will Rely Upon the Courts to Resolve Conflicts Over Jurisdiction. The Larger the Number of Relatively Autonomous Public Enterprises Based Upon Diverse Political Regimes, the Greater the

Reliance Upon the Judiciary in Determining the Decision Rules Operable Among Agencies.

The maintenance of the condition of legal rationality in a system of public administration relying upon a diversity of relatively autonomous public enterprises will devolve upon the courts in adjudicating controversies over jurisdiction and in determining the order among conflicting elements of public policy applicable to an agency's mode of operations. We would thus expect the development both of statutory law standards and common law rules to be applicable to the operation of inter-agency relationships governing the multi-organizational arrangements inherent in diversified systems of public administration composed of many relatively autonomous public enterprises.

Conclusion Seven: Agencies Operating in a Multi-Organizational Environment Involving High Levels of Interdependency Will Organize Inter-Agency Committees or Associations Under Decision Rules Which Place Primary Reliance Upon Substantial Unanimity in Order to Facilitate Negotiations and Reduce Decision Costs.

The interposition of potential vetoes and extended litigation can be costly both in the expenditure of time and effort and in uncertainty about the future course of events. In order to reduce those costs, we would expect rational public entrepreneurs to attempt to search out solutions which would be generally agreeable to those involved

in each set of highly interdependent enterprises. Stable organizational arrangements providing facilities for pooling information and for sustaining negotiations can be expected to develop under the decision rules of voluntary associations. Such associations may take the form of inter-agency committees or industry associations. These committees or associations become analogous to confederations of constituencies and extend the operation of political constituency groups to the multi-organizational or industry level.

Conclusion Eight: A Highly Diversified Public Enterprise System Will Sustain a Long-Term Tendency to Rely Upon Substantial Unanimity Among Its Political Constituencies, Even Though Short-Term Decisions May Be Sustained by Significantly Relaxing the Rule of Substantial Unanimity.

This proposition is essentially derived from the prior propositions and can be expected to lead toward solutions that are consistent with the criterion of Pareto optimality so long as alternative decision structures, whether legislative, executive or judicial are responsive to essential interests affecting considerations of social welfare. If such interests are capable of sustaining essential veto positions then we can expect those interests to be taken into account in light of prior reasoning. The economic criterion that any enterprise, public or private, should cover all opportunity costs foregone in calculating the economic worth of its service or product is the relevant

criterion to be used. We cannot expect perfect equilibrium solutions because we cannot expect to have a perfectly responsive political system. But the measure of optimality attained by a system of public administration can be crudely estimated based upon the above analysis.

Conclusion Nine: The Greatest Opportunity for Collusive Factions to Dominate Political Decision Making Will Exist in Relation to Those Decision Structures Having Extended Jurisdiction, Affording Opportunities for Large Pay-Offs, and Capable of Sustaining Decisions on the Basis of Decision Rules Which Depart Furthest from Substantial Unanimity.

This conclusion is an extension of the proposition implied by Madison's assertion that "In every political institution, a power to advance the public happiness involves a discretion which may be misapplied or abused."[16] This conclusion is based upon the presumption that rational individuals will pursue the opportunities available to them. We would consequently expect any rational political entrepreneur to attempt to maximize his net advantage. The opportunity affording the best relative advantage would be to gain dominance in a decision structure of broad jurisdiction controlling potentially significant pay-offs and subject to the reduced decision making costs inherent in decision rules which depart furthest from substantial unanimity.

On the basis of Madison's analysis in The Federalist, we might reasonably infer that such opportunities were most

favorable in relation to state legislatures. The persistent reoccurrence of boss rule and machine politics during the Nineteenth century would tend to provide empirical support for such an inference. Constitutional reforms at the state level in many states during the late Nineteenth and early Twentieth century appear to have substantially altered the costs of putting together a collusive coalition capable of dominating significant decision structures at that level.

During the latter part of the Twentieth century, one might infer that the most favorable strategic opportunities for political entrepreneurs to put together a collusive faction capable of dominating a significant decision structure would appear to exist in the office of the President. The extent of public authority exercised by U.S. President has been significantly extended; control over economic resources has become substantial; and the President is capable of taking decisions under conditions involving extreme departures from substantial unanimity.

We would infer that where collusive factions or political coalitions are able to gain dominance over decision structures having broad jurisdiction that policy decisions will be taken which favor the development of institutional arrangements allowing for an increasing monopolization of profitable economic opportunities by those who participate in the formation and maintenance of such collusive factions. We would also expect political factions to sustain economic

policies which would bias the distribution of economic surplus or economic rent to producers rather than to consumers.

These circumstances clearly imply that the structure of decision making arrangements in a political system which allows for significant departures from substantial unanimity of agreement on policies can generate non-optimal solutions where some one will be able to derive substantial advantage from opportunities to deprive others. The possibilities inherent in dominance by what Madison called a "majority faction" gives rise to precisely this opportunity. Dominance of political structures by factions creates opportunities to establish economic policies and to rig the economic game in ways that assure substantial advantage for some at the expense of others.

Yet, if substantial unanimity were to be required as the base decision rule for taking collective action, we would infer that the decision making costs would become inordinately high, that few, if any, actions would be taken which required recourse to large-scale decision making capabilities. The viability of a political order would no longer exist in view of our previous conclusions that a necessary condition for political choice is an unequal distribution of decision making capabilities such that some persons (i.e., officials) will be able to enforce decisions in relations to others.

The American solution to the problem of political choice is based upon a formulation which would allow for collective action by majority rule subject to an array of potential veto capabilities. The veto arrangements were devised in order to reduce the probability that a collusive faction could gain long-term dominance and be able to impose its solutions upon others. The interposition of vetoes requires recourse to extraordinary majorities to overcome veto positions. Given this combination of decision rules, the constitution of the American political system is one that cannot be characterized as being based upon simple majority rule or simple majority vote. Rather, provision for majority rule is made under a variety of circumstances which define minimal conditions for collective action. But the interposition of vetoes requires recourse to more than minimum winning coalitions under majority rule to take collective action. Majority rule defines one set of parameters for taking collective action but vetoes with extraordinary majority votes imply another set of parameters that moves toward substantial unanimity. Decision making in the American political system thus oscillates between a condition of majority rule and substantial unanimity. When viewed over time, short-term commitments made by a bare majority will not become long-term settlements unless they attain substantial unanimity.

Conclusion Ten: A Stalemate Induced by an Invocation of Veto Capabilities by a Substantial Set of Interests That Cannot Be Accomodated by Existing Policies Will Lead to a Restructuring of Political Coalitions and a Reformulation of Basic Policies Having Constitutional Significance.

A system of government where authority is dispersed among a variety of different decision structures with each exercising a limited competence creates opportunities for strong minority elements and nascent coalitions to interpose vetoes and create a stalemate. In a highly centralized political system, persistent exercise of such veto capabilities could prove to be a fatal flaw. The one center of authority capable of acting would be immobilized. However, a highly federalized system permits collective action to be taken independently at different levels of government.[17] What may be a minority in one context may become a majority in another. Solutions can be disaggregated to permit the simultaneous pursuit of different policies. Experience with alternative arrangements may enable a more confident decision to be made about one or another policy if disaggregation cannot be sustained as a long-run solution.

New problems of substantial importance may rise on the political horizons to challenge the prevailing political consensus. Persons articulating new sets of interests which arise from such problems will take advantage of the potential

veto positions inherent in the American political system and attempt to interpose a veto. Such efforts will engender open conflict. Actions will be delayed. Conflicts are indicative of basic disagreements over whether or not specific measures will enhance or diminish human welfare. The processes inherent in having recourse to various decision structures implies that opportunities are available to order conflict into a process of due deliberation where the issues can be examined and debated. Proposed courses of action can be reformulated in light of varying contentions.

"Speed and dispatch" in political decision making is inversely related to what Hamilton has called "due deliberation." Priority to "speed and dispatch" will sacrifice "due deliberation;" and conversely, priority to "due deliberation" will sacrifice "speed and dispatch." The persistence of open conflict in the American political system means that some problems are not subject to easy solution. Conflict is a necessary burden which fallible creatures must endure. The political task is to transpose conflict into a method for solving problems where adversaries can enlighten each other in a process of deliberation, and be able to reach decisions under conditions where decision costs can be held within reasonable limits.

If problems cannot be accommodated within existing programs and structures of government, processes of conflict

and debate in different decision centers may point to a need for significant modifications in the structure of governmental responsibilities and for basic changes in constitutional arrangements. Such circumstances have arisen in American politics in the 1800's, the 1820's, the 1850's, the 1880's, the 1900's and the 1930's. Such circumstances have again arisen in the late 1960's and the early 1970's. The crisis over American policies regarding slavery in the late 1850's was the only such crisis where the American political system has failed to reach a political solution without recourse to military action. The constitutional order remained essentially intact by either making changes within the constitutional structure itself or substantially modifying the assignment of governmental responsibilities within the constitutional order. Processes of constitutional decision making will be a means of seeking resolution to political stalemates where the existing structure of government may not be sufficient to provide appropriate instrumentalities for resolving new problems which may arise on the political horizon.

Conclusion Eleven: Water Policy Is Derived from the Concurrent Actions of Many Different Units of Government and Public Service Agencies. The Actions of Each Affects the POTENTIAL Opportunities and Capabilities of Others. Changes in Policy Will Involve Complex Adjustments in the Operation of Many Different Units of Government and Public Service Agencies.

Given the terms and conditions of political choice in the American political system, enactments of the U.S. Congress, state legislatures or of other units of government cannot be treated prima facia as valid decision rules operable in the conduct of water resource agencies. Such policy prescriptions only become operable as they affect the structure of opportunities of the diverse enterprises and agencies functioning in a water economy. They become effective only as actions are taken and conflicts are resolved. A judicial determination adverse to a particular set of interests need not foreclose still other opportunities and possibilities for modifying that determination. Policy depends upon the long-term settlements reached in the operating agencies engaged in the provision of water services.

As a consequence, we would expect effective water policy in the Great Lakes basin to differ from the Columbia basin which would differ significantly from the Central Valley, California or the Colorado basin. Statutory enactments establish the basis for diverse sets of interests to establish claims to possible courses of action. It is only as conflicting claims are determined and those determinations become working rules in the operation of going concerns that policy is established and legal prescriptions become effective decision rules. These conclusions derive from the conflict of laws inherent in a political system which relies upon a system of concurrent regimes with a

dispersion of decision-making capabilities among a variety of different decision structures.

Professor Samuel C. Wiel, a distinguished authority on Western water law, recognized, for example, that the conservation policies being enacted during the first decade of this century would have a significant effect upon the Western water law. But in preparing the third edition of his classic text, published in 1911, Wiel concluded that this policy was so "controversial and contains so much not concerning law, that a law book upon a limited field had best not enter."[18] Many significant issues relative to the application of those policies had not been determined some decades later. Only as legislative decisions and judicial determinations become effective working rules in the conduct of operating agencies can we ascertain the nature of water policy and establish its effect upon the course of events.

General Conclusion

These terms and conditions of political choice in the American political system imply that substantial elements of democratic administration, if we use Max Weber's defining characteristics, permeate the American system of public administration or the American public service economy. The American processes of constitutional government as these

processes relate both to allocation of decision making capabilities for taking collective action and to the enforcement of constitutional decision rules as positive law carry substantial implications that the American people have reserved significant areas of decision making for consideration by individual members of a political community and have placed significant limits upon the authority allocated to public officials. The power of command is restricted by constitutional prerogatives which entitle persons to challenge the actions of officials as to their proper exercise of governmental prerogative. The public official is accountable for the discharge of his public trust through various political and legal processes. He is rarely extended the immunity to function as a political master rather than as a public servant. The American system of public administration embraced within a democratic system of constitutional law would appear to be more representative of a system of democratic administration than of a system of bureaucratic administration.

FOOTNOTES

[1]James M. Buchanan and Gordon Tullock, The Calculus of Consent: Logical Foundations of Constitutional Democracy (Ann Arbor, Michigan: University of Michigan Press, 1965).

[2]See John Rawls, "Constitutional Liberty and the Concept of Justice" in Nomos VI: Justice, Carl J. Friedrich and John W. Chapman, eds. (New York: Atherton Press, 1963), 98-125, and "Distributive Justice" in Philosophy, Politics and Society, Peter Laslett and W.C. Runciman, eds. (Oxford: Blackwell and Sons, 1967), 58-82.

[3]Alexander Hamilton, John Jay and James Madison, The Federalist (Indianapolis: Modern Library, 1937), Federalist No. 1.

[4]Ibid., Federalist No. 16.

[5]Ibid., Federalist No. 36.

[6]Ibid., Federalist No. 46.

[7]Ibid., Federalist No. 48.

[8]Ibid., Federalist No. 41.

[9]Ibid., Federalist No. 10. Emphasis added.

[10]Ibid., Federalist No. 9.

[11]Ibid., Federalist No. 58.

[12]Ibid., Federalist No. 81.

[13]Ibid., Federalist No. 78.

[14]Ibid., Federalist No. 51.

[15]Alexis de Tocqueville, Democracy in America, Phillips Bradley, ed. (New York: Vintage Books, 1954).

[16]Op. cit., Federalist No. 41.

[17]When I use the expression of a "highly federalized system," I mean a system of several concurrent regimes (i.e., more than two) with substantial autonomy for independent actions made by reference to the same political constituencies differently organized. I thus mean a system that can take centralized and decentralized actions concurrently. I do not mean to imply that decentralization simultaneously precludes centralized action. A federalized system does not imply centralization versus decentralization.

[18] Samuel C. Wiel, Water Rights in the Western States (San Francisco: Bancroft-Whitney Company, 1911).

Part III

THE CHOICE OF INSTITUTIONAL ARRANGEMENTS IN THE DEVELOPMENT OF THE CALIFORNIA WATER INDUSTRY

Proceeding on the assumption that people, in pursuing developmental opportunities, will seek to order their relationships with one another through the allocation, exercise and control of decision making capabilities, we shall turn in Part III to an examination of how the people of California sought to solve these problems of ordering relationships with one another. The choice of institutional arrangements for water resource development always occurs against the backdrop of particular environmental conditions and patterns of human demand. Chapter 4 presents an examination of the environmental conditions of California.

The choice of particular institutional arrangements for water resource development also occurs against the backdrop of the prevailing political conditions assigning constitutional capabilities for the governance of any community. In Chapter 5 we shall extend our previous analysis of "The Problem of Constitutional Choice" to an examination of the choice of constitutional arrangements for the government of water-related matters in California. Constitutional revision has been a significant factor in extending the range of institutional alternatives available to the people of California in undertaking the development of water resources.

The availability of water is essential both to human survival and for the conduct of any form of human enterprise. To be excluded from an access to water supply is to be excluded from the conditions of economic enterprise and of survival. The distribution of decision making capabilities concerning the use of water and its allocation among competing users and groups of users, thus, is of critical importance in any society where water is a scarce commodity. In Chapter 6 we shall examine the California law of water rights as a means of allocating rights to the use of water as a common property resource.

The law of water rights as such provides only a partial solution to the problem by establishing the decision making capabilities and limitations of the various potential claimants. On the basis of these decision making capabilities and limitations, various water user groups have sought out other solution through the organization of various forms of collective enterprise. Chapter 7 will examine several different types of organizational arrangements used to provide water services to different communities of water users. Chapter 8 will examine the decision rules which apply to the operation of the Corps of Engineers, the Bureau of Reclamation and the California Department of Water Resources as large-scale water producers.

Public regulatory efforts are sustained by a variety of agencies which are concerned with opportunities associated

with residual uses inherent in the flow characteristics and quality of water existing in water resource systems. Public regulation typically involves different strategies for action than those involved in the production of water services. These considerations will be examined in Chapter 9.

When a variety of collective enterprises has been established to serve particular communities of water users the several enterprises develop a variety of multi-organizational arrangements which take on the attributes of a public service industry. In Chapter 10, we shall examine the development of multi-organizational arrangements in the California water industry.

Finally, in Chapter 11 we shall examine the relationship of these developments in fashioning institutional arrangements for the California water industry to the political process more generally. The solutions attained depend upon the strategic opportunities of people to pursue their interests within the political decision making process generally. Thus, the governance of water resource development in the California water industry depends upon the pursuit of strategic opportunities in a series of interdependent games being played in several different decision structures. The rational strategy on the part of any entrepreneur is to attempt to reach a mutually-agreeable solution which will maximize the net advantage of a community of water users within the constraint of various potential

veto positions which can adversely affect the viability of an undertaking.

This examination of the choice of institutional arrangements in the development of the California water industry will indicate the type of political investments that the people of California have made in devising institutional arrangements for allocating, developing and reallocating water supplies among various joint and alternative uses. These arrangements reflect such a magnitude in depth of development that a limited cross-sectional view of a particular state is a necessary expedient in understanding the essential structure of these relationships. We would expect experience to vary in other regions of the United States with 1) environmental conditions, 2) patterns of demand, and 3) the terms and conditions of political choice reflected in differing constitutional arrangements. However, we also assume that these variations will occur within the limits of those features which are common the American political system. Common patterns reoccur with varying elements.

Chapter 4

CALIFORNIA: ENVIRONMENTAL CONDITIONS FOR WATER RESOURCE DEVELOPMENT

During the decade of the 1960's, California moved to first position in the size of its population among the American states. In standard of living as reflected in average annual per capita income, Californians also rank first. Yet this level of economic development has occurred in a state where most of the natural habitat is dominated by the arid conditions of a desert or semi-desert region.

Many of the areas of human habitation in contemporary California are deceptively lush and verdant. The casual visitor to Los Angeles is struck by the green lawns and expansive gardens. The realities of the desert become apparent only in the frequency with which garden and lawns are watered. Yet water is used more freely to irrigate lawns, to wash sidewalks and to clean gutters than in most other regions of the United States.

These casual observations become more congruent with reality when occasional aqueducts and reservoirs are also identified as a part of the landscape. To the casual visitor, many of the rivers in California, except for the northern regions of the state, are objects of jest. More likely than not, a bridge traversing a river will reveal only a bed of dry gravel. Where running surface water does

occur, it is apt to be flowing in man-made streams formed by aqueducts constructed in the foothills or at the upper periphery of valleys. California has been aptly described as a land of man-made rivers.

A local view of the landscape may give an erroneous impression of water problems in California. A general view of the topography of the state together with the patterns of precipitation is necessary for an understanding of the opportunities and constraints in water resource development. Once these general patterns are comprehended, then the developmental possibilities in any particular area or region of the state become more apparent.

The Topography of California

The state of California forms a large, crude rectangle with the slight twist of a boomerang. Its longer dimension extends for nearly 800 miles from north to south and its narrower dimension varies from about 200 to 250 miles in width. Two great mountain ranges extend through much of the length of California. The Coast range reaches from the Olympic mountains in Washington and covers the entire distance of the Pacific coast of the United States, including all of California. The Coast range is only moderately high, with peaks in California ranging to 10,000 to 11,000 feet in elevation. Further to the east is a parallel range of much higher mountains formed by the terminus of the Cascade

range and the Sierra Nevada. Mount Shasta and Mount Whitney both exceed 14,000 feet in elevation; and Whitney reaches the highest elevation of any peak in the contiguous 48 states.

Near the Oregon border, the Siskiyou mountains run in an east-west direction to form a series of mountains across the northern portion of California. Between Bakersfield and Los Angeles, the Tehachapi mountains also extend east and west to join the Coast range with the Sierra Navada. The Tehachapis separate southern California from the northern three-fourths of the state. Only one mountain range, usually identified as a part of the Coast range, extends southward from the Tehachapis through the remaining length of California into the Lower California region of Mexico.

The space bounded by the Coast range on the west, the Siskiyous on the north, the Sierra Nevada to the east and the Tehachapis on the south forms the great Central valley of California. The valley floor extends approximately 450 miles from north to south and averages about 40 miles in width with some portion in the southern half reaching nearly 100 miles in width. The floor of the Central Valley of California occupies an area of 15,700 square miles or more than 10,000,000 acres of land. This area comprises approximately 50 percent of the irrigable land in California and contributes proportionately to a high agricultural yield in which California exceeds the agricultural productivity of any other state.

The Sacramento river drains the northern one-third of the Central valley while the San Joaquin river drains most of the southern two-thirds except for the southerly portion which has become landlocked in the Tulare basin. The San Joaquin river joins the Sacramento river in the Delta region near Martinez and cuts through the hills of the Coast range at the Carquinez straits into San Francisco bay.

The coastal plain of southern California is narrowly confined to the coast in both its northern and southern extremes in Ventura and San Diego counties. The coastal plain and inland valleys surrounded by low-lying hills extend to substantial depth through Los Angeles, San Bernadino, Riverside and Orange counties. The distance from Santa Monica to the San Bernadino-Riverside area is approximately 80 miles. This represents the relatively greatest depth of the southern California coastal plain. This area has developed into one of the most extensive urban regions in the United States but continues to produce a substantial yield of agricultural products as well.

The counterpart of the southern California coastal plain to the east of the Coast range includes some of the most extreme deserts in the United States. Imperial valley and the Coachella valley have been able to derive advantage from their proximity to the Colorado river which forms the eastern border of southern California. Water is diverted from the Colorado river to support a substantial agriculture

in the Colorado desert region of California where elevations decline to well below sea level.

The coastal regions of northern California are usually identified in three separate groupings: the central coastal region, the San Francisco bay region and the north coastal region extending from the San Francisco bay area north to the Oregon border. Each of these regions in interspersed with relatively long and narrow structural valleys in the Coast range. These valleys include the Santa Maria valley, the Salinas valley, the Santa Clara valley, San Francisco bay, where the valley floor drops below sea level, the Santa Rosa valley, and a series of similar valleys in the Trinity and Klamath river basins.

Similarly, to the east of the Sierra Nevadas a number of high desert valleys or basins drain naturally into inland lakes or sumps including Honey lake, Lake Tahoe, Walker basin, Mono lake and Owens lake, among others. These basins are all landlocked; none drains to the ocean. The region along the eastern slope of the Sierras is usually grouped together and characterized as the Lahontan region of California.

Patterns of Precipitation

The storms carrying moisture-laden air to California come predominantly from the North Pacific moving from northwest to the southeast. The resulting patterns of precipitation

occurs more in the winter than in the summer, in the north than in the south, in higher elevations than in lower elevations, and on western slopes than on the eastern slopes of mountains.

