

*Taming Chance:
Randomization in Individual
and Social Decisions*

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I

Decision making by the flip of a coin, the toss of a die, and more generally by formal or informal lotteries is, I believe, largely perceived as a curiosity. Randomization is often mentioned in passing as a possible method for allocating resources, assigning tasks, and, more generally, for making social decisions. It is occasionally discussed in more detail with respect to specific types of decisions. Yet with the exception of Thomas Gataker's *On the Nature and Use of Lots* of 1619, it has not, to my knowledge, received sustained and systematic attention.¹ This lack of interest in decision making by lottery might, of course, be thought to suggest that the problem is inherently uninteresting. My aim in these lectures is to persuade you that this vacuum is not a "much needed gap" but one worth filling.

Many of the ideas in these lectures grow out of a research seminar at the Institute for Social Research in Oslo. During a discussion of child custody legislation some three years ago, Karl O. Moene suggested that custody disputes might be resolved by the flip of a coin. The proposal seemed intriguing and worth pursuing, not only as a way of resolving custody conflicts (see my article cited in note 58 below), but as a way of making decisions in a number of different contexts. Among the participants in the seminar, I am especially indebted to Fredrik Engelstad and Aanund Hylland for their constructive and critical contributions. Thanks are also due Torstein Eckhoff, Karl O. Moene, and Kirsten Sandberg. I received many useful comments when presenting earlier versions of these lectures at seminars at the University of California at Davis, the University of Pittsburgh, Yale University, and the University of Miami. Earlier drafts have also been read by Akhil Amar, Robert Bartlett, John Broome, G. A. Cohen, J. Gregory Dees, Gerald Dworkin, Ed Green, Stephen Holmes, Mark Kishlansky, William Kruskal, Isaac Levi, Stephen Stigler, and Cass Sunstein. I am grateful to them all for their comments and suggestions. I also thank King K. Tsao for competent research assistance.

¹Page references to Gataker's work are to the second edition, 1627. An important exception is some recent work done at the Yale Law School. See notably H. Greely, "The Equality of Allocation by Lot," *Harvard Civil Rights-Civil Liberties Review* 12 (1977): 113-41, and A. R. Amar, "Choosing Representatives by Lottery Voting," *Yale Law Journal* 93 (1984): 1283-1308.

There are two main questions we can ask ourselves with respect to the use of lotteries.² First, when are lotteries actually used to make decisions and to allocate tasks, resources, and burdens? This is the main topic of parts I and II. Second, under which conditions would they seem to be normatively allowed or prescribed on grounds of individual rationality or social justice? This is the question I shall address in part III. There is no reason, of course, to expect the answers to these questions to coincide. Hence we can generate two further questions, which are also addressed in part III. What explains the adoption of lotteries in situations where normative arguments seem to point against them? What explains the nonadoption of lotteries in situations where they would seem to be normatively compelling? This last question is perhaps the most intriguing and instructive one. I shall argue that we have a strong reluctance to admit uncertainty and indeterminacy in human affairs. Rather than accept the limits of reason we prefer the rituals of reason.

The use of lotteries to make decisions itself requires the decision to use this decision mechanism rather than another. As emphasized by Gataker (pp. 55–56), lotteries reflect an intentional choice to make the decision by a nonintentional mechanism.³ To explain and justify the decision to randomize (or not to randomize) requires a study of this higher-order decision. Who makes it? How is it made? It can be made by an individual facing a choice between several courses of action. Seeking my way out of the forest, I may decide to toss a coin when the road bifur-

²I shall not discuss ordinary lotteries, that is, the betting on numbers, as a source of income for the state. It seems misleading to subsume this practice under the rubric of “referring potentially contentious decisions to lot,” as does K. Thomas, *Religion and the Decline of Magic* (Harmondsworth: Penguin 1973), p. 140. It should be noted, however, that ordinary lotteries have their origin in the selection by lot of political representatives in Genoa. Initially people made bets on the candidates, whose names were later replaced by numbers.

³In J. Elster, *Ulysses and the Sirens*, rev. ed. (Cambridge: Cambridge University Press, 1984), pp. 13–17. I discuss two-stage decision problems where one intentionally decides to solve a decision problem by trial and error rather than by consciously directed search.

cates. It can be made by a group of individuals who agree by unanimity, by majority decision, or in some other accepted way to allocate goods, burdens, or tasks among themselves in this manner. A divorcing couple who must decide on custody of the children, may agree to make the decision by the flip of a coin. It can be made, finally, by an administrative, legal, or political agency. Hospital administrators may decide to use a lottery to allocate kidneys for transplantation.

