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Preface

In this book I have used social choice theory to explicate the theory of democracy. In particular, I have examined the feasibility of the political ideal of democracy in terms of the practical constraints that the social choice analysis reveals concerning various democratic aspirations. Therefore, this book is written for three kinds of readers: political philosophers, students of political institutions, and beginning students of social choice theory.

For political philosophers, I hope it will demonstrate the inescapable relevance of the social choice analysis to the normative concerns of political philosophy. Unfortunately very few political philosophers have heretofore recognized this relevance, possibly because social choice theory has usually been cast in mathematical form, thereby suggesting that it is merely a technical exercise. By showing that important themes from the social choice literature necessarily enter into philosophic discourse and by presenting these themes wholly in nonmathematical terms, I show the importance of the theory of social choice.

For students of political institutions, this book will demonstrate that analytic theory can help in the interpretation of events. One central question of political description—a question much disputed but little understood—is the problem of explaining why some issues are politically salient and others not. This problem has usually been investigated by reducing politics to something else—to economics, for example, as in Marxism, or to psychology, as in psychoanalytic visualizations—thereby producing an economic (or psychological) interpretation of politics. However, in Chapters 8 and 9, I offer a political interpretation of politics, a theory about the rise and decline of the salience of issues that derives directly from social choice theory and is entirely political in form. This theory is an extension into political description of the rational choice model of individual deci-

sion that underlies social choice theory. At the same time, my theory utilizes some of the main discoveries of social choice theory to describe politics generally.

For beginning students of social choice theory—a category that should, I believe, include most beginning students of political science—this book will serve to introduce both the main topics of inquiry and the main conclusions so far arrived at in this theory. Since, as I have already noted, it has usually been presented in a fairly formidable mathematical form, many college freshmen and sophomores have probably not understood the intellectual motivation for the theory. I have summarized the main topics and related them to political philosophy and the description of politics. This will help beginning students to appreciate the importance—and even the elegance—of the theory of social choice.

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I began to think about the theme of this book when I was a Fairchild Fellow at the California Institute of Technology, and I was given the opportunity to write it by the Scaife Family Charitable Trust. I deeply appreciate the support from both these endowments. So many friends have helped me to understand the topics in this book that I cannot thank them all. But I must single out for public appreciation Duncan Black, Gerald Kramer, Steven Brams, Richard McKelvey, Peter Ordeshook, John Ferejohn, Richard Kronick, Darrell Dobbs, James Enelow, Gideon Doron, Raymond Jean, and especially Kenneth Shepsle, whose criticisms of the first formulation of the theme of this book (at a conference in 1976 sponsored by the Mathematical Social Science Board) have been a constant warning and whose comments on the final formulation have clarified many a paragraph. Jeffrey Richelson, whose dissertation “A Comparative Analysis of Social Choice Functions” (University of Rochester, 1975) provided one main point of departure; Charles Plott, whose seminar at Cal Tech gave me a chance to converse with him and others about most of these issues, both analytic and normative, and Richard Niemi, whose incisive criticisms of every page have greatly benefited both me and my readers.

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William H. Riker

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The democratic ideal of justice is a society in which free and equal citizens can try to control their environment and their futures, thereby to realize the ultimate moral ideal of human dignity. The instrument of this kind of justice is popular participation by voting, organized through political parties. Citizens' freedom to organize into parties is protected by free speech, religious liberty, and free economic life, and their ability to organize is guaranteed by equality at the ballot box. The democratic instrument and the democratic ideal are thus identical, free and equal participation, viewed either as means or as an end.

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The Connection Between the Theory of Social Choice and the Theory of Democracy

The theory of social choice is a theory about the way the tastes, preferences, or values of individual persons are amalgamated and summarized into the choice of a collective group or society. Because voting is one method of aggregating values, social choice theory must include, among other elements, a theory of voting. Voting is in turn an indispensable feature of democracy because, however the goals of democracy are defined, its method involves some kind of popular participation in government. Although participation can take many forms, historically—and probably logically—it invariably includes voting. Therefore, the theory of social choice is highly relevant to the theory of democracy.

Only recently, however, has this relevance been recognized. One reason recognition has come slowly is that students of democracy have tended to regard the mechanism of voting and counting votes as a trivial subject. There has, it is true, been a century-long controversy over proportional representation, but that controversy has centered more on fairness than on the operating characteristics of alternative mechanisms. Otherwise, political philosophers, engaged in the pursuit of justice, have ignored and neglected the theory of voting methods as something best left to the attention of municipal employees.

To some degree, the philosophers have been right: The theory of voting has barely existed until this generation, and one cannot attribute much relevance to a theory that barely exists. Only in the 1940s did Duncan Black, then an unknown lecturer on economics in Glasgow, rediscover the paradox of voting (see section 1.H) and recognize the full significance of a theory of social choice.

The paradox of voting is the coexistence of coherent individual valuations and a collectively incoherent choice by majority rule. In an election with three or more alternatives (candidates, motions, etc.) and three or

more voters, it may happen that when the alternatives are placed against each other in a series of paired comparisons, no alternative emerges victorious over each of the others: Voting fails to produce a clear-cut winner. This paradox was originally discovered by Condorcet in the late eighteenth century, just at the time that voting was becoming a much more frequently used method of social decision. Condorcet's discovery made little impression on his contemporaries, and neither did the rediscoveries in the late nineteenth and early twentieth centuries by Lewis Carroll (Charles Dodgson) and E. J. Nanson make much impression on their contemporaries. Duncan Black, however, in a series of essays begun in the 1940s and culminating in his *Theory of Committees and Elections*, effectively communicated the profound significance of the rediscovered paradox to other scholars.¹ One was Kenneth Arrow, who proved in *Social Choice and Individual Values* that the paradox may occur in any reasonably fair system of counting votes.² Another was Robin Farquharson, who showed in *Theory of Voting* that political strategy and dissimulation about tastes were ineradicable parts of the process of voting.³

The work of Black, Arrow, and Farquharson launched the theory of social choice and connected it logically with the theory of democracy. But, though the connection is now made, it is on the whole still true that political scientists and political philosophers have not worked out the significance of the connection. Most writers simply ignore the problem, and those who recognize it tend to sweep it under the rug.⁴ Robert Dahl did try to work out some connection between the two theories.⁵ But social choice theory, at the time he wrote, was not yet mature. Consequently, the full significance of the connection was not visible to him.

Now, however, that significance can be specified more easily: Democracy is an ideal of both justice and political life, and it is a method of realizing that ideal in ordinary politics. The ideal is individual self-realization (that is, the achievement of the human potential for good qualities of character and behavior) and individual self-respect (that is, a sense of one's worthiness as a person and a pride in one's self-realization). The method is, for each person, free and equal participation in the political life of the community, engaging thus in whatever control of the social environment is possible. Both parts, the ideal and the method, are necessary for democracy. They can exist separately in other contexts—the ideal in, for example, an ethical system and the method in, say, a religious society. But what makes democracy unique is that the democratic means and the democratic ends are joined. Indeed, they are the same things viewed ideally and instrumentally. According to democratic theory, democratic ends can be achieved by democratic means. Now, of course, that assertion may or may not be true. If it is true, then the notion of democ-

racy makes sense. But if it is not true, if the method cannot realize the ideal, then, however lofty the ideal may be, the notion of democracy is meaningless. Thus, a profoundly important question about democracy is whether the means are capable of achieving the ends.

The theory of social choice permits us to approach, and perhaps even partially to answer, that question. The ideal of democracy is set forth in a normative statement of what we want the natural world of human interaction to yield for us. The theory of social choice is an analytic theory about the way that natural world can work and what kinds of outputs that world can yield. By means of this analytic theory, we can discover whether pursuit of the ideal is promising or futile.

What we hope to have is always conditional on what we can have. To seek what we know, a priori, we cannot get is about like trying to square the circle. But to search for an algorithm to compute a result that we know is, at least in principle, computable is a sensible task. This then is the connection between the theory of democracy and the theory of social choice: By use of the latter it is possible to assess, at least in part, whether it is sensible to pursue democratic ends by democratic means.

1.A. The Attainability of Justice

In the study of justice the need to investigate whether the specified means can be used to achieve the specified ends recurs frequently. It is exactly such investigation that has heretofore been neglected by students of democracy.

Such neglect is common enough in contemporary political thought, and many recent interpreters of nondemocratic notions of justice have been equally guilty of neglecting the study of institutions by which their versions of justice might be attained. Witness, for example, John Rawls' utilitarianism with a Kantian overlay or Herbert Marcuse's improbable combination of humanism and violence. Both of them have been presented as definitions of goals, but they lack any consideration at all of whether the goals are physically attainable by any imaginable means.

It does not really make sense to ignore the question of attainability, and in the long history of the study of justice such questions have typically been a central part of the inquiry. In the *Republic*, the earliest-recorded well-articulated theory of justice, Plato defines justice as a condition in which everyone is doing the job best fitted to his or her talents. This definition is only the beginning of a discussion of whether that particular goal can be achieved by various devices, such as an appropriate ideology

(the so-called noble lie), an educational system for rulers, the generation of wisdom-loving kings, and even divine intervention in history. Similarly, in the modern world, the Marxian definition of justice as the distribution of material goods according to needs was proposed along with a concrete method of achieving it—namely, the dictatorship of the proletariat led by its vanguard, the Communist party. Marx himself devoted much thought to concrete steps in the revolution (for example, in the *Critique of the Gotha Program*), and his successors Lenin and Mao equated philosophy with a theory of party organization and a theory of propaganda.

In the interpretation of both the Platonic and the Marxian theories, it is certainly appropriate and in fact customary to inquire whether the means are efficient for attaining the ends. Very few people have seriously considered attempting to achieve Platonic justice, not primarily because Platonic justice is rather uninspiring, but because the education and the institution of a philosopher-king seem internally contradictory and quite unlikely to achieve the intended effects even if they could be carried through. Similarly, although the materialism of Marxist goals has a wide appeal, it is far from clear that the dictatorship of the Communist party has promoted distribution according to need. Many observers believe that Communist bureaucracies, multiplying disincentives for production and satiating themselves with perquisites, have produced distributions even less in accord with stated Marxist goals than was achieved under the systems they replaced. If so, then Marxist means may well have prevented the achievement of Marxist ends.

As these two examples indicate, the question of whether particular goals are achievable by specified means (or indeed by any means at all) is an elementary and unavoidable question about *any* theory of justice. Yet up to this time it has not been asked about democracy. The main reason it has not been asked is, I believe, that we have lacked an appropriate base for questioning. But now that we have an analytic theory about the main institution of democracy—namely, voting—we do have an appropriate base. Consequently, it seems both possible and worthwhile to study the relation of democratic means to democratic ends, and that is the purpose of this book.

1.B. The Elements of Democracy

To begin the investigation we need some agreed-upon notion of what democracy is. Unfortunately we cannot go to a unique authoritative source for a definition. Democracies have existed in the ancient Medi-

ranean world, in late-medieval central European cities, and in many nations of the modern world. Their social and cultural circumstances have been extremely diverse, and their goals and methods have been defined in many constitutions and in a vast body of judicial, philosophical, didactic, and popular commentary. Since the literature celebrating democracy—even authoritatively explicating it—is far too much for one person to read, it is difficult to set forth a fair and inclusive definition.

On another occasion I attempted to bypass this difficulty by the statistician's device of selecting a sample. I compared five representative documents, looking for the elements they had in common.⁶ Without repeating that analysis here, I will list the properties found in those documents. They are participation, liberty, and equality. Most recent writers attribute those properties to democracy; I will explain how they fit together coherently.

To anticipate my conclusion, and to indicate the direction of the argument, I want to point out that the coherence depends on the fact that all democratic ideas are focused on the mechanism of voting. All the elements of the democratic method are means to render voting practically effective and politically significant, and all the elements of the democratic ideal are moral extensions and elaborations of the features of the method that make voting work. Voting, therefore, is the central act of democracy, and this fact makes apparent the immediate relevance of the theory of social choice.

Participation

The crucial attribute of democracy is popular participation in government. This is what the root of the word originally meant in Greek. Although the institutions of participation have been many and varied, they have always revolved around the simple act of voting. Even recent theories, such as those from Dahl and his followers, that equate democracy with the free interplay of groups and the existence of an opposition cannot avoid an emphasis on voting as the ultimate way groups and oppositions make themselves felt. Voting, however, is not equivalent to democracy. Only voting that facilitates popular choice is democratic. This condition excludes voting both in oligarchic bodies and in plebiscites in communist and military tyrannies, where voting is no more than forced approbation. Thus one can say that democracy implies voting but voting does not imply democracy. Or, voting is a necessary, but not sufficient, condition of democracy. To render them equivalent, voting must be surrounded with numerous institutions like political parties and free speech, which organize voting into genuine choice.

The purpose of participation is twofold. In most cases it has been instituted to restrain oppressive rule by subjecting rulers to popular judgment. But, in addition, it has been invested with a positive value of its own. Ruling and being ruled in turn is, said Aristotle, the essence of good citizenship; and good citizenship he equated with the good life. To take, thereby, full responsibility for oneself—both by internal discipline and by cooperative management of the physical and social environment—is to achieve as much self-control as one can. And self-control is a necessary instrument of that human dignity and self-respect that moral philosophers of almost all persuasions have regarded as the best human achievement. To facilitate that achievement is the goal of democracy and its ideal of justice. Hence, participation is an end in itself as well as a practical method.

Liberty

A second feature of democracy is liberty to pursue one's goals. This notion has been variously expressed. In the tradition of Locke, which has dominated Anglo-American thought, liberty has been described as the natural rights inherent in human life and independent even of citizenship. Many of the great democratic declarations are tabulations of rights such as free speech, religious liberty, fair legal procedure, property ownership, and economic security. But the connection between democratic liberty and natural rights is not necessary. In the ancient world there was no notion of natural rights, yet Pericles praised freedom as one of the main features of Athenian democracy. And in the tradition of Rousseau, liberty resides in participation in government, not in rights distinct from government.