Summer months are extremely dry in California with more than 80 percent of the precipitation occurring during the winter season from November to March. At sea level along the coast, average annual precipitation varies from about 50 inches in the extreme north to 10 inches in the extreme south. At higher elevations in the northwest corner of the state, average annual precipitation reaches a maximum of more than 100 inches per year. In the southeastern region of the Colordado desert where elevations drop below sea level, precipitation averages as little as 2 inches per year. In the Sierra Nevada at elevations of about 5000 to 6000 feet precipitation averages between 60 and 70 inches per year. By contrast, the valley floor in the Central Valley averages between 10 to 20 inches of precipitation each year with extremes of 40 inches at the northern end and 5 inches at the southern end of the valley.

Precipitation in California is subject to substantial variations from the mean where several dry years or wet years may occur in a series. The Department of Water Resources has estimated the average annual runoff from natural stream flow to be 71,000,000 acre-feet over a 53-year period on record prior to 1950. Annual discharges varied from a low of 18 million acre-feet in 1923-24 to a high of 135 million

acre-feet in 1937-38. During a ten-year period from 1927-1937 runoff averaged only 69 percent of mean. No single year during that drought cycle reached the long-term mean. An occasional tropical storm coming from the mid-Pacific can bring heavy precipitation and warm temperatures to cause disasterous floods by simultaneously melting accumulations of snow in the higher mountains. Periods of drought and deluge are characteristic of California's climate.

The coincidence of high precipitation in the winter months and at higher elevations means that a substantial portion of the precipitation in the Sierra Nevada, the Cascades and the Siskiyous occurs as snow. Especially in the high Sierras, moisture is held in winter storage until the snowfields melt with the arrival of spring and early summer. The release of water from the melting of snow thus coincides with the early growing season in the Central Valley and occurs usually after the danger of serious floods from downpours of rain has passed. A careful survey of the snow pack during the late winter permits the use of reservoir storage with minimal loss of storage capacity reserved for flood control purposes.

The disparities in water yield among the different regions of California reach some extreme proportions. The north coastal region receives nearly 38 percent of the state's total water crop and sustain an annual run-off of 28,890,000 acroe-feet. By contrast, the Colorado desert

region of the southeasten portion of the state receives about 0.3 of the state's water crop or about 221,000 acre-feet per year. The bulk of the economy in this region depends upon diversion of water from the Colorado river.

The southern California coastal region receives 1.6 percent of the state's water crop or about 1,227,000 acre-feet per year. This amount has been somewhat more than doubled by imports from outside the region to support more than one-half of the state's population. The dryness and moderate temperatures chaacteristic of the Mediterranian climate of southern California have attracted a disproportionately large population to a region with a disproportionately small water crop. (See Figure IV-1).[1]

Similar but less extreme patterns of maldistribution of the water crop in relation to potential demands exist in the Central valley of California. The average annual runoff in the Sacramento river drainage is approximately twice that of the San Joaquin and Tulare lake basins. The Sacramento portion of the Central valley yields a runoff of about 22,400,000 acre-feet of water per year compared to 11,250,000 for the San Joaquin-Tulare lake region. Yet in land area, the Sacramento river drainage comprises only about one-third of the valley floor in the Central Valley of California. In effect, one-third of the valley floor has access to two-thirds of the water supply while two-thirds of the valley floor has access to one-third of the natural water supply.

Table IV-1

Estimated Population and Mean Annual Runoff of Major Hydrographic Areas of California[2]

	POPULATION		RUNOFF	
	For 1967	Percent of Total	In Acre-Feet	Percent of Total
North Coastal	180,000	0.9	28,890,000	37.9
San Francisco Bay	4,320,000	22.6	1,245,000	1.6
Central Coastal	750,000	3.9	2,448,000	3.2
South Coastal	10,510,000	55.0	1,227,000	1.6
(Colorado River*)			1,212,000	1.6
Sacramento River Basin	1,540,000	8.1	22,390,000	29.4
San Joaquin-Tulare Basin	1,320,000	6.9	11,246,000	14.7
Lahontan	260,000	1.4	3,177,000	4.2
Colorado Desert	220,000	1.2	221,000	0.3
(Colorado River*)			4,150,000	5.5
TOTAL	19,100,000	100.0	76,212,000	100.0

*Amount of water transferred from the Colorado River to the hydrographic area where the water is used.

The variation of precipitation with elevation can be illustrated by reference to different points in the southern California coastal region. At San Pedro, near sea level, precipitation averages 10.66 inches per year. Los Angeles at 338 feet elevation has an annual rainfall of nearly 15 inches. Pasadena at 805 feet elevation averages 18 inches of rainfall. Sierra Madre at the base of the San Gabriel mountains, receives 23 inches of rain at an elevation of 1100 feet. Rainfall at Lowe Observatory at 3420 feet elevation averages 25 inches. At the summit of Mount Wilson (5850 feet) annual precipitation reaches 31 inches. At a few points in the higher mountains annual precipitation exceeds 50 inches. On the eastern slope of the Coast Range, the rate of precipitation declines rapidly. At Llano (3400 feet) the average annual precipitation is only 6 inches.

Ground Water Basins of California

The mountains and valleys which form the topography of California provide only a surface view of potentials for water resource development. Many of the valleys of the state are deep structural troughs in which the present valley floor represents the accumulation of sediments which have been eroded from the mountains over extended periods in geological history. The sediments vary in coarseness from large boulders to strata of impervious clay.

Most of the sediments in the valleys of California can hold relatively large quantities of water and the strata of water-bearing sediments or aquifers provide a major source of water supply. They can also serve as natural reservoirs, holding water underground until it is needed for surface use with minimal loss through evaporation and transpiration. The California Department of Water Resources has identified some 250 ground water basins with a surface area of five square miles or larger.

Data are available to estimate the gross storage capacity for 211 valley floor areas comprising ground water basins or sub-basins. In an average weighted interval of 185 feet of depth estimated to occur between depths of 15 feet and 200 feet, the gross storage capacity of these ground water basins is estimated to be sufficient to store 450,000,000 acre-feet of water. The Central valley of California contains approximately 130,000,000 acre-feet of this capacity in the same depth interval. The usable capacity as against the potential capacity in the Central valley is estimated to be approximately 100,000,000 acre-feet for the depth interval from 15 feet to 200 feet below the surface of the valley floor. The storage capacity of the underground aquifers in the Central valley is approximately equal to the yield of the Sacramento and San Joaquin river system for a three-year period. Pump lifts in the San Joaquin valley range in excess of 400 feet in depth. Such

pump lifts would suggest that these estimates of potential storage capacity are highly conservative.

The ground water basins of California, thus, form large underground reservoirs which are relatively small when compared to the Great Lakes. But when compared to the largest man-made reservoirs, such as Lake Mead formed by Hoover Dam on the Colorado river, or with the total surface storage in California, some of the California ground water basins are large in proportion. In the 185-foot interval, the usable storage capacity of the Central valley is equivalent to the usable storage capacity of approximately five Lake Meads, and is five times as large as the usable capacity of all surface reservoirs in California.

The structural conditions of California ground water basins give rise to a number of opportunities and difficulties. The sediments accumulate largely from erosion on the surrounding mountains. Floods carry the sediments from the mountains onto the valley, depositing the coarsest materials nearest the mountains, and distributing the finer sediments at greater distances onto the valley floor. As intensities of floods vary from one period to another, the coarseness of different strata of sediments will vary at any particular point on a valley floor.

Typically, a cross-section of the alluvial cone formed at the foot of a mountain will include sufficiently coarse sediments at varying depths so that water percolating underground at this point will intersect many strata to a considerable depth. Such areas have been characterized as

forebays in ground water basins, in the sense that they form a forward pool of ground water supplying various ground water aquifers.

On the valley floors, away from the mountains, the sediments are formed into strata of varying depths and porosity. Some of the finer clay-like deposits may form impervious strata confining the water-bearing strata into water-tight aquifers. Since the gradient of these strata normally slope upward from the valley floor toward the forebay or the piedmont cone, the water occurring in confined aquifers may be subject to substantial hydrostatic pressure. If this pressure is released by piercing the overlying impervious strata, water will flow upward from the pressurized aquifer through a pipe or well casing until a hydrostatic equilibrium is established. Such flows of water may give rise to artesian wells where the confined ground waters flow to the surface or substantially diminishes the depth of the pump lift necessary to raise water to the surface.

The pattern of surface flow in many of the watersheds in the southern portions of California is sporadic and discontinuous. Typically, mountain streams will discharge onto the piedmont cones at the base of the mountains and disappear in the gravel of the stream beds. Continuous flow occurs only during the wet season of the year. Percolating ground water would historically have flowed to the surface forming a stream at a point where a channel has been eroded

through the confining hills. Under present conditions of development, ground water supplies are usually captured in wells and water tunnels before they can again rise to the surface. Perennial streams with continuous patterns of flow are typical only of northern California.

Knowledge about the precise geological structure of a ground water basin underlying any particular piece of property is relatively difficult to attain. Some aquifers may be pressurized; others may not. Several competing demands upon a pressurized aquifer may reduce or eliminate the hydrostatic pressure and eventually dimish the yield of water. The safe yield of an aquifer or a ground water basin may be exceptionally difficult to estimate.

Water quality may vary substantially in different ground water basins and among different aquifers and locations within a basin. Some aquifers may contain high concentrations of accumulated alkaline salts and, hence, supply unusable water. In other areas, when demands may have depleted ground water supplies at depths below sea level, the exposure of water -bearing strata to the ocean along the coastline may cause salt water to flow into underground aquifers.

Extraction of ground water supplies may also cause a compaction to occur in the sediments. This compaction of underground sediments may adversely affect the transmissibility of aquifers and their storage capacity. In some instances, compaction may also cause subsidence in the

surface elevations of overlying land, adding complications to the surface uses of land which may be affected by slight shifts in contour.

While many of these problems associated with ground water supplies have plagued developers, the aggregate potential of the ground water basins as a source of supply and as low-cost storage facilities is substantial. More than one-half of the water being consumptively used in California in 1950 came from ground water sources.[3] By 1970, approximately 40 percent of the total water supply in California was being derived from ground water sources.

Problems of Water Resource Development

Given the conditions of topography, water supply and the structure of ground water basins in California, problems of water resource development have varied substantially from one period of development to another depending upon levels of technological development, knowledge of available water supply conditions and patterns of aggregate demand. For purposes of discussing the problem of water resource development associated with each period of development, California history will be divided roughly into four periods: 1) 1850 to the 1870's, 2) the 1870's to 1900, 3) 1900 to 1930, and 4) 1930 to 1960.

Problems of Development During the Period From 1850 to the 1870's

Gold was discovered in 1848 shortly after American occupation of California during the War of 1848. Cattle raising had been the primary economic occupation of the early Spanish and Mexican settlers who inhabited California prior to the American occupation. Much of the valley land in early California had been organized into large ranchos and missions. A rancho or mission of 100,000 acres in size was not unusual.

For the first three decades following American statehood, cattle raising continued to be a primary economic activity in the San Joaquin valley, the central coastal region and throughout southern California. Dry-farm cultivation of grains also devloped in the Sacramento and San Joaquin valleys. The large influx of population in the gold rush of 1849 and 1850 created a substantial demand for meat and grain supplies. In the early 1860's, a drought of disastrous proportions struck the ranchos in southern California where thousands of cattle died for lack of water. Large quantities of water lay under the parched earth, but the lack of knowledge regarding ground water supplies left them unavailable for alleviating the disasterous drought.

Gold mining in early California required large quantities of water to separate the gold by washing the sand and gravel through sluices. The lighter sediments were washed away while the heavier gold was detained by riffles in the sluices.

In the late 1860's, substantial pieces of hydraulic equipment were introduced into the mining field to aid in the excavation of large quantities of gravel. One such machine which operated at the North Bloomfield mine on the Yuba River, for example, had a nozzle which measured 8 inches in diameter and the capability to discharge 185,000 cubic feet of water per hour with a velocity of 150 feet per second.[4]

The demand for water in mining generated early conflicts over water rights. The doctrine of prior appropriation as a means of allocating water rights originated in the California mining regions. The movement of millions of cubic yards of gravel caused large quantities of mining debris to be flushed out of the mountains with each spring flood. Between 1849 and 1869, the amount of gravel accumulating in the river channel had caused the low-water plain of the Sacramento river at Sacramento to rise by 2.9 feet. With the introduction of hydraulic mining, the low-water plain of the river rose another 3 feet between 1869 and 1879, for an accumulated rise of at least six feet between 1849 and 1881. Raising the plain of the river in relation to the surrounding countryside substantially increased flood damages. Some navigation channels had been clogged by mining debris and others were seriously impaired. The formation of great sand and gravel bars along the Feather and Sacramento rivers destroyed thousands of acres of farm land. During the 1870's, the debris problem caused havoc for valley dwellers and was a portend of disaster for the gold miners.

Problems of Development During the Period From the 1870's to 1900

The completion of the transcontinental railroads to California, first to the San Francisco area in 1869 and to the Los Angeles area in 1885, marked the beginning of a new era in California. An injunction issued by a Federal court in 1884 enjoining miners from uncontrolled disposal of mining debris because of its harmful effects upon water pollution marked the end of an era in California gold mining.

Transcontinental railroads provided access to new national markets for agricultural products. A shift from cattle raising on the old Spanish ranchos began to give way to more diversified and intensive forms of agriculture relying upon water for the irrigation of crops. Southern California experienced the most extensive shift to an irrigated horticulture when land developers subdivided many of the old ranchos into relatively small farms with water provided through the instrumentality of mutual water companies.

A somewhat similar shift to a more intensive agriculture also occurred in the Central Valley of California where large-scale private enterprises diverted extensive quantities of water from some of the major rivers in the valley. The water resource development during this era was largely preoccupied with diverting the surface flow of natural streams for irrigation purposes and with the construction of irrigation canals to supply crops on the valley floor. A few

relatively small reservoirs were constructed to store flood waters for use during the dry season. Some land was being subdivided, but other lands were being accumulated into large holdings by the acquisition of Spanish ranchos and public lands made available by the U.S. government. The Miller and Lux interests in the San Joaquin valley and the Haggin interests in the Tulare basin developed extensive irrigation works and retained proprietorships over sources of water supply when land was subdivided and sold to settlers. These two groups created some of the largest water companies and some of the largest land companies in California. The Miller and Lux interests held a total of approximately 1,000,000 acres, a large portion of which extended for 120 miles along the San Joaquin river. The Haggin interests were the originators of the Kern Land and Cattle Company, one of California's larger land companies.

Visions of a grand scheme for capturing the water which flooded down from the Sierras each spring for irrigating the Central Valley of California and converting the valley floor into several million acres of farmland began to captivate Californians during the 1870's. The first major survey of a system for the irrigation of the Central Valley was made by the Alexander Commission composed of two officers from the U.S. Army Corp of Engineers and one officer from the U.S. Coastal Survey. The Alexander Commission report contemplated a system of canals situated on both sides of the Central

valley to divert water from Red Bluff at the head of the Sacramento valley to the Kern river at the southern end of the Tulare basin. These canals were to be supplied with water from large storage reservoirs to be constructed in the foothills of the Sierras on each of the principal tributaries of the Sacramento-San Joaquin river system. The commission indicated that such a development would require many years of effort involving diverse undertakings by private capital and associations of farmers with appropriate aid from the state government, the counties that would be benefited, and the United States in relation to Federal public lands in the southern-most portion of the valley.

The first irrigation districts in California were organized in the late 1880's following the passage of the Wright Act of 1887. Settlers in the Modesto area had advanced the concept of an irrigation district to provide an alternative institutional structure to that of the profitable private water company for procuring a water supply for irrigation purposes. The beginnings of extended public controversy and debate over the appropriate choice of institutional arrangements for water resource development had crystallized in California during an era when most of the development was being shaped by private entrepreneurship.

Problems of Development During the Period From 1900-1930

Major technological developments significantly altered opportunities for water resource development during this period in California history. The deep-well turbine pump first became available at the turn of the century. Previously, pumps had been designed to create a vacuum and to take advantage of the atmospheric pressure to force water upward into a vacuum chamber and out through a plunger. The vacuum pump could lift water no higher than the atmospheric pressure would sustain. A barometric reading of 30.0 would theoretically support a column of water 30 feet high in a perfect vacuum at sea level. For all practical purposes, a vacuum pump was limited to a lift of approximately 25 feet.

The deep-well turbine pump, introduced during the first decade of the Twentieth century, was based upon the concept of lowering a pump through an enlarged well casing and submerging it in water at the bottom of a well. A pump operating at the bottom of a well would then be used to force water upward. The column of water which can be supported by such a pump depends upon the amount of power applied. The limits are largely economic related to the investment in the depth of a well, the size of the pumping plant and the cost of energy to sustain the pump lift. Deep-well turbine pumps capable of lifting water for several hundred feet are commonplace.

Other major technological developments, such as the internal combustion motor and the electrical motor, added to the capabilities of the deep-well turbine pump. A sealed electric motor can be attached directly to a turbine pump and be lowered to the bottom of a well, eliminating the need for a long drive shaft to connect the motor to the pump. The electrically-powered, deep-well turbine pump became an immensely flexible tool for exploiting the ground water basins of California. The rapid expansion of California agriculture during the first decades of the Twentieth century was largely undertaken by tapping the accumulated ground-water reserves. The low cost of this alternative form of water supply drove many of the less efficient private water companies into bankruptcy and generally dominated patterns of water resource development in California during the period 1900-1930. Instead of going to the mountains, Californians went underground for their primary sources of water supply during this period.

The major exception to this pattern occurred in the Los Angeles and San Francisco bay areas. Both cities had access to limited local water supplies and were surrounded by adjoining farm lands that had intensively developed local water supplies for an irrigated horticulture. The intense competition for local water supplies in both the Los Angeles basin and the San Francisco bay region together with the supplementary pay-off to be derived from generating

electrical power lead municipal officials in both areas to import water supplies from the Sierras. Los Angeles pursued developments in the Owens valley on the eastern slope of the Sierras while San Francisco initiated efforts to develop water and power supplies on the Tuolumne river within the boundaries of Yosemite Park. The Los Angeles efforts proceeded rapidly and led to the rapid expansion of that metropolitan region. San Francisco's efforts were slower in moving to fruition. The municipalities along the eastern shore of San Francisco bay formed a separate municipal utility district and developed an alternative source of supply on the Mokelumne river.

The larger electric utility companies, the Pacific Gas and Electric Company in northern California and the Southern California Edison Company in southern California joined the search for attractive hydro-electric development opportunities. These utilities usually entered into contractual relations with agricultural users downstream from their power reservoirs as a means of disposing of their stored water and resolving some of the potential conflicts over water rights. They operated largely as producers and wholesalers of water and as integrated producers and retailers of electrical power.

The visions of large-scale water resource developments centering upon the Central valley of California were revived by the publication in 1920 of the Marshall Report. The Marshall Report called for major diversions of water from

the Klamath and Trinity rivers in the north coastal region into the Sacramento valley, the diversion of water from the Sacramento valley southward into the San Joaquin valley and Tulare basin, and the diversion of the Kern river southward into southern California. Much of the public discussion of water resource development during the 1920's focused upon these opportunities and a parallel pattern of development being proposed for the lower Colorado river.

The City of Los Angeles joined by a number of other municipalities in southern California and by irrigation interests in Imperial valley initiated proposals to construct a high dam on the Colorado river near Boulder canyon for purposes of flood control, hydro-electric generation and the storage of water for municipal and agricultural use. As the decade of the 1920's came to a close, the Boulder canyon project had been authorized by Congress and the Metropolitan Water District of Southern California had been organized to construct and operate the Colorado river aqueduct for transporting water across the Coast range and provide supplemental water for the municipalities of southern California.

Problems of Development During the Period From 1930-1960

The occurrence of the Great Depression following a decade of public discussion and planning efforts regarding the large-scale development of the major river systems of California led to an accelerated development of both the

Lower Colorado project and the Central valley project. Hoover dam near Boulder canyon, Davis dam, Parker dam at the site of the intake for the Colorado aqueduct and Moralos dam at the Mexican border together with the All-American canal to divert irrigation water into the Imperial valley and Coachella valley and the Colorado river aqueduct were brought to rapid completion before World War II.

Shasta dam on the Sacramento river and Friant dam on the San Joaquin river were the first two principal works in the Central valley project. Water diverted from Friant dam supplied areas in the southeastern portions of the San Joaquin valley and Tulare basin through the Merced and the Friant-Kern canals. Water released from Shasta dam was used to supplement supplies at the Delta. This supplemental water was then diverted southward along the west side of the San Joaquin valley to the Mendota pool. The water available from this source was exchanged for water which had previously been diverted from the San Joaquin river at or below the Mendota pool.

In the post-war years, new components have been added to the Central Valley project by the construction of storage facilities on various streams flowing from the Sierras or from the Coast Range. The Trinity river was the first project to be developed for transfering water from tne north coastal region into the Sacramento river basin. By 1960, the only water being exported from the Central valley of

California was about 250,000 acre-feet per year being transported to the San Francisco bay area by the City of San Francisco and the East Bay Municipal Utility District.

The large reservoirs in the Central valley project were capturing the flood flows from the mountains and making the surplus water available during the dry seasons of the year. By means of these reservoirs, California had attained substantial capability to transfer water from the mountains to crop lands on the valley floor and from the winter and spring seasons to the growing seasons in the summer and fall months of the year. Major inter-basin transfers had occurred in southern California from the Colorado river into the California desert regions of Imperial and Coachella valleys and to the southern California coastal plain. In addition, the City of Los Angeles transfered water from Mono basin and Owens valley into the upper Los Angeles basin. The Delta-Mendota canal affected a major transfer of water from the Sacramento valley into the San Joaquin valley and the Friant-Kern canal transfered San Joaquin river water into the Tulare basin.

Plans for a substantial inter-basin transfer from the Sacramento-San Joaquin Delta into southern California were approved in 1960. This development will mark the beginning of major inter-basin transfers among the different hydrological regions of California. The California aqueduct, now being constructed, will transport water to the southwestern

portion of the San Joaquin valley and Tulare basin, to the central coastal region, to the Mojave desert region and to the southern California coastal plain.

Human effort over the course of the past century has accomplished a substantial redistribution of water supplies to compensate for the natural patterns of precipitation and to exploit the opportunities afforded by California's topography and climate. The resulting patterns of economic growth and increase in population have been of substantial magnitude.