There is a second decision that has to be made before the decision by lottery can take effect: one must decide how the possible actions should be matched with the various outcomes that can be generated by the randomizing device. Clearly, the general solution cannot be to assign actions to outcomes by means of another lottery. At some stage, the assignment will have to be done by “picking” rather than “choosing.”⁴ Neglect of the need for this preliminary decision led Gataker (pp. 185–86) to propose the following invalid argument against the interpretation of lotteries as showing God’s particular will or “special providence.” He observed, correctly, that men often use past (unknown) events as elements in the lottery which is to guide their decisions. From this he concluded that, since even God cannot alter the past, the outcome of lotteries cannot in general reflect his special providence. The inference fails, since God’s intervention might well come in the contemporaneous stage of matching actions with outcomes. Using his knowledge of past events he could influence the matching so as to bring about his particular will.

The use of lotteries is associated with uncertainty, indifference, indeterminacy, and incommensurability. In the absence of reasons for choosing one alternative, one candidate, one recipient, or one victim rather than another, we might as well select one at random. These lectures will to a large extent be an elaboration of this statement.

⁴On this point, see E. Ullman-Margalit and S. Morgenbesser, “Picking and Choosing,” *Social Research* 44 (1977): 757-85.

The relation between uncertainty and lotteries is, however, more complex than one might suspect at first glance. Generally speaking, we tend to see uncertainty as an unmitigated ill. Uncertainty prevents us from planning for the future. Even more important, it prevents us from making choices that we can justify to ourselves and others as grounded in reason. This leads us to adopt tactics for uncertainty-avoidance and uncertainty-reduction. Usually, we do not want to cope with indeterminacy but to avoid it. The use of lotteries to resolve decision problems under uncertainty presupposes an unusual willingness to admit the limits of reason.

Sometimes, however, we welcome an element of uncertainty, and even create it if necessary. It is true that uncertainty makes it difficult to plan for the future, but without uncertainty we might not even want to plan for the future at all. It is not easy to imagine how we would feel and behave if we knew the exact day on which we would die, but a backward induction argument similar to that of the finitely iterated Prisoner's Dilemma might apply.⁵ If life today has meaning only because there is a prospect of further meaningful days in the future, then the knowledge that on one specific day there will be no more meaning would retroactively remove meaning from all earlier days. This argument is, inevitably, speculative. For myself, I am quite sure that I would prefer a shorter life expectancy with a larger spread to a longer life with no spread at all. If I had the choice, on this issue, between an unfair lottery and a sure thing, I would take the lottery.⁶

Our life span is substantially outside our control. Here, we do not have the choice between certainty and uncertainty. In other domains, where we do have this choice, we might want to set up a lottery. By removing the knowledge about who will do what or

⁵R. D. Luce and H. Raiffa, *Games and Decisions* (New York: Wiley, 1957), pp. 98ff.

⁶Formally, this is a form of preference for risk. The underlying reasons, however, are quite different. If I prefer the smaller average with the larger dispersion, it is not because I gamble on a long life but, as stated, because the certainty would be intolerable.

get what at which times, one also removes incentives for opportunistic and wasteful behavior. Since lotteries also remove the opportunity for long-term planning, their net effect may be positive or negative. I shall discuss cases of both kinds. Here I only want to insist on the variety of attitudes we adopt toward uncertainty. Sometimes we face it squarely; sometimes we seek to avoid or reduce it. We may welcome uncertainty and even actively promote it.

I shall now proceed as follows. I first discuss the nature of randomness and random choice, to bring out some conceptual and practical difficulties associated with lotteries. I then consider, very briefly, the use of lotteries as an aid to individual decision making. In the remaining part of the lectures I look at some varieties of social lotteries. After an overview of actual or proposed social lotteries, I go on to consider the use of lotteries to allocate goods and burdens and to compare them with other allocation mechanisms. In part II, I discuss a variety of political and legal lotteries. In part III, I sketch some tentative answers to the questions stated at the beginning: When are lotteries used? When ought they to be used? When and why do the answers to these two questions differ?

In most contexts, we want lotteries to be fair, in the sense of being truly random and unbiased. To implement this goal, we would want to have at our disposal a truly randomizing device which gave each outcome the same probability of being realized. The problem lies in the construction of a physical device of this kind. As John von Neumann once observed, “anyone who considers arithmetical methods of producing random digits is, of course, in a state of sin.”⁷ Tables of random numbers have had to be modified because they turned out to have undesirable regularity properties.⁸ Such revisions are hard to justify, since any

⁷Cited in H. Goldstine, *The Computer from Pascal to von Neumann* (Princeton: Princeton University Press, 1972), p. 297.