Nevertheless, however expressed, there is a close connection between liberty and democracy. How can the persistence of this association be explained? Historically, at least, the association is instrumental because liberty is necessary to organize participation in government. In the English tradition, limited government originated in claims of freedoms against the Crown. The earliest such claim was that members of Parliament not be prosecuted for speeches in Parliament. The claim protected politicians temporarily in office and not certain of staying there and thereby enabled them to form factions and organize voting against the government. Ultimately this freedom was extended to everybody, but it has never lost its association with political opposition and the nourishment of faction. Almost everything else that we think of as civil liberties (the rights of a speedy trial, habeas corpus, and security against unreasonable search and seizure, for example) originated to protect politicians who

feared prosecution if and when they lost office. Thus the historic purpose of these fundamental democratic liberties has been not to provide freedom as an end in itself, but to render effective both political participation and the process of choice in voting.

Freedom, however, has also become an end in itself because, like participation, it generates self-control and facilitates self-respect. Hence it is not only an instrument for, but also a part of, justice. Civil liberties are now thought to be good for everybody, not just politicians. Religious liberty, which religious factions—uncertain of victory in the wars of religion—devised to protect themselves, is now thought to be part of self-control and the good life itself. Economic liberty—that is, the free markets and free entrepreneurship of modern capitalism—originally protected a faction, namely, merchants, in conflict with the Crown and the feudal order. Although it has been fashionable in this century to deride economic freedom, capitalism remains essential for faction: No government that has eliminated economic freedom has been able to attain or keep democracy, probably because, when all economic life is absorbed into government, there is no conceivable financial base for opposition. But economic liberty is also an end in itself because capitalism is the driving force for the increased efficiency and technological innovation that has produced in two centuries both a vast increase in the wealth of capitalist nations and a doubling of the average life span of their citizens. These practical achievements also facilitate self-control and are therefore important features of democratic justice.

Altogether, therefore, democratic liberty (whether civil, religious, or economic) originates as an instrument to organize voting and popular participation in government. Once in existence, however, it has always been found good in itself as a part of self-control and human dignity. So, like participation, democratic liberty—originally an instrument—became a part of the democratic ideal.

Equality

A third feature of democracy is equality, which like liberty and participation, originated in some rough sense as an instrument of voting. Voting would not mean much if each person's vote were not counted in the same way. So equality at the ballot box, by some measure, is necessary to make voting and participation work.

But the claim of equality usually involves much more. Sometimes it means equality before the law, which prevents powerful persons from using the law to take advantage of weaker persons. Sometimes it means equal educational or economic opportunity or even equal shares of the

wealth of the world. Whatever form the claim takes, its moral significance is clear: To permit serious inequality means to deny to some people the chance to the self-control and cooperative management involved in democratic justice. Equality thus becomes an instrument facilitating self-respect and self-realization, although like the other elements of the democratic ideal its logical base lies in the instrumental value of making voting work.

1.C. The Meaning of Democracy

Democracy is both an ideal and a method. Now, having catalogued its features, I can explain how the ideal and the method are assumed to cohere, though, as will be seen, there may be profound philosophical difficulties beneath this assumed coherence. The ultimate moral ideal of democracy is the self-respect and self-realization that are made possible by self-control and the concomitant cooperative control of the environment. Whether that ideal is achieved depends on how individuals view themselves and what they themselves do to realize their potentials. The function of political justice is to facilitate that achievement by creating appropriate social conditions. In a society characterized by democratic justice, people are free (by reason of democratic liberty) and have the chance (by reason of democratic equality) to seek self-respect and self-control (through some kind of democratic participation). The democratic method that is supposed to achieve this ideal is, of course, the same three features viewed as means rather than as ends: The method is the process of participation, specifically through voting, in the management of society, where voting is understood to include all the ancillary institutions (like parties and pressure groups) and social principles (like freedom and equality) that are necessary to render it significant.

Consequently, we can say that voting, which is a main subject in the theory of social choice, is at the heart of both the method and the ideal of democracy. Clearly, therefore, the theory of democracy must be intimately involved with the theory of social choice.

1.D. The Liberal Interpretation of Voting

Democrats of all persuasions would probably agree that participation built on the act of voting is the focus of democracy. But they certainly

interpret voting in different ways. What does it accomplish? What does it mean? The sharp dispute on these questions can be summarized in two views—one of which I call *liberal* or Madisonian, the other *populist* or Rousseauistic.⁷

In the liberal view, the function of voting is to control officials, *and no more*. Madison, who is the original American spokesman for liberal democracy (or republicanism, as he called it) defined a republic as “a government that derives all its powers directly or indirectly from the great body of the people, and is administered by people holding their offices during pleasure, for a limited period, as during good behavior.”⁸ The first requirement, popularness, he called essential (that is, *necessary*); the second, election and limited tenure, he called *sufficient*. Thus his definition is *logically complete*, and there is nothing to add. Madison said nothing about the quality of popular decision, whether good or bad.

Since all democrats would accept the necessary condition, it is the sufficient condition that is distinctive and hence deserving of detailed explication. Why is election and limited tenure sufficient? Popularness, the necessary condition, ensures participation and equality. The sufficient condition is intended to ensure liberty. In Madison's view, the danger for liberty lies in government officials who might deprive citizens of liberty or fail as agents of citizens' participation. In either case, the liberal remedy is the next election. That is all that is needed to protect liberty; so election and limited tenure are sufficient.

To consider first the protection of citizens' liberty: The replacement of officials is, in the liberal view, the only available instrument. The liberal fear is that the force of government can easily be deployed against citizens to make them support unpopular policies that officials believe necessary. The liberal hope is that officials will be restrained from such behavior out of fear of the next election. It is true that Madison and other framers of the Constitution provided the separation of powers as auxiliary protection, but Madison regarded that protection as distinctly secondary to “a dependence on the people.” And the contemporary liberal agrees with Madison that the defense of liberty lies in the discipline of elections.

In the twentieth century it has sometimes (but not lately) been fashionable for populists to dismiss the liberal fear of oppression as an anachronism. Populists believe that, by reason of popular participation, democratic governments embody the will of the people and cannot therefore oppress. Only in the eighteenth century, they say, when executives were officers of the Crown was this danger real; now that elected executives supposedly embody the popular will, they cannot oppress. In *Roosevelt and Hopkins*, Robert Sherwood, for example, disputed Lord Acton's assertion that power corrupts with his (that is, Sherwood's) own belief

that power ennobled Franklin Roosevelt.⁹ But it was Sherwood's other subject, Harry Hopkins, who presumably uttered that epitome of corruption: "We will tax and tax, spend and spend, elect and elect." Lately, of course, even populists have been shaken by the imperial presidency of Johnson and Nixon, who, however popularly elected, persisted in a hated and oppressive war. In both cases the threat of the next election proved decisive for liberty because it made one not try for reelection and the other (ultimately) end the war. Even more impressive, the possibility of impeachment, a kind of negative election, made Nixon resign. Moreover, it was elections themselves, not just the threat of them, that as recently as 1977 disposed of two putatively tyrannical rulers in India and Sri Lanka.

The other part of Madison's concern was a fear of tyranny by the majority. This is a fear that officials acting for a majority created in the last election will persecute the minority of that election. Madison hoped that such oppression would be minimized by the fact of shifting majorities, so that a future majority might throw out of office the officials who oppressed in the name of the former majority. This is the reason he stressed diversity in the electorate. The way, he said, "to guard one part of society against the injustice of the other part" is to comprehend "in the society so many separate descriptions of citizens as will render an unjust combination of a majority of the whole very improbable, if not impracticable."¹⁰

Viewed statically, this sounds like just another version of the separation of powers.¹¹ Viewed dynamically, however, this is simply the claim that an unjust majority cannot last through several elections. Looking at the oppression of blacks, the most persistent issue in American politics and the clearest case of tyranny by the majority, it appears that the Madisonian hope has been justified. As long as blacks were excluded from the political system (from the beginning to 1867 and from the end of Reconstruction in 1877 to the emergence of a substantial number of black voters in the 1930s), they were persecuted. But including them in the system, especially as they became a marginal bloc between the political parties, led to political reform and even to reorientation of the judiciary, so that national political leaders (followed by the courts) have mitigated and are gradually eliminating that tyranny by the majority.

To consider the other danger to liberty (that officials be inefficient agents): The only possible remedy—and one recommended by both populists and liberals—is to elect new officials. So again the next election promotes liberty. Notice, however, that in the liberal view it is not assumed that the electorate is right. This assumption characterizes populism, as I will show. The liberal assumes not popular competence, but merely that

the electorate can change officials if many people are dissatisfied or hope for better performance.

It may seem that in the liberal view officials, who are only negatively controlled by voting, cannot really act as agents of the electorate. By reason of regular elections, however, officials may be rejected. In their efforts to avoid rejection they usually act in some rough way as agents of the electorate, at least attempting to avoid giving offense to some future majority. Since this future majority cannot at any moment be clearly specified, officials seeking to placate it in advance must anticipate several kinds of potential majorities, the union of which is often most of the electorate. By reason of this anticipation of the next election, officials are, even in the liberal view, subject to electoral discipline as the agents of democratic self-control.

1.E. The Populist Interpretation of Voting

For the populist, liberty and hence self-control through participation are obtained by embodying the will of the people in the action of officials. The fundamental notion goes back at least to Rousseau. There is a social contract, which creates a "moral and collective body" that has "life" and "will," that is the famous "general will," the will of the incorporated people, the Sovereign. Individual liberty, for Rousseau and subsequent populists, is the participation of the citizen in this sovereignty. "Liberty," Rousseau says, "is obedience to a law we have prescribed for ourselves," understanding, of course, that the prescription is through the acts of the anthropomorphized Sovereign.¹² The way to discover the general will, which is the objectively correct common interest of the incorporated citizens, is to compute it by consulting the citizens. The computation will be accurate if each citizen, when giving an opinion or vote, considers and chooses only the common interest, not a personal or private interest. Thus, by summing the common interest regarding wills (votes) of real persons, one can arrive at the will of the great artificial person, the Sovereign.

In the Middle Ages it was sometimes (blasphemously) said that the voice of the people is the voice of God. Rousseau did not invest the people with quite such divine authority—indeed he believed they might be mistaken about the general will—but he did assert that the general will is always correct and embodies the objective good for society. Later populists have continued to attribute some special character to the voice of the

people: What the sovereign people, when speaking for the public interest, want is justified because the sovereign people want it and because it is their liberty.

To summarize: According to the populist interpretation of voting, participation in rule-making is necessary for liberty. The rules thus made must be respected as right and proper because they embody that liberty. Were they not so respected, liberty itself might vanish.

1.F. Differences Between Liberal and Populist Interpretations of Voting

In the liberal view, since voting generates liberty simply by restraining officials (by popular election and limited tenure), there is no need to treat the output of government as the precious embodiment of liberty itself. Indeed, for the liberal, law is no more than the decree of legislators or judges, accepted and occasionally ratified by the citizens. But in the populist view, since voting generates liberty by participation, the output of government must be precious, for that very output *is* liberty.

We can understand the difference between the two views somewhat better, I believe, by recounting a controversy over Isaiah Berlin's distinction between positive and negative liberty.¹³ Berlin defined *negative liberty* as the absence of interference by others (especially government) in one's activity. *Positive liberty*, on the other hand, is being one's own mentor. The burden of Berlin's argument is that these two apparently similar notions are at loggerheads. Berlin's explanation of this paradox is that ideas about self-mastery are turned into particular goals for society that people are then coerced into following: They are forced, that is, to be "free." His main example is the transformation of Kant's notions of individual ethical responsibility by, successively, Hegel and Marx into the justification for a monstrous dictatorship. Berlin's point is that positive liberty, which appears initially innocuous, is the root of tyranny.

C. B. MacPherson, in a clever effort to rescue positive liberty from Berlin's obloquy, redefined three kinds of positive liberty:

1. *Liberty as "self-direction" or "self-mastery"*: "to live in accordance with one's own conscious purposes."
2. *Liberty as obedience to law*: "coercion, by the [supposedly] fully rational or those who have [supposedly] attained self-mastery [e.g., Lenin or Mao], of all the rest."

3. *Liberty as participation*: "the democratic concept of liberty as a share in the controlling authority." (Notice that this is the populist, not the liberal view of voting.)¹⁴

MacPherson's argument is that Berlin, lumping the three kinds of positive liberty together, used the obvious and admitted difference between negative liberty and populist voting to generate a contrast and (through liberty as obedience and coercion) an inconsistency between negative liberty and all kinds of positive liberty. MacPherson, as a populist and socialist, wants to save self-mastery as complementary to and not inconsistent with negative liberty, while banishing coercion, that Stalinist embarrassment to "democratic" socialists. MacPherson accomplishes his purpose by giving self-mastery a new name, "developmental liberty," so that it appears to be clearly separate from liberty as obedience and coercion.

The problem, however, is that populist voting is ineradicably different from negative liberty and yet is logically correlated with coercion. This association is precisely explained by Willmoore Kendall in his explication of Locke's version of majority rule.¹⁵ Kendall sought to reconcile Locke's presumed belief in objective moral law with his conclusion that right is what the majority wills. The explanation Kendall proposes of this apparent paradox is that Locke assumed that most people are just and rational; consequently, "The individual can . . . covenant to obey the majority without subjecting himself to . . . arbitrary authority . . . since the judgments of the majority are those of reason and justice."¹⁶

Thus it is that MacPherson's populist voting unites self-mastery and coercion. All one has to do is to find that a majority (perhaps a putative or even a wholly imaginary and nonexistent majority like the "proletariat" conjured up by Marx) has willed some version of self-mastery. It then becomes both *reasonable* and *necessary* to impose that version of liberty by coercion. It is *reasonable* because the majority that produced the particular version of self-mastery is, in Kendall's words, "rational and just." And it is *necessary* because the particular self-mastery is the embodiment of that majority's liberty, and its liberty would vanish were it not translated into a coerced version.

If, however, one had not the populist view of voting, but merely the liberal view, then this totalitarian sleight-of-hand would not be possible. Indeed, if there were only the liberal view and if one banished the populist "share in the governing authority," then it would be easy for MacPherson to demonstrate the complementarity between negative liberty and self-mastery. But, as a socialist, MacPherson cannot give up populism, and so

he is necessarily stuck with coercion. Clearly, Berlin's villain all along is really populism, not just self-mastery. He should have contrasted not negative and positive liberty, but rather negative liberty and the populist view of voting that is used to justify coercion in the name of temporary or spurious majorities.