Of a total of 22.5 million acres of irrigable land in California, 8.5 million have been irrigated for agricultural uses and 2.3 million have been developed for urban purposes. The overwhelming demand for water has been for agricultural irrigation. In 1950 the demand for agricultural water amounted to 90 percent of the total demand for water in the state. In 1967 agricultural uses were estimated to be 85 percent of total demand. With an estimated total population of 45 million persons in 2020, water for agricultural purposes is assumed to approximate about 75 percent of the total demand.[5]

What the magnitude of future development may be is difficult to estimate. Italy, with a comparable climate and area, but less hospitable expanses of valley lands, supports a population in excess of 40 million persons. Present projections used by the Department of Water Resources estimate

a total population for California in 2020 to be about 45 million. Japan with a comparable area, a somewhat comparable climate and a less hospitable topography, supports a population of approximately 100 million persons.

Whatever the course of economic development may be in California, that development depends in a critical way upon the institutional arrangements which enable the people of California to undertake programs of water resource development and to proportion and allocate water supplies among the various demands that human beings have for the use of water. Whatever institutional arrangements are devised, they must in the aggregate meet the demands of each individual if he is to survive and prosper. Each individual's well-being will be favorably or unfavorably affected by his capacity to make demands upon water supply. Each individual will have an interest in many uses or demands that can be made upon water-resource systems. His well-being will also depend upon whether institutional arrangements are available to facilitate his diverse demands and to proportion water services in ways that will provide appropriate combinations or mixes of water services.

Things called institutions do not automatically respond to human needs. Rather, institutional arrangements are nothing more than the assignment of decision making capabilities and limitations which create opportunities and deterents for human beings to serve one another. In the following

chapters, we shall be concerned with an examination of how decision making arrangements have been both used and shaped to affect the structure of opportunities and deterrents for facilitating or limiting water resource development in California.

In Chapter 5 we shall proceed with examinations of "The Choice of Constitutional Arrangements for the Government of Water-Related Affairs in California." This is the first step in characterizing the structure of decision making arrangements which provide opportunities and deterrents to those interested in water resource development. Other elements in the organizational structure of the California water industry will be developed in succeeding chapters.

FOOTNOTES

[1]As a result, public entrepreneurship has been a critical factor in the development of water supply for the region. See Vincent Ostrom, Water and Politics (Los Angeles: The Haynes Foundation, 1952).

[2]Information from Department of Water Resources, The California Water Plan, Bulletin No. 3, p. 12 and The Water Plan Outlook in 1970, Bulletin No. 160-70, p. 13.

[3]The date 1950 was used by the Dopartment of Water Resources as the base period for its assessment of water requirements in California as a part of the California Water Plan.

[4]Woodruff vs. North Bloomfield Gravel Mining Company, 18 Fed Rep 753 (1884), 757.

[5]California Department of Water Resources, Water for California, The California Water Plan, Outlook in 1970, Bulletin No. 160-70, 16-17.

Chapter 5

THE CHOICE OF CONSTITUTIONAL ARRANGEMENTS FOR THE GOVERNMENT OF WATER-RELATED AFFAIRS IN CALIFORNIA

The American Inheritance

When the United States acquired California and other territories in the American Southwest from Mexico in 1848, California inherited the constitutional arrangements of the American political system. In 1789, the United States had adopted these arrangements for organizing a federal political system to be governed under provision of positive constitutional law. The theoretical significance of the U.S. constitution has been examined in Chapter 3. The analysis in this chapter will be confined to an analysis of constitutional provisions pertaining to water-related matters.

The American inheritance also encompassed reference to a Spanish inheritance of some significance. The United States by terms of the Treaty of Guadalupe Hidalgo with Mexico, undertook an obligation to confirm private rights to property which had vested under Spanish and Mexican law. As a consequence, basic land grants establishing the early ranchos, missions, presidios and pueblos became the source of legal titles to much of the better lands in California. The United States succeeded to all ungranted lands which had remained in the public domain. Several California cities succeeded

to both land and water rights which derived from Spanish and Mexican pueblo or presidio grants. Los Angeles, in particular, was able to claim exclusive right to the use of water in the upper Los Angeles basin and thereby to monopolize that source of water supply and gain early dominance in the development of southern California.

The political arrangement which California inherited upon acquisition by the United States included an opportunity to fashion its own constitution and to be admitted to statehood on equal terms with the other American states. As soon as these conditions were met, California could assume responsibility for the government of its own affairs subject to the jurisdiction which the United States government exercised in the conduct of national affairs under the terms of the U.S. Constitution.

Under those terms, the national government exercises substantial authority in the development of water resources. Two primary sources of national authority over water resource development have derived from 1) the commerce clause which gives Congress power "to regulate commerce with foreign nations, and among the States, and with the Indian tribes. . ."[1] and 2) the property clause which gives Congress "power to dispose of and make all needful Rules and Regulations respecting the territory or other Property belonging to the United States . . . ."[2] Other sources of constitutional authority for national action in water-related matters derive from

national authority to provide for the common defense, to make treaties with foreign powers and to provide for the general welfare. The assertion of authority to provide for the general welfare has been especially important since the Great Depression when Federal support of public works projects became a significant factor both in water resource development and in efforts to stimulate the employment of a large unemployed labor force.

National Authority Under the Commerce Clause

Until the development of the railroads in the latter half of the Nineteenth century, the relationship of navigation to commerce both in California and in the nation at large was of vital importance. One of the most compelling interests which contributed to the formulation of the U.S. constitution was the need for national control of interstate commerce and the avoidance of trade barriers which the states would otherwise create to obstruct commerce among the states.

The capacity of the Federal government to use the commerce clause to regulate navigation received early confirmation in decisions of the U.S. Supreme Court. In Gibbon v. Ogden, the court rejected the claim of a grantee of the state of New York to exclusive rights of steamboat navigation on the Hudson River and asserted that the power of the Federal government "comprehends navigation within the limits of every State of the Nation, so far as that navigation may be, in any manner,

connected with 'commerce with foreign nations, or among the several States, or with the Indian tribes.'"[3] By the end of the Civil War, the supreme Court had held that:

> The power to regulate commerce comprehends the control for that purpose, and to the extent necessary, of all the navigable waters of the United States which are accessible from a State other than those in which they lie. For this purpose, they are the public property of the nation, and subject to all the requisite legislation by Congress.[4]

California's admission to the Union was upon the expressed condition, provided in the Act of Admission, that "all the navigable waters within the . . . state shall be common highways, and forever free as well to the inhabitants of said state and to the citizens of the United States, without any tax, impost, or duty therefor."[5]

The relationship of upstream tributaries to the flow characteristic of a navigable river system was recognized as the basis for extending Federal authority to include control over "non-navigable reaches of navigable waterways and their non-navigable tributaries if the navigable capacity of navigable waterways is affected or if interstate commerce is otherwise affected."[6] Federal authority in relation to navigable streams was used in 1884 to enjoin the operation of hydraulic mining in the California gold fields high in the Sierra Nevada because of the damages being created by the debris being released into the streams and washing down into the river valleys to innundate riparian lands and endanger

navigation on the Sacramento and Feather rivers. The miners were enjoined from the conduct of hydraulic mining operations on the Yuba river until tailings and mining debris could be impounded to prevent further damage to downstream riparians and further injury to navigation. The high costs of such impoundments virtually marked the end of the gold mining industry in California.[7]

Once national interest is justified in relation to navigation and the commerce clause, the Federal government may perform functions in the development of water resources that are incidental to its interest in navigation. These may include power production and transmission, storage of water used for irrigation and municipal consumption, pollution abatement, recreation, fish and wildlife and other related uses. In confirming Federal authority to construct Hoover dam, the first major Federal multiple-purpose, water works project, the U.S. supreme court held that, "the fact that purposes other than navigation will also be served could not invalidate the exercise of the authority conferred, even if those other purposes would not alone have justified an exercise of Congressional power."[8]

The scope of Federal authority for the conduct of activities in water resource development is great, indeed, when interests regarding navigation and commerce are related to the other uses of a river system which can affect its navigability and its uses for other commercial potentials.

Furthermore, the exercise of the Federal interest in navigation constitutes the dominant interest or easement in relation to all other non-Federal interests. A riparian owner of land bordering a navigable stream may hold a water right by virtue of his title to adjoining land under state law, but this right is good only against others than the Federal government. In undertaking public works for the improvement of navigation, the United States is required to compensate only for the land and improvements taken in acquiring property incidental to those developments. No private property right can be claimed to flowing water in a navigable stream as against the United States. All non-Federal interests are subservient to the Federal interest in navigation.[9]

National Authority Under the Property Clause

Many of the important developments in the American West accrued on land in the public domain. Gold miners in California pursued their activities largely on land in the public domain held by the Federal government. Apart from the California ranchos, much of the western cattle industry has depended upon use of the public domain for grazing livestock. Control of water supplies was vital to the conduct of both forms of enterprise.

Any adjudication of right in a conflict among miners, cattlemen, or with other groups including railroads, or homesteaders, over the use of water on the public domain depended

upon the superior right and title of the Federal government to the public domain. The issue was forced in the 1860's when persons holding formal patents under railroad and homestead grants attempted to oust those who had already appropriated water for mining and grazing purposes on the public domain. In 1866, Congress responded by declaring mining lands on the public domain to be free and open to preemption by private individuals who could establish a mining claim. Section 9 of the Act of 1866 provided that conflicts over water rights occurring in the use of the public domain for mining and other purposes would be determined by the following rule:

> That, whenever, by priority of possession, rights to the use of water for mining, agricultural, manufacturing, or other purposes, have vested and accrued, and the same are recognized and acknowledged by the local customs, laws, and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same . . . .[10]

Again, in 1870, Congress confirmed this provision of the Act of 1866 by providing that all Federal conveyances of title "shall be subject to any vested and accrued water right" that may have been acquired under the Act of 1866.[11]

The courts have construed these two provisions, taken together, as a recognition by Congress of the validity of water rights acquired on the public domain by the principle of prior appropriation in accordance with state laws. The principle of acquiring water by appropriation

on the public domain for irrigation purposes was also recognized in the Desert Land Act of 1877.[12] The relevant provisions are formulated in the following terms:

> . . . [T]he right to the use of water . . . shall depend upon bona fide prior appropriation; and such right shall not exceed the amount of water actually appropriated and necessarily used for the purpose of irrigation and reclamation; and all surplus water over and above such actual appropriation and use, together with the water of all lakes, rivers, and other sources of water supply upon the public lands and not navigable, shall remain and be held free for the appropriation and use of the public for irrigation, mining and manufacturing purposes subject to existing rights.

The provisions in these public land laws of 1860, 1866 and 1877 have sometimes been characterized as the Federal "charter" for the western law of water rights. It is a somewhat ambiguous charter. Many recent conflicts between state and Federal authorities over water rights have derived from the insecure legal foundation of these public land laws.

The U.S. Reclamation Act of 1902 is essentially an extension of these earlier public land acts providing for the disposition and settlement of the public domain. By this act, Congress authorized the Secretary of the Interior to undertake projects in order to <u>reclaim</u> arid lands by irrigation and to make the reclaimed lands available for settlement. This authority now applies both to the development of public lands for settlement and to lands already in private ownership which might benefit from irrigation or from a supplementary supply of water for irrigation. In Section 8

of the Reclamation Act, Congress subordinated the administration of the reclamation program to state water law and to water rights acquired under state law in the following terms:

> . . . [N]othing in this Act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or territory relating to the control, appropriation, use or distribution of water used in irrigation, or any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this Act, shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any land owner, appropriator, or user of water in, to or from any interstate stream or the waters thereof: Provided, that the right to the use of water acquired under the provisions of this Act shall be appurtenant to the land irrigated and beneficial use shall be the basis, the measure, and the limit of the right.[13]

However, the U.S. Supreme Court has held that Section 8 of the Reclamation Act " . . . does not mean that state law may operate to prevent the United States from exercising the power of eminent domain to acquire the water rights of others."[14] The effect of Section 8 is " . . . to leave to state law the definition of the property rights, if any, for which compensation must be paid."[15] Persons whose water rights are seized in the development of a duly authorized reclamation project under the terms of Section 8 of the Reclamation Act have only a compensable claim to damages as against the United States.

In addition to these public land laws providing for the disposition and settlement of the public domain in the western

states, Congress has used its proprietary powers to reserve certain public lands for the orderly conservation and development of natural resources. Among these reservations are the very extensive national forest reserves, the national parks, monuments and wilderness areas and the Federal water power reserves. The Federal Power Commission was authorized to license non-Federal projects for the development of hydroelectric power on navigable streams and non-navigable waterways located on public lands under provisions of the Federal Water Power Act of 1920. Federal control over water resources in these reserved lands has been one of the significant areas at issue in recent litigation involving conflict between Federal and state authority over unappropriated water in the western states.

Licensees of the Federal government may be vested with the cloak of Federal authority to undertake activities beyond their legal competence under state law. The exercise of the Federal power of eminent domain to develop hydroelectric power facilities by a licensee of the Federal Power Commission may go well beyond the powers of eminent domain which can be exercised by a local government agency or a privately-owned public utility under state law. In one such case, a local municipal power system was able to prevail over a state reservation of a stream for fisheries purposes and to condemn state-owned fisheries facilities located within the reservoir site of its proposed hydroelectric power development licensed by the Federal Power Commission.[16]

The early policies pursued under the authority of the property clause were largely oriented toward disposing and settling the public domain by converting public lands to private ownership. The fact that the arid conditions of the West left much of the land unclaimed and unsettled under the homestead and other settlement acts has left the development of a variety of land and water resource management programs based primarily upon Federal proprietorship. Federal public lands include approximately fifty percent of the land area in California. These Federal lands are located predominantly in the mountainous water-producing areas of the state and can be a strategic factor in decisions affecting the future use of unappropriated waters in the state. The various subordination clauses which have been part of the early public-land laws have tended to reduce the degree of conflict between state and Federal authorities. However, the fuller implications of the property clause as authority for the activity of the Federal government in various fields of water-resource development and land management is only beginning to be tested in the higher courts.

Other Sources of Constitutional Authority for National Action in Water Resource Development

Three other sources of constitutional authority are sometimes invoked to justify Federal activity in the development of water resources. These include the defense and general welfare powers contained in the constitutional prescription that:

> The Congress shall have Power to Lay and collect Taxes, Duties, Imposts and Excises to pay the Debts and provide for the common Defense and general Welfare of the United States . . . .[17]

In the third place, the President has the "Power, by and with the Advice and Consent of the Senate, to make treaties, provided two-thirds of the Senators present concur . . . ."[18]

The development of water resources as an aspect in the provision for the common defense has had only limited application. The Muscle Shoals project on the Tennessee river, a precursor of TVA developments, was largely undertaken to provide power for the manufacture of nitrates for munitions. Otherwise, this source of constitutional authority has rarely been used to justify Federal water resource development, except where those water developments were required for the operation of a military base or installation.

The treaty-making power has given rise to important settlements on international rivers affecting both Canada and Mexico. The Mexican Water Treaty bears upon the allocation of water supplies to southern California and the potential level of demand in that area upon alternative water supplies from northern California. In addition, the United States is a party to a treaty with Canada regarding the salmon fisheries of California, Oregon, Washington and British Columbia. If the Federal government should choose to place greater emphasis upon the development of anadromous fisheries as a function in its water resource programs, the treaty clause and the commerce

clause both offer sources of authority that have not been seriously exploited.

The general welfare clause also has not been widely used as a source of constitutional authority to justify Federal activity in water resource development. Until 1936, the preponderant weight of judicial opinion has construed this clause to be a general reference limited to functions which were more specifically enumerated among the powers of Congress and not a separate delegation of power apart from the other enumerations.[19] Since 1936, the weight of judicial opinion has shifted and the general welfare clause is recognized as a general source of authority which is presumably limited only the requirement that it be exercised for a common benefit as against some purely private or local purpose. The Flood Control Act of 1936 asserts authority under the general welfare clause as grounds for undertaking Federal flood control projects on non-navigable streams.

In the Gerlach case, the U.S. Supreme Court even went so far, in dicta, to suggest that the general welfare clause might be a better source of authority upon which the Federal government could stand in undertaking large-scale water developments than the commerce clause. In its own words, the Court concludes:

> Thus, the power of Congress to promote the general welfare through large-scale projects for reclamation, irrigation, or other internal improvement, is now as clear and ample as its power to accomplish the same results indirectly through resort to strained interpretation of the power over navigation.[20]

The Choice of Constitutional Arrangements for the Government of State and Local Water-Related Affairs

The U.S. constitution, as a legal instrumentality, is generally regarded as a grant of authority to the Federal or national government which is limited to those powers expressly delegated and those which can be reasonably implied from the expressed powers. All other powers are presumably reserved to the states and to the people. A state constitution rests upon somewhat different premises than the Federal constitution. States are presumed to possess the general powers of a sovereign political community except for those powers and limitations which are expressly formulated in the U.S. Constitution.

States are thus presumed to have the capability of a sovereign to exercise general political authority without the need for a specific grant of constitutional authority. A state legislature is presumed to have general plenary powers in the exercise of a state's sovereignty. A state constitution, consequently, functions as a legal instrument to limit the exercise of power by a legislature rather than being a grant of power to a state legislature. Among the constitutional limits upon state legislative authority are constitutional grants of authority to municipal corporations and other instrumentalities of local government existing within a state.

In its preparations for meeting the conditions for admission to statehood in the United States, California

adopted its first constitution in 1849. That constitution largely took its inspiration from constitutions adopted by other states in the Union. Whole sections were little more than editorially revised copy of other constitutional provisions. Approximately one-half of the provisions of the constitution of 1849 has been identified as coming from the state constitutions of Iowa and New York. Except for the guarantees of the rights of persons, few constraints were placed upon the exercise of state legislative authority. The constitution of 1849 was little more than a frame of government providing for essential state offices and a declaration of rights. The authority of the legislature under the constitution of 1849 applied broadly to all problems of state and local government in California.

A new and substantially revised constitution was adopted in 1879 as a major reform effort to impose substantial restrictions upon the exercise of legislative authority. Further modifications in the basic structure were attained through constitutional amendments initiated by the Progressive Reform movement during the first two decades of the Twentieth century. These reforms include provisions both for direct legislation by initiative petition and constitutional amendment by initiative petition. Legislation adopted by the state legislature is also subject to a popular referendum whenever a petition by the citizens of the state invoke such procedures.

Under provisions for initiative and referendum, the state Legislature no longer exercises a monopoly over lawmaking capabilities. The people of the state acting in a regular election can approve an initiative measure either as direct legislation or as a constitutional amendment. Under the provisions of a referendum, the people of the state can also veto legislation enacted by the legislature and signed by the governor. The frequency of constitutional amendments is an indication that processes of constitutional decision making form a fundamental element in California politics.

Constitutional Authority for the Organization and Conduct of Local Government

Problems associated with the conduct of local government had been a source of popular grievance against legislative rule under the constitution of 1849. All cities had been incorporated by special charters enacted by the Legislature. Such charters could be "amended, superseded or repealed with great abandon. . . ."[21] Rarely was local approval a requisite for the operation of such charters. Similar legislation was used 1) to impose obligations upon municipalities to pay financial claims made by private individuals, 2) to transfer money from one city fund to another, and 3) to create municipal indebtednesses providing public funds to aid in the construction of private railroads and other privately-owned utilities including privately-owned, water-supply systems.[22] Political coalitions able to dominate the state Legislature

could use legislative control over local government as a major source of political spoils.

The constitutional convention of 1879 consciously sought to reform the basic structure of local government and to provide for what it called, "a new system of local self-government."[23] In constituting its "new system of local self-government," the constitutional convention of 1879 substantially reformulated the constitutional allocation of authority over local governmental affairs. The main thrust of the new constitutional formulation regarding the organization of local government was to prohibit the use of special legislation and to require general legislative enactments regarding the organization of corporations for municipal purposes. Local government agencies were constitutionally authorized to make and enforce local ordinances not in conflict with state law. Matters of municipal or local concern were within the self-governing competence of agencies of local government.

Cities were also authorized to formulate their own home-rule charters for the government of municipal affairs. This provision authorizing home-rule charters extended the principle of constitutional decision making to local communities. By this provision, cities could authorize the election of a board of freeholders. The board of freeholders would then prepare a proposed city charter and submit that proposed charter to the municipal voters for approval. If the charter were ratified by a majority of the voters, the state constitution

required that the charter would then be submitted to the state legislature "for its approval or rejection as a whole without power of alteration or amendment." If approved by a majority of each house of the legislature, the charter would become the organic law for the city, "and supersede any existing charter and all amendments thereof, and all laws inconsistent with such charter."[24]

These provisions placed substantial constraint upon legislative discretion, and greatly expanded the powers of local citizens to exercise control over the governance of local affairs. By increasing the degree of self-government exercised in local or municipal affairs, the California constitution extended the federal principle downward so that units of local government were capable of acting with substantial autonomy in pursuing their own interests within the structure of general laws operable at the state and federal levels. Subsequent amendments to the constitution of 1879 have substantially extended and reinforced this "system of local self-government."

The structure of local government contemplated by the California constitution of 1879 specifically provided only for counties, incorporated cities and towns, and townships in those counties which chose to adopt township organization. No reference was made to the possibility of organizing a variety of governmental instrumentalities or public corporations for various functions of water supply and water resource

development. When considering the application of constitutional policies regarding the organization of local government to the variety of special districts established for purposes of water resource development, the California supreme court has characterized them as being special agencies and instrumentalities of the state, quasi-corporations, or public corporations other than municipal corporations. The court has rarely characterized them as being municipal corporations within the meaning of constitutional provisions on local government. As a result, the creation of these districts is considered to be a valid exercise of the plenary powers of the legislature to provide for local improvements to advance the public welfare. The absence of any general constitutional reference to the creation of public corporations other than those which can be strictly defined as municipal corporations permits the courts to assume that the legislature has general authority to act in creating such agencies.

Public districts for water resource development have also been generally excluded from the application of constitutional provisions relating to the political rights of citizens in the conduct of government. The California constitution, for example, includes a provision that "No property qualification shall ever be required for any person to vote or hold office."[25] In holding that reclamation districts were not subject to this constitutional provision, the court concluded that, "the district . . . was a part of a scheme for conducting a public

work, and not for self-government."[26] By excluding the application of constitutional provisions regarding the political rights of citizens in the conduct of government, the courts have validated legislation providing for the use of a variety of different voting qualifications and voting formulas in the government of public districts for water resource development which rarely occur among other public instrumentalities.