⁸L. Lopes, “Doing the Impossible: A Note on the Induction and Experience of Randomness,” in H. R. Arles and K. R. Hammond, eds., *Judgment and Decision Making* (Cambridge: Cambridge University Press, 1986), pp. 720–38.

sufficiently long random sequence is virtually certain to have some regular looking chunks or runs. By eliminating them, one approaches the nonrandom case of intentional mixing.⁹ There is (casual) evidence that the selection of questions from different subdisciplines by university examiners in successive years is a form of intentional mixing rather than random selection. In theory, students should be able to exploit this practice to their advantage.

Could one appeal instead to the inherent randomness of the selections actually generated by the device, as distinct from patterns in the hypothetical long-run sequence? Here again we run into problems. The notion of inherent randomness is quite deep and may ultimately defy analysis for reasons related to Kurt Gödel's incompleteness theorem.¹⁰ Although one may sometimes be able to prove that a given sequence of numbers is random or that it is not random, no computer program can prove, for any given sequence, whether it is random or not. The notion of randomness invoked here can be brought out by comparing the following sequences:

0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1
0 1 1 0 1 1 0 0 1 1 0 1 1 1 1 0 0 0 1 0

The first sequence can be generated by the program "Print 0 1 ten times." The simplest program that can generate the second is "Print 0 1 1 0 1 1 0 0 1 1 0 1 1 1 1 0 0 0 1 0." This "incompressibility," which is used to define inherent randomness, corresponds to the intuitive idea that in a random sequence there will not be any obvious patterns. A truly random mechanism, on the other hand, would be one that has an equal likelihood of realizing any twenty-digit sentence of 0's and 1's. It would, therefore, sometimes pick a sequence which is not inherently random, although most se-

⁹W. Feller, *An Introduction to Probability Theory and Its Applications*, 3d ed. (New York: Wiley, 1968), vol. 1, p. 204.

¹⁰The following discussion draws heavily on G. C. Chaitin, "Randomness and Mathematical Proof," *Scientific American* 232 (May 1975): 47-52.

quences generated by a truly random device will themselves be fairly random, in a sense that can be made precise.¹¹

Inherent randomness is neither necessary nor sufficient for justice by lottery.¹² Imagine that in a class of twenty pupils only ten can receive some good, and that they are matched in alphabetical order with an inherently random sequence constrained to have ten 0's and ten 1's. If the choice of this particular random sequence among others equally random was not itself made randomly, the pupils might well suspect some favoritism in the choice. Conversely, if an unbiased mechanical device happened to come up with a sequence of alternating 0's and 1's, the ensuing distribution would be quite acceptable once the pupils had satisfied themselves that the mechanism was truly random. For purposes of fairness what matters is that the randomizing device be thought to be unbiased.

Nevertheless when people have no direct knowledge about the generating mechanism, they have to judge the randomness of the draw by looking at its outcome. We have seen that this assessment is problematic even if they can observe many successive draws, and it is even more tenuous when inspection of a single outcome is used to judge how likely it is to come up. There are two closely related fallacies involved here. The first is that people misperceive inherent randomness. William Feller, referring to the pattern of German bombing over Britain in the Second World War, writes, "To the untrained eye, randomness appears as a regularity or tendency to cluster."¹³ Similarly, Daniel Kahneman and Amos Tversky write, "Among the 20 possible sequences (disregarding direction and label) of six tosses of a coin, for example, we venture that only HTTHTH appears really random. For four tosses, there may not be any."¹⁴

¹¹Ibid.

¹²On this point, see also I. Levi, "Direct Inference and Randomization," *PSA* 2 (1982): 447-63, at 453.

¹³Feller, *Introduction to Probability Theory*, p. 161.

¹⁴D. Kahneman and A. Tversky, "Subjective Probability: A Judgment of Representativeness," in D. Kahneman, P. Slovic, and A. Tversky, eds., *Judgment under Uncertainty* (Cambridge: Cambridge University Press. 1982). pp. 32-47. at p. 37.