I have emphasized the moral certainty implicit in the populist view of voting in order to correct the common misconception that populist democracy is simply majority rule. The customary distinction—often expressed in the cliché “majority rule versus minority rights”—is between (1) popular sovereignty or lodging power and decision in the hands of the majority and (2) limited government or reserving some rights for minorities (within an otherwise majoritarian framework). Dahl, for example, makes this distinction, in effect terming (1) Madisonian and (2) populist. This distinction cannot be maintained, however. All democracies involve popular government, equality, and the rule of decision according to the greater number—precisely the features Dahl attributes to populism. Conversely, all democracies (populist as well as liberal) actually limit government by the technique of shifting majorities. So the customary distinction is without a difference.

What is different between the liberal and the populist views is that, in the populist interpretation of voting, the opinions of the majority *must* be right and *must* be respected because the will of the people is the liberty of the people. In the liberal interpretation, there is no such magical identification. The outcome of voting is just a decision and has no special moral character.¹⁷

1.G. The Vitality of the Liberal and Populist Interpretations of Voting

To show that two interpretations of voting have existed does not prove that they continue today to influence thought. They may have been amalgamated, and if so there is not much point to discussing them, except as historical phenomena. Two writers I have quoted—Berlin (fatalistically) and MacPherson (hopefully)—have each tried to show that populism is absorbing liberalism. I believe, however, that the two traditions remain separate. My evidence is two recent books whose authors are deeply concerned in a practical way with changing American politics, who do not bother with abstract political philosophy, but who nevertheless reflect in more or less pure form the two interpretations I have described.

The books are William A. Rusher's *The Making of the New Majority Party*, which is the liberal offering, and Marcus Raskin's *Notes on the Old System*, which is the populist offering.¹⁸

Both writers were impelled to write by the Watergate crisis. Rusher observed the scandal weakening the Republican party at the very moment that a majority of citizens seemed to him to be abandoning the then-dominant statism for so-called conservatism (actually Madisonian liberalism). These citizens lacked, he feared, an appropriate vehicle through which to express their new values, not only because the Republican party was discredited, but also because it was infected with the statism of, for example, Nelson Rockefeller. Consequently, Rusher wrote to propose a new national party that would organize the now-leaderless putative majority.

Raskin, on the other hand, regarded Watergate as another compelling instance of the way that what he called “the System” (in which he included the imperial presidency, the CIA, rich people, the Joint Chiefs, the Democratic party, and capitalism) frustrated the supposed impulses of most people to take the positions he (Raskin) believed correct on public policy. Seizing the occasion, therefore, he wrote both to induce popular disgust and to propose a reform—namely, a nationwide system of grand juries to instruct members of Congress. This change, he believed, would amplify voices now supposedly muffled.

Both authors describe themselves as democrats, accurately, I believe, although Raskin displays tendencies toward MacPherson's preference for coercive liberty. Both Rusher and Raskin also denounce the huge bureaucratic apparatus of the contemporary state and seek to hook this Leviathan. But there the similarity ends, and each proceeds according to the tradition he represents.

Rusher thinks the Leviathan exists in large part because voters are often wrong, misled by demagogues who promise “benefits” that cannot be paid for and will, by inducing inflation, harm the ostensible beneficiaries. Clearly, he has no populist illusions that the people do what is right. On the other hand, he wants to make democracy work and rejects the possibility of limiting suffrage. Instead he proposes a new party to instruct and lead the people. “How,” Rusher asks, “does an honest politician . . . run against some spellbinder who has invented a new ‘benefit’?” The answer: “By telling the truth, of course, about the real cost and impact of the proposed ‘benefit’” (p. 200). This answer is introduced by quoting Madison, who wrote that “knowledge will forever govern ignorance” and popular governments “must arm themselves with the power knowledge gives” (p. 198). Thus, Rusher's prescriptions are exactly liberal: Without

supposing the people are especially wise, one should nevertheless try, at the polls at the next election, to hook the Leviathan, the king of the children of pride.

Raskin thinks that the Leviathan exists because an elite (politicians, bureaucrats, soldiers, corporate executives) uses the System to suppress the voice of the people and do all sorts of wrong things like building MIRVs and collecting withholding taxes. He is confident that the people, if they could speak, would do right. Like Rousseau, he wants to erase the special interests that stand between the people and the general will. His method is a huge number of grand juries to conduct inquiries and to instruct members of Congress. A Congress thus revitalized would, he believes, embody the true will of the people in law.

Raskin's scheme contains both features of the populist view. First, it stresses participation in local assemblies that will be "instruments of the people as people and as citizens" (p. 157). Second, what the people do will be good, for they will "express a quality of empathy, fairness, and inquiry" (p. 152). Raskin quotes approvingly these sentences from Martin Buber:

Though something of righteousness may become evident in the life of the individual, righteousness itself can only become wholly visible in the structure of the life of a people. . . . Only life can demonstrate an absolute, and it must be the life of the people as a whole.¹⁹

As applied by Raskin, this is the most extreme claim of populism I have ever seen. Apparently, Raskin believes that the works of the people embody not only their liberty and true justice, but also (and incredibly) *absolute* righteousness.

1.H. The Paradox of Voting

As a beginning of the discussion of the attainability of democratic justice, I have so far shown that the ideal as well as the method of democracy focuses on voting and that voting has been interpreted in two quite different ways. Now I want to show that the theory of social choice raises other disturbing questions about voting, questions that are as controversial as the issue between liberalism and populism and that may affect or even resolve that issue.

Historically, the theory of social choice arose out of the paradox of

voting. Without here going into many subsequently developed niceties, one can explain the paradox with these primitive notions of preference and choice.

1. *Preference.* Assuming there are *alternatives*, x, y, \dots , which may be objects, values, motions, candidates, and so on, a person, i , may prefer one alternative to another. This state of mind is represented as the relation of *preference*, P , between some pair of alternatives, x and y . Conventionally, one writes $x P_i y$, to mean " i prefers x to y ." The relation, P , is *transitive*, which means that the following sentence is true:

If $x P_i y$ and $y P_i z$, then $x P_i z$.

Quantitative relations like equality (=) or greater than (>) are transitive. For example, if a equals b and b equals c , then a equals c . Other relations, such as parenthood, are not transitive. Clearly, if a is the father of b and b is the father of c , then it does *not* follow that a is the father of c . Preference is said to be transitive mainly because intransitive preferences usually seem bizarre. If a man says he likes Republicans better than Democrats and Democrats better than Communists, then we think he is indeed strange if he also says he likes Communists better than Republicans.

2. *Rules of Choice.* Given a society of n persons, where i is one individual, and given a set of alternatives, $X = (x, y, \dots)$, a rule of choice is a rule by which a choice, C , is made for all of the n persons (e.g., the selection of a winning alternative by voting or the selection of the alternative left after discussion has eliminated all expressions of dissent). Conventionally one writes $C(X) = y$ to mean "the social choice from X is y ."

There are many rules of choice. A typical example is *simple majority voting between two alternatives*. By this rule, if more people prefer x to y than prefer y to x , then x wins. Conversely, if more people prefer y to x than x to y , then y wins. And if the same number prefer x to y as prefer y to x , then x and y tie.

With these primitive notions of preference and choice, the paradox of voting can now be stated: Suppose three people, 1, 2, 3, choose among three alternatives, x, y, z , by the method of simple majority rule applied successively to pairs. Suppose also that each person has the following transitive ordering of preference on x, y , and z :

Person 1: $x P_1 y$, $y P_1 z$, and $x P_1 z$; or $x y z$

Person 2: $y P_2 z$, $z P_2 x$, and $y P_2 x$; or $y z x$

Person 3: $z P_3 x$, $x P_3 y$, and $z P_3 y$; or $z x y$

Then the social choices are:

$C(x, y) = x$ because $x P_1 y$ and $x P_3 y$, while $y P_2 x$

$C(y, z) = y$ because $y P_1 z$ and $y P_2 z$, while $z P_3 y$

$C(x, z) = z$ because $z P_2 x$ and $z P_3 x$, while $x P_1 z$

Thus, although each individual in the society has a transitive ordering of preference, the outcome of voting is not transitive because x beats y , y beats z , and z beats x . If one tried to arrange the outcome of voting in a sequence of "social preference," one would not be able to do so because one could not say whether x or y or z stood first. Any one of these arrangements would be possible: $x y z x$, $y z x y$, $z x y z$.

If, on the other hand, one imposed transitivity by starting with $C(x, y) = x$ and $C(y, z) = y$ and concluding, by reason of transitivity, that $C(x, z) = x$, then person 1 would be a dictator, because only person 1 prefers x to z . Apparently, one is forced either to accept intransitivity for society or to achieve transitivity at the cost of creating a kind of dictator.

Many people are shocked by this result. One standard of consistency in sentences and coherence in thought is transitivity. We would consider a person claiming to like five dollars more than three dollars, three dollars more than one dollar, and one dollar more than five dollars to be quite confused. So we say that *preference* is a transitive relation. We can go further and say that social choice should also be transitive. If so, then, in the case of the voting paradox, we must affirm, paraphrasing Reinhold Niebuhr, "coherent man and incoherent society." Although individuals can arrive at a unique choice, in this case society cannot even choose. What makes all this so democratically unpalatable is that, apparently, the only way to make "society" choose coherently is to impose a dictator.

The possibility that social choice by voting produces inconsistent results raises deep questions about democracy. Can the democratic ideal be attained if the method used to attain it produces confusion? Given the possibility of inconsistency, does one interpretation of voting make more sense than another, or are both interpretations hopelessly flawed?

To raise the issues in the bluntest possible ways, I ask:

1. Can voting restrain officials if the outcome of voting is inconsistent?

How can restraint occur if it is not clear what restraint is imposed?

2. Is someone, supposedly restrained at the polls, merely kept in or out of office accidentally? If the outcome of voting might be $x y z x$ or $y z x y$ or $z x y z$, does not an accident of institutions, rather than popular taste, select the winner? And if the antecedent constitution, rather than the people, chooses, how can any kind of democracy be said to operate?

3. If liberty is embodied in an inconsistent law, is not liberty itself defective? If alternative laws are in a cycle, $x y z x$, then which alternative ought to be regarded as the will of the people and their liberty?

4. When an absolute good produced by voting is inconsistent, can that absolute have any moral significance? To say that x is morally right because x beat y seems difficult to defend if z also beat x .

These are the kinds of questions raised when we allow the theory of social choice to confront the theory of democracy. In this book I will elaborate the theory of social choice in order ultimately to explore these questions.

Different Choices from Identical Values

Democracy, however interpreted as a political ideal, uses, as a method of governing, social summaries of citizens' decisions in elections and legislators' decisions in representative bodies. The theory of social choice raises fundamental questions about the quality of these summaries: Are they coherent? Are they imposed by manipulation? This, then, is the problem: Are the doubts raised by social choice theory enough to necessitate a reinterpretation of democracy itself?

Before I begin the investigation, I want to point out that most citizens of democracies seem to be unaware of the problem. Although many people now complain about the adequacy of institutions like parties, they seem more or less satisfied with the fairness and integrity of the voting process (though not necessarily with the outcomes of voting). This satisfaction is easy to understand. We do not frequently have persuasive evidence of the defects in voting. When an election or a committee's decision procedure produces an outcome, evidence that another outcome *might* be socially preferred is usually never collected. One can seldom know, therefore, that the road not taken could have led to a better choice.

For example, when many candidates for an office are winnowed down to two by some nominating procedure (a primary election or a nominating convention), some candidate actually preferred to all others by a majority of voters may nevertheless be eliminated in the nominating process. Such a candidate, call him Golden Median, though very popular with independents as well as with many people in all parties, might lose by a narrow margin in his own party to another candidate, call her Bitter End, who is liked only by those who nominate her. In the election itself, Bitter End faces Blandly Mild, chosen by the other party. Blandly Mild easily beats Bitter End and is said, therefore, to be the voters' choice, even though Golden Median would defeat Blandly Mild if there were some

way to conduct another election. But such information is seldom available, and in its absence we cannot know that the best choice was not made. So instead we take the victory of Blandly Mild as evidence that he was the choice of the majority against all others, when, strictly speaking, that victory is only evidence that he was the majority choice against Bitter End.

Lacking clear-cut evidence of the inadequacy of voting, we repress our doubts—if indeed we ever have any—and treat elected officials and enacted legislation as if they were the true embodiments of popular preference. Nevertheless, we ought not to be wholly satisfied with the integrity of voting summaries, for we do have some evidence that elections do not always select the “best” or “right” result.

This evidence is based on the fact that different methods of election and committee decision-making have produced different results from identical distributions of preference. If one method were clearly superior, we might be able to say that its choice was the right one. But, as I will show in detail in Chapter 4, it is not possible to prove or even to argue persuasively that any method of election or decision is clearly superior to all others. Thus the fact of different results from different methods is powerful and disturbing evidence that the social summaries on which democracy depends are of poor quality and possibly are inadequate for the function they are expected to perform. Chapter 2, therefore, is devoted to an examination of a few instances in which one has good reason to question the quality of social summaries of individual preferences.

2.A. Evidence from Elections

To present clear-cut evidence that different methods of voting produce different results, one must show that, with exactly the same structure of individual preferences, two methods each produce unique results. Although this is not easily proved, we can get a strong suggestion of it from the elections we know best—namely, elections of the president of the United States. Most people in the United States probably believe that the election of the president works out pretty well—except for the special problem of the electoral college. Many people fear that the electoral college will distort the outcome, but it has produced the “wrong” result at most twice—in 1888 and 1824. Much more serious is the fact that quite often candidates win with less than half of the votes cast; and, surprisingly, this does not seem to bother people. Doubtless many citizens recall the election of 1968, in which Nixon’s plurality over Humphrey was only

seven-tenths of 1 percent, while the third candidate (Wallace) received about 14 percent of the vote. If the supporters of Wallace had been forced to choose between Nixon and Humphrey, the election might have turned out differently. Still, this possibility apparently disturbs very few people, although in the summer of 1980 it seemed likely that Anderson’s candidacy would have had an even more disturbing effect than Wallace’s.