While the legislature has had very broad powers in constituting public districts, public corporations or agencies for water-resource development, that power, on the whole, has been exercised within the spirit of constitutional commitments to home-rule or local self-determination. In practice, the legislature has evidenced substantial willingness to authorize arrangements which have been negotiated among local water users whenever local users generally support such an arrangement. The local control which home-rule cities can exercise over the provision of water supply as a municipal affair has also led to considerable variety in the organization of municipal water supply systems.

When taken together, the strong home-rule tradition in California and the inclination of the legislature to use its broad powers to validate whatever organizational arrangements local water users can generally agree upon has produced a variety of public corporate and quasi-corporate instrumentalities with many different combinations of powers. These

arrangements have permitted a larger degree of independence in decision making and in entrepreneurial freedom of operation than might normally be assumed to exist in the conduct of public agencies.

Constitutional Policy for the Regulation of Water Utilities as Public Service Agencies

Beginning with the constitution of 1879, California has relied upon processes of constitutional decision making to formulate basic state policies regarding the development of water resources by private enterprise and the assignment of regulatory authority over the enforcement of such policies. The use of water for "sale, rental or distribution" was declared in the constitution of 1879 to be a "public use" subject to public regulation and control.[27] Regulatory authority over rate schedules for the provision of water to any county, city or town was assigned to county board of supervisors or city or town councils. Constitutional amendments adopted in 1911, 1914 and 1946 subsequently transferred this authority to the California Public Utilities Commission.

Provision was also made in the constitution of 1879 to allow private entrepreneurs greater freedom to enter into the provision of water supply for public use by making public rights-of-way more readily available to new entrepreneurs. By 1911, this constitutional provision was considered to be a "distinct disappointment." An alternative constitutional provision was adopted to authorize municipal corporations to

provide public utility services, including water supply, for its own residents and for persons outside its boundaries provided that the consent of a neighboring municipality is secured before services are provided to its inhabitants.[28] In the absence of competitive purveyors of water supply, the constitutional policy in California is to provide water users, as residents of local communities, with a choice over the structure of institutional arrangements for the provision of such services. Private provision of water for "sale" as a "public service" subject to regulation by a public utility commission is one alternative. Public provision of water services through a municipal water department or public water district is another alternative available to any incorporated community. Provision of water by either a non-profit mutual water company for sale to its own members or by a public agency for sale to its residents is not subject to public utility regulation. Where mutual water companies sell water to non-members, such enterprises are then subject to regulation by the California Public Utilities Commission. Where public agencies sell water to non-residents outside their primary jurisdiction, those non-residents are entitled to judicial remedies regarding water service policies. Persons residing within the jurisdiction of public agencies and members of non-profit mutual water companies can represent their interests as water users through the decision making arrangements internal to such organizations. The Public Utilities

Commission and the courts provide alternative means for representing consumer or user interests for those not formally represented in the internal government of water purveying enterprises.

Constitutional Policy Regarding Water Rights

The U.S. constitution and the California constitution both contain numerous provisions extending constitutional protection to persons regarding the rights of property. Such provisions are important in allocating decision making capabilities to individuals and to collective enterprises which acquire a property right to the use of water resources. They also establish constraints or limits upon the exercise of governmental authority regarding such rights. These provisions have further significance in establishing claims to legal remedies regarding conflicts which may arise among property owners or between property owners and public authorities. Property rights, in effect, define the authority of property owners or proprietors to make decisions regarding the control and use of property. These rights establish the freedom of choice that can be exercised in the ownership and exchange of economic goods. Consequently, they do much to determine patterns of economic development.

The Fifth and Fourteenth Amendments to the U.S. constitution provide constitutional protections against the taking of property either by the United States or by states without due process of law. The Fifth Amendment also provides that

private property shall not be taken for a public use without "just compensation." These provisions both place limits upon the exercise of Federal and state governmental authority regarding property rights and assure legal remedies in Federal law bearing upon the protection of these rights.

U.S. constitutional provisions regarding property rights have substantial significance, but most private property rights in the United States are defined by state laws. The procedures for recording titles to property, and the instruments for conveyance are the formal manifestations of ownerships which are maintained and executed under state law. Property rights to the use of water, thus, depend primarily upon the provisions of state law.

The basic constitutional formulation regarding property rights is contained in Article I or the Declaration of Rights in the California constitution. The first section is a declaration of the inalienable rights of men. Among these inalienable rights are those of "acquiring, possessing and protecting property . . . ." Section 13 of the Declaration of Rights contains a due process clause similar to the U.S. constitution. This clause provides that "No person . . . shall be deprived of life, liberty or property without due process of law." Section 14 provides that "Private property shall not be taken or damaged without just compensation having first been made . . . ."

Since the nature of any property is defined by law, the first task in maintaining the inalienable right of

"acquiring, possessing and protecting property" is to formulate the law which is applicable to a definition of those rights. Thus, a crucial decision in California water law was made when the state supreme court invoked a statute incorporating the common law as a part of the decision rules applicable to the courts of the state in deciding the competing claims of two private proprietors to the use of the water of the Kern river. A water right was held to derive from land ownership, as provided under the common law.[29]

California courts have been reluctant to recognize the authority of the legislature to define and reformulate the nature of property rights to water. Efforts by the legislature to limit common law claimants to reasonable beneficial use and to make surplus waters of the state available for appropriation were held to be an unconstitutional deprivation of property rights.[30] The courts had held that a riparian proprietor was not limited by a rule of reasonable, beneficial use in the uses he made of water in relation to non-riparian proprietors.

The resolutions of the issue created by the conflict between actions of the legislature to modify the law of water rights and the refusal of the California courts to give judicial cognizance to the actions of the legislature was attained through constitutional action. An amendment to the state constitution, adopted in 1928, declared the doctrine of reasonable, beneficial use to be the basic policy of the state

regarding water rights. This constitutional declaration of policy regarding water rights is formulated in the following terms:

> It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water. Riparian rights in a stream or water course attach to, but to no more than so much of the flow thereof as may be required or used consistently with this section, for the purposes for which such lands are, or may be made adaptable, in view of such reasonable and beneficial uses; provided, however, that nothing herein contained shall be construed as depriving any riparian owner of the reasonable use of water of the stream to which he is lawfully entitled. This section shall be self-executing, and the Legislature may also enact laws in the furtherance of the policy in this section contained.[31]

After the doctrine of reasonable, beneficial use had been incorporated into the state constitution, state courts substantially modified their decision rules to give priority to efforts to work out physical solutions to conflicts over water rights and to limit the general use of injunctions as legal remedies. The doctrine of reasonable, beneficial use had the effect of

extending an entitlement to equitable remedies to an enlarged community of water users who now had a greater equality of standing before the law. The net effect of these changes was to enhance rather than to diminish the role of courts as essential participants in the decision making process concerned with water resource development in California. These developments will be examined further in Chapter 6 on the allocation of rights to the use of water.

Constitutional Policy Regarding the Taking of Private Property for Public Uses

The California constitution provides that private property cannot be taken for public use "without just compensation having first been made. . . ."[32] This requires that condemnation proceedings be instituted, that a determination of proper compensation be reached by a jury and full compensation be made before taking possession of the property necessary for a public use. The only exception to this requirement in the original formulation of this section of the constitution of 1879 was the right of municipal corporations to acquire rights-of-way at variance with this procedure.

Amendments to this section have since added counties, the state, metropolitan water districts, municipal utility districts, municipal water districts, drainage, levee, reclamation or water conservation districts and "similar public corporations" to the list of exceptions from the rule that just compensation must "first be made" before private property

may be acquired for public use as right-of-way or "lands . . . for reservoir purposes."[33] In any eminent domain proceedings to acquire a right-of-way or land for reservoir purposes for public use, these agencies may take immediate possession upon a court order granting possession pending the determination of value and upon posting security in the manner and amount as required by the court.

An alternative method of condemnation is one which arises from the circumstances of a public agency taking private property for a public use and then leaving the burden on the injured party to institute proceedings for compensatory damages. This method is usually referred to as inverse or reverse condemnation. Under federal law where a private property right is considered to have only a compensable interest as against a public use, recourse to inverse condemnation has become a standard procedure for exercising the power of eminent domain.[34] Under state law, the courts have held that injunctive relief may be secured by a private property owner to prevent the taking of his property in violation of procedures established under state constitutional guarantees.[35] Where private property has been taken for public use without compensation, a suit for damages by an injured party is also a proper form of relief under state law.

Litigation over water rights is the one area in California law where inverse condemnation procedures have come to be increasingly accepted by the state courts. Since the adoption

of the reasonable-use amendment to the state constitution in 1928, the courts have been reluctant to grant general injunctive relief in water rights litigation. This tends to limit judicial action to judgments involving an alternative physical solution to existing water supply problems or to compensatory damages. When compensation is awarded after the fact for the "taking" or "damaging" of a private property right in order to provide a water supply for a public use, the action has in effect been converted into an inverse condemnation proceedings.

The tendency to have recourse to such proceedings is also enhanced by the practical difficulties in determining the point at which a public user has begun to impair the rights of a private user when both are making use of a common water supply. The difficulty of determining if and when such an impairment of right has occurred would lead a public agency to defend its claim to continued use of a water supply either by asserting a prescriptive right through adverse use for a period of five years or, failing that, to assert the right of eminent domain and acquire a right to continued public use by inverse condemnation. The exercise of a prescriptive right by adverse use or the acquisition of right by eminent domain are the primary means by which public agencies have sought to resolve conflicts with private proprietors making use of a common source of water supply.

The Availability of Alternative Institutional Arrangements in the U.S. Constitutional System

Processes of constitutional decision making have made a wide variety of institutional arrangements available for undertaking collective action and enforcing claims to legal remedies at several different levels of government. Each person has access to these different levels of government as instrumentalities for dealing with problems that impinge upon widely varying fields of effects. State governments provide an initial institutional base for governing public affairs. Where the domain of states is insufficient in scale to deal with problems of regional or national domain, the Federal government provides an alternative set of institutional arrangements for dealing with those problems. Conversely, where the field of effects is limited to a local neighborhood or community, local governmental institutions are available for managing those problems. In some states, including California, residents of local communities are able to exercise control over the constitutional structure of local-governmental arrangements through the terms and conditions specified in home-rule charters.

Decision making arrangements such as the initiative, referendum and recall may also be available to enhance popular participation in governmental decision making and provide alternative methods of governmental decision making apart from those exercised by governmental officials. Should

governments fail to sustain conditions of consensus, those who are adversely affected by public policies will have a variety of alternative remedies available to them for articulating alternative possibilities.

Experience in many of the states, including California, would indicate that the more exclusive the monopoly of a state legislature over the affairs internal to a state, the greater the likelihood that political coalitions will attempt to dominate the legislative process and exploit that advantage to the detriment of others in the state. The most flagrant era of machine politics and boss rule occurred during the period when the fewest constitutional remedies were available to permit alternative forms of collective action. Efforts to alter such conditions were taken at the constitutional level by interposing a variety of constitutional constraints upon legislative authority in the organization and conduct of local government, by constitutional guarantees of rights to private property, and by the development of methods of direct legislation as alternatives to action by the state legislature.

Where any one person can gain an advantage by recourse to alternative decision making arrangements in the pursuit of collective action or in the enforcement of claims to legal remedies, he must correlatively bear the costs inherent in the capability of any other person to seek recourse to the same advantages. Resolutions of conflict under such

conditions will depend both upon the availability of institutional facilities for processing conflicts and upon the availability of institutional arrangements to embody new forms of relationships attained in the resolution of such conflicts.

In Chapter 6, we shall examine the allocation of rights to the use of water as an important consideration for assigning economic capabilities for the use of water resources and for assigning legal and political capabilities to participate in decision making arrangements involving conflicts of interests among water users. The allocation of property rights to the use of water will also have a significant influence upon the shape of institutional arrangements devised to resolve conflicts over property rights.

FOOTNOTES

[1]Art. I, sec. 8.

[2]Art. IV, sec. 3.

[3]Gibbon v. Ogden, 9 Wheaton 1, 197 (U.S. 1824).

[4]Gilman v. Philadelphia, 3 Wallace 713, 724-25 (U.S. 1865).

[5]9 U.S. Stat., 452, 453.

[6]President's Water Policy Commission, Water Resource Law (Washington, D.C.: Government Printing Office, 1950), 73.

[7]Ibid.

[8]Arizona v. California, 283 U.S. 423, 456 (1931).

[9]President's Water Policy Commission, op. cit., 25-29.

[10]14 U.S. Stat., 251, 253 (1866).

[11]16 U.S. Stat., 217, 218 (1870).

[12]19 U.S. Stat., 377 (1877).

[13]32 U.S. Stat., 388, 390 (1902).

[14]City of Fresno v. California, 372 U.S. 627, 630 (1963).

[15]Loc. cit.

[16]City of Tacoma v. Taxpayers of Tacoma, 357 U.S. 320 (1958); State of Washington Department of Game v. Federal Power Commission, 207 Fed. 2d., 391 (1953).

[17]Art. I, sec. 8. Emphasis added.

[18]Art. II, sec. 2.

[19]U.S. v. Butler, 297 U.S. 1 (1936).

[20]Samuel C. Wiel, Water Rights in the Western States, rev. ed. (San Francisco: Bancroft-Whitney Company, 1911), 166.

[21]John C. Peppin, "Municipal Home Rule in California: I," California Law Review, 30 (1941), 10.

[22]Ibid., 11-13.

[23]California Constitutional Convention, Constitution of the State of California (Sacramento: State Printing Office, Printed by Order of the Constitutional Convention [1879]), 43.

[24]Art. XI, sec. 8.

[25]Art. I, sec. 24.

[26]People v. Reclamation District No. 551, 117, Cal. 114, 123 (1897).

[27]Art. XIV, sec. 1.

[28]California, Secretary of State, Proposed Amendment to the Constitution of the State of California, With Legislative Reasons For and Against the Adoption Thereof (Sacramento: State Printing Office, 1911).

[29]Lux v. Haggin, 69 Cal. 255 (1884).

[30]Herminghaus v. Southern California Edison Company, 200 Cal. 81 (1926).

[31]Art. XIV, sec. 3.

[32]Art. I, sec. 14. Emphasis added.

[33]West's Constitution of the State of California, Annotated I, 405-406.

[34]The standard clause in federal legislation authorized the acquisition of property by "proceedings in eminent domain, or otherwise." The U.S. Supreme Court has recognized that such rights may be acquired by "seizure" and the recourse of those whose property has been taken is a claim for damages.

[35]Beals v. City of Los Angeles, 23 Cal. 2d. 381, 388 (1943).

Chapter 6

ALLOCATION OF RIGHTS TO THE USE OF WATER

Water as a Common Property Resource

The natural characteristics of any water resource system pose substantial difficulties for their control and conversion into economic goods and services. The liquidity of water gives it the characteristic of a flow resource subject to only limited and partial control by human efforts. The flow characteristic is further complicated by the variety of potential uses and deprivations which affect the welfare of those people who draw upon such resources to support their livelihood. Developing the complex bundle of potential goods inherent in water resource system, in turn, involves a high degree of interdependency among the joint and alternative uses. When these factors are considered together, some extraordinarily difficult problems are posed for the development of institutional arrangements for water resource development.

Water as a liquid flows from higher to lower elevations and accumulates in streams and other bodies of water on the surface of the earth and in the interstices of the soil beneath the surface of the earth. Human effort can accomplish a substantial degree of control over relatively small quantities of water but only limited control over large quantities of water. As a consequence, water, except for bottled water,

is not subject to an exclusiveness of possession and control by human enterprise. The difficulties in securing exclusiveness in the possession and control of water resource systems implies that such resources cannot be subject to an exclusiveness of ownership.

The failure of the exclusion principle to operate in the possession and control of water resource systems has led to a legal distinction between rights to the corpus or the body of a water supply system as against rights to use water. Since Roman times, rights to the corpus of a water supply system have been recognized as having the characteristics of a common property which may implicate different communities of interest. The concept of a negative community is used to characterize those common property resources whose commonality is subject to the authority of no one but is available for use by any one. The oceans, today, are treated essentially as resources subject to this principle of res nullius despite increasing efforts being made by riparian states to redefine and extend their control over "territorial waters" and adjoining continental shelves.

Within the jurisdiction of sovereign states, control over the body of water supply systems is subject to implicit or explicit control by appropriate governmental authorities. This control may vary from a quasi-trusteeship over the inchoate interests of those who may have present and future interests in water as a common property resource to the exercise

of positive measures of public control over such common property resources. The degree of public control exercised over a water supply system may vary with relative demand. When demands exceed supply critical problems inherent in the tragedy of the commons will arise unless public control is exercised to proportion supply and demand.

While rights to the corpus of a water supply system have the characteristics of a common property subject to varying degrees of control by public authority, the use of water can be subject to a private property right to allocate such uses among competing claimants. Such a property right accrues to a usufruct, or to a use of water, and not to the corpus of a water supply system, per se. Individual rights, thus, accrue to the use of water while the corpus of a water-supply system retains the characteristic of a common property resource subject to public regulation and control but not to exclusive possession and control as a private property.

In our previous discussion of institutional weakness and institutional failure in market economies, we defined a purely private good as one which is subject to exclusion in possession, exchange and use. Water resource systems are not subject to an exclusiveness in possession. Several different uses may be subject to substantial degrees of exclusion. However, exclusion does not apply to all forms of use, such as flood control and recreation. Such uses take on the attributes more of public goods than of private

goods. Some uses may also be subject to exclusion in exchange between a purveyor of water services and a consumer of water services.

The different uses of a water supply system can be distinguished between those uses which occur on-the-land and those uses which occur within the corpus of a water supply system. We would expect on-the-land uses such as irrigation, domestic, municipal and industrial water supply to be subject to a high degree of exclusion in possession, exchange and use, once water has been diverted from its natural source. However, problems of interdependency and commonality are by no means eliminated in the operation of water works and water distribution facilities devoted to on-the-land uses. Such problems, as we shall see in the next chapter, generate substantial elements of public interest in the distribution and sale of water for on-the-land uses. In-the-channel uses, i.e., uses occuring within the corpus of a water-supply system, such as navigation, recreation, flood control, pollution abatement, fish and wildlife are subject to a lower degree of exclusion in possession, exchange and use and will be more intricately involved in problems of interdependencies and commonality associated with public regulation and control. Potential conflicts between on-the-land uses and in-the-channel uses which derive from the natural flow characteristics of water are somewhat minimized when water for consumptive, on-the-land uses is derived from ground water supplies. Yet the

potential use of ground water basins as natural reservoirs and as distribution systems means that public regulation and control over the corpus of a ground water supply system assumes significant proportions wherever demands exceed supply.

A property right to the use of water takes only a partial and limited account of the diverse interests implicated in water resource systems. Yet the characteristics of that right significantly affect the confidence with which entrepreneurs can use water in the conduct of economic activities. This, in turn, affects their confidence in making longer term investments in economic enterprises which require significant quantities of water. Water rights can have an important influence upon opportunities for economic development.

If a system of water rights can be developed which allows for a greater specifity of the quantity of water to be used and allows for a greater exclusiveness of right to use, that water right may facilitate the development of market arrangements in buying and selling water rights. The availability of market arrangements would substantially alleviate problems associated with the re-allocation of water supplies to higher-valued uses by permitting those making a lower-valued use to sell and realize some of the advantage of transferring water rights to those who can derive a greater economic advantage. Conversely, a system of water rights which involves ambiguity and interdependency in the claim that individual proprietors can make upon a water

supply system may create incentives to search out alternative solutions which look toward collective management of the joint resource as a means for optimizing the supply available to all proprietors.

Thus, the allocation of rights to the use of water will influence the relative economic priorities for different patterns of use and the pattern of institutional arrangements for re-allocating and developing water resources. However, the allocation of rights to the use of water as property rights has only a limited and partial effect upon the aggregate structure of institutional arrangements in a water economy. Interests which are more closely related to regulation and control over in-the-channel uses will be subject to substantial measures of public control and public proprietorship.

Given the multi-jurisdictional characteristics of the American system of federal government, the public interests concerned with the management of water resources will be occupied by agencies at different levels of government. These different governmental interests have substantial effects upon those who hold property rights to the use of water. Thus, the interests of both private proprietors and public proprietors in the development of water resource systems will be affected by the way property rights are defined in any particular water economy.

In this chapter we shall examine the development of the law of water rights in California as providing an important element in the institutional structure of the California water industry. After reviewing California experience in the development of its law of water rights, we shall analyze the allocational effects that the different species of water rights will have upon the development of water resources. We shall conclude with a tentative consideration of the rationale which might be used in choosing among the alternative forms of water rights that have been developed in California.

The Development of the California Law of Water Rights

The California law of water rights has had substantial implication for the development of water law in many of the Western states, because California has experimented with several different principles of water law. Rather than choosing one and rejecting others, California has developed a system of water law which nominally retains elements of several species of water rights. The critical problem is how these contrary principles are resolved in an adjudication of water rights among conflicting claimants.

We shall review the different elements which were introduced into the California water law in the course of the state's historical development. The first to be considered is the pueblo water right which is derived from Spanish law.

The second is the law of prior appropriation first developed in the mining camps of California. The third is the riparian law of water rights which the California courts adopted as the common law rule for adjudicating water rights among private land owners. The California courts also developed a new doctrine of ground water law drawing upon principles inherent in the riparian doctrine and applying those principles among competing claimants to ground water. This doctrine, ironically, was at variance with the English common law doctrine which recognized that overlying land owners held complete ownership of ground water as a part and parcel of the land. Efforts to resolve the conflicts arising from these different doctrines of water law eventuated in the adoption of a constitutional amendment declaring a doctrine of reasonable use to be the basic water policy of the state. Whether that doctrine will provide a basis for resolving conflicts as among the various elements of California water law still remains to be seen.

The basic principles inherent in the decision rules for each of these doctrines will be examined in turn. We will then examine the efforts at reformulating the California law of water rights following the constitutional amendment on reasonable use.

Pueblo Rights

When the United States acquired California and other western territories from Mexico under the terms of the Treaty

of Guadalupe Hidalgo, the acquisition provided for recognition of vested property rights which had been established under Spanish and Mexican law. Spanish water law was generally based upon the riparian doctrine subject to a liberal use of royal grants and dispensations. Among these special grants were those to the pueblos, or organized civil communities, which required that certain properties including pastures, woodlots, and water supplies be held by a pueblo for the common use of its inhabitants.