Second, people believe that a given inherently random sequence is a more likely outcome of a random process than a given regular sequence. Kahneman and Tversky cite an experiment concerning the distribution of twenty marbles to five children, each marble being randomly allocated to one of them. Subjects stated that the outcome 4-4-4-4-4 was less likely to be the outcome of a random process than the outcome 4-4-5-4-3, in the sense that it would occur less frequently in repeated distributions. Yet the uniform distribution is actually more likely to occur.¹⁵ As Kahneman and Tversky note elsewhere, “a slightly uneven outcome represents both the fairness of the coin and the randomness of tossing, which is not at all represented by the exactly even result.”¹⁶

Even disregarding these problems, randomness is not easy to implement. In the 1940 draft lottery of American soldiers, out of serial numbers from 1 to 9,000, “no serial number between 300 and 600 was drawn in the first 2,400 draws. By pure chance, this would occur less than once in 15×10^{40} times.”¹⁷ Insufficiently good physical mixing led to a similar result in the 1970 draft lottery.¹⁸ The 1971 draft lottery finally got it right.¹⁹ The process of selecting jurors at random can be even more tortuous and difficult. In the recent case of *State v. Long* the defense successfully claimed that the process of jury selection in Atlantic City did not give each person the same chance to be selected for jury service.²⁰ For instance, the source list used for the random draw had about 180,000 names on it, whereas there were only 130,000 people in

¹⁵*Ibid.*, pp. 35-36. Subjects act as if they compare classes of distributions (equal distribution versus one child getting three marbles, one getting five, and the others getting four) rather than individual distributions.

¹⁶D. Kahneman and A. Tversky, “Variants of Uncertainty,” in Kahneman, Slovic, and Tversky, *Judgment under Uncertainty*, pp. 509–20, at p. 514.

¹⁷S. Fienberg, “Randomization and Social Affairs: The 1970 Draft Lottery,” *Science* 171 (1971): 255–61.

¹⁸*Ibid.*

¹⁹J. Rosenblatt and J. Filliben, “Randomization and the Draft Lottery,” *Science* 171 (1971): 306308.

²⁰499 A.2d 264 (N.J. Super L. 1985).

the relevant age group. Hence almost 40 percent of the people had double opportunity to be selected for jury duty. Also, the use of fifth-letter alphabetization as a criterion of selection “meant that many people in the same panel would have the same fifth letter in their last name. This explained how some panels had large numbers of Jewish names (eg. Wiseman, Feldman) or Italian names (e.g. Ferarro, Dinardo).”²¹ These practices were held to violate the defendant’s constitutional right to a jury drawn from a representative cross section of the community. The value of this right is further examined in part II.

The belief that a process of selection is truly or objectively random is sufficient but not necessary for its perceived fairness. Epistemic randomness, that is, the fact that all outcomes are equally likely as far as one knows, may also be sufficient to ensure perceived fairness.²² One may use natural lotteries, in which the decision is made contingent upon an event which is not specially arranged for the purpose and about which the parties have no special information. Gataker (p. 16) gives these examples: “Suppose two by the way contending which way they shall take, put themselves upon the flight of the next fowle that crosseth them, or upon the turning of a stranger, whom they see ride before them, to the right hand or to the left.” The flight of the bird is subject to natural necessity and the turn of the stranger to intentional choice, but since these events are insulated from the information and control of the parties, they are random as far as they know.

²¹V. P. Hans and N. Vidmar, *Judging the Jury* (New York: Plenum Press, 1986), p. 57. First names are no more reliable. “In the town of Mannheim, for example, statistics were compiled regarding the number of children in each family. The sample comprised the families whose names had the initial letters A, B and M. It turned out, however, that names with these initials were especially numerous among Jewish families, and as the children of Jewish families were particularly numerous, the enquiry gave a misleading result” (A. Jensen, “The Representative Method in Practice,” *Bulletin of the International Statistical Institute* 22 [1926]: 381–439, at pp. 429–30).

²²On this point, see also G. Sher, “What Makes a Lottery Fair?” *Nous* 14 (1980): 203–16, at p. 206.

The problem is how to make sure that the events are really thus insulated. Often one party is better able to predict the natural event, or he may be in a position to influence it. When Darius and his competitors agreed to settle the empire on him whose horse should first neigh when they met in a given place on a given day, he rigged the natural lottery in his favor by arranging for his horse to have been in that place with a mare so that it could be expected to neigh.²³ The information problem can be solved by an analogy to the “divide and choose” principle. If one person proposes to have a decision made by a certain natural event, another shall have the right of matching outcomes with decisions.²⁴ The manipulation problem can be solved by using a past event to make the decision. By combining these solutions, we can ensure the epistemic randomness of natural lotteries.