Perhaps most people believe this kind of election is an infrequent aberration. But, as Display 2-1 shows, such outcomes occurred in 14 of the 39 elections (36 percent) since 1824, when most states began popular voting for presidential electors. It might be said in defense of the “infrequent aberration” notion that some of these cases are not “serious” because the winner would have retained a substantial plurality under any reasonable reallocation of the ballots for third and fourth candidates. In 1948, for example, Truman’s plurality was 4.4 percent and each minor party candidate had 2.4 percent of the total vote. In a reallocation, most of Wallace’s votes would probably have gone to Truman and so might some of Thurmond’s. If so, then Truman’s failure to get a majority made no difference to the outcome. Nevertheless, before the 1948 election, most people correctly believed that Truman would get only a minority of the votes. Many voters, therefore, may have voted strategically (that is, not for their true preference) just because of this anticipation. Suppose most voters for Thurmond ordered the candidates thus: Thurmond, Dewey, Truman. Then, the assurance of Truman’s loss led them to vote for Thurmond rather than for Dewey. Perhaps also potential voters for Dewey did not vote because they believed he was a sure winner. If these possibilities are realistic, then Dewey might have won, and at the very least the summary is flawed, no matter what the actual outcome.

If we discard the “infrequent aberration” notion on this basis, then we ought to add to the list in Display 2-1 the elections of 1832, 1852, 1924, and 1980. In those elections, despite the winner’s simple majority over all other candidates, 5 percent or more of the ballots were cast for a third candidate, whose very presence thus casts doubt on the quality of the electoral summary—that is, his presence may have led people to vote contrary to their true tastes. If so, then 18 out of 39 elections (46 percent) might have turned out differently with a different method of summarizing. A different outcome would not, of course, be “right.” It might simply reflect different strategic considerations. But the possibility of difference is itself disconcerting.

The problem is that, in the American system of choosing a single official in a single district of the whole country, choosing between two candidates by a simple majority and choosing among several candidates by a plurality are quite different procedures. There is no reason to suppose

Display 2-1

U.S. Presidents Who Won with a Minority of the Popular Vote, 1824-1976

Year	Winner	Percent for winner	Percent for runner-up	Percent for third place	Percent for fourth place	Percent for others
1824	Adams	31.0*	41.3	13.0	11.2	3.5
1844	Polk	49.6	48.1	2.3	—	—
1848	Taylor	47.3	42.5	10.1	—	0.1
1856	Buchanan	45.3	33.1	21.5	—	0.1
1860	Lincoln	39.8	29.5	18.1	12.6	—
1880	Garfield	48.27	48.25	3.3	—	0.2
1884	Cleveland	48.5	48.3	1.7	1.5	—
1888	Harrison	47.8	48.6	2.2	1.3	0.1
1892	Cleveland	46.0	43.0	8.5	2.3	0.2
1912	Wilson	41.8	27.4	23.6	6.0	1.6
1916	Wilson	49.2	46.1	3.2	1.2	0.3
1948	Truman	49.5	45.1	2.4	2.4	0.6
1960	Kennedy	49.7	49.5	0.2	0.1	0.5
1968	Nixon	43.4	42.7	13.5	0.1	0.3

*Elected by the House of Representatives.

Note. In 1876, Tilden apparently received over half of the votes cast; but the electoral commission recognized Hayes electors from three disputed states, and Hayes was elected in the electoral college.

they will turn out the same way. This is not, however, a defect unique to the single-member district system. Even under proportional representation, slightly different methods of summarizing can produce markedly different results. The French parliamentary election of 1951 provides a persuasive illustration of this fact.

In preparation for that election, the parties of the center, the so-called Third Force, which had jointly controlled the National Assembly from the election of 1946, *slightly* changed the electoral procedures in a way that *greatly* enhanced their opportunities to remain in control. It seems likely that the ordinary citizen did not observe much difference in the procedure. Indeed, in 1946 and 1951 he or she cast a ballot by exactly the same method. Furthermore, the ballots themselves appeared to be of exactly the same sort. Only the parties and the vote-counters did anything differently or perhaps even knew much about the difference. Nevertheless, the outcome in 1951 was grossly manipulated, enough to change the whole tone of French politics. Without this manipulation, both Gaullists and Communists would have had more seats, and that fact would very likely have changed the Cabinets between 1951 and 1955 from mostly Third Force coalitions to either right-leaning or left-leaning ones. Whether the contrived enhancement of the Third Force was fortunate or unfortunate I cannot say. But I can say for certain that the actual outcome and what might have been were very different reflections of voters' preferences.

The purpose of proportional representation is to reflect as accurately as possible in the legislature candidates' or parties' votes in the election: If a party has x percent of the total vote, then it ought to have exactly x percent of the seats in the legislature.¹ But it is seldom possible, especially with districts smaller than the whole nation, to achieve quite this objective in practice. And it was this fact that the French legislators exploited.

In both 1946 and 1951, elections were conducted in districts with from two to ten seats allocated roughly in proportion to district population. Each party, if it ran in a district, presented a list of as many candidates as the district had seats, and each voter cast a ballot for one list. In 1946 parties were assigned seats by districts using the formula of the highest average.

In 1951 two changes were made. In some districts, parties were permitted to form alliances and seats were assigned by the highest-average formula applied either to parties or to alliances. In other districts, alliances were not permitted, and seats were assigned by the largest-remainder formula.² The highest-average method favors large parties; the largest-remainder method does not systematically favor large or small parties.

In 1951, alliances among parties were permitted in all districts except Paris and its suburbs. The voters still voted for an individual party (not for a whole alliance). Since the ballots looked just like the ballots used in 1946 and did not indicate the existence of alliances, it is possible many voters did not know alliances existed. If, together, the parties in an alliance got more than half of the valid ballots, then *all* the seats in a district were divided among just the parties in the alliance by the highest-average formula. If an alliance did not get half of the votes, then seats were assigned, as in 1946, by the highest-average formula, to *all* parties that had enough votes. This procedure greatly helped the Third Force parties (the mildly conservative Radical Socialists, the barely socialistic Socialists, and the Catholic centrist Popular Republican Movement [MRP]). They were ideologically compatible, were already jointly running the government, and could get a bare majority in quite a large number of districts. In contrast, the largest parties, the Communists and the Gaullists, were at opposite ends of the ideological spectrum and had very few ideologically friendly parties to ally with (although the Gaullists made a few alliances with traditional rightist parties).

The total number of seats in districts permitting alliances was 508. Display 2-2 summarizes the gains and losses that actually occurred with alliances and the outcome that would have occurred under the 1946 law without alliances. The Display is based on two allocations of seats: (1) the actual allocation with alliances and (2) an imaginary allocation without alliances. Gains and losses are the differences between the two allocations. The calculation of the imaginary allocation is, for each legislative district, by the highest-average method, using the votes actually cast for the individual parties, but assuming that no alliances were made. The alliance procedure permitted parties of the governing coalitions to gain 85 of 508 seats or about 17 percent.

In Paris and its suburbs, Communists and Gaullists controlled probably two-thirds of the votes. The procedure of a majority alliance could not help the Third Force parties, and they did not permit it in the 75 seats there. Instead, they changed the formula of counting votes from the highest-average method to the largest-remainder method. Since the highest-average method sometimes penalizes small parties, while the largest-remainder method treats large and small parties indifferently, the relatively smaller parties of the Third Force could improve their chances by this change. The right and center parties gained 9 of 75 seats or about 12 percent of the Parisian seats. The actual gains and losses are summarized in Display 2-3.

As a consequence of these manipulations, the distribution of parties in the National Assembly in 1951 turned out to be quite different from

Display 2-2

**Gains and Losses in 1951 from Using
the 1951 Procedure of Alliances
Rather Than the 1946 Procedure of
Parties Standing Independently**

Parties	Gains	Losses	Net change
Third Force			
Radicals	24	2	+22
Socialists	17	3	+14
MRP	26	—	+26
Rightist parties	25	2	+23
Communists	—	65	-65
Gaullists	2	22	-20
	<hr/>	<hr/>	<hr/>
	94	94	0

Display 2-3

**Gains and Losses in Paris in 1951
from Using the Largest-Remainder Method
Instead of the Highest-Average Method**

Parties	Gains	Losses	Net change
Third Force			
Radicals	3	1	+2
Socialists	1	—	+1
MRP	4	—	+4
Rightist parties	2	—	+2
Communists	—	4	-4
Gaullists	—	5	-5
	<hr/>	<hr/>	<hr/>
	10	10	0

Display 2-4

**Actual Outcome of the 1951 Election in Paris
Compared to a Hypothetical Outcome
from Using the 1946 Electoral Law
to Calculate 1951 Results**

Parties	Actual outcome	Hypothetical outcome
Third Force		
Radicals	90	62
Socialists	107	90
MRP	97	294
		65 217
Rightists		
Independent Republicans	52	
Center Republicans	42	94
		82
Gaullists		146
Communists	120	
	101	170
Unassigned		18
		12
Total*		627
	627	
Constitutional majority	314	314

*Includes 44 members from overseas.

what it would have been under the 1946 election law. This distribution, including 44 overseas members, is set forth in Display 2-4. As it illustrates, the Third Force could get a majority of 314 to form a Cabinet by attracting only 20 more supporters ($314 - 294$)—a few Rightists or Gaullists. In fact, the Gaullist party split up for just this reason within a few months. Consequently, most Cabinets from 1951 to 1955 were dominated by the Third Force along with a few Rightists and complaisant Gaullists. If the 1946 law had remained in effect, however, the Third Force would have needed 97 additional votes to form a Cabinet ($314 - 217$), and this would surely have forced the inclusion of either Gaullists or Communists. Since the latter option then appeared politically infeasible, the Third Force would probably have had to compromise with De Gaulle. One can always wonder whether such a compromise might have saved the Fourth Republic, which De Gaulle replaced in 1958. (One can also wonder whether the Fourth Republic was worth saving.)

2.B. Evidence from Experiment

The evidence cited so far of defects in the process of voting is inadequate because we do not have a full record of voters' preferences. Hence we cannot be absolutely certain whether the different possible results derive from different methods of summation or from quirks in voters' behavior such as strategic voting (that is, voting not in accord with one's true preferences). There is, however, at least one very well documented instance of voting for which we have an exhaustive record of preferences and to which we can apply different methods of summation in full confidence that only the methods vary, not the preferences themselves. The fact that in this case different methods produce different results seems to me to be definitive evidence of ambiguities in the process of aggregating preferences.

In preparation for a project to launch two Mariner (now Voyager) spacecraft in the summer of 1977 to fly by Jupiter in 1979 and Saturn in 1980 and then to escape from the solar system, the Jet Propulsion Laboratory of the California Institute of Technology (the manager of the project for the National Aeronautics and Space Administration) assembled about 80 outside scientists divided into ten teams concerned with various features of the observation of planets. Typical teams were Magnetic Fields (MAG), concerned with planetary and interplanetary magnetic fields, and Infrared Radiation (IRIS), concerned with energy-related topics such as the atmospheric composition and temperature of planets. One of the first tasks of the ten teams was the selection of specific trajectories for the two spacecraft, and it was in connection with the decision on this task that detailed data on preferences were collected.³

Initially, engineers at the Jet Propulsion Laboratory selected 105 trajectories satisfying certain fundamental navigational, scientific, and budget constraints. Pairs of trajectories—one trajectory for each of the two spacecraft—were then matched for the beginning and end of the feasible launching period in August and September 1977. After extensive analysis by the teams of outside scientists, 32 pairs of trajectories were selected for final consideration. In October 1973, each team ranked the 32 pairs according to their usefulness for the observations with which the team members were concerned. This ranking produced the ordinal utility of each team for the pairs. *Ordinal utility* is a measure of preferences in terms of rank orders—that is, first, second, etc. Once ordinal utility is determined, it is possible to transform it into cardinal utility. *Cardinal utility* is a measure of preferences on a scale of cardinal numbers, such as

the scale from zero to one or the scale from one to ten. In this case, the experimenter used a standard method to elicit from each team its cardinal utility numbers from 0.0 for lowest to 1.0 for highest.⁴ The ordinal and cardinal rankings by teams are the fundamental data on preferences to which various methods of summation can be applied.

There can be no doubt that the members of the teams took this task very seriously and calculated their preferences according to their own self-interest rather than according to any kind of general interest (as assumed in some populist theories). As two observers, Dyer and Miles, remarked, "The duration of the MJS77 Project is about ten years and may represent the only foreseeable opportunity for some of these scientists to be involved in a planetary mission."⁵ Clearly a good part of the team members' professional lives and indeed of their scientific achievements was involved in the selection of good trajectories. Furthermore, the pairs of trajectories were of widely different value. Trajectory pair 24, for example, was ranked first by team UVS, third by team RSS, and thirty-second by teams LECP, MAG, and PRA.

The teams were given approximately one month to analyze the relative merits of the 32 pairs by mail and telephone, and then they were assembled physically for two days to carry through the actual ordinal rankings and to derive cardinal utilities. The result is, I believe, a thoughtful and careful ordering of preferences, more thoughtful and careful than is usually found in political decisions. Furthermore, the teams were isolated from each other when they measured their preferences, so it was not possible to report their preferences falsely in order to exploit intransitivities and other anomalies in the sum of other teams' preferences. Hence we can interpret the data as an honest, nonstrategic expression of the voters' (i.e., the teams') true tastes.

The data on preferences is set forth in Display 2-5. Using this data, Dyer and Miles applied four well-known and well-rationalized methods of summation:

1. *Sum of ordinal ranks comparison.* This method involves summing, for each pair of trajectories, the rank orders given that pair by each of the teams. This is an adaptation of the *Borda method* of rank order comparison, named after its eighteenth-century inventor.
2. *Sum of cardinal utilities comparison.* This method consists of summing, for each alternative, the cardinal utilities assigned to it by each team. The alternative with the highest sum is the winner. This can be called the *Bentham winner*, after Jeremy Bentham, the nineteenth-century philosopher who advocated "utilitarianism."

3. *Multiplicative cardinal utilities comparison.* This method consists of multiplying, for each alternative, the cardinal utilities assigned to it by each team. The winner is the alternative with the highest product and is called the *Nash winner* after the contemporary mathematician who proposed it.
4. *Ordinal pairwise comparison.* This method (see Display 2-6) involves setting each alternative (in this case, pairs of trajectories) against each other alternative in a head-to-head vote by simple majority rule. If any alternative can defeat each of the others by a simple majority, it is the *Condorcet winner*, so named after the eighteenth-century philosopher who first proposed this method.

By the Condorcet standard, pair 26 was the clear winner, for, as partially indicated in Display 2-6, it defeats all others in a head-to-head contest. Notice that team IRIS ranks pair 26 second and pair 31 third. Hence in pairwise voting between 26 and 31, IRIS should (and did) vote for pair 26.