As adjudicated in California courts, the pueblo water right gives those cities founded as pueblos the paramount right to make use of all water naturally occurring within the pueblo limits to the extent of the needs of their inhabitants. The pueblo water right is a public proprietary right vested in a municipality. It is not subject to private ownership. All other rights are subservient to the municipality's right when the water is needed. When the supply exceeds the municipality's needs, others outside its boundaries are free to use the surplus water. But this use may be enjoined, at any time, when the municipality requires the full supply.[1]

The pueblo right is limited to the needs of the inhabitants of a municipality. A municipality may not sell surplus water outside its boundaries under claim of a pueblo right. However, the pueblo right allows for the continued growth of a municipality both by an increase of population within the original pueblo boundaries and as the boundaries may be

extended through the annexations of lands not within the original pueblo. The pueblo right, thus, assures "a water supply for an expanding city with a minimum of waste by leaving the water accessible to others until such time as the city needs it."[2]

Because a municipality cannot object to others' using surplus water beyond its needs, a pueblo right cannot be invaded by adverse use or be lost for non-use as long as a surplus is available.[3] The pueblo right is available when needed and only to the extent of actual need.

In the case of Los Angeles, the pueblo right applies to the natural flow of the Los Angeles river above the pueblo's lower boundary and to the ground water supplies in the San Fernando valley which are the source of the Los Angeles river.[4] In San Diego, the pueblo right applies to all surface and ground waters of the San Diego river including tributaries from its source to its mouth. Both cities, by virtue of the pueblo grant, hold a right that must be deemed the same as if the water had been condemned for public use, and all possibilities for the future growth and requirement of the city were taken into consideration.

Prior Appropriation Rights

Prior appropriation as a means of acquiring water rights was first developed by the gold miners of California. No effective government existed during the initial period of the gold rush in 1848, and the miners devised rules in each

of their separate camps to regulate the conditions of mining and to indicate the basis for determining the rights of those who worked the mines. These customary mining rules all recognized "discovery followed by appropriation as the foundation of the possessor's title and development by working as a condition of its retention."[5]

Water was relatively scarce in many of the mining areas, and the principles used to determine mineral rights were simply extended to apply to the use of water as a scarce commodity. These customary rules of the early mining camps provided the first formulation of the prior appropriation doctrine of water right which is generally applied in much of the arid region of the American West today.

The principle of discovery is not adhered to literally in determining priority to water supplies. Rather, the rule of priority--first in time; first in right--implicit in the principle of discovery, was applied to the appropriation of water.

The principle of appropriation in mining law refers to the act of making a formal claim to a mineral deposit. This usually includes procedures for 1) location by specifying the site of the claim, and 2) public notice, or a public declaration of the claim. The public declaration might include a notice posted at the site of the claim, a formal notice or instrument filed with an appropriate agency for public recordation of the claim, or a combination of both forms of notice.

These procedures were followed quite closely in establishing rights to appropriate water. Location usually involved a specification of the site of diversion, and the site of intended use. Notices of appropriation were posted at the site of the diversion and filed with the county clerk or recorder after such offices were organized. The date of priority was usually determined by the date when the public notice was filed.

Another basic principle of customary mining law in the California gold fields required that a claim must be worked in order to maintain a right to the claim. In the appropriation of water, this principle is asserted by requiring that a right is established only to such water as is put to beneficial use with reasonable diligence and is maintained only so long as beneficial use is continued. If water is wasted, others can claim against a prior appropriator; and if the use is not continued, the right may be lost.

After California became a state, the legislature acted to recognize the fait accompli in the mining field. The customary rules of the mining camps were applied by the state courts in determining rights among miners when these customs did not conflict with the constitution or laws of the state. Because much of the mining occurred on Federal public lands, the legislature recognized possessory interests in the public domain and authorized possessors on public land to sue in the state courts to protect their possessory

interests. By 1855, the California supreme court confirmed the appropriation doctrine as applying to the adjudication of water rights among miners who had possessory interests on Federal public lands.[6]

The California legislature did not formally incorporate the doctrine of prior appropriation into the statutory law of the state until the adoption of the Civil Code of 1872. That code contained thirteen brief sections which were essentially a codification of the customary rules in the mining camps. No declaration of public policy was made to the effect that the acquisition of water rights by prior appropriation was based upon considerations of public interest or public necessity. The final section even included a reservation that "the rights of riparian proprietors are not affected by the provisions of this title."[7]

The prior appropriation doctrine of water law places primary emphasis upon beneficial, consumptive use. It gives little cognizance to public, non-consumptive, in-the-channel uses of water. Prior appropriations, however, have long been used to establish rights for hydroelectric generation. Appropriations of water for maintenance of stream flow by public agencies for other non-consumptive uses has occurred only in more recent time. Any proprietor, whether a private person, corporation or public agency, may acquire a right by prior appropriation. No legal restriction is placed upon the location of use. No constraint generally exists upon

the exportation of water from a natural watershed area, except where statutory reservations have been established.[8] A right exists to a specifiable quantity of water and is limited to that quantity put to actual beneficial use. The place of diversion and site of use may be changed--provided that other appropriators are not adversely affected. The force of the proviso, however, greatly limits the transfer of appropriative rights.

Riparian Rights

While the doctrine of prior appropriation was being formulated through the experience of miners in the California gold fields, occasional references were being made to another doctrine of water law which derived from the common law and from even earlier traditions in the Roman law.[9] This doctrine was the law of riparian rights. Ripa, in the Latin, referred to the banks of a stream; and a riparian right is defined in relation to those who own land located along the banks, or are riparian to a stream or to some other body of water.

The basic emunciation of the riparian doctrine in California water law was made by the California supreme court in the classic case of Lux v. Haggin.[10] The case involved the claims of James B. Haggin and associates, organized as the Kern River Land and Canal Company, to a prior appropriation to divert substantially all of the flow of the Kern River for irrigation purposes on their privately-owned land.

Charles Lux and Henry Miller, partners in the Miller and Lux holdings which extended for more than one hundred miles along both banks of the San Joaquin River, claimed riparian rights to overflow lands which they had acquired from Federal grants along various sloughs in the overflow basin of the Kern. This was a contest between two giant holders of private agricultural land in the San Joaquin valley and the Tulare basin.

Since the California legislature in 1850 had adopted the common law as the rule of decision for the courts of the state, the California supreme court held that the riparian doctrine, as the doctrine of the common law, was applicable to the definition of water rights in California. The supreme court granted judgment to Miller and Lux on the basis of their riparian claims. In effect, the original owners of land in California, including the Federal government, were all declared to be riparian owners. Cities holding pueblo rights, and prior appropriation rights recognized by Federal and state law were special exceptions. The United States was held to be the owner of both the land and water on the public domain, and prior appropriation rights established by miners and other prior appropriators were derived from Federal recognition of a property right to water appropriated for beneficial use by those having possessory interests in public lands. Subsequent sales and grants of public land were conditioned by a recognition of these

prior appropriation rights. Subject to vested rights acquired by prior appropriation, subsequent grants of public lands were held "to carry with them the appropriate common-law use of the waters of the innavigable streams thereon, except where the flowing waters have been expressly reserved from the grant."[11]

The early tradition of the English common law placed considerable emphasis upon rights to beneficial, non-consumptive uses by riparian proprietors. Old cases in English law use the language that "a water course begins ex jure naturae, and having taken a certain course naturally, cannot be diverted."[12] Still other language asserts that "water flows in its natural course, and should be permitted thus to flow; so, that all through whose land it naturally flows, may enjoy the privilege of using it. The property in the water therefore, by virtue of the riparian ownership, is in its nature usufructory, and consists not so much of the fluid itself, as of the advantage of its impetus."[13] According to this view, a riparian proprietor may "do a prejudice to the water course, either by diverting, detaining or corrupting the water."[14] It would have been illegal to divert a watercourse "without returning the water to its natural channel, before it passes by the land of a riparian proprietor below."[15]

In England the major task in reclaiming land for cultivation was to drain surplus water from marshes and bogs. The primary uses made of water were the non-consumptive uses of

a stream for drainage, for navigation and for the production of power by propelling water wheels. In this situation, the function of the law was to facilitate the common use of the stream by preventing obstruction, pollution, or modification of flow that would adversely affect the rights of others to use a stream. The riparian doctrine developed in a society where demands were for the preservation of rights to the continued and unobstructed flow of a stream rather than the diversion of water for use upon the land.

In Lux v. Haggin, the California supreme court recognized a riparian right as entitling a riparian proprietor to a reasonable use of the waters in the customary and natural flow of a stream including the right to divert water for irrigation and other consumptive purposes subject to the right of other riparian proprietors to reasonable use of the waters of the same stream.[16] Since one's right to use water in a stream is contingent upon the right of others to make comparable uses of the water, the riparian right can be described as a correlative right. If there were not enough water to meet the requirements of all riparian users, then the court would have to adjudicate the interests and make an equitable allocation to each user.

The right of the riparian proprietor to the flow of the stream is "inseparably annexed to the soil, and passes with it, not as an easement or appurtenance, but as a part and parcel of it."[17] A riparian right derives from the ownership

of land through which a stream flows. No special condition must be met to make a legitimate claim upon water except to have title to lands riparian to a stream.

The correlative character of the riparian doctrine implies a rule of equality among riparian proprietors who are permitted to make reasonable use of the waters of a stream. An upper riparian owner has an absolute right to consume all of the water of a stream only if it is necessary to satisfy his "natural" requirement for domestic consumption or for watering livestock. Otherwise, his rights are correlative and his right to use water is subject to a comparable right among other riparian proprietors similarly situated. What constitutes reasonable use is considered a question of fact to be determined in any particular case. The right to reasonable use does not turn on the question of diminution of the flow of the stream, but upon the use of a stream without causing material injury to other riparian proprietors. In the case of material injury, the question of reasonableness of use is subject to judicial determination.

The riparian doctrine of water rights, as first formulated in California, maintained a rule of absolute inequality between riparian proprietors and non-riparian proprietors. In Lux v. Haggin, the court stated that none but riparian owners may employ or suffer the employment of water for any purpose.[18] In Miller and Lux v. Madera Canal and Irrigation Company, the California court later held that:

> As against an appropriator who seeks to divert to non-riparian lands, the riparian owner is entitled to restrain any diversion which will deprive him of the customary flow of water which is or may be beneficial to his land. He is not limited to any measure of reasonableness.[19]

Since riparian proprietors were not limited by a rule of reasonableness as against non-riparian proprietors in any use that they might make of the "customary flow" of a stream, the court's definition of the "customary," "normal" and "ordinary" flow of a stream assumed substantial significance for the development of the state's water resources. Although the precedents were established much earlier, the California supreme court articulated its most explicit definition of the customary flow of a stream when it asserted:

> Seasonal accretion to the waters of a natural stream which are variable in quantity in the course of each and every year, being largest at times of heavy rainfall in the watershed and also in the spring and summer by reason of melting snow in the mountains . . . constitute usual and ordinary flow of the stream and are in no sense 'storm,' 'flood,' 'vagrant' or 'enemy' waters as these terms are used in the law.[20]

The inclusion of "flood" flows as a part of the "customary" flow of a stream subject to claim by a riparian proprietor has given rise to what is sometimes referred to as "grassland rights" or "rights to flood flows" in California water law. A riparian proprietor had a right to claim the use of these flows in order to fertilize his lands by the disposition of silt, irrigate his meadows or grasslands, replenish the

natural aquifers in underground basins and leach salts from natural salt marshes by permitting flood waters to overflow his lands.[21] None of these cases has given attention to the injury or possible injury that might be suffered by other riparian proprietors from floods.

Once the courts acted upon the riparian doctrine of the common law in defining private property rights to the use of water, their decisions constituted a fundamental commitment in the development of California water policies. Property rights are protected by the state's constitution and once the right to the use of water as a part of the land had vested in private ownership, "the state has no power to divest him (the owner) of the right, except on due compensation."[22] Constitutional protection of property rights imposed a substantial constraint upon legislative action in reformulating the water law of the state.

A riparian right, in conclusion, derives from the ownership of land riparian to a stream. These rights were extended to include reasonable use for consumptive purposes subject to the right of other riparian proprietors to make reasonable use of the same stream. A rule of equality prevails among riparian proprietors in the enjoyment of a correlative right. Rights are never defined to a specifiable quantity of water. Rights of riparian proprietors, as originally formulated by California courts, were paramount to those of non-riparian proprietors; and the right extended to the full

customary flow of a stream. In California this has been interpreted to include the regular annual floods produced by winter rains and the spring discharge from the melting snow in the Sierras.

As a part and parcel of the land, a riparian right is neither created by use nor destroyed by disuse. Water rights are automatically transferred with an unrestricted sale of land. A purchase of a riparian water right exclusive of land means no more than the willingness of the seller to make no further legal claims against the buyer for his use of the water. A sale of a riparian water right apart from the land is no more than a quit claim on the part of the seller. Other riparian proprietors are not precluded from action against the buyer.

Ground Water Rights

Much of the water used in California is pumped from underground basins. Because riparian rights apply only to surface water courses or to underground streams in clearly defined channels, special consideration was required for determining rights to ground water supplies.

The English common law rule recognized the absolute ownership of percolating ground water by the overlying land owner. According to this rule, "the water which is held by the soil is a portion of the soil itslef, and belongs to the owner of the land as fully as any other ingredient of

the land."[23] In the absence of malice, a proprietor, under this common law rule, could exploit ground water supplies found beneath his lands at will and could use these water supplies upon his own land or for sale without regard to the site of use within or without a basin.

The case of Katz v. Walkingshaw involved a conflict between a proprietor using water on overlying agricultural land and a proprietor using ground water supplies from his land for sale to users on distant lands.[24] The California supreme court in that case recognized the inappropriateness of applying the traditional common law doctrine to local conditions in California. Instead, the court turned to the basic doctrines implicit in the law of riparian rights and formulated a new doctrine of correlative rights applicable to percolating ground waters.[25] The basic rule as restated by the court in another case holds that:

> Each owner of land overlying the same general underground supply of water may take such water on his land for any beneficial use thereon, so long as such taking works no unreasonable injury to other land overlying such waters; that if the natural supply is not sufficient for all such owners, each is entitled only to his reasonable proportion of the whole, and that each may apply to the courts to restrain an injurious and unreasonable taking by another and to have the respective right adjudicated and the use regulated so as to prevent unnecessary injury and restrict each to his reasonable share.[26]

As in the case of the riparian doctrine, the right of the overlying owner to percolating waters is defined by the

ownership of land contiguous to the water supply. In this case, the land defining the right must be overlying instead of riparian. A claim for the use of water on land not overlying the ground water supply could not be justified on the basis of this doctrine. Instead, reference was made to the doctrine of appropriation. An overlying land owner who extracted water from a ground water basin for sale to non-overlying users was thus characterized as an appropriator. However, no presumption was made than an appropriator of ground water was required to follow the same procedures as an appropriator of surface water in perfecting his right. The taking of water under presumption of right (i.e., in the absence of trespass) for use on non-overlying land was deemed to be an appropriation of ground water.

The correlative doctrine of overlying use placed an altogether different emphasis upon the rights of an appropriator in relation to a true overlying proprietor in comparison with the right of the riparian proprietor to non-riparian appropriators. The riparian proprietor was not limited by any rule of reasonableness, but the overlying user had no right to enjoin an appropriator from taking water for use on non-overlying land except when his lands were injured by the exportation. In Katz v. Walkingshaw, the court held that the overlying user's right extends only to the quantity of water that is necessary for use on his land. The appropriator may take the surplus.[27] An overlying proprietor is

limited to standards of reasonableness in the amount of water taken and in the time and manner of taking the water supply in order to allow for the reasonable requirements of an appropriator.[28]

In defining the nature of a "surplus" supply available for appropriation beyond the reasonable requirements of the overlying landowners, the court in San Bernardino v. Riverside recognized that several thousand wells made sufficient demands upon an artesian basin so that artesian wells no longer flowed at the surface, and pumps were required to raise the water. Even under these circumstances the court concluded that there was no long-term deficiency in the water supply and consequently there could be no substantial injury or damage to the right of the overlying user. The court observed:

> In dry years they [the overlying users] might be compelled by necessity to have more wells or to put in more pumps or substitute more powerful ones, in order to obtain the supply now in use, but this must be considered no more than a reasonable requirement, at least under the conditions existing in that part of the state, so long as this process does not result in using quantities of water exceeding the quantity that would be restored to the basin, in excess of the use, during succeeding wet years.[29]

This rule of reasonableness might be viewed as an appropriate compromise for recognizing the diverse interest of so-called appropriators and true overlying landowners which had not been distinguished under the English common law

doctrine. The right of the true overlying owner, analogous to the riparian right to make reasonable use of ground water supplies was recognized as paramount. However, the burden of proof was placed upon the true overlying owner to demonstrate substantial injury before judicial remedies were justified. This left the true overlying owner and the appropriator on a plane of essential equality.

The California doctrine of ground water rights permitted full utilization of the ground water supplies for beneficial consumptive use for all interests who can gain lawful access to such supplies. The new doctrine of "reasonable use" permitted appropriators to make reasonable use of ground water for export to non-overlying lands so long as the reasonable use of overlying owners was not impaired. The courts were liberal in construing the availability of surplus water and reluctant to grant injunctive relief to overlying owners who could not demonstrate substantial damages and reasonableness in their own methods of use. The result was a marked contrast between the legal relationships associated with the use of water from surface supplies and those associated with the use of water from underground supplies.

Conflict and Resolution

By the second decade of the Twentieth century, California confronted a major controversy over the law of water rights. The controversy focused on the holding of the California

supreme court in Miller and Lux v. Madera Canal and Irrigation Company. The court held that a riparian proprietor is not limited by any rule of reasonableness in being entitled to restrain an appropriator from interfering with the customary flow of a stream or from diverting water for use on non-riparian lands. This rule, if rigorously enforced, would have the effect of substantially interfering with efforts to store flood waters to be used during the dry season of the year or to divert water for the development of non-riparian lands for agricultural or urban uses.

Judicial Accommodation Through Prescriptive Rights

The judicial accommodation to the conflict of interests between riparian owners and appropriators was to recognize appropriation as a means for gaining a right by adverse possession and use. Where adverse possession and use are continued for a period of five years or more, the statute of limitations prevented any action by the injured party to recover his property. The adverse user could perfect a clear title to the property.[30] A claim to a property based upon adverse use and possession is a claim to a prescriptive right.

A prescriptive right is acquired only where the use is actual, open and notorious on the part of the claimant; hostile and adverse to the existing owner; continuous for the five-year period prescribed in the statute of limitations

and under a claim of right. When all of these elements have been met, a prescriptive right can be asserted. A prescriptive right is superior to and exclusive of the rights of the former owners and can be defended against all other claimants.[31] By a strange irony, an appropriator, following the procedures required in making a claim to an appropriative right, could meet all of the conditions for the establishment of a prescriptive right. The requirement of open and notorious use under a claim of right could be met by 1) posting a notice of the intended appropriation at the point of diversion and filing a notice of intention to appropriate as required under the Civil Code procedures, or 2) filing an application for a permit to appropriate water under the terms of the Water Commission Act of 1913. Since a riparian proprietor had a right to use the full, ordinary and natural flow of a stream subject only to the reasonable use of other riparian proprietors, any impairment of the riparian claim to the full flow of a stream was grounds for asserting a prescriptive right.[32]

The coincidence of procedures for asserting an appropriative right to water with the conditions necessary for the establishment of a prescriptive right meant that an appropriation could ripen into a prescription. Prescription, then, became a means for converting an appropriation which was a distinctly subordinate right in relation to riparian rights into a right to use water that was superior to those

exercised by all riparian proprietors who were adversely affected. This coincidence between appropriative procedures and the elements of prescription has even led the court on occasion to conclude that "appropriation under the Civil Code is but another form of prescription. . . ."[33]

The difficulties and costs of enforcing the exclusion of appropriators by riparian proprietors, other than the very large riparian proprietors such as Miller and Lux, has meant that many appropriators were able to perfect a prescriptive right, as against riparian proprietors. A prescriptive right is an exception to the basic rule of riparian right and has the effect of radically altering the rules implicit in the riparian doctrine. A prescriptive right is established to the quantity of water put to adverse use. The place of use is not limited to any location immediately contiguous to the source of supply. Failure to make continued use would result in a loss of the right. Once adjudicated, water used under a prescriptive right might be freely conveyed to other users. Prescriptive rights rank in an order of priority higher than the right which was prescribed. Prescriptive rights, thus, have become a significant part of the California law of water rights.

Legislative Reformulation of the Appropriation Doctrine

With the advent of the Progressive Reform movement in 1910, the problem of water law became a primary issue for

political consideration. Governor Hiram Johnson urged the adoption of "a rational and equitable code and method of procedure for water resource development" upon the 1911 session of the state legislature.[34] This action was necessary, he contended, to correct a situation in which "the great natural wealth of water in this State has been permitted, under our existing laws or lack of system, to be misappropriated and be held to the great disadvantage of its economic development."[35] The 1911 session of the legislature authorized the creation of a Conservation Commission to investigate the general problems of public policy involved in the fuller development of the state's water resources and to report its findings to the next regular session of the legislature in 1913.

On the grounds that the riparian doctrine excluded the use of water on non-riparian land, the Conservation Commission found that "enormous quantities of water, which might be, and ought to be put to some beneficial use are permitted to run to waste into the ocean without doing anybody any good, and in districts subject to flooding doing great harm."[36] In conclusion, the commission looked "with great disapproval upon this right and privilege of the riparian proprietors to waste and turn into a devastating element a most valuable natural resource."[37] A reformulation of the law of water rights on the basis of the appropriation doctrine was recommended following a similar course of action which had

been taken by the state of Oregon. The acquisition of water rights under the appropriation doctrine was recommended as the basis for a water policy to assure comprehensive development of the state's water resources.

The Water Commission Act, as passed by the Legislature in 1913, declared all surface waters not "reasonably needed for useful and beneficial purposes" on riparian lands nor "otherwise appropriated" to be "public waters of the State of California."[38] The failure of riparian proprietors to put water to "a useful and beneficial purpose" in a period of ten years following passage of the act was declared to be a "conclusive presumption" that the water was not needed upon riparian lands and that the unused water was available for appropriation.[39] The declaration that "unused" water constituted surplus water available for appropriation would have converted rights of riparian proprietors to the equivalent of an appropriation. A right would have vested only to that quantity of water put to a useful and beneficial purpose under the terms of the statute.