I said that in *most* contexts we would want to use fair lotteries, in which each person has the same chance of being selected, at least as far as anyone knows. Although equiprobability is the rule, there are exceptions.²⁵ In Georgia’s land lottery of 1832 “each citizen was entitled to one chance, unless he belonged to a favoured group — orphans, Revolutionary War Veterans, head of a family and the like — in which case he was given two chances.”²⁶ Presumably the authorities did not want a settlement whose population was composed exclusively of orphans, veterans, and heads of families. Another example is provided by the West German procedure of admission to medical school. Applicants are rated on a point system, with probability of admission proportional to the number of points. The idea, presumably, is to strike a compromise between individual need and social utility, equity,

²³Herodotus, *The History*, 3.84-87.

²⁴For a related proposal, see Sher, “What Makes a Lottery Fair?” p. 207.

²⁵P. Fishburn, “Even-chance Lotteries in Social Choice,” *Theory and Decision* 3 (1972): 18-40, at p. 19.

²⁶D. C. Wilms, “Georgia’s Land Lottery of 1832,” *Chronicles of Oklahoma* 52 (1974) : 52-60, at p. 54.

and efficiency. Selective law enforcement could similarly be organized as a weighted lottery, with the more serious crimes having the greater likelihood of being pursued, without smaller offenders knowing that they could go about their business with no risk of punishment. Perhaps this is how police attention actually is allocated.

We should consider, finally, a very different interpretation of selection by lot, as the revelation of God's will. Proverbs 16:33 has it that "The lot is cast into the lap; but the whole disposing thereof is of the Lord." From the Old Testament until the early modern age, divinatory, divisory, and consultory lotteries were often used for the purpose of discovering God's will.²⁷ A late example is from 1653, when "a London congregation proposed that a new Parliament should be selected from nominees chosen by each religious congregation "by lot after solemn prayer (a way much used and owned by God in the scriptures)."²⁸ In this function, lotteries, whether formal or informal,²⁹ are but one of many equivalent devices used to force God's hand, the best-known alternatives being the ordeal and the duel.³⁰ On this interpreta-

²⁷For an extremely full survey see Gataker, *On the Nature and Use of Lots*; also see J. Lindblom, "Lot-casting in the Old Testament," *Vetus Testamentum* 12 (1964): 164-78.

²⁸Thomas, *Religion and the Decline of Magic*, p.141.

²⁹An instance of an informal lottery is opening the Bible at random in the hope that the selected verse might offer guidance to action. See Thomas, *Religion and the Decline of Magic*, p. 139; also see B. Donagan, "Godly Choice: Puritan Decision-making in Seventeenth-century England," *Harvard Theological Review* 76 (1983): 307-34, who refers to an instance where "by a Catch-22 argument, a randomly opened Bible on one occasion forbade the practice itself" (p. 317). (Gataker, *On the Nature and Use of Lots*, p. 346, refers to a similar self-undermining consultation by Saint Francis.) The practice goes back to the *sortes Virgilianae* of the classical world, amusingly described in Rabelais, *Gargantua and Pantagruel*, 3.11-12. Rabelais brings out the large scope 'for discretionary interpretation of the randomly selected texts.

³⁰This distinction is slightly misleading, as witnessed by the existence of "ordeal by lot." For surveys of these techniques for revealing God's will, see H. Nottarp, *Gottesurteilstudien* (Munich: Kösel Verlag, 1956); H. C. Lea, *The Ordeal* (Philadelphia: University of Pennsylvania Press, 1973); H. C. Lea, *The Duel and the Oath* (Philadelphia: University of Pennsylvania Press, 1974), p. 195; R. Bartlett, *Trial by Fire and Water* (New York: Oxford University Press, 1986).

tion, there is no need to make lotteries fair, since God's hand could always steer the die or the coin so as to make the right side come up, just as he could ensure the victory of the weaker party in a duel. Nor would there be any need to take great care in selecting the pool of eligibles for a lottery. "If a lot were God's sentence, what need men be so curious in examining and trying the fitness and unfitness of those that they admit to a lot?"³¹ That people did in fact care about these procedural matters testifies to their ambiguous attitude toward the methods.