By the Borda method of summing ranks, pair 31 won. By the Bentham method of adding utilities, pair 26 again won, while by the Nash method of multiplying utilities number 31 won a second time. Finally, although plurality voting probably ought not to be taken seriously in this case, pair 25 and pair 27 were tied, each with two first-place votes. Nevertheless, ignoring the plurality outcome, with four methods, each of which can be supported by strong and persuasive arguments, there are two distinct winners, each of which wins twice. Which one ought to be regarded as the "true" winner? I cannot say, and I think it is difficult to produce a convincing argument either for pair 26 or for pair 31. The best that one could possibly say is that probably one of these two pairs should have been chosen. Actually, the Jet Propulsion Laboratory, after some adjustment and improvement of pair 26, persuaded the teams to adopt it. But, as Dyer and Miles point out, if pair 31 had been similarly improved, it might just as easily have been chosen.

This example of real decision-making, the only one known to me in which full information on preferences was collected from real decision-makers, reveals the fundamental ambiguity in methods of summarizing preferences.⁶ This example demonstrates that, even if an omniscient observer, call him Zeus, knew the true tastes of every voter, it would still be impossible for him to predict the social choice or the product of aggregating preferences unless he also knew the method of aggregation. This means that the social choice depends not simply on the wills of individuals, but also on the method used to summarize these wills.

Display 2-5

Ranking and Utilities of Ten Trajectory Pairs According to the Borda, Bentham, and Nash Methods

Trajectory pair	Borda method: Ordinal utility		Bentham method: Additive cardinal utility		Nash method: Multiplicative cardinal utility	
	Social ordering	team's rank numbers	Social ordering	Sum of team's cardinal utilities	Social ordering	Product of cardinal utilities
31	1	67.0	2	8.87	1	0.2703
29	2	75.0	3	8.75	3	0.2340
26	3	75.5	1	8.89	2	0.2701
27	4	100.0	4	8.56	4	0.1738
5	5	111.5	6	7.91	6	0.0796
25	6	113.0	5	8.22	5	0.1124
35	7	120.0	7	7.57	8	0.0524
17	8	131.0	10	7.38	10	0.0399
8	9	134.5	8	7.55	7	0.0537
10	10	136.5	12	7.28	12	0.0310

Adapted from James S. Dyer and Ralph E. Miles, Jr., "An Actual Application of Collective Choice Theory to the Selection of Trajectories for the Mariner Jupiter/Saturn 1977 Project," *Operations Research*, Vol. 24 (March 1976), pp. 220-244.

By the Borda method, each team ranks the 32 pairs first, second, etc., on to thirty-second. Then, for each alternative, the ranks are summed. The winner is the pair with the lowest sum, here pair 31, which has a sum of 67. (The minimum sum would be 10, if each team ranked the same alternative first. Display 2-9 contains an example of the Borda calculation in reverse ranking.)

To use the Bentham and Nash methods, the rank orders by each team are transformed to a cardinal scale, using 1 for the highest rank and zero for the lowest rank. Then, for the Bentham method, the cardinal numbers are summed for each alternative, while for the Nash method they are multiplied. The maximum values, which would occur if each of the ten teams put the same trajectory pair in first place, are 10 under the Bentham method (i.e., $1 + 1 + \dots + 1 = 10$) and 1 under the Nash method (i.e., $1 \cdot 1 \cdot \dots \cdot 1 = 1$). The minimum values, if each team put the same trajectory pair in last place, are zero in both cases.

Display 2-6

**Ordinal Pairwise Comparison of Four Trajectory Pairs
Ranked Highest by the Borda, Bentham, and Nash Methods**

Teams' Ordinal Rank Numbers*

Trajectory pair	RSS	IRIS	ISS	PPS	UVS	CRS	LECP	MAG	PLS	PRA
31	20.5	3.0	5.0	8.5	6.0	8.0	4.0	3.0	4.0	5.0
29	20.5	5.0	19.0	6.5	9.0	3.0	2.0	2.0	4.0	4.0
26	20.5	2.0	10.0	11.0	7.0	17.5	3.0	1.0	1.5	2.0
27	20.5	1.0	30.0	16.0	3.0	17.5	1.0	4.0	4.0	3.0

Calculation of the Condorcet Winner: Pairwise Voting*

	Contest		Contest			
	Pair	Pair	Pair	Pair		
	26	vs.	29	26	vs.	27
IRIS	ISS		IRIS	PPS		IRIS
LECP	PPS		ISS	CRS		UVS
MAG	UVS		UVS	LECP		LECP
PLS	CRS		MAG	PLS		PLS
PRA			PLS	PRA		PRA

*Adapted from James S. Dyer and Ralph E. Miles, Jr., "An Actual Application of Collective Choice Theory to the Selection of Trajectories for the Mariner 1977 Jupiter/Saturn Project," *Operations Research*, Vol. 24 (March 1976), pp. 220-244.

I have been very much impressed with this deep ambiguity; and, as an additional exercise in demonstrating the defects of voting, I have concocted an imaginary voting situation with five alternatives. This imaginary, but nevertheless disconcerting, situation is set forth in Display 2-7. Each column shows the preference order of a single voter. The most-preferred alternative is at the top of the column, and the least-preferred alternative is at the bottom. The voter's cardinal utility for each alternative is in parentheses.

Notice that the plurality winner is alternative *b*, which is supported in first place by voters 4 and 5, or 40 percent of the voters. The Condorcet winner is alternative *a*. It wins in a head-to-head vote against each of the others, as shown in Display 2-8. By the Borda method, alternative *b* wins again as shown in Display 2-9. (Dyer and Miles inverted the Borda scale to simplify arithmetic for a large number of alternatives. Usually, however, the Borda count, for *n* alternatives, gives *n* – 1 points to a voter's first choice, *n* – 2 to his or her second choice, on down to zero points for the last choice. The winner is the alternative with the most points.) The Bentham winner (by additive cardinal utility) is alternative *d*, as shown in Display 2-10. And, finally, the Nash winner (the product of cardinal utilities) is alternative *e*. The Nash winner is calculated from the data in Display 2-9, except that the utilities in each row are multiplied together instead of summed. (For example, in the first row $1.00 \times .61 \times .70 \times .75 \times .60 = .192150$.) The products for each row are:

- a*. .19215
- b*. .19800
- c*. .07700
- d*. .20250
- e*. .20956

Of the five alternatives, *a*, *b*, *c*, *d*, and *e*, every one except *c* wins by some defensible method of aggregating preferences. Clearly, the outcome is just as much a function of the method as it is of the underlying tastes.

* * *

I have discussed a variety of methods of voting, methods in use in different cultures and in different kinds of social circumstances. In each example, alternative methods do not agree on the social choice, thereby suggesting doubts about the quality of the process of amalgamation. By reason of the variety, it is clear that something more general is involved

Imaginary Ordinal and Cardinal Utilities for Five Alternatives and Five Persons

Rank order	Voter 1	Voter 2	Voter 3	Voter 4	Voter 5
Highest: 1	<i>a</i> (1.00)	<i>d</i> (1.00)	<i>e</i> (1.00)	<i>b</i> (1.00)	<i>b</i> (1.00)
2	<i>d</i> (0.90)	<i>a</i> (0.61)	<i>c</i> (0.80)	<i>d</i> (0.90)	<i>e</i> (0.96)
3	<i>b</i> (0.60)	<i>b</i> (0.60)	<i>a</i> (0.70)	<i>a</i> (0.75)	<i>c</i> (0.70)
4	<i>c</i> (0.55)	<i>e</i> (0.59)	<i>b</i> (0.55)	<i>e</i> (0.74)	<i>a</i> (0.60)
Lowest: 5	<i>e</i> (0.50)	<i>c</i> (0.50)	<i>d</i> (0.50)	<i>c</i> (0.50)	<i>d</i> (0.50)

Note. Cardinal utilities are in parentheses.

Display 2-8

**Calculation of the Condorcet Winner
for the Five-Person Society of Display 2-7**

**Number of Votes for the Alternative in the Row
when Placed in Contest against the
Alternative in the Column**

	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	
<i>a</i>	—	3	3	3	3	(Condorcet winner)
<i>b</i>	2	—	4	3	4	
<i>c</i>	2	1	—	2	1	
<i>d</i>	2	2	3	—	3	
<i>e</i>	2	1	4	2	—	

Since alternative *a* (top row) has a majority over each of the other alternatives, it is the Condorcet winner.

than a mere locally idiosyncratic feature of the process. I have not yet investigated the characteristics of the methods or attempted to judge their merits; yet each method has been recommended because it is believed to be appropriate and justifiable. We are thus driven to ask: Is there one method (and hence outcome) that *ought* to be chosen? In these examples I think that even Zeus, with, presumably, perfect knowledge of voters' tastes, could not predict the social choice. And if Zeus were required to impose some method of summation, which method would he say was morally right or even merely technically correct? I do not know, and, if Zeus existed, I doubt very much if he would know either. In the next two chapters, I will try to instruct him about how to choose.

Display 2-9

Calculation of the Borda Winner for the Five-Person Society of Display 2-7

Number of Points for Alternatives in Rows; Preference Orders in Columns

Alternatives	Points from Voter <i>i</i>					Total
	<i>i</i> = 1	<i>i</i> = 2	<i>i</i> = 3	<i>i</i> = 4	<i>i</i> = 5	
<i>a</i>	4	3	2	2	1	12
<i>b</i>	2	2	1	4	4	13 (Borda winner)
<i>c</i>	1	0	3	0	2	6
<i>d</i>	3	4	0	3	0	10
<i>e</i>	0	1	4	1	3	9

Borda calculation: Add the points for each alternative (in rows) across individuals (in columns). The winner is alternative *b*, with the most points in total.

Display 2-10

Calculation of the Bentham Winner for the Five-Person Society of Display 2-7
Utility for Alternatives in the Rows; Voters' Judgments in the Columns

Alternatives	Cardinal Utilities for Alternatives by Voter <i>i</i>					Total
	<i>i</i> = 1	<i>i</i> = 2	<i>i</i> = 3	<i>i</i> = 4	<i>i</i> = 5	
<i>a</i>	1.00	.61	.70	.75	.60	3.66
<i>b</i>	.60	.60	.55	1.00	1.00	3.75
<i>c</i>	.55	.50	.80	.50	.70	3.05
<i>d</i>	.90	1.00	.50	.90	.50	3.80 (Bentham winner)
<i>e</i>	.50	.59	1.00	.74	.96	3.75

Bentham calculation: Add the utilities for each alternative (in rows) across individuals (in columns). The winner is alternative *d*, with the largest sum.

3

Simple Majority Decision

The examples of Chapter 2 clearly indicate that different methods of summarizing the same underlying structure of preference produce different social choices. Still, this fact need not cause problems for democratic theory if one method of aggregation is clearly superior to all others. And, as it happens, there is one that is quite attractive and perhaps appears better than others—namely, simple majority decision when there are exactly two alternatives.

The procedure does have highly desirable properties, and one reason that most people are indifferent to the defects in voting may be that they believe that simple majority rule over two alternatives is in use most of the time. If this belief were correct, popular indifference would probably be justified. Unfortunately, simple majority rule displays its most desirable properties only when there are exactly two alternatives, and nature hardly ever offers us binary choices. We have, of course, many institutions, like primary elections, to reduce alternatives to exactly two. But simply because we force ourselves into a binary choice should not obscure the fact that we really start out with many alternatives and that we can never be certain that our institutions have narrowed the choice down to the right pair for us to choose between.

Rare as its natural occurrence is, however, simple majority decision is still very attractive, which is why some people want to realize it in institutions. In this chapter, therefore, I will explain in detail why it is attractive. Then, in conclusion, I will describe the tradition of democratic thought devoted to institutionalizing it. But I will also show that simple majority decision cannot be institutionalized without violating fundamental notions of fairness.

In this chapter and the next two, it will be necessary to define a number of technical terms in order to reveal some of the deep meaning of

the issues raised. Definitions will always be stated in the text. Formal statements—if useful—will be placed in the Notes. Since this is an introductory discussion, no proofs of formal theorems will be given.

3.A. Introductory Definitions

In section 1.H several primitive notions were introduced. I will elaborate them here and introduce a few more.¹

1. A set, $X = (x, y, \dots)$, of alternatives, which can be motions, candidates, platforms, bundles of goods, and so on. Since in this chapter the concern is with simple majority choice between pairs, the set X will here be limited to exactly two members, $X = (x, y)$; later it may be indefinitely or even infinitely large. Here, x and y may be thought of as two candidates (x is, say, candidate A , and y is then candidate B) or as yea or nay votes on a motion (x is for yea, and y is for nay).
2. A set, $N = (1, 2, \dots, n)$, of people, which is a society of n members or eligible participants, where i is any one of the n members, that is, $i = 1$ or 2 or \dots or n .
3. For each i , a relation, P_i , of preference over X . Each P_i is asymmetric: If a judgment is made between x and y , then either $x P_i y$ or $y P_i x$ but not both. Notice that P_i need not be complete so that, for some x and y in X , neither $x P_i y$ nor $y P_i x$.
4. For each i , a relation, I_i , of indifference, which, given a judgment between x and y , is defined as: not ($x P_i y$) and not ($y P_i x$). Hence I is symmetric: if $x I_i y$, then $y I_i x$.
5. For each i , a relation, R_i , of P_i and I_i combined, which is defined as: $x R_i y$ is equivalent to not ($y P_i x$).² Notice that R_i is complete so that either $x R_i y$ or $y R_i x$.
6. The concept of a social choice, $C(X)$, where $C(X) = z$ means “When the society follows a given rule for choosing, the choice from X is z .” If the context does not make clear the rule being followed, say, simple majority (SM) or plurality (P), then the rule in use will be indicated as a subscript to C , thus: $C_{SM}(X)$ or $C_P(X)$.

It is a delicate matter to determine just what P_i , I_i , and R_i involve. One possible interpretation is that they refer to private individual judgments. We learn of such judgments, however, only through their public

expression, as when a person says, “I like y better than x ,” or when a person votes for x . Unfortunately, public expressions may or may not truly reflect private judgments. A person may dissemble opinions, for strategic reasons, and perhaps vote contrary to true tastes (either because of being manipulated or because of trying to manipulate). It is not quite clear, therefore, just what the statement $x P_i y$ means. For convenience I will adopt this convention: Except when I expressly note that private judgment and public action may differ, I shall equate the two. Hence $x P_i y$ will mean both private preference for x over y and the public (though possibly secret) act of voting for x , and $x I_i y$ will mean both private indifference and abstention from voting.