The "surplus" public waters of the state were made subject to appropriation in accordance with provisions of the act. A State Water Commission was established to determine the extent of the unappropriated waters of the state and to administer procedures for receiving, processing and approving applications to appropriate water in accordance with principles of prior appropriation. In addition, the

a coordinated state water plan. The decision appeared to preclude comprehensive development by permitting riparian proprietors to enjoin those who sought to capture and store flood flows for subsequent use during the dry summer months as an impairment of their right. Projects involving flood control, hydroelectric development, irrigation and related types of use were generally dependent upon large structures to store surplus flood waters.

As a result, the legislature in 1927 adopted a proposed constitutional amendment proclaiming the rule of reasonable use to be the basis of the state's water policy. The amendment was submitted to the voters at the 1928 general election. This amendment, approved by popular referendum, was added as section 3 of Article XIV on "Water and Water Rights." The rule of reasonable use was now made applicable to both surface and ground water supplies.

The reasonable use amendment, quoted more fully in the earlier discussion of California constitutional law, declares that the general welfare of the state requires that its water resources be put to ". . . beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare." The right to the use of water was

limited to "such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water." The riparian right was limited to no more of the flow of a stream than may be used consistent with the rule of reasonable use "for the purposes for which such (riparian) lands are, or may be adaptable." However, a riparian proprietor was protected in his right to make such "reasonable use of the water of the stream to which he is lawfully entitled."[45]

The effect of the reasonable use amendment was to save the State Water Commission Act and its effort to provide for the appropriation of surplus waters beyond the reasonable requirements of riparian proprietors. The validity of an appropriation to waters surplus to the reasonable requirements of riparian proprietors was established by the reasonable use amendment. The amendment also precluded an appropriator from acquiring a prescriptive right against riparian proprietors because an appropriator was lawfully entitled to water beyond the reasonable requirements of riparian proprietors.

Claims to the natural flow of a stream, including usual and ordinary flood flows, no longer came within the scope of a reasonable use or reasonable method of use by riparian proprietors. A prohibitory injunction was no longer

warranted in sustaining the right of a riparian proprietor to the natural flow of a stream where the use or the method of use did not permit reasonable use of surplus water by appropriators. However, the right of the riparian owner is a vested right protected by the reasonable use amendment. A riparian proprietor is entitled to judicial remedy either in the form of 1) some alternative physical solution consistent with standards of reasonable use which will satisfy the riparian proprietor's interest while permitting alternative development of the surplus water by an appropriator[46], or 2) compensation for damages suffered by the riparian proprietor when his unreasonable uses or methods of use were impaired. In the absence of an appropriate physical solution, a riparian proprietor is entitled to damages through inverse condemnation proceeding. Either under the terms of a physical solution or an inverse condemnation, an appropriator sponsoring a new development of "surplus" water is required to assume a burden for the opportunity costs that are inherent in the benefits which others are required to forego as a necessary condition of his proposed development.

Federal adjudication of cases, involving Bureau of Reclamation projects in the Central Valley where Federal law protects vested water rights acquired under state law, has recognized compensation as the only remedy available in Federal law. A physical solution formulated in a Federal district court decree in Rank v. Krug was disallowed by the

United States supreme court in Rank v. Dugan and the complaining parties were limited to a claim for damages against the United States for any partial taking of or interferences with their water rights.[47] In U.S. v. Gerlach, a riparian proprietor was allowed damages for the taking of flood flows used to irrigate "uncontrolled grass lands" along the flood plain of the San Joaquin river.[48]

The rights of a riparian proprietor for irrigation and related on-the-land uses continue to be protected under the reasonable use amendment, but substantial doubts exist regarding comparable rights to in-the-channel uses of a stream. In Rank v. Krug, the claims of riparian proprietors engaged in commercial recreational activities for the maintenance of the fisheries in the San Joaquin river were disallowed.[49] The state of California was held to be the proper party of interest since proprietorship over the use of water for fishing and recreational purposes rested with its public officials. A private person cannot seek relief from damages resulting from the destruction of fish in a river. Whether the state of California has a compensable interest in the opportunities foregone through the destruction of fish resources when water is appropriated for other purposes has never been tested in the absence of a state action to assert such a claim.

Although the method of appropriation was clearly recognized in the reasonable use doctrine, the meaning of the

priority inherent in the principle of prior appropriation--first in time; first in right--became less than clear. The right of a riparian proprietor is protected and that right is a part and parcel of riparian land. Demands for reasonable use on riparian lands may vary over time. The United States by virtue of its ownership of public lands possesses a riparian right of substantial proportions.

In addition, the state legislature has introduced substantial modifications in the basic structure of the appropriation process. In 1927, during the same legislative session that formulated the reasonable use amendment to the state constitution, legislation was enacted directing the Department of Finance to file applications to appropriate unappropriated waters necessary for a general and coordinated program of resource development.[50] These applications cover most of the unappropriated waters of the state which afford opportunities for integration into a coordinated program of development. In 1931 and 1933, the Californial egislature enacted further legislation to subject these state applications to a reservation of prior right to counties and areas-of-origin to use such water as may be necessary for their development. An appropriator wishing to appropriate water covered by a state application must secure an assignment subject to a reservation of prior rights by the counties or areas-of-origin from the State Water Resources Control Board. The State Water Resources Control Board also uses similar

language in issuing licenses for the appropriation of water. As a consequence, the priority inherent in the principle of prior appropriation is a matter of substantial ambiguity.

The relationships among the various species of water rights under the reasonable use doctrine have by no means been resolved. Claims to various rights have been asserted as a basis for using water. When taken together these various means for claiming a water right afford substantial equality among proprietors in securing access to some form of water supply. Each proprietor in turn can use various means for defending his right to use water.

Whether the divergent principles inherent in the different species of water rights will be adhered to indefinitely is a matter of some doubt. In the adjudication of water rights to ground water basins in southern California, the procedure of inverse condemnation was disallowed on the grounds that all uses were effectively dedicated to public use whether or not a particular proprietor was a public agency.[51] Distinctions between overlying rights and appropriative rights to ground water were not considered in making a pro-rata allocation to each user in establishing his adjudicated right to the determined safe yield of the basin. If such principles of adjudication were extended to surface waters to include reference to the conjunctive use of both surface and ground water supplies in any particular water basin, then the different species of water rights

would tend to merge into a claim for an equitable allocation under the reasonable use doctrine. In that case, anyone who had gained lawful access to a source of water supply would be entitled to an equitable allocation and all water rights under the reasonable use doctrine would be correlative rights.

Concluding Analysis

California's experience in the allocation of rights to use water has substantial implication for anyone concerned with water policy as choice among alternative arrangements for water resource development. First, that experience includes reference to several alternatives for establishing a property right to the use of water. Second, that experience was marked by substantial controversy contributing to a clarification of some of the economic and political consequences which flow from a decision to act upon one or another of those alternatives. Finally, this experience should point to some tentative conclusion regarding the rationale that might be used in choosing one or another of these alternatives.

This concluding analysis will turn first to an assessment of the distributional consequences which can be expected to flow from the use of each different type of water rights upon economic opportunities to use and control water resources

and upon the exposures and risks which are assumed by those who are excluded by the structure of rights when they pursue opportunities for water resource development. The analysis will conclude with a consideration of the rationale which might be used in choosing among these alternatives.

Distributional Consequences

Pueblo Rights

A pueblo right gives a pre-emptive advantage to any organized municipality which is a successor to a pueblo grant under Spanish law to monopolize the water supply in a tributary basin whenever that water is needed to meet the demands of that municipality. Residents living in a watershed subject to a pueblo right have a substantial incentive to annex to that municipality to gain access to its water supply. Those unable or unwilling to annex are exposed to actions which will deprive them of local sources of supply and require them to develop an alternative source of supply external to their local environs. Such conditions interpose high costs of development upon neighboring communities located in the same watershed with a municipality holding a pueblo right.

Prior Appropriation Rights

The principle of prior appropriation allocates rights to the use of water supply on the basis of first-in-time; first-in-right. If an initial condition of equality exists

among appropriators, if rights are acquired to relatively small increments of water supply, and if such rights are readily transferrable, then the doctrine of prior appropriation would provide for a relatively equitable means of allocating water rights among competing claimants.

Where these conditions of equality, small and numerous holdings, and transferability cannot be met, the doctrine of prior appropriation can be expected to generate serious inequities. These conditions did not prevail in California, except in the early mining camps. Much of the preferred valley lands in California had passed into private ownership during the Spanish and Mexican periods in the form of large ranchos for raising cattle. In addition, large blocks of land had been granted by the Federal government to railroads and to developers interested in reclaiming swamp and overflow lands in the Central valley. When the Kern River Land and Canal Company, for example, filed for an appropriation on the Kern river, its filing proposed to divert the full flow of the river for irrigation purposes. Under these circumstances, the principle of prior appropriation can be used by a very large entrepreneur to gain control over a resource vital to the development of an arid region. Through that control, such an entrepreneur would be in a position to extract an economic rent from all economic activities dependent upon his original appropriation.

The doctrine of prior appropriation also involves an unequal assignment of exposures and risks which falls disproportionately upon junior appropriators and other potential users. This circumstance creates a substantial impediment for individual incentives to undertake economic activities dependent upon water supplies. Only a well-established agency can assume the high development costs for incremental sources of water supply where senior appropriators have no incentive to share the costs of providing for supplemental supplies.

The emphasis of the prior appropriation doctrine upon beneficial consumptive use also implies a bias for the development of water for on-the-land uses to the potential detriment of various non-consumptive, in-the-channel uses of a stream. In some arid regions where streams maintain an irregular pattern of flow insufficient for regular non-consumptive uses, an emphasis upon consumptive uses can be entirely appropriate. In other regions where streams maintain perennial flows capable of supporting various non-consumptive uses, the doctrine of prior appropriation in itself provides an insufficient basis for attaining a balanced development between consumptive and non-consumptive uses of water resource systems.

The principle of prior appropriation has led to the claim by several western states, that the United States as the proprietor of large tracts of public lands has no right

to the use of water except through procedures of prior appropriation under state law. The same principle applies to state agencies, such as the fish and wildlife agencies, in relation to the quantities of water which may be necessary for the maintenance of stream flow and the preservation of various in-the-channel uses. Diligence by prior appropriators can lead to a pre-emption of water for on-the-land uses to the detriment of public uses of a flowing stream.

Riparian Rights

The doctrine of riparian rights where riparian proprietors are entitled to the full and natural flow of a stream limited only by the right of other riparian proprietors to a reasonable use of a stream in like circumstances has meant that appropriators could be excluded from access to water supplies for use on non-riparian lands. Chief Justice Lucien Shaw of the California Supreme Court confirmed this conclusion in the following observation:

> If the doctrine of the riparian rights had been strictly enforced in all cases by the abutting land owner, it is obvious that it would have prevented all use of the waters of streams passing through lands in private ownership, on any non-riparian lands. The rightful use of such waters on non-riparian land would have been impossible, for such landowners could not lawfully take out the water without impinging upon the right of every riparian owner along the stream to have the water flow as it was accustomed to flow.[51]

Such a system of water rights could have lead, if enforced,

to serious distortions of economic development in California.

However, the costs of enforcement were such that smaller riparian proprietors could gain no net advantage from enjoining appropriators so long as water was available to meet their essential requirements. Justice Shaw has described the strategic opportunities which can be pursued when such circumstances prevailed:

> Any person who does not own land on a stream may obtain access to the water thereof by purchasing the right to do so from the owner of any parcel of riparian land. Usually the banks on larger streams are so high that the owner of a small tract cannot bring the water upon his land, except by diversion on the land above him, to which of course, he must have the consent of the owner thereof. Such owners frequently made little use of the water for irrigation and were indifferent to their riparian rights therein. Hence they usually made no objection to a diversion therefrom until five years had elapsed. The large diversions, almost without exception, have been made near the point of emergence of the stream from the mountains, where land had little value for any purpose, and where the diversion would have little effect on the land nearby and were so far from the land seriously affected thereby that they provoked no immediate opposition. In these ways and for these reasons, innumerable prescriptive rights to the use of the water of streams have been acquired from the riparian owners of private land, either without objection or by successful litigation. As a net result, the irrigated land in the state is almost all non-riparian, and the existence of the riparian right has not prevented the beneficial use of the greater part of the waters of the streams.[53]

The large riparian proprietor was in a substantially different strategic position. If appropriators could be

enjoined from diverting water for use on non-riparian lands, those lands would have negligible economic value and could be acquired at a relatively low price. Once the riparian proprietor had acquired the non-riparian land, he could divert water to those non-riparian lands. Unless he was challenged by some other riparian proprietor, he could acquire a prescriptive right to the continued use of that water once adverse use for a period of five years had run its course.

Miller and Lux, as the dominant riparian interests on the San Joaquin river, were able not only to protect their claims as riparian proprietors owning land for more than one hundred miles along the San Joaquin river, but to acquire prescriptive rights for large tracts of adjoining lands not riparian to the river. When the Bureau of Reclamation undertook to divert San Joaquin water from Friant dam into Tulare basin and to supply the lower San Joaquin from the Delta-Mendota Canal, the Bureau agreed to deliver in excess of 1,000,000 acre-feet of water annually to Miller and Lux and its subsidiary interests. As the Conservation Commission of 1911 recognized, the doctrine of riparian rights, as formulated prior to the adoption of the reasonable-use amendment, created an opportunity for the pursuit of legal strategies where "the largest purses can indefinitely harass and annoy those whose purses are not so large."[54]

The riparian doctrine as construed by the California courts prior to 1928 creates difficulties for municipalities, public corporations or privately-owned water utilities to establish a right to the use of water for sale to non-riparian residents. A municipal corporation can hold a riparian right only for that riparian land which it owns. It cannot exercise a riparian right to supply water for customers who do not hold land immediately riparian to a stream. These water purveyors stand as appropriators and are required to rely upon their powers of eminent domain to defend rights to the use of water as against riparian proprietors.

Substantial inequities and distortions in patterns of economic development flow from an effective application of the riparian doctrine in an arid region. These consequences are ameliorated by the costs of enforcement and by the uncertainty that prevailed regarding the legal status of rights acquired by prior appropriation. Appropriators can defend their taking of water as a prescriptive right acquired by adverse possession and use where the period of prescriptive use has run its course. Strategic opportunities available prior to 1928 enabled large riparian proprietors to preclude appropriators from diverting water to non-riparian lands and thus enabled these riparian proprietors further to extend their landholdings.

The basic principles inherent in the riparian doctrine are congruent with the maintenance of in-the-channel uses of a perennial stream. However, such rights are also related to problems of public proprietorships and raise questions as to who is entitled to a remedy at law in the assertion of such a claim.

Ground Water Rights

The California doctrine of ground water rights allowed anyone who could gain lawful access (i.e., not trespass) to a ground water supply to extract ground water either for use on overlying lands or on non-overlying lands so long as that use was reasonable and was undertaken by reasonable methods of use. As long as supplies were adequate to meet demands, the rules applicable to ground water rights permitted an equitable use of water for a variety of agricultural and urban land uses.

Long-term cyclical variations in patterns of precipitation lead to substantial variations in supply. Because these cycles occur over a period of a decade or more, substantial elements of uncertainty existed in determining when long-term demands would exceed long-term supply. The period of adverse use when the taking of water could ripen into a prescriptive right is only five years. This circumstance added substantial risk to the difficulty of knowing when demands exceeded supplies.

The relatively large quantities of water which became available from ground water sources after the development of the deep-well turbine pump provided an alternative source of water supply for most water users in California during the period of debate over water law from 1910 to 1928. The availability of alternative sources of ground water supply under rules which interposed minimal constraints upon water users alleviated the danger that large appropriators would dominate the primary sources of supply.

The correlative nature of California ground water rights implied that the costs of adversity would be shared proportionately among all water users. When demands exceeded supplies, water rights became subject to adjudication by a proportionate reduction in the amount of water pumped by each and every user. Under these circumstances, each pumper had an incentive to develop alternative sources to augment his ground water resource and to undertake joint efforts to manage the ground water supply to maximize net return.

The reasonable use amendment extended the principles applicable to ground water rights to the users of surface waters and placed riparian proprietors and appropriators on an essential parity with one another. Whether the net effect will be to place all proprietors claiming rights to the conjunctive use of both surface and ground water supplies under California law on an essential parity with one another remains to be seen.

Rationale for a Choice Among the Alternative Forms of Water Rights

In view of the distributional consequences which flow from each of the different doctrines of water law and the implication of those distributional consequences for biasing economic development in different ways, some standard of evaluation is necessary to provide a rationale for choice among the alternative forms of water rights. As indicated in Chapter 2, I shall assume that a democratic society requires a strong presumption for an equality of opportunity among the persons living in such a society. I shall assume that the choice of a legal institution establishing a property right to the use of water to meet this presumption should conform to the requirements that 1) each person will have an equal right to the most extensive opportunities compatible with a like right to all other individuals and 2) inequalities in opportunities are tolerable only a) if such inequalities work out to everyone's advantage and b) if access to the positions created by such unequal opportunities are open to all.[55]

If we use these criteria for choice, the constraints inherent in the law relative to pueblo rights, prior appropriation rights and riparian rights all fail to meet the test of equality of opportunity essential for a democratic society. The law of pueblo rights can provide an equitable solution only so long as competing interests do not exist

outside the boundaries of a municipality having a pueblo right to the water in a particular watershed. The pueblo right cannot provide an equitable solution to an assignment of property rights in an extensive watershed where a large variety of diverse social and economic interests exist.

Similarly the law of prior appropriation fails to meet the essential test whenever the availability of large landholdings permits a relatively few proprietors to acquire monopoly power over very large increments of water supply. Where an essential equality of conditions prevails among the individuals making use of the available supply, where the quantities of water held under such rights are small and numerous and where such rights are readily transferable, the law of prior appropriation can meet the test of providing substantial equality of opportunity. These conditions may apply in many of the western states where the homestead policy resulted in numerous small grants of land to bona fide settlers or where relatively small-scale enterprises were established upon lands in the public domain. Such conditions, however, did not prevail in California except in very limited circumstances.

The law of riparian rights as construed by the California Supreme Court prior to 1928 clearly fails to meet the test of substantial equality of opportunity under conditions prevailing in California. Extensive reliance upon the assertion of a prescriptive right through adverse use over a

five-year period ameliorated the force of this constraint but engendered suspicion among neighbors. The strategy of the appropriator was not unlike that of the highwayman: Take what you can get and be prepared to defend what you have got!

The riparian doctrine qualified by a rule of reason to allow the use of water on non-riparian lands may provide a legal arrangement which permits substantial equality of opportunity so long as aggregate supplies exceed demands. In areas where water supplies are relatively abundant, a qualified law of riparian rights may provide a reasonable base for allocating rights to the use of water.

Given the serious shortcomings in the primary rules for allocating rights to the use of water under both the prior appropriation and the riparian doctrines, it is not surprising that the law of water rights should have become a primary political issue in California which was engaged in every major political arena in the state. Only recourse to processes of constitutional decision making resolved the conflict. The reasonable-use doctrine, drawn from the California law of ground-water rights, would appear to meet the criteria for substantial equality of opportunity when extended to the conjunctive use of surface and ground-water supplies. Anyone who can gain lawful access to a source of water supply is entitled to make reasonable use of that water supply subject to the right of all others similarly situated to make reasonable use of that same source of supply.

Where supplies exceed demands, minimal developmental costs are imposed as a legal or political condition for acquiring a right. Anyone adversely affected can initiate action wherever someone's use or method of use is unreasonable and causes injury to others.

Where demands exceed supply, the correlative character of water rights under the reasonable use doctrine would imply that each user assumes his proportionate share of the costs either through a pro-rata reduction in his water supply or by undertaking efforts to develop supplementary sources of supply. The implication of equality of opportunity is inherent in the reasonable use doctrine, and its translation into specific decision making arrangements depends upon the decision rules adopted for the organization of various water agencies created to serve different communities of water users.

The law of water rights, thus, provides only a limited and partial solution to the choice of institutional arrangements for water resource development. The doctrine of reasonable use sustains substantial equality of opportunities so long as supplies exceed demands. Efforts to organize water agencies to act on behalf of different communities of water users will introduce substantial inequalities in the decision making capabilities exercised by those who undertake joint efforts on behalf of such communities of water

users. The issues raised by the organization of water service agencies will be pursued in Chapter 7 and in Chapter 8.

FOOTNOTES

[1]Vincent Ostrom, Water and Politics (Los Angeles: The Haynes Foundation, 1953), 31-36.

[2]City of Los Angeles v. City of Glendale; City of Los Angeles v. City of Burbank, 23 C. 2d. 68, 76 (1943).

[3]City of Los Angeles v. Los Angeles Farming and Milling Company, 152 Cal. 645, 653-54 (1908).

[4]Whether a pueblo right, if no surplus exists, can be lost by prescription is an issue currently being litigated in City of Los Angeles v. City of San Fernando, et al. Los Angeles Superior Court Case #650079.

[5]George P. Costigan, Handbook on American Mining Law (St. Paul, Minn.: West Publishing Co., 1908), 5-6. Emphasis added.

[6]Irwin v. Phillips, 5 Cal. 140 (1855). The United States Congress also acted through the public land laws of 1866, 1870 and 1877 to confirm the possessory interests of miners and others pursuing economic interests on the public domain to water rights established by prior appropriation. See: Chapter 5,

[7]California, Civil Code (1872), sec. 1422.

[8]This assertion should be qualified by reference to the statutory reservation contained in the areas-of-origin legislation. Infra., 244-245.

[9]Conger v. Weaver, 6 Cal. 548 (1856); Kelly v. Natoma Water Company, 6 Cal. 105 (1856).

[10]Lux v. Haggin, 69 Cal. 255, 339-340 (1884).

[11]Ibid.

[12]Joseph K. Angell, A Treatise on the Law of Watercourses, 3d. E. (Boston: Charles C. Little and James Brown, 1840), 11.

[13]Ibid.

[14]Ibid., 13.

[15]Ibid.

[16]Lux v. Haggin, 69 Cal. 255, 391 (1884).

[17]Ibid., 390.

[18]Lux v. Haggin, op. cit., 395-396. Municipalities, public districts or privately-owned water utility companies cannot exercise a riparian right in California law to serve customers who do not hold land immediately riparian to a stream. Such water purveyors were required to stand as appropriators and to defend their right to take water by condemnation or by prescription.