For each i in N , there is a structure, D_i , of individual judgment over the members of X . In the two-alternative case, D_i is just one of $x P_i y$, $x I_i y$, or $y P_i x$. These forms can be represented conveniently by the integers (1, 0, -1):

$$\begin{aligned} D_i = 1 &\quad \text{means} & x P_i y \\ D_i = 0 &\quad \text{means} & x I_i y \\ D_i = -1 &\quad \text{means} & y P_i x \end{aligned} \tag{3-1}$$

For the whole set N , there is a vector, D , of all the individual judgments, where $D = (D_1, D_2, \dots, D_n)$. Using (3-1), some profile, D , of a society may be thought of as a string of integers chosen from (1, 0, -1), where each integer stands for an individual judgment. For example, on a five-person committee, where the first, fourth, and fifth members favor and vote for a motion, the second is undecided and abstains, and the third opposes and votes against, $D = (1, 0, -1, 1, 1)$. Finally, the vector D is a member of a set \mathbf{D} , which is the set of all possible social profiles. For example, if N consists of two people (that is, $n = 2$), then \mathbf{D} is as set forth in Display 3-1.

Thus, D_i is some particular person’s preference or values, D is the profile on a particular occasion of the preference or value structure of all members of the society, N , and \mathbf{D} is the set of all possible social profiles that N might display.

Inasmuch as our concern is with some kind of *social* choice, based ultimately on individual judgment, there must be a rule by which the D_i in each D are amalgamated. This rule is a function, F , which is stated in complete form so that it can operate on any D in \mathbf{D} . The social choice from X , given D and F , is referred to as $F(X, D)$. I will abbreviate this to $F(D)$. Note that $F(D)$ is thus a special case of $C(X)$, special in the sense that a profile, D , and a rule, F , are stipulated. For the case where X has

Display 3-1

Members of D for Two Persons

$$D = \left\{ (1, 1), (0, 1), (-1, 1) \right. \\ \left. (1, 0), (0, 0), (-1, 0) \right. \\ \left. (1, -1), (0, -1), (-1, -1) \right\}$$

Each pair of D_i in parentheses indicates a possible choice by the two voters. Thus $(0, 1)$ means that $D_1 = 0$ (for $x I_1 y$) and $D_2 = 1$ (for $x P_2 y$). The set of nine possibilities in large brackets is all possibilities of D .

just two members, I define $F(D)$ parallel to the interpretation of D_i :

$F(D) = 1$ means x is the social choice from X by F , given D .

$F(D) = 0$ means x and y tie and are together the social choice by F from X , given D . (Many rules of amalgamation do not exclude ties. Practically, however, there are usually ad hoc rules to break ties—tossing coins, extra votes for presiding officers, etc.—which have nothing to do with the amalgamation itself.)

$F(D) = -1$ means y is the social choice by F from X , given D .
(3-2)

Obviously, there are a large number of possible rules or functions. To convey a sense of the wide variety, I will list a few to be discussed:

1. *Constant functions*

- a. *Indecisive.* x and y always tie, regardless of the individuals' preferences in D ; that is, $F(D) = 0$, for all D in D .
- b. *Imposed.* x (or y) always wins, regardless of the individuals' preferences in D ; that is, $F(D) = 1$ (or -1), for all D in D .

2. *Simple majority functions.* That alternative wins which has more votes than the other (or, if the number of voters is even, alternatives may tie), where members of N may vote or abstain. Many variations can be obtained by weighting votes and declaring the winner to be that alternative with the greater sum of weights.

3. *Absolute majority functions.* That alternative wins which has more votes (or weights) than half of the total votes or weights in N , with abstention permitted or not permitted as the case may be.
4. *Special majority functions.* That alternative wins which has more than some specified proportion of the votes or weights (e.g., ratios like $2/3$ or $3/4$), when the proportion is calculated from those voting or from all members of N .

3.B. Properties of Simple Majority Decision: Monotonicity

The method of simple majority decision, in which voters are weighted equally and in which they can either vote or abstain, is defined thus: If more people vote for x than for y , x wins; if the same number vote for x and y , they tie; and if more vote for y than for x , y wins. Using the terminology of D_i , if the sum of the D_i in D is greater than zero, x wins; if equal to zero, x and y tie; and if less than zero, y wins.³ The method has three independent properties—monotonicity, undifferentiatedness, and neutrality. An examination of each of them will permit a full appreciation of this rule.⁴

By *monotonicity* is meant that an increase in the value of some D_i implies an increase, or at least not a decrease, in the value of $F(D)$. That is, if one or more voters change preference in a direction favorable to x (i.e., change from favoring y either to being indifferent between x and y or to favoring x , or change from being indifferent to favoring x), then the resulting change, if any, in the fate of x should be an improvement for x .

Monotonicity is an especially important feature of any decision rule that amalgamates individual tastes into a social outcome. It would be perverse in the extreme if increased votes for an alternative contributed to its defeat. Consequently, it seems an elementary requirement of sensible and fair choice that the decision rule respond positively, or at least non-negatively, to increases in individual valuation of an alternative. This is precisely what monotonicity (or, as it is sometimes called, *responsiveness* or *nonperversity*) provides for. Desirable as monotonicity may seem, however, there are, quite surprisingly, a number of widely used social choice functions that fail to satisfy it.

To define monotonicity, consider some D and D' both in D . They may be identical; but for every i in N , $D_i \geq D'_i$. Specifically, any change from D' to D involves a change, for one or more i , in the direction of fa-

voring x over y . Thus, for any person, i , whose values change, if $D'_i = -1$ (i.e., $y P_i x$), then $D_i = 0$ or 1 ; or if $D'_i = 0$ (i.e., $x I_i y$), then $D_i = 1$. This means that, for the whole society, the sum of D_i is equal to or greater than the sum of D'_i , because, if any change occurs from D'_i to D_i , it must increase the sum of D_i relative to D'_i . Hence monotonicity for a rule, F , means that if some D_i increases over D'_i , then $F(D)$ is not less than $F(D')$.⁵

To state this definition in another way, suppose an alternative is rendered more preferred in private judgment and individual voting. Then, if any change in outcome results, that change *must* not hurt the alternative that has come to be more attractive. But, of course, no change in outcome need result. Indeed, this condition on F does allow for a wide range of ties and hence for a wide range of situations in which, despite shifts in preference or valuation, no change in outcome results. Specifically it might happen, for an F satisfying equation (N3.2) (see note 5),* that some person changes $D'_i = 0$ to $D_i = 1$, yet nevertheless $F(D') = F(D) = 0$. This means that an individual valuation of x rises, but the tie between x and y is not broken.

A commonly used method of social choice that displays such a wide range of ties is the rule used on juries. For a jury, where x means conviction and y means acquittal, the jury function is the rule that x or y wins only if the jury is unanimous and that otherwise x and y tie in a hung jury.⁶ For this F in situation D' the jury might be split nine to three for conviction (i.e., $\sum_{i=1}^n D'_i = 6$). Then to create situation D some juror, i , might switch from acquittal to conviction so that $D'_i = -1$ and $D_i = 1$. (Consequently, $\sum_{i=1}^n D_i = 8$.) But the jury would still be hung, so $F(D') = F(D) = 0$.

In simple majority decision, ties are not so persistent, which is one of the merits, I believe, of this rule for large electorates. To describe simple majority decision, therefore, one needs the notion of *strong monotonicity*: If a tie exists and just one voter shifts his or her position, the tie is broken.⁷ Thus, if just one person shifts from abstaining ($D'_i = 0$) to voting ($D_i = 1$ or -1), strong monotonicity requires that the tie be broken, provided no one else changes a vote. On, for example, a seven-member committee with six members present and split three to three on election of a chairman, the absent member will, when brought in to vote, break the tie.

As this example indicates, simple majority voting is strongly monotonic because a single person can always break a tie if no one else changes. The jury rule, while monotonic, is not strongly monotonic, because changes by several persons may be required to break a tie.

*The prefix "N" indicates that the equation appears in the Notes at the back of the book.

3.C. Violations of Monotonicity

Given the fundamental importance of monotonicity for constructing a consistent relation between individual valuations and social outcomes, it is truly astonishing that several widely used social choice functions violate this condition. Although violators are probably rare when restricted to binary choice—I shall, however, offer one example—they are quite common among functions that operate on more than two alternatives, and I shall describe several.

Social Choices Operating on Two Alternatives

One widely used method of choosing a winner in contests of musical performance violates a condition of unanimity. Since unanimity is closely related to and implied by monotonicity, a violation of unanimity also constitutes a violation of monotonicity. There are two forms of the unanimity condition: (1) *unanimity*, which means that, if everyone favors x , then x wins (and vice versa for y); and (2) *weak unanimity*, which means that, if everyone favors x , at least y does not win (and vice versa for y).⁸ For F nonconstant and admitting values of 1 , 0 , and -1 , strong monotonicity implies unanimity and monotonicity implies weak unanimity, so forms of unanimity are special cases of forms of monotonicity. This is as it should be, for there is a congruence of sense between the two conditions. Certainly, if we believe that improving the private valuation of an alternative *ought* not to make it worse off (monotonicity), then a unanimous preference for that alternative *ought* to guarantee that it not lose (weak unanimity).

In judging performances in musical contests, the following rule is often used: For n judges and m performers (here I present an example with $m = 2$ to preserve binary choice and $n = 3$ to save arithmetic, though typically m and n are both much larger), each judge awards each performer from 1 to 25 points.⁹ For each performer, the judges' awards are ordered from highest to lowest, the median award is determined, any awards in excess of 8 points difference from the median are discarded, and the remaining points are summed. The performer with the highest sum wins. Under this rule it is possible for a performer who is unanimously preferred to lose.

Let three judges award two performers points as shown in Display 3-2. Each judge prefers A to B , yet B wins in clear violation of weak unanimity and monotonicity. To see these violations, suppose judge 3 had given performer A only 7 points, with all other points the same. Since judge 3's points for A would not count, B would win. If judge 3 increased

Display 3-2**Voting in a Musical Contest**

	Performer A	Performer B
Judge 1	15	10
Judge 2	16	10
Judge 3	25*	15
Total	31	35

*Excluded from the total because it exceeds the median, 16, by more than 8 points.

the points for *A* to 8 on up to 24, *A* would win. But as judge 3 increases *A*'s points to 25, *A* turns into a loser in spite of the increased support and unanimous preference.

Doubtless this rule was devised to minimize favoritism in judging (often judges in such contests find their own students among the contenders). Ignoring outliers appears, therefore, to be an appropriate remedy. Nevertheless, it allows perverse results.

Social Choices Operating on More Than Two Alternatives

It has been shown that any social choice function providing for the elimination of alternatives violates monotonicity.¹⁰ Of course, when *X* has more than two alternatives, we must think of monotonicity in a slightly different way. Let $F(D)$ now mean the choices by F from X , given a profile of preference structures, D . If an alternative *x* is in $F(D')$ and D differs from D' only in that *x* has risen in some individual preference order(s) in D from D' , then monotonicity requires that *x* be in $F(D)$. That is, a higher individual valuation and more votes cannot hurt an alternative.

Two voting rules, by providing for dropping alternatives, violate this condition: (1) the single transferable vote method of proportional representation,¹¹ used for national legislatures in Ireland and Malta and in local governments and private societies in most of the English-speaking world; and (2) the two-stage majority system, currently used in France for national elections and in many local primaries and elections in the United States.

The rule for the *single transferable vote method* is: For districts with S seats and m candidates ($m \geq S$), the voters, V in number, mark ballots for first choice, second choice, . . . , and m^{th} choice. A quota, q , is calculated thus:

$$q = (V/S + 1) + 1$$

and q is rounded down to the largest integer contained in it.

If a candidate receives at least q first-place votes, he or she wins, and any surplus votes (i.e., the number of first-place votes in excess of q) are transferred to nonwinning candidates in proportion to the appearance of these candidates in next place on all ballots for the initial winner. Another candidate who then has q first-place and reassigned votes wins, and his or her surplus is transferred to the next nonwinning candidate on his or her supporters' ballots (again in proportion to their appearance in next place) and so on until all seats are filled. If at any point in the process (including the beginning) no candidate has q first-place and reassigned votes, the candidate with the fewest first-place and reassigned votes is eliminated and all the ballots for her or him are transferred to candidates in the second (or next) place on those ballots; and this is repeated until some candidate has q votes.

Doron and Kronick have devised an example in which monotonicity is violated by this rule.¹² In Display 3-3 two seats are to be filled from four candidates by 26 voters, where q rounds down to 9. The two situations, D' and D , are identical except that, for the two voters, i , in the third row, $D'_i = y \ x \ z \ w$ and $D_i = x \ y \ z \ w$. That is, these two voters increase their valuation of *x* in D as against D' . In both situations, *w* has nine first-place votes and is initially elected. No surplus exists and no other candidate has enough first-place votes to win. So in both situations, the candidate with the fewest first-place votes must be eliminated, and his or her votes are transferred to the candidate in second place on these ballots. In situation D' , *z* is eliminated and his or her five votes go to *x*, who is elected with eleven votes. In situation D , *y* is eliminated and his or her four votes go to *z*, who is elected with nine votes. In going from D' to D , *x* has risen in two preference orders and nothing else has changed. Since D differs from D' only by two voters increasing their valuation of *x* in D , it is a violation of monotonicity that *x*, which won in D' , loses in D .

The same kind of situation can arise in *two-stage majority voting*, in which, if no candidate receives an absolute majority of votes cast in a first stage (where more than two candidates are offered), then a runoff election is held between the two highest candidates. If voters retain the same preference structures between the two elections, then the situation is like

Display 3-3

**A Profile of Preference Orderings
in Situations D' and D
Using Single Transferable Vote**

Situation D'					
Number of voters	First choice	Second choice	Third choice	Fourth choice	
9	w	z	x	y	
6	x	y	z	w	
2	y	x	z	w	
4	y	z	x	w	
5	z	x	y	w	

Situation D					
Number of voters	First choice	Second choice	Third choice	Fourth choice	
9	w	z	x	y	
6	x	y	z	w	
2	x	y	z	w	
4	y	z	x	w	
5	z	x	y	w	

Note. $q = (V/S + 1) + 1 = (26/3) + 1 = 9.67 \approx 9$ (using the customary procedure of rounding down).

Adapted from Gideon Doron and Richard Kronick, "Single Transferable Vote: An Example of a Perverse Social Choice Function," *American Journal of Political Science*, Vol. 21 (May 1977), pp. 303–311.

the single transferable vote in the sense that voters initially supporting an eliminated candidate vote for the remaining candidate who stands higher in their preference orders. Exactly the same kind of perversities can arise as in the single transferable vote method, although, of course, the elections themselves never reveal enough data about preferences to make the perverse outcomes visible to the voters.

Monotonicity is primarily a technical requirement that one would want to impose on *any* voting system. If we assume that the purpose of voting is to amalgamate individual tastes into a social decision, then monotonicity requires that voting actually do so by counting all individual judgments in generating an outcome. Moral (as distinct from technical) considerations may arise in choosing between forms of monotonicity. For example, one might prefer a two-thirds majority (monotonic) to a simple majority (strongly monotonic) on ethical grounds. But that some kind of monotonicity be required is hardly a moral question. It is simply a straightforward matter of making the voting system do what it is supposed to do.

Theoretically, therefore, one should, on technical grounds, reject all nonmonotonic systems, although practically compromise may be appropriate. Two-stage majority rule, though nonmonotonic, may be better than the plurality system it replaces. It is hard to believe there is any good justification for the single transferable vote, however, when there exist proportional representation systems (such as list systems) that are at least weakly monotonic. In rejecting the single transferable vote, technical considerations ought to dominate.

**3.D. Properties
of Simple Majority Decision:
Undifferentiatedness (Anonymity)**

As we turn now to other properties of simple majority decision, moral rather than technical considerations dominate. The property of undifferentiatedness (or anonymity, as it is usually called) is imposed primarily because of preferences about political values, although the condition itself is technical.

Undifferentiatedness is often said to be the same as equality and to embody the principle of "one man, one vote." Actually, however, it is the technical condition underlying equality and is quite distinct from equality. The best name for the condition is *undifferentiatedness* because this is primarily what it provides—namely, that one vote cannot be distinguished from another. This feature allows for anonymity, and anonymity in turn allows for equality. In the next few paragraphs, I will explain the sequence from technical antecedent to moral consequent.

Sometimes voters are clearly distinguished by the differentiated votes they cast. They may, for example, be assigned unequal numbers of votes. These may be thought of as weights, w_i , where $i = 1, 2, \dots, n$. On

the New York City Board of Estimate, the mayor, comptroller, and president of the City Council each have four votes, while the five borough presidents have two votes each. In effect, each official's judgment on a motion is multiplied by the number of assigned votes. This fact can be described by writing $D = (w_1 D_1, w_2 D_2, \dots, w_n D_n)$, where $w_i \geq 0$. Calculating the sum of the weights, W , the rule for weighted voting is: That alternative wins which receives more than half of the sum of the weighted votes; and, if both alternatives get the same weighted votes, they tie.¹³

Naturally, votes must be differentiated from each other so that vote-counting will be accurate. One possible formulation of the condition of undifferentiatedness is, therefore, that weights be equal: $(w_1, w_2, \dots, w_n) = (1, 1, \dots, 1)$. This formulation is inadequate, however, because votes are also differentiated by the roles the voters play in the system. For example, in the United Nations Security Council, for a (substantive) motion to pass, all five permanent members (US, USSR, China, Britain, France) must vote yea and so must four of the ten temporary members. The permanent members' rights of veto clearly require that their votes be differentiated. Several scholars have translated rules for this sort of differentiation into weights in a weighted voting system.¹⁴ Unfortunately, the methods of translation vary in assumptions and therefore disagree in results, sometimes wildly.¹⁵ It seems to me wise, therefore, not to try to reduce all differentiation to a matter of unequal weights. Since roles as well as weights require that votes be differentiated, it is essential that the definition of undifferentiatedness capture the fact that neither makes a difference.

To do so, I introduce the notion of a *permutation*. Let $(1, 2, \dots, n)$ be a sequential arrangement of n objects. One can rearrange them by replacing the first object in the sequence with another object (including possibly itself), the second object with another, and so forth through the n^{th} object. If we signify the replacement itself with $\sigma_{(i)}$ where σ indicates the replacement and the subscript indicates the object replaced, a permutation of $(1, 2, \dots, n)$ is then a new arrangement: $(\sigma_{(1)}, \sigma_{(2)}, \dots, \sigma_{(n)})$. For example, if the initial arrangement is $(1, 2, 3)$ and $\sigma_{(1)} = 2$, $\sigma_{(2)} = 1$, and $\sigma_{(3)} = 3$, then the permutation is $(2, 1, 3)$.

Undifferentiatedness is the condition that any permutation of a set of individual judgments leads to the same social choice.¹⁶ This means that the votes cannot be differentiated either in weight or in the roles played by the voters because if judgments are rearranged among voters *in any way* the same outcome is produced. Thus, for example, on a five-member committee, undifferentiatedness requires $F(1, 0, -1, 1, 1) = F(-1, 1, 1, 0, 1)$. If we use simple majority rule, $F(D) = 1$ for both these sequences.

Undifferentiatedness provides the technical base for anonymity but is not the same thing. Votes are undifferentiated, while voters are anonymous. Suppose in some society undifferentiated votes are bought and sold. Buyers do not care which votes they buy because votes are undifferentiated. Hence the purchase of k individual judgments in one permutation produces the same outcome as the purchase of k votes in another permutation. Thus the definition of undifferentiatedness (which is also the usual definition of anonymity) is satisfied. Nevertheless, in that society voters cannot be anonymous because their names are necessary for enforcement of contracts.

Once votes are undifferentiated, however, it is possible to detach names, and historically this is precisely what happened. In the Anglo-American tradition, the content of legally undifferentiated votes was, in the eighteenth and early nineteenth centuries, recorded by the name of the voters in poll books. Since this practice was believed to admit both corruption and coercion of voters, it gradually gave way to printed ballots. Since the ballots were produced and distributed by party workers, they knew how voters voted, and corruption and coercion were still possible—and indeed widespread. Finally, the secret ballot, a late-nineteenth-century invention, effectively provided anonymity. Notice, however, that it was historically a necessary condition of anonymity that votes be undifferentiated.

The same development from undifferentiatedness to anonymity occurred in a curious way in ancient Athens. As the selection of officials by heredity gave way to election by legally undifferentiated voters, political leaders developed groups of clients whose votes they coerced. Two devices were then developed to provide anonymity: Most officials were selected by a lottery, and the size of juries, which decided many political questions, was increased in some cases to sixteen hundred jurors whose votes were, presumably, hard to supervise.

The motive for providing anonymity for persons who cast otherwise undifferentiated votes is a belief in the ethical principle of equality, which is especially attractive to leaders who have relatively few clients. Those who cast undifferentiated votes may not be equal, for the operative principle can be “one important man, many (clients’) votes; one client, no personally decided vote.” Anonymity permits this rule to change to “one man, one vote,” because all voters can then have an equal personal impact on the outcome (assuming monotonicity). Hence it is the ideal of equality that (morally) justifies anonymity, and it is the fact of anonymity that admits the practice of equality.

Whether it is desirable to impose undifferentiatedness and, further, anonymity on a method of social choice depends on whether one wants

to achieve equality of influence on outcomes. In business corporations, where, presumably, influence on outcomes is roughly proportional to ownership, neither anonymity nor differentiation is desired. In representative bodies, legislators are expected to be legally undifferentiated but not anonymous. Citizens need to know how their representatives vote. Furthermore, in the operation of party government, legal undifferentiation is replaced by de facto extra weighting of party leaders by giving them the weights of disciplined backbenchers. Thus, party government requires that nonanonymous legislators have identifiable (nonanonymous) votes; but in order to guarantee equality of representation, these identifiable votes must be undifferentiated. On the other hand, for popular elections of government officials it is usually desired that voters be treated equally, and for this, undifferentiated votes must also be cast by anonymous persons.

To illustrate the significance of undifferentiatedness for equality, I will conclude with a comparison and contrast of a system intended to promote inequality—the so-called demand-revealing process that Tideman and Tullock have recently proposed to extend to ordinary elections.¹⁷ This process was invented as a device to motivate truthful statements of the demand for public goods such as schools and armies. It operates like this when applied for more than two voters on a binary choice: Each voter, i , offers to pay money, m_i , to obtain a preferred alternative, x or y . The amounts for x are summed over all who offer to pay for x into an S_x , and similarly for y into an S_y . The alternative with the largest sum wins. To motivate truthfulness, each person, i , on the winning side, say x , who offers to pay more than the margin of winning—that is, when $m_i > (S_x - S_y)$ —must pay a tax of the amount of his or her contribution to the victory of x , which is $[S_y - (S_x - m_i)]$, when that number is positive. This tax is then destroyed. For example, suppose there are voters who offer the amounts shown in Display 3-4.

Since $S_x > S_y$, x wins. Person 2 must pay $[S_y - (S_x - m_2)] = 10 - (15 - 12) = \7 , which is destroyed. (Were the \$7 given to person 1 and person 4 or used to run government, the losers would have a motive to bid up to \$14.99, which would increase taxes on persons 2 and 3 to \$14.98.) On the other hand, since $[S_y - (S_x - m_3)]$ is negative (i.e., $10 - (15 - 3) = -2$), person 3 pays no tax since x would win without his or her vote.

A voter in this process who offers more than his or her true valuation on an alternative may have to pay a tax higher than his or her true valuation. For example, if persons 1 and 4 each offered \$8 to make y win, they would each have to pay a \$7 tax, which is more than y is really worth to them. A voter who offers less than his or her true valuation risks losing.

Display 3-4

The Demand-Revealing Process for Two Alternatives

Money Offers, m_i , for Alternatives x and y		
	x	y
Person 1	—	\$ 5
Person 2	\$12	—
Person 3	\$ 3	—
Person 4	—	\$ 5
Total $S_x = \$15$		$S_y = \$10$

In either case, he or she is somewhat motivated to tell the exact truth, if it is known.¹⁸

As Tideman and Tullock point out, this process is like simple majority rule with secret ballots in that an abstainer gets what the higher bidders want, except when the abstainer decides to vote and can change the outcome and thus get what he or she wants. There the similarity of procedures ends, although they share the goal of truthful revelation. By treating voters anonymously, simple majority decision by secret ballot is intended to minimize coercion and corruption and thus allow voters to express their true preferences, although they may misrepresent their preferences if they find doing so to their advantage. Demand-revelation is also aimed at revealing true preferences, but it operates by treating voters unequally and requiring public revelation. The two systems are thus at loggerheads, and the difference between them is the moral value placed on equality.

It seems to me that the demand-revealing process promotes inequality in two ways:

1. Since utilities for money differ and since therefore more prosperous people (other than misers) are more likely to offer large amounts than are less prosperous people, demand-revelation clearly gives an advantage to the better-off. Indeed it might be described as a method to make wealth count for more.

2. Demand-revelation admits and encourages coercion because the winners' tax depends on the size of the losers' bids, which are necessarily revealed. (As pointed out in note 18, the tax is zero when $S_x > S_y$ and, for all i who have $x P_i y$, $m_i > S_y$. Surely this is an invitation to intimidation and coercion of exactly the sort that the secret ballot was intended to minimize.)

The strength of these forces toward inequality emphasizes by contrast just how deeply undifferentiated and anonymous voting provides for and is justified in terms of the notion of equality. Observe that item 1 violates the criterion of undifferentiated votes and that item 2 violates the criterion of anonymous voters. This joint violation renders equality impossible and thus reveals how equality is built on the sequential layers of undifferentiatedness and anonymity.

3.E. Properties of Simple Majority Decision: Neutrality

The third condition of simple majority decision is *neutrality* (or, as it is also known, *duality*), which means that the method does not favor either alternative. Many decision rules give an advantage to the status quo or to expediting motions in a committee (and there are often good reasons to do so). By contrast, the condition of neutrality, which seems especially appropriate for contests between candidates, provides that neither has an advantage.

One way of characterizing this idea is to note that, if neither alternative has an advantage, reversed preferences will lead to a reversed result. This statement is not generally true of rules that favor one alternative. For example, under the two-thirds rule, where x stands for the yea side, y is advantaged because it can win with no more than one-third plus 1 of the vote. Suppose y does win minimally and then the individual judgments are reversed so that x has one-third plus 1 of the vote. Still y wins. Under simple majority rule, however, if x wins minimally with just over half of the vote and preferences are reversed, y will have just over half and win.¹⁹

One important feature of neutrality is that decision rules embodying this condition typically allow for ties. Consequently this condition is inappropriate when decisions must be made. *Decisive* rules, which do not admit ties and are not neutral, have therefore a role in social choice. Here are some examples of decisive rules:

1. *Simple majority decision with a rule for breaking ties.* Ordinarily, under simple majority rule, neither side wins if the sum of D_i is zero. But if there is a rule to pick a winner, then that alternative has an advantage and the procedure is not neutral. Here are two examples of commonly used winner-picking rules (with their rationales, some of which appear dubious):
 - a. In a legislature, when yeas and nays tie, nays win. (Rationale: In the absence of a clear majority, the status quo ought not be changed.)
 - b. On an appellate court, on a motion to reverse a lower court decision, a tie sustains the lower court decision. This rule favors the alternative chosen by the lower court. (Rationale: In the absence of a majority to reverse, a lower court decision ought to stand.)
2. *Minority decision rules.* By these rules, if any number larger than a minority of specified size approves, a motion passes; otherwise not. Typically these rules are intended to expedite procedure or to protect minorities. Two examples:
 - a. The constitutional requirement that in Congress one-fifth of a house may order the recording of the yeas and nays.
 - b. The rule that four judges of the Supreme Court can grant *certiorari* (i.e., they can force the Court to hear a case).
3. *Special majority decision rules.* Under these rules, if a motion receives a specified special majority, say two-thirds, of the votes cast (or possible), it wins; otherwise not. An example of a *relative* special majority is the rule for constitutional amendments in Congress, where the motion to submit an amendment to the states passes with the assent of two-thirds of the votes cast. An example of an *absolute* special majority is the rule that three-fourths of all the states is necessary to ratify an amendment. The motive for such rules is not so much to force decision as it is to protect minorities by supporting the status quo. An extreme form is unanimity, the famous *librum veto* of the Polish Diet, where if $D = (1, 1, \dots, 1)$, then $F(D) = 1$; otherwise $F(D) = -1$. This rule protects a minority of one.