[19]Miller and Lux v. Madera Canal and Irrigation Company, 155 Cal. 59, 64 (1907). Emphasis added.

[20]Herminghaus v. Southern California Edison Company, 200 Cal. 81, 91 (1926).

[21]Gallatin v. Corning Insurance Company, 163 Cal. 405 (1912) provides a divergent doctrine to the general trend of cases. This case held that the riparian owner did not have a right to the "extraordinary storm waters" of a river. This conclusion was applied to a coastal stream where flood waters are more vagrant, less predictable and thus less amenable to regular use.

[22]Lux v. Haggin, op. cit., 394.

[23]Gould v. Eaton, 111 Cal. 639, 644-645 (1896).

[24]Ibid., 140.

[25]While a number of contemporary authorities refer to this ground water right as the "correlative right," I would prefer to identify the doctrine as the right of the overlying owner. The right is a correlative right but so is the riparian right; and other rights may have certain correlative characteristics. I prefer to discuss the correlative character of various doctrines of water and avoid confusion in this discussion by characterizing the ground-water right of the overlying owner as "the right of the overlying owner," or "overlying rights."

[26]San Bernardino v. Riverside, 186 Cal. 7, 14 (1921).

[27]Ibid., 136. Emphasis added.

[28]Burr v. Maclay Rancho Water Company, 154 Cal. 428 (1908).

[29]San Bernardino v. Riverside, op. cit., 17.

[30]California, Civil Code, sec. 1007.

[31]Wells A. Hutchins, The California Law of Water Rights, 322ff.

[32]Scott v. Fruit Growers' Supply Company, 202 Cal. 47, 52 (1927). This rule applied until the adoption of the "reasonable use" amendment to the California state constitution in 1928.

[33]San Bernardino v. Riverside, op. cit., 12.

[34]Message of the Governor, reproduced in Franklin Hichborn, Story of the Session of the California Legislature of 1911 (San Francisco: John H. Bondy Co., 1911), Appendix, xiv.

[35]Ibid.

[36]California, Conservation Commission of 1911, Report, (Sacramento: Superintendent of State Printing, 1912.)

[37]Ibid., 28.

[38]California, Statutes, 1913, 1017-18.

[39]Ibid., 1018.

[40]Tulare Water Company v. State Water Commission, 187 Cal. 533 (1921).

[41]Ibid., 543.

[42]Herminghaus v. Southern California Edison Company, op. cit., 101.

[43]Ibid.

[44]Ibid.

[45]California Constitution, Art. XIV, sec. 3.

[46]Peabody v. Vallejo, 2 Cal. 2d., 351, 377-383 (1935). The relief afforded by a form of judgment calling for a physical solution can be illustrated by reference to the Peabody case. The Town of Suisun, one of the plaintiffs, was the owner of one acre of land in the Suisun Valley where it had located wells and pumping plants for a standby or emergency water supply. The city contended that the full flow of the stream was required to press water into the underground acquifers in order to maintain its ground water supply. The court held such a requirement to be unreasonable. Suisun's rights could be adequately protected by a judgment declaring the priority of its right as against the defendant and "if necessary, the

duty [could be] imposed upon the defendant to make up the loss, if any, in kind, thus supplementing the town's supply to the extent of the loss by means other than by the percolating water process." (381-382. My emphasis.) Vallejo was able to proceed under these terms with alternative plans to develop the surplus water in Suisun Creek.

[47] Rank v. Krug, 142 Fed Sup 1. S.D. Cal., (1956).

Dugan v. Rank, 372 U.S. 609 (1963).

[48] U.S. v. Gerlach Live Stock Company, 339 U.S. 725 (1949).

[49] Rank v. Krug, 90 Fed. Sup. 773, 801 (S.D. Cal., 1950).

[50] California, Statutes, 1927, Ch. 286, 508-509.

[51] Pasadena v. Alhambra, 33 Cal. 2d. 908 (1949).

[52] Lucien Shaw, "The Development of the Law of Waters in the West," California Law Review, X (1922), 443, 455.

[53] Ibid.

[54] California, Conservation Commission of 1911 Report, 27.

[55] These criteria are based upon the principles of justice as fairness formulated by John Rawls. Their application to the choice of institutional is presented in John Rawls, "Constitutional Liberty and the Concept of Justice," Chapter 6 in Carl J. Friedrich and John W. Chapman, eds., Nomos VI: Justice (New York: Atherton Press, 1963), 100.

Chapter 7

ORGANIZATION OF WATER SERVICE AGENCIES: THE INFRASTRUCTURE

Introduction

The provision of water services may be undertaken by different forms of collective enterprise. Whenever economies of scale can be derived from using a single system of works to supply numerous users, advantage can be gained from the use of collective enterprises to provide water for such on-the-land uses as irrigation, domestic, municipal or industrial supply. Various forms of collective enterprise may also be used to undertake the management of water supply systems so as to sustain the value of the common resource for several joint and alternative uses.

As indicated in the Introduction to Chapter 6, various on-the-land uses of water most closely approximate the conditions of exclusion which enable water services to be vended as a private good. Water for such uses is typically confined in a system of works. The potential consumer can be excluded from enjoying the use of water unless he agrees to meet the terms and conditions, including the payment of a price, required by the vendor. The provision of water as a marketable commodity, however, occurs under circumstances of highly imperfect market arrangements. Once a distribution

system has been established to provide water for a particular service area, the likelihood that a competitive vendor will offer services to the same service area is virtually nil. As a consequence, the force of direct competition is unlikely to exist. Water markets will manifest substantial tendencies toward monopoly organization and are thus highly imperfect markets.

The flow-resource characteristic of many on-the-land uses of water leads to a variety of institutional difficulties in the organization of water distribution systems. A distribution system capable of delivering large quantities of water must have a continuous flow uninterrupted by the happenstance of intervening ownership of property. Again the structure of incentives inherent in a common property resource arises. If each land owner were free to hold out for as much as he could get before granting an easement for a pipeline, the costs of acquiring rights-of-way for water distribution systems would become extraordinarily high. Such costs would be to the long-run disadvantage of the aggregate community of water users. As a result, the power of eminent domain is usually made available to any enterprise, private or public, offering water services to the public. A water distribution system can, then, be constructed at less cost. Compensation is required only for the opportunities foregone by intervening landowners because their land is occupied by an adverse easement.

In exchange for the power to traverse the property of unwilling landowners when constructing water distribution systems an entrepreneur assumes a liability to public regulation of his water pricing and service policies.

Other flow characteristics engender problems in the operation of water distribution systems and have significant implications for the organization of water service agencies. Fire suppression is an important use of water in a domestic or municipal supply system. Such a use depends upon the flow characteristics of the distribution system. These "fire flow" characteristics, in turn, enter into the calculation of fire risk and fire insurance rates. Similarly, water quality standards in relation to public health requirements are incidental characteristics of the water supplied through a distribution system. Grievances associated with the "lack of water" for fire protection purposes and epidemics of water-borne diseases have been important factors leading to shifts in institutional arrangements for the distribution of municipal water supplies from the private to the public sector during the course of this past century.

Finally, an additional problem associated with the flow resource characteristics of water diverted for on-the-land uses arises from the return flow which is residual to any particular pattern of use. Water is rarely consumed in toto. The residual supply of municipal systems is often

used to dispose of wastes through sewers before the residual is again allowed to intermingle with other water forming the corpus of a natural supply system. The degradation of water quality may pose serious problems for downstream users.

Even more difficult problems arise in the provision of water services associated with in-the-channel uses or with the management of the joint supply inherent in a water supply system as a common property resource. All who can gain access to a stream are free to enjoy its in-the-channel uses. Within broad tolerances, use by one may not preclude or interfere with use by others. In this sense, in-the-channel uses are commonly referred to as "non-consumptive" uses of water.

The physical conditions bearing upon various in-the-channel uses give rise to different opportunities for constituting appropriate organizational arrangements to develop and manage such services. The provision of flood control facilities and the regulation of a stream for flood control purposes provides a benefit to the affected property owners which is available to all in like circumstances. None can be technically excluded from enjoying the benefit. A charge for flood control service cannot be instituted except as a compulsory tax levy. The task of devising a tax which would function as an efficient service charge proportional to the benefit received from flood control

efforts would be difficult to devise short of a compulsory system of insurance for flood damages.

On the other hand, the use of water for sports fishing can be subject to exclusion by prohibiting all without a license from fishing. A license fee is the equivalent of a price charged by a legal monopoly. But fish and game departments cannot exercise effective monopoly control over anadromous salmonoid fisheries in the open ocean. The common pool problems involving anadromous fisheries, thus, are of fundamentally different proportions than the common pool problems involving flood control and the discharge of flood waters.

The use of a river for navigational purposes is somewhat analogous to its use for fishing purposes. Improvements to enhance navigation can be financed by a service fee charged upon those using a stream for navigational purposes. While exclusion is technically feasible and service fees can be established to place the burden for the cost of an improvement upon the beneficiaries, a problem may arise over the economic feasibility of establishing such marketing arrangements. If the cost of collecting service charges exceeds the revenues produced, then a system of service charges would not be warranted on economic ground.

The use of the hydraulic gradient of a stream for the production of hydroelectric energy is relatively easy to conceptualize in economic terms. At the production level

the use of a stream for the generation of power is a part and parcel of the common-pool, flow-resource situation. However, electrical power can be metered and sold under circumstances that are crudely analogous to, but simpler than, the distribution and sale of water for on-the-land uses. Electrical energy as a product derived from a common-pool resource can be metered and sold to the ultimate consumer.

Thus, the provision of different types of water services gives rise to special problems in developing appropriate organizational arrangements in a water economy. Varying organizational arrangements may be available to provide particular types of services and create opportunities for choices as among the alternative forms of organization. Where a competitive choice is not directly available among vendors of water services, a choice may be available from among alternative institutional arrangements for organizing water service agencies. In the absence of opportunities for a competitive economic choice, an opportunity for a political choice of alternative organizational arrangements may have consequences similar to those which would be engendered by a competitive market economy.

In this chapter on the organization of water service agencies, we shall examine the different organizational arrangements which form the basic infrastructure of the California water industry. Consideration will be given

first to the two different forms of private enterprise: the non-profit, mutual water companies and the profitable, or commercial water companies. Municipal departments or municipal utility systems will be examined next. Consideration will then be given to the variety of public water districts which render many different services in the California water industry. These are the principal forms of organization used to supply water services to local communities of water users.

Mutual Water Companies

Many of the early water resource developments in California were undertaken by private enterprise, largely as an adjunct of land development efforts. In the case of a mutual water company, a developer or a group of settlers acting jointly would acquire a large tract of land for development by irrigated agriculture.[1] The land was frequently subdivided into small parcels and the settlers generally planned to cultivate orchard crops, grapes or other farm products with a comparatively high cash return.

In organizing these land development efforts, developers would organize two distinct enterprises--a land company and a water company. All water rights appurtenant to the land were separately conveyed to the water company. A system of water works to supply the various parcels of

provision are applicable to other municipal activities that impinge upon municipal water services.

Municipalities, in contrast to most public water districts, are specifically authorized by the California constitution to provide water and related utility services to persons outside city limits. Extra-territorial service to another municipality can only be provided with the consent of such a municipality expressed by ordinance.[25] Both the extra-territorial operations of a municipal water system and the annexation of adjoining unincorporated territory is a potential source of rivalry between municipalities and other types of water service agencies.

The general concept of a municipal corporation, which has its fullest development in the organization of home-rule cities, has a number of attributes which makes it a useful model for the organization of many different forms of public enterprise. A municipal corporation is a form of public corporate organization authorized under the laws of a state for use by a community of people to create an organization to provide for local public needs. The act of organizing a municipal corporation, especially in the home-rule tradition, permits substantial felxibility in defining the area to be included within the incorporated unit. The government of a municipal corporation is generally vested with elected officials who represent the members of the community who form the corporation. A

municipal corporation, in the case of a home-rule city, may even formulate its own charter as a constitutional arrangement for determining what municipal services shall be provided for the local community, what powers may be exercised over its municipal affairs and how its government shall be organized. Provisions for legislation by initiative petition, for referenda, for the recall of public officials and for popular participation in the revision of municipal charters are common features of municipal government in California.

While cities may themselves be characterized as general-purpose municipal corporations, they often come to resemble holding companies exercising limited control over semi-autonomous departments having quasi-corporate status of their own. Municipal water departments and other municipally-owned utility operations are especially apt to acquire semi-autonomous corporate status within the structure of city government. The organization of municipally-operated, water service agencies forms part of a complex structure of political and administrative decision making arrangements associated with the concept of local self-government as expressed through the provisions of a city charter.

Public Water Districts

Public water districts were first developed in California to provide water services in rural areas. Their form of organization included many features of the mutual water company with the addition of important governmental powers of taxation and of eminent domain. The variety of public water districts authorized by the California legislature has greatly expanded as the California water industry has grown. Different types of districts have been created to provide water services in rural areas and to provide urban-type water services for urban areas not incorporated as municipalities. In each of these types of districts, service is provided to individual water users such as farmers, householders and business firms.

Another type of public water district provides services for other public water districts, municipalities, mutual water companies and commercial water companies and has come to have an important place in the California water industry. These districts usually operate as intermediate producers and wholesalers of surface water supplies or as agencies responsible for managing ground water supplies. I shall arbitrarily refer to this type of public water district as an "overlay agency." The nature of its operation depends upon the existence of a service area or jurisdiction which overlaps the service areas or jurisdictions of several

water service agencies being served by a supplemental water supply. The overlay agencies serving other water service agencies usually have structural characteristics which differ from those public districts supplying water services directly to members of a community. The subsequent discussion of public water districts will distinguish between these two types of organization.

Public Water Districts Providing Water Services to Ultimate Consumers or Final Users

Paradoxically, the first public districts organized to provide water services for farming areas in California were organized to prevent flood damage and to drain swamp and overflowed lands. They were formed near the channels of the Sacramento and San Joaquin rivers, in the Delta region where the two rivers join before flowing into San Francisco bay, and in the lowlands of the Tulare basin. These areas of fertile river-bottom land all required the construction of drainage works and levees to make them available for intensive agriculture. The reclamation districts authorized by state legislation enacted in 1868 contain most of the elements of organization characteristic of public water districts.

The organization of a reclamation district under the reclamation district legislation of 1868 could be initiated by a petition signed by persons holding certificates of purchase or other evidence of ownership "representing

one-half or more of any body of swamp or overflowed, salt marsh or tide lands susceptible of one mode of reclamation . . . ."[26] The county board of supervisors was required to hold public hearings upon the petition. Upon finding that the boundaries of the district had been properly drawn and the petition had been properly formulated, the board could issue an order creating a reclamation district.

Once organizing formalities had been completed, the petitioning land purchasers were authorized to "ordain and establish such by-laws as they shall deem necessary to effect the work of reclamation and keep in repair."[27] The petitioners were also authorized to elect three of their number to act as a board of trustees in managing the affairs of the district. Both the adoption of the by-laws and the election of the board of trustees were to be accomplished "by the votes and signatures of the holders of certificates of purchase or patents representing at least one half of the land sought to be reclaimed."[28]

The board of trustees was vested with authority to elect one of its own members as president and to employ engineers and others "to survey, plan, locate and estimate the cost of the works necessary for reclamation; to determine the lands that would be needed for rights of way, drains, canals, embankments, etc.; and to construct, maintain and keep in repair all works necessary for the object

in view."[29] The board of trustees of any reclamation district for which by-laws had been recorded was also vested with power to acquire property, both within and without the district, that was necessary for the reclamation plan and to provide "materials for the construction, maintenance and repair thereof."[30] If a voluntary purchase could not be made, the board of trustees was given the authority to acquire land and materials by condemnation proceedings.

The board of trustees was authorized to execute the necessary reclamation works either "by contract or by day's work," or by both modes depending upon which in their judgment was "most conducive to economy, security and perfection in the work to be done."[31] The trustees were required to keep an account of all expenditures and a record of all contracts which were to be open "to the inspection of any person interested in the district, or their agents or attorneys and to the Board of Supervisors."[32]

Once a plan of works had been approved and an estimate of cost made, "together with estimates of incidental expenses of superintendence, repairs, etc."[33] the board of trustees was required to submit these plans and proposals to the county board of supervisors (or to the several boards if located in more than one county). The board of supervisors was then required to appoint a board of three assessment commissioners. The assessment commissioners were required to "jointly view and assess upon each

and every acre to be reclaimed or benefited thereby a tax proportionate to the whole expense and to the benefits which will result from such works."[34] The tax was to be collected and paid into the county treasury and placed into an account to the credit of the district. The assessment was, in effect, a lien against the land. Any purchaser of a tract of unsold state land located within a reclamation district with recorded by-laws was required by the law to take the land, "subject to all of the provision of said by-laws, and the assessments levied in pursuance thereof, and shall have all the rights and privileges enjoyed by the original signers . . . ."[35]

Most of these elements remain as a basic part of the legal structure of reclamation districts in contemporary California law. The function of reclamation by drainage has been supplemented to permit reclamation districts also to perform the function of supplying water for irrigation.[36] Districts are now permitted by statute to enlarge their boards of trustees to five or seven members.[37] Regular elections are required at two or four-year intervals.[38] The voting formula now provides that each landowner in the district may cast "one vote for each dollar's worth of real estate" owned by him in the district.[39] The board of trustees also has the optional authority to provide for the levy of an ad valorem tax on all land and improvements in the district to pay operation and maintenance assessments.[40]

Reclamation districts may issue bonds as a means of financing assessments other than operation and maintenance assessments. A bond issue must be approved by the landowners of the district by a majority of the votes cast at a special election.[41]

The beginnings of modern public districts is often identified with the Wright Act of 1887 authorizing the creation of irrigation districts. The Wright Act provided for a more carefully delineated structure of government with a board of directors, an assessor, collector and treasurer elected for four-year terms of office by all residents of the district qualified to vote under the general election laws of the state. The corporate powers vested with the board of directors in irrigation districts are broadly defined. In the course of time, the powers have been extended to include provision of many services other than the irrigation of agricultural lands. Irrigation districts have substantial authority, subject to voter approval, to create bonded indebtednesses. A combination of taxes and service charges could be levied to meet both capital costs and current operating expenditures. Subsequent legislation has introduced limits which confine district taxes, for example, to levies upon land values rather than upon real property generally. Irrigation districts were organized for much larger undertakings than was originally implied by reclamation district legislation.

Most public district laws like the reclamation district legislation include provisions for 1) the services to be performed, 2) incorporation standards and procedures, 3) organization of district government, 4) general statement of corporate powers, 5) specific taxing, borrowing and spending authority, and 6) methods of reorganization including annexations, mergers and dissolutions. Other legislation also places substantial emphasis upon provisions concerning 1) water rights, entitlements, and water distribution policies, 2) contractual and agency relationships with other water service agencies, and 3) organization of special improvement districts or zones of benefit for specialized services rendered to a limited area within a public water district.

Incorporation procedures for some public water districts providing water services to individual users have reference to a state agency such as the Public Utilities Commission or the Department of Water Resources in addition to or in substitute for county boards of supervisors. Since 1965, county boards of supervisors are also required to refer all incorporation of public districts and district reorganization proposals to a local agency formation commission for review and recommendation. Incorporation standards vary with the services to be performed.

The government of most public districts is vested with a governing board elected to represent local water users.

In most urban water districts and in irrigation districts, each citizen, resident in the district, is entitled to vote. Some rural districts assign votes in proportion to the acreage or assessed valuation of the land included in the district or receiving water services. The fiscal authority of all public water districts is subject to special provisions. Districts are never given general and unlimited power to tax and to spend funds. As districts undertake more diverse functions, authority to establish special improvement districts has increased significantly. The provision of domestic water supply in an irrigation district, for example, may be organized through a special improvement district and the costs of that improvement can be assessed only upon those within the improvement district.

Public water district legislation frequently contains special provisions regarding water rights and the entitlement of water users to water supplied by a district. The original Wright Act creating irrigation districts, for example, provided that:

> . . . all waters distributed for irrigation purposes shall be apportioned rateably to each landowner upon the basis of the ratio which the last assessment of such owner for district purposes within said district bears to the whole sum assessed upon the district; provided, that any landowner may assign the right to the whole or any portion of the water so apportioned to him.[42]

These apportionment and assignment provisions are limited to the special case of financing by tax assessment, and do not apply when revenues are derived from tolls or service charges. Where district revenues are derived from tolls or service charges, the law only requires that water be distributed equitably among those offering to make the required payment.[43] The board of directors in each irrigation district is also required to establish "equitable rules for the distribution and use of water, which shall be printed in convenient form for distribution within the district."[44]

In considering the claims of a landowner under an assignment of a proportionate allocation of an irrigation district's water supply, the courts have recognized the validity of such an assignment as between landowners within a district, but have rejected the claims of a landowner to require the delivery of water under such an assignment for use outside district boundaries.[45] The right of a landowner within a district to use the water acquired by the district, as a consequence, is to be exercised in accordance with district legislation providing for the improvement, by irrigation, of lands within the district.

> His right is always in subordination to the ultimate purpose of the trust. So far as he proposes to use the water for the irrigation of lands within the district, he is proposing to use it in furtherance of the purpose of the trust, and is entitled to have distributed to him for that purpose such proportion as his assessment entitles him to.[46]

However, he may not assign his share of water free from this trust for use outside the district. The board of directors of an irrigation district may, however, make a temporary sale of surplus water to users outside a district. Where it has acquired utility obligations as a condition of the acquisition of water rights already dedicated to public service, a district may be required, under terms of law, to provide for the sale of water to users outside the district.

In general, most public water districts are required to provide water services in accordance with general rules where each user is entitled to the same benefits as each other user in his class of service. In this sense, public water districts are subject to a public-utility obligation similar to the utility responsibility borne by commercial water companies.

Public Water Districts Organized to Provide Water Services for Other Water Agencies

The organization of public water districts which provide water services to other water agencies and not for individual water users poses a number of difficulties requiring attention to the special circumstances that are involved in each case. As a consequence where general legislation is used, the number of particular districts incorporated under that legislation will be very small. The Metropolitan Water District Act, for example, has been used to organize only

one such district, the Metropolitan Water District of Southern California.