On the other hand, where a decision is not absolutely necessary and where there is no minority to protect, it is often desirable to use rules that satisfy neutrality. Some of these are:

1. *The jury rule.* As described in section 3.B, unanimity results either in conviction or in acquittal; a tie is a mistrial. The wide range of ties

protects the defendant, and owing to the existence of ties the rule is neutral.

2. *Simple absolute majority decision with no tie-breaking rule.* This method requires that the winner get more than half of the possible votes. If neither alternative does, they tie. This rule is often used on committees such as city councils, to elect a chairperson, and, as is well known, there is often a deadlock when some member abstains.
3. *Rules for more than two alternatives.* This situation is not relevant to the main theme of this chapter, but it does pertain to the condition of neutrality, which must be redefined for the cases of three or more alternatives. Instead of requiring a complete reversal of preference orders, D_i , it is enough to require consistent permutations of the alternatives in them. Then, if the choice from a profile of permuted preference orders is the same as the permutation of the choice from the initial profile, the rule is neutral.²⁰ The rules discussed in Chapter 2—plurality, Condorcet, Borda, and Bentham rules—all satisfy this neutrality. Although none of them prevents ties, they do guarantee that no alternative has an advantage.

As can be seen from these examples, neutrality is inappropriate when either decisiveness or delay is desired. It is appropriate, however, when one wants to treat alternatives as impartially as possible. In this sense, neutrality is to alternatives what undifferentiatedness is to votes: a technical base for equality. Undifferentiatedness requires that votes be treated equally; neutrality requires that alternatives be treated equally. Hence neutrality is especially appropriate for choice between two candidates, where, in fact, simple majority decision is mainly used, except when tie-breaking is necessary.

3.F. Simple Majority Decision and Fairness

In Chapter 2, I emphasized that different methods of voting could result in different social choices when applied to the same profile of individual preferences. I concluded that, since all the methods appeared, superficially, to be fair, no social choice could be justified on the ground that it was fairly chosen but others were not. If, for any choice that is supposedly fair because it comes out of a fair procedure, there is another choice from another procedure that is fair in a different and conflicting

way, then it is difficult to justify the fairness of any choice. Two methods based on mutually exclusive assumptions cannot both be fair. Simple majority voting, which is said to be fair because it is undifferentiated, and demand-revealing voting, which is said to be fair because it is not undifferentiated, cannot both be fair. Yet if there is no obvious way to choose between them, it is hard to say that either one is fair. The only escape from this relativistic, even nihilistic, conclusion is to find that some method is uniquely the fairest and thus clearly superior on moral grounds to all others.

Simple majority decision between two alternatives is said to be just that. As revealed in Kenneth May's theorem (see note 4), this method of decision is the *only* method that simultaneously satisfies the criteria of monotonicity, undifferentiatedness, and neutrality. And since these three criteria are sometimes thought to be necessary (both individually and together) for fairness, the unique method of decision that satisfies them all must be fairer than other methods. Such are the grounds for believing that simple majority voting on binary alternatives is indeed so superior a method that the relativistic conclusion of Chapter 2 is unjustified.

It is indeed true that simple majority voting is, on the grounds just set forth, an attractive method of social decision. But it is limited in application. If it could be used universally, then we might be justified in conceding its general superiority. Unfortunately, it is probably extremely rare for binary alternatives to occur naturally without any human intervention. Instead, society acquires binary alternatives, which allow for a fair procedure, only by reducing the size of the set of alternatives—a reduction that is often (possibly always) in itself unfair.

I will conclude this chapter by examining this contradiction in the concrete case of democratic voting. In this case, however fair simple majority decision on binary alternatives is in the abstract, it is unfair in practice because the institutions to generate binary alternatives are unfair, mainly because they are not neutral. The institutions give some alternatives advantages over others.

3.G. Democratic Thought About Simple Majority Decision

Simple majority decision on binary alternatives is consistent with the democratic purposes of voting (by reason of strong monotonicity); it is fair to all voters (by reason of undifferentiatedness); and it is fair to all candidates (by reason of neutrality). Consequently, it satisfies most of

what is expected from democratic voting. Naturally, therefore, it has entranced many theorists of democracy, who have tried to find ways to force the world to use it.

Unfortunately, there is no fair way to ensure that there will be exactly two alternatives. Usually the political world offers many options, which, for simple majority decision, must be reduced to two. But usually also the *way* the reduction occurs determines *which* two will be decided between. There are many methods to reduce the many to two; but, as has long been obvious to politicians, *none* of these methods is particularly fair because their different ethical principles cannot be effectively ordered and, worse still, because *all* methods can be rigged.

Consequently, although the notion of achieving democracy by simple majority decision on binary alternatives is a will-o'-the-wisp, there has been (or, better, was) a long academic tradition in the United States about the notion of a "responsible" two-party system. The scholars in that tradition did not use the language of social choice, but they were, I believe, trying to realize simple majority decision as the regular, indeed only, method of choice. I think they saw in it, perhaps dimly, exactly the features of consistency and fairness that I have described. In this tradition, which started with Woodrow Wilson and reached its zenith with the report in 1950 of the Committee on Political Parties of the American Political Science Association, the writers were perturbed by compromise and incoherence in American politics.²¹ They believed that responsible parties to generate clear binary choices would result in national public policy in a national interest. I am not sure which they thought was the engine of coherence—either binary choice itself or the system of two responsible parties associated with binary choice. Whichever way they saw it, they really were proponents of simple majority decision.

Unfortunately, these writers were profoundly wrong, largely because they did not know the theory of voting summarized in this book. If there were exactly two alternatives (i.e., party platforms), then the notion of responsible parties might make sense because such parties might clarify each alternative. (There is good reason to believe, however, that they would do the exact opposite.) Since there are always more than two alternatives, the most that responsible parties can do is select two of them—usually in an unfair way. So the democratic advantage of simple majority decision is nonexistent.

Many early exponents of the tradition of responsible parties were Anglophiles who, like Woodrow Wilson and A. Lawrence Lowell, admired the parliamentary discipline in British parties, where backbenchers usually supported the leaders' programs. They believed—doubtless mistakenly—that these programs were internally consistent and sharply dif-

ferent from each other (for they also thought it was a two-party system, despite the very obvious Irish). Consequently, they believed that British voters were always given a clear, programmatic choice in elections. The theme of Wilson's *Congressional Government* is that American parties in Congress lack a national program and that local and trivial interests, voiced through congressional committees, dominate policy outcomes. "It is ever the little foxes," Wilson quoted, "that spoil the grapes."²² Lowell, in one of the first important accumulations of political statistics, demonstrated that American parties were quite undisciplined in comparison to the British.²³

These themes persist. The report of the Committee on Political Parties was motivated in good part by an animosity toward special interests: "By themselves, the interest groups cannot . . . define . . . policy democratically. Coherent public policies do not emerge as the mathematical result of the claims of all the pressure groups" (p. 19). Its authors' remedy was a party system that would be "democratic, responsible, and effective," by which they meant parties that "are able to bring forth programs to which they commit themselves, . . . that . . . possess sufficient internal cohesion to carry out these programs" (pp. 17–18). This was their ideal and their argument:

When there are two parties identifiable by the kinds of action they propose, the voters have an actual choice. On the other hand, the sort of opposition presented by a coalition that cuts across party lines, as a regular thing, tends to deprive the public of a meaningful alternative. When such coalitions are formed after the elections are over, the public usually finds it difficult to understand the new situation and to reconcile it with the purpose of the ballot. Moreover, on that basis it is next to impossible to hold either party responsible for its political record. This is a serious source of public discontent [pp. 18–19].

It is difficult to imagine more populistic enthusiasm for discovering the people's will in simple majority decision. But enthusiasm for this particular nostrum has waned. Just at the time of the report, Pendleton Herring and David Truman were reviving Arthur Bentley's picture of public policy as a vector of group interests.²⁴ And, soon after, Robert Dahl replied in a sense to the report with his influential description of American "polyarchy":

The making of governmental decisions [Dahl argued] is not a majestic march of great majorities united upon certain matters of basic policy. It is the steady appeasement of relatively small groups. Even when these groups add up to a numerical majority at election time it is usually not

useful to construe that majority as more than an arithmetic expression . . . It is the various components of the numerical majority that have the means for action.²⁵

As Dahl cast doubt on the doctrine of responsible parties using a more or less inductively arrived-at description of American politics, Anthony Downs presented a wholly deductive argument that parties would not offer those “meaningful alternatives” for which the committee had asked.²⁶ Suppose there is a single issue dimension, x , which might, for example, concern the degree of government regulation of the economy, where the left end represents a high degree and the right end a low degree. Citizens can be arranged along that dimension according to their individual choices. The horizontal axis in Figure 3-1 is such a dimension, with point x_1 indicating the value judgment of a particular citizen on that issue. The position of all citizens is indicated by the curve in Figure 3-1, which shows the number, $f(x)$ —on the vertical axis—of citizens at each point on the horizontal axis. Downs showed that, if the distribution $f(x)$ was unimodal, both political parties would adopt platforms near the median, x_m , which is the point on the horizontal axis from which a perpendicular line, p , erected parallel to the vertical axis divides the distribution $f(x)$ exactly in half.

Downs’ argument is distressingly simple: Suppose one party goes to the median while the other goes to x_1 . The party at x_1 gets the votes to the left of x_1 and the votes to the right of x_1 but to the left of the midpoint between x_1 and x_m . Clearly, therefore, the party at x_1 loses and has every incentive to get as close to x_m as it can. The same kind of analysis applies to parties to the right of x_m . If both parties move to x_m , they tie.

Downs presented his argument for the unimodal case, but it applies to any distribution in one dimension. Consequently, far from providing “meaningful alternatives,” parties should be expected to be as much alike as possible. Peter Ordeshook extended this observation by allowing for nonvoters and more than one dimension with, however, several fairly severe restrictions.²⁷ Richard McKelvey, imposing fewer restrictions than Ordeshook, nevertheless showed that “uncommitted citizens” near the median of a multidimensional distribution have the most influence on party platforms and that “there is a tendency for candidates to move away from their strongest supporters” at the extremes, a quite counter-intuitive result.²⁸

We will later observe that, in the wholly unrestricted case of n dimensions, the tendency toward equilibrium at the median does not survive—a fact discovered by McKelvey himself. Still, the drag of institutions guarantees that, in the short run, party positions will converge

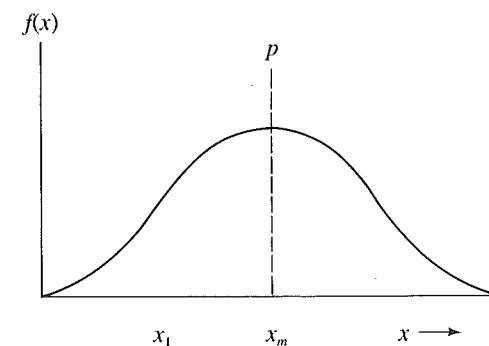


Figure 3-1 Distribution of citizens in one dimension.

to a median, even though in the long run there may be considerable divergence. In any event there is no theoretical comfort here for the doctrine of responsible parties. If Downs, Ordeshook, and McKelvey are right, the theory that two parties, however “responsible,” would give voters a clear choice between distinct alternatives is simply wrong. Furthermore, American experience in the 1960s and 1970s has tarnished somewhat the ideal of presidential leadership to create coherent parties. Perhaps for this reason, political parties themselves have rapidly lost identifiers and loyalty. So the experiential justification for responsible parties has now also failed.

In a sense, political science and political events have passed the adherents of “responsible parties” by. It may seem foolish to waste time now on their mistake of expecting a clear binary choice. Still, we can understand their mistake a little better today. It is not simply an empirical matter—as Dahl, for example, argued—that the American (or any other) system does not work in the neat way the Wilsonians wanted. More important is the fact that what they wanted was itself morally wrong from a liberal democratic view, because to get binary choice one must *enforce* some method of reducing options. This is precisely the coercion involved in populist liberty. The populist expectation of a coherent program is not attainable by weaving together individual judgments, either for a small group or for a large nation. To attribute human coherence to any group is an anthropomorphic delusion. Worse, however, the populists expected to calcify politics on *their* own issues, progressivism or the New Deal. That is fundamentally unfair. Winning politicians are, of course, happy to stick with the issues on which they are winning. Losing politicians are not so entranced with that future. The losers of the last election become the winners of the next by changing issues, revealing new dimensions of choice, and uncovering covert values in the electorate. To create and en-

force coherent parties with stable programs is to foreclose this artistry. It is the nature of politics that issues are in continuous creation. No institutional device to force binary choice can stop that creation and, furthermore, no device should stop it. Fairness to losers and an interest in what losers create forbid the imposition of binary choice.

* * *

So I conclude: Simple majority decision on binary alternatives satisfies three fundamental criteria of fairness and in that sense seems superior to other methods. But it cannot be fair in a democratic sense because the imposition of binary alternatives is itself unfair. Hence the relativistic conclusion of Chapter 2 still stands.

4

Voting Methods with Three or More Alternatives

Simple majority decision on binary alternatives requires some social embodiment of Procrustes, who chopped off the legs of his guests to fit them into the bed in his inn. The number of alternatives *must* be reduced to exactly two, and this means that some alternatives worthy of consideration must be excised. Furthermore, there must be some Procrustean leader or elite to excise them. Even the apparently unbiased method of reducing alternatives by a series of binary elections requires that someone decide on the *order* of elections—and control of the order is often enough to control the outcome, as we shall see. Thus, however democratic simple majority decision initially appears to be, it cannot in fact be so. Indeed, it is democratic only in the very narrow sense of satisfying certain formal conditions. In any larger sense, it is not democratic because its surrounding institutions must be unfair.

If a voting system is to be really fair, more than two alternatives must be allowed to enter the decision process; a decision method must be able to operate on three or more alternatives. But here is a snag. Many decision methods can deal with several alternatives, but no one method satisfies all the conditions of fairness that have been proposed as reasonable and just. Every method satisfies some and violates others. Unfortunately, there are, so far as I know, no deeper ethical systems nor any deeper axioms for decision that would allow us to judge and choose among these conditions of fairness. Hence there is no generally convincing way to show that one decision method is truly better than another.

So we are faced with a dilemma. Simple majority decision between two alternatives, while narrowly fair, is unattractive because it requires unfair institutions to operate it. On the other hand, no particular decision methods for three or more alternatives can be unequivocally demonstrated to be fair or reasonable. The problem is that we cannot prove that any