As demands have increased for the organization of overlay districts, there has been a marked tendency to use special legislation creating a specifically-named district such as the Santa Barbara County Water Authority in preference to general legislation authorizing the creation of county water authorities. Reliance upon special legislation avoids the problem of instituting incorporation proceedings under general law. Where incorporation procedures are used under general laws providing for overlay districts, increased emphasis is placed upon the participation of state agencies, such as the Department of Water Resources, in those proceedings.

Public districts providing intermediate water services are often subject to specific limitations upon the water services they may provide. Metropolitan water districts until recently were explicitly limited to the provision of water at wholesale. Such a provision precludes a metropolitan water district from becomming a fully-integrated water agency. Replenishment district legislation explicitly expresses a preference for the provision of services through contractual arrangements with other water agencies in order "to avoid duplication of similar operations by existing agencies . . . ."[47]

The structure of government within an overlay district providing intermediate water services varies substantially from that of public districts which serve individual water users. The metropolitan water district relies upon a system of indirect representation. The member-units designate representatives to the metropolitan board of directors. Where representatives are elected directly by all voters in an overlay district, such representatives are usually organized in relation to designated districts that take account of subordinate communities of interest. Another method for governing an overlay district which is coterminous with a county is to designate the county board of supervisors as the ex officio board of directors for the district. The State Reclamation Board serves as the ex officio governing board for the Sacramento-San Joaquin Drainage District which has general jurisdiction over reclamation and drainage efforts of local reclamation districts in the Sacramento-San Joaquin basin.

The fiscal powers of overlay districts usually reflect the special circumstances involved in those types of services. A metropolitan water district may levy a tax upon all property in the district to cover capital costs and expenses as well as charge for water sold at wholesale. Member units, however, may exercise an option of paying the equivalent of the taxes levied through special water service charges collected from water users.

Water conservation and replenishment districts have developed assessment levies or "pump taxes" to cover part of their costs by taxing the quantity of water extracted from a ground water basin.

Overlay districts also make extensive use of special improvement districts or zones of benefit in levying taxes where a water service is being provided for the benefit of a limited locality within the district and is not of general benefit for the district as a whole. Some overlay districts are even authorized to establish advisory boards for special improvement districts to take account of local interests within those improvement districts.

Inter-agency relationships between intermediate suppliers and local water service agencies are frequently subject to complex contractual arrangements. The relationship between the Santa Barbara Water Agency and its member units, for example, are established entirely by contractual arrangements. Replenishment districts are required to formulate a management plan as a part of their incorporation procedures which gives quasi-constitutional status to the inter-agency agreements which become a part of its management plan.

Conclusion

The many different forms of public water districts add significant elements in the structure of the California

water industry. In the rare cases, a public district like the East Bay Municipal Utility District may provide a highly integrated form of organization supplying water to all residents in its service area and extending its operation to include the production and transmission of water from distant sources in the High Sierras. In other circumstances, several overlay agencies may coexist in providing different intermediate water services to many different public and private agencies which in turn serve local users. The large number of different types of public water districts permits many variations to occur in the organization of the California water industry.

Concluding Analysis

The different forms of both private and public enterprises which purvey water services for different groups and communities of water users are subject to varying institutional capabilities and limitations. These capabilities and limitations affect developmental opportunities and the distribution of economic gain to be derived from advantageous developments. Those who are in search of an appropriate form of enterprise for undertaking developmental opportunities can be expected to choose the institutional arrangement that will afford greater advantage relative to the opportunities at hand. If these opportunities are

subject to a substantial democratic bias we would expect benefits to accrue to the local residents or property owners who are water users. This concluding analysis makes a preliminary assessment of the allocational consequences which can be expected to flow from different forms of collective enterprise.

Mutual Water Companies

Mutual water companies provide a relatively simple organizational structure which can be developed with minimal organizational costs at the time when a land developer is undertaking a subdivision of grasslands for an irrigated agriculture or of agricultural land for single family residences in a suburban neighborhood. The new residents become shareholders. They acquire votes, choose a board of directors, and participate in the development of water service policies. Under the non-profit form of cooperative enterprise, water-pricing policies tend to minimize the cost of water to the individual shareholder. The community of shareholders tends to capture the economic surplus to be derived from land development opportunities after the initial acquisition of land from the developer.

After land parcels have been subdivided and acquired by separate owners, the difficulties in organizing a mutual water company are very great. Where ground water supplies are readily available, the organizer of a mutual

company is confronted with the availability of an alternative supply for anyone who is willing to pay for the installation of pumping facilities. This difficulty can become a serious obstacle if a mutual were organized to import a supplementary source of water supply. The holdout would be free to pump from ground water supplies and indirectly gain the advantage of the supplemental supply without paying for it. Under these circumstances, the inability of a mutual to include without their willing consent all persons who benefit within its service area can be a fatal weakness. Mutuals do not have the power to tax indirect beneficiaries or force their inclusion within the collective enterprise.

Mutual companies are also subject to serious limitations in their capacity to borrow funds from private investors since improvements do not usually constitute a lien upon the land benefited by the improvement. Federally-guaranteed loans arranged through the Farm Home Administration are means of overcoming this difficulty. Mutual water companies are one of the organizational structures that farming and suburban neighborhoods can use to qualify for Federally-guaranteed loans to install domestic water services.

A mutual company provides for effective decision-making arrangements in the sense that decisions can be taken by majority vote within the specific structure of a

particular mutual water company. The interest of the user-shareholder is the dominant interest in a mutual company. In this sense, a mutual is designed to reflect the interests of water users. When changes occur in the basic nature of the enterprise and in the type of services being provided for water users, mutual companies are apt to be highly inflexible. Boundary changes in service areas are not easily made. The reconstruction of an agricultural supply to meet conditions of urbanization may pose difficulties in a mutual company. Mutual companies are subject to complaints for providing insufficient pressure, capacity and fire-flow in urbanizing areas. When such problems reach critical proportions mutual water companies are likely to be supplanted by municipal water departments or public water districts.

Commercial or Profitable Water-Service Companies

The commercial water company renders a water service for an economic return to the company's shareholders who need not be the company's water users. A conflict of interest between shareholder interests and water user interests is apt to arise. In the absence of public regulation this conflict of interest can reach substantial proportions. The rational entrepreneur managing a commercial water company would attempt to maximize profits by setting prices where his costs of production equal marginal revenue.

He would attempt to practice discriminatory pricing to take advantage of varying demands for water. In such circumstances economic surplus would accrue as a producer surplus in contrast to the consumer surplus accruing to water users in a mutual water company. It is this conflict of interest that gave rise to constitutional efforts to regulate the sale of water in 1879 and a long history of conflict over the organization of regulatory arrangements to control water-pricing and water-service policies of commercial water companies.

The conflict of interest between equity owners and water users in commercial water companies will also be reflected in the development of joint products which accrue to water users. Water pressure and line capacity affect fire-flow potentials. Unless some arrangement exists to compensate directly for fire-flow, a rational entrepreneur would seek to minimize his expenditures for such services. Yet water users will be highly sensitive to the risks they bear in potential fire losses and the costs they bear for fire insurance. Other joint products such as water quality may reflect the same structure of incentives.

The general thrust of public regulatory efforts is to shift the pricing and water service policies of commercial water companies in the direction of the nonprofit mutual companies or public water districts. The equity

interest of the shareholder is recognized by allowing a "reasonable" rate of return for the commercial enterprise. With that modification, price is adjusted from a base which covers the average cost of doing business. In turn, the public regulatory agency is designed to be a mechanism for the representation of user interests in decisions affecting the operation of commercial water companies.

Mechanisms for public regulation may be highly unresponsive to consumer interests. Each individual consumer in taking remedial action will calculate the marginal cost which he must individually bear as against the marginal benefit which will accrue to him. Under these circumstances the costs of taking remedial action will usually exceed the benefits to be derived. The rational utility customer will endure problems without pressing for remedies except in the form of relatively costless efforts. A utility company by contrast may be in a position to make substantial expenditures to influence political decisions without adversely affecting the rate of return for the enterprise. Political expenditures for campaign contributions, lobbying efforts, and public relations campaigns may be allowable expenditures calculated in the cost of doing business before profits are determined. Utility companies, under these circumstances, will have a substantial advantage over utility consumers in political bargaining. This inequality of political effort leads to a

consequence where profitable enterprises in a regulated industry are able to dominate the selection of public comissioners. In such circumstances the question of who is regulating whom becomes ambiguous and regulatory mechanisms can be used to protect monopoly enterprises from the threat of competitive rivalry.

Such strategies are greatly minimized in the California water industry in those circumstances in which commercial water companies are exclusively concerned with the sale of water to consumers. In general, alternative sources of water supply available from ground water sources place limits on water pricing to allow for only a limited exercise of monopoly power by commercial water companies.

Where conflicts do arise between water users and commercial water companies, the unwillingness of individual users to separately bear the costs of remedial action usually implies that some form of collective organization becomes necessary before effective bargaining can take place between water users and a commercial company. If a municipality is organized within the water service area, the municipality may become the instrument through which water consumers seek to articulate their interests. Such efforts may eventually lead to municipal acquisition of the water distribution system. Various forms of public water districts may also be used to articulate water user interests in negotiating with a commercial water

company. The outcome of such negotiations usually brings a change in the structure of the enterprise in which the commercial company is compensated for its interests either through a voluntary purchase agreement or through proceedings in eminent domain. The public district or municipality becomes the new operator of the water supply system.

Municipal Water Departments

Municipalities are self-governing public corporations capable of providing a wide range of municipal goods and services for urban residents living within their territorial boundaries. Water for domestic consumption, municipal and industrial uses, sewerage facilities, storm drains and related water services may be provided by different agencies of municipal government. These agencies may be variously organized and in the case of some municipalities, municipal water departments may have autonomous corporate status within the general structure of municipal government.

Pricing and water service policies will reflect the non-profit status of municipalities. Much of the economic surplus generated by municipal water development will accrue as consumer surplus available to municipal residents who have an equity interest in property within a municipality. A water user who owns property in a

municipality will acquire a return on economic surplus in much the same way as a shareholder in a mutual water company. Where substantial developmental opportunities exist surplus values will be reflected in the price of land.

Municipalities may pursue an alternative policy of using "surplus" water revenues to support other municipal services. The rationale for such transfers depends upon the alternative sources of water supply available to a municipality. If the marginal cost of water exceeds average costs such transfers may be reasonable. Municipalities with broad powers of taxation, eminent domain, and police powers to enforce municipal ordinances will be expected to provide better joint services such as fire-flow and water quality control than would be available through either mutual or commercial water companies. Some municipalities where developmental opportunities are large will support promotional efforts to attract industry and other types of urban growth in combination with other municipal-service agencies. Water pricing and taxing policies may as a consequence be biased toward the advantage of large users and to the disadvantage of small users.

The boundaries of municipalities will rarely be devised to take account of hydrographic areas relevant to the management of water supply systems at their source. Municipal water departments, as a consequence, will rarely be able to reflect the diverse interests involved in the

management of water production areas. Where they undertake water production programs in territory outside their jurisdiction municipal departments will become involved in substantial conflict with residents of those areas. Municipal water departments may seek recourse to the organization of public water districts, joint operating agreements or contractual arrangements with the large-scale, water production agencies to deal with such problems.

In large cities where access to municipal office is effectively pre-empted by political entrepreneurs who regularly nominate slates of candidates for municipal office, conflicts of interest are also likely to arise between those who control major municipal offices and those who operate a major revenue-producing service within the municipality. This conflict of interest is apt to be associated with special provisions bearing upon the use of funds derived from water revenues and the independent corporate status of the municipal water department apart from other departments of municipal government.

Public Water Districts

The structural characteristics of public water districts has a strong similarity with municipal corporations except that public water districts are usually organized to purvey water services only. In rare instances such as irrigation districts, legislation has authorized the provision of other

miscellaneous public services such as the maintenance of public airports. The narrow range of functions performed by most public water districts permits the design of various conditions of organization to be related specifically to the function to be performed. Water conservation districts and water replenishment districts, for example, are designed to assure jurisdiction in relation to water management programs that can be related to particular hydrographic areas.

Public water districts that supply water services to the ultimate consumer are usually designed to reflect user interests similar to mutual companies and municipalities. Any economic surplus generated by a public water district would tend to accrue as consumer surplus. Public water districts are usually less exposed than municipal water departments to the transfer of funds to be used to finance other departments of government.

However, the overlay districts which provide intermediate water services to other water agencies are apt to have only weak ties to the ultimate constituency of interests being served. Mechanisms of indirect representation, or of ex officio representation, substantially constrain the voice of the ultimate water user in the affairs of overlay districts. Some overlay districts may become little more than intermediate fiscal agents concerned with the financing of water services in different service areas.

They contract either with the Department of Water Resources or the Metropolitan Water District of Southern California to discharge the financial obligations for water services and in turn contract with other water service agencies which purvey water to the ultimate consumer. Both the Department of Water Resources and Metropolitan have explicit criteria which contracting units or member units must meet. There is some tendency for the overlay districts which become contracting units for the Department of Water Resources or member units of the Metropolitan Water District to become "sweetheart" districts which are organized more under terms congenial to their sponsors than to the taxpayer-residents of those districts.

Concluding Evaluation

The different forms of collective enterprise comprising the infrastructure of the California water industry offer potential for economic advantage in the operation of water distribution systems and the development of water management in smaller hydrographic areas. By taking joint actions to meet the demands of larger numbers of water users a net economic advantage can be derived. Whether or not this advantage meets the requirement of equality of opportunity--that 1) each person will have an equal right to the most extensive opportunities compatible with a like right to all other individuals and 2) inequalities in opportunities are tolerable only a) if such inequalities work out to

everyone's advantage and b) if access to the positions created by such inequalities are open to all--depends upon the form of organization.

The form of organization inherent in commercial water companies could meet the conditions of equality of opportunity only if public regulation were able to attain solutions which were equivalent to those which effective competition would sustain in a competitive produce market. Historically, commercial companies have departed radically from this requirement. However, the availability of alternative sources of water supply during much of the Twentieth century has contributed markedly to a greater equality of opportunity for those served by commercial water companies.

Mutual water companies, municipal water departments and public water districts each offer strong prospects of being able to meet requirements for equality of opportunity inherent in a democratic ethic. However, each form of organization may be subject to conditions which depart from that norm. A mutual water company may be highly unresponsive to the changing demands of its constituents when patterns of land use are undergoing basic changes. Municipal water departments can be subject to highly selective benefits for those able to dominate processes of political choice. Public water districts which provide intermediate water services to other public agencies may become relatively

insensitive to interests of taxpayers as against the interests of other water service agencies. The responsiveness of overlay districts depends more upon the competitive rivalry and bargaining among water service agencies than upon constituency control through the internal decision making structure of the agency.

All local water service agencies will be limited in the range of water services which they are capable of providing because the hydrographic areas relevant to different services will vary. Where any one agency is appropriately organized to serve a particular constituency of water users, the provision of that service may engender social costs which impair other joint and alternative uses of a water supply system. The magnitude of such problems will vary with particular environmental conditions and with the effect of aggregate demand upon the available supply of water at the source. Thus, conditions which may be relatively optimal under a given organizational structure may be quite insufficient to meet new problems required by new patterns of development. As a consequence, no single pattern of organization to provide water services to communities of water users will be sufficient over time to respond to changing patterns of demand for diverse types of water use under varying conditions of supply.

FOOTNOTES

[1] The first such enterprise was organized in San Francisco by a group of fifty individuals who formed the unincorporated Los Angeles Vineyard Association to develop cooperatively a tract of land in what is now Anaheim, California. A tract of 1165 acres of land with riparian right to the Santa Ana river was acquired from the Rancho San Juan y Cajon de Santa Ana. The Los Angeles Vineyard Society was incorporated in 1857 to develop this tract. The development included the construction of diversion works and a canal to transport water to all of the land in the tract. In 1859, the association formed the Anaheim Water Company and the Los Angeles Vineyard Society transferred all of its water right, rights of way, canals, ditches and other works to the water company. William Hammond Hall gives the following account of the development:

> The stock of the Anaheim Water Company was divided into fifty shares, which were issued, one each, to the owners of the fifty vineyard lots, with the understanding that each certificate of stock and the water-right represented thereby, were to be appurtenant to the vineyard lot having the corresponding number and letter, so that no sale or transfer of the stock, or of the water-right represented thereby, could be made or would be recognized, acted upon, or binding upon the company, except by the conveyance of the vineyard lot to which the stock was appurtenant.

William Hammond Hall, Irrigation in California [Southern] (Sacramento: 1888), 618.

[2] Wells A. Hutchins, "Mutual Water Companies in California and Utah," Farm Credit Administration Bulletin No. 8 (Washington, D.C., 1938), 39-40.

[3] Ibid., 147.

[4] Ibid., 77. ". . . When large improvements by mutual companies seemed in order, the market for their bonds in many sections of the West exclusive of southern California was often sufficiently narrower than that for comparable district bonds to induce the formation of districts."

[5]Charles H. Lee, "Subterranean Storage of Flood Water by Artificial Methods in San Bernardino Valley, California," in the California Conservation Commission's Report, 1913 (Sacramento: 1913), 342-350.

[6]California Conservation Commission Report, 1913 (Sacramento: 1912), 276.

[7]Edward F. Treadwell, in The Cattle King (New York: The Macmillan Company, 1931) relates how discriminatory pricing was practiced by the San Joaquin and Kings River Canal and Irrigation Company. Miller and Lux received water at one-half the rate charged others and could freely take water surplus to the needs of others. See pp. 67-73.

[8]Samuel Edwards Associates v. Railroad Commission, 196 Cal. 62 (1925). The court held that both those who "expressly or impliedly" hold "themselves out as engaging in a business of supplying water to the public as a class" are included within the definition of public utility.

[9]Allen v. Railroad Commission, 179 Cal. 68 (1918); Richardson v. Railroad Commission, 191 Cal. 716 (1922).

[10]Lukrawka v. Spring Valley Water Company, 169 Cal. 318 (1915).

[11]Butte County Water Users Association v. Railroad Commission, 185 Cal. 218 (1921).

[12]Loc. cit.

[13]B. H. Leavitt v. Lassen Irrigation Company, 157 Cal. 82, 83 (1909). The courts have held that "A public service company which is appropriating water under the constitution of 1879, for purposes of rental, distribution, and sale, cannot confer upon a consumer any preferential right to the use of any part of its water. All are equally entitled to share in the use of the water who pay, or offer to pay, the legal rate and to abide by the reasonable rules and regulations of the company."

[14]See standard forms for "Tariff Schedules Applicable to Water Service" used by California Public Utilities Commission.

[15]In Pacific Telephone and Telegraph Co. v. Eshleman, 166 Cal. 640, 663 (1913), the California Supreme Court included the following among the regulatory powers which can properly be exercised in the regulation of public utilities: "3. The right to make orders and to formulate rules governing the conduct of the public utility, to the end that its

efficiency may be built up and the public and its employees be accorded desirable safeguards and conveniences." (Emphasis added.)

[16]The tenor of Public Utilities Commission proceedings and the authority implicit in these proceedings is reflected in two brief excerpts from the findings in a decision of the California Public Utilities Commission (57 PUC Opinions and Orders, 586, 589, 590) regarding the application of the Dyke Water Company, Orange County, for a rate increase:

> The Commission finds that applicant's estimates of revenues, expenses and rate base for the year 1959 are unrealistic, unreliable and unreasonable. The estimates of the Commission staff, however, are found to be fair and reasonable and are hereby adopted for the rate-making purposes of the proceedings . . . . In the basic matter of main-extension practices, the Commission finds that applicant has extended its water system into territory into which it had no right to extend, and pursuant to agreements which are unlawful. Such payment of large sums of money out of revenues to defray the cost of capital additions to applicant's plant, both within and without the certified area, made by persons as advances for construction, clearly constitutes unlawful conduct, reveals a failure to recognize the minimum responsibility incumbent on the part of the applicant's management; and indicates a failure to apply prudent management principles in the conduct of the applicant's public-utility water business. Further, it appears that applicant may have contracted for long-term debt without having obtained this Commission's authority as required by law. The Commission would be derelict in its duty of protecting the public interest if it were to countenance any continuation of these unlawful and imprudent practices or permit the burdening of utility customers with added costs attirbutable to such improper practices. The Commission concludes that applicant must immediately cease and desist from any extension practice which does not comply strictly with the lawfully effective Rule No. 15 concerning main extension.

In a subsequent contempt proceeding, fines of $500 each were assessed by the Public Utility Commission against the Dyke Water Company and against its president, Dyke Landsdale, for violation of Commission orders regarding extension of service areas. (57 Public Utility Commission Opinions and Orders, 526-534.)

[17]See Chapter 5, Constitutional Authority for the Organization and Conduct of Local Government, 190-191.

[18]Los Angeles Gas and Electric Corp. v. City of Los Angeles, 188 Cal. 307, 317 (1922).

[19]California, Constitution, Article XI, sec. 19. See Chapter 5, Constitutional Authority for the Organization and Conduct of Local Government, 189-194.

[20]Sophie H. Shelton v. City of Los Angeles, 206 Cal. 544-549 (1920).

[21]Loc. cit. This position was also confirmed in Department of Water and Power of the City of Los Angeles v. James P. Vroman, 218 Cal. 206, 217 (1933).

[22]Edward F. Whrle v. Board of Water and Power Commissioners, 211 Cal. 70, 73 (1930).

[23]W. C. Mushet v. Department of Public Service of the City of Los Angeles, 35 Cal. App. 630 (1917).

[24]W. W. Mines v. R. F. Del Vaile, 201 Cal. 273 (1927).

[25]California, Constitution, Article XI, sec. 19.

[26]California, Statutes, 1867-68, Ch. 415, Sec. 30, 514-515. (Emphasis added.)

[27]Ibid., sec. 32, 515.

[28]Loc. cit.

[29]Ibid., sec. 38, 517.

[30]Loc. cit.

[31]Loc. cit.

[32]Loc. cit.

[33]Ibid., sec. 33, 516.

[34]Loc. cit.

[35] Ibid., sec. 35, 517.

[36] California Water Code, sec. 50910.

[37] Ibid., sec. 50601.

[38] Ibid., sec. 50730.

[39] Ibid., sec. 50704.

[40] Ibid., secs. 51360-51365.

[41] Ibid., sec. 52203.

[42] California Statutes, 1887, Ch. 34, sec. 11, 34.

[43] California Water Code, sec. 22252.

[44] Ibid., sec. 22257.

[45] Jenison v. Redfield, 149 Cal. 500, 502 (1900).

[46] Ibid., 504.

[47] California Water Code, sec. 60231.