Gataker's view was that the use of lotteries to reveal God's will was lawful only when expressly commanded by God.³² Instances are the command to use lotteries to divide the land of Israel (for example, Num. 26:52-56) or to detect the guilty (Josh. 7). Otherwise the use of lotteries to reveal God's will is a blasphemous and superstitious tempting of God. Saint Thomas Aquinas, while holding broadly the same position, had a slightly more lenient view. "If, however, there be urgent necessity it is lawful to seek the divine judgment by casting lots, provided due reverence is observed."³³ To support his view Aquinas cites Augustine (*Ep. Ad Honor* 180): "If, at a time of persecution, the ministers of God do not agree as to which of them is to remain at his post lest all should flee, and which of them is to flee, lest all die and the Church be forsaken, should there be no other means of coming to an agreement, so far as I can see, they must be chosen by lot." Gataker's interpretation of this passage from Augustine seems more plausible. One should decide by lot who should "retire and reserve themselves for better times; that so neither those that stayed might be taxed of presumption, nor those that retired themselves be condemned for cowardice" (p. 66).³⁴

³¹Gataker, *On the Nature and Use of Lots*, p. 200.

³²*Ibid.*, pp. 14-25.

³³Saint Thomas Aquinas, *Summa Theologica*, pt. II-II, qu. 95, art. 8.

³⁴The same argument applies to the other text from Augustine cited by Aquinas in support of his view: "If thou aboundest in that which it behooves thee

To discuss the use of lotteries in individual decision making, I shall distinguish between parametric and strategic decisions. The latter are characterized by a strong form of interdependence of decisions: to make up my mind I must anticipate what others will do, knowing that they are similarly deciding on the basis of anticipating my decision. In the former, the environment, including the behavior of other people, can be taken as given or at least as dependent only on my actual behavior, not on anticipations about my behavior. Both types of decisions have scope for randomization. Parametric decisions call for a lottery when the agent is indifferent or his preferences are indeterminate. Strategic decisions call for a lottery when there is no equilibrium point in pure strategies. In a parametric decision, decision by lot is rarely if ever rationally prescribed, although sometimes rationally allowed. (The habit of always using lotteries to resolve parametric decisions when they are rationally allowed may, however, be rationally prescribed as a means of economizing on costs of decision.) In a strategic decision randomization is sometimes rationally prescribed.

In parametric decisions, or “games against nature,” decision by lot would seem useful when we are unable to make up our mind about what to do, or when the effort required to make up our mind does not seem worthwhile, or when it has good incentive effects. The last reason, while very important in social lotteries, has only a minor role to play in individual decisions. The most important example is probably randomization in designing experiments. “The medical experimenter who selects which patients are to receive a new treatment for a disease and which are to receive the standard treatment or none at all can unconsciously select for the new treatment patients that are healthier and have therefore

to give to him who hath not, and which cannot be given to two; should two come to you, neither of whom surpasses the other either in need or in some claim on thee, thou couldst not act more justly than in choosing by lot to whom thou shalt give that which thou canst not give to both.” Again nothing supports the view that Augustine was recommending the lottery as a means to find the divine judgment. Indeed, the phrase “thou couldst not act more justly” directly suggests the other interpretation.

a better chance of recovery. Randomization prevents the exercise of such bias.”³⁵ This is almost a two-person problem, in which a conscious self, seeking truth, uses a lottery to prevent an unconscious self, seeking success, from succumbing to the pleasure principle.

More important, we could use lotteries when there are several options that are equally and maximally good. These options may be indistinguishable, as in the choice between identical cans of Campbell’s tomato soup, or they may differ in ways that exactly offset each other so as to leave us indifferent between them. Next, we could use lotteries when the top-ranked options are incommensurable, for either of two reasons. In some contexts we may be unable to rank or compare the outcomes of the various actions we can take. If the outcomes differ along several dimensions, we may find ourselves unable to make the necessary trade-offs. In other contexts we may be able to attach values but not numerical probabilities to the outcomes. Both are forms of uncertainty, about matters of value or preference or about matters of fact. The situation may also be more complex. The top-ranked options may be equally good as far as we know. We may be confident that one of them would prove superior if we took the time and effort to find out more about them. Yet it may not be rational to make the investment, because the difference is expected to be small compared with the cost of acquiring the additional information.³⁶ Since these conditions obtain quite often, we might expect lotteries to be widely used in making individual decisions. For reasons discussed in part III, they are actually quite rare.

Consider next lotteries in strategic decision making. Here, the purpose of randomization is not to resolve indeterminacy but to keep other people uncertain about what one is doing. A simple

³⁵P. Suppes, *Probabilistic Metaphysics* (Oxford: Blackwell, 1984), p. 211

³⁶Strictly speaking, the first category, of choice under indifference, should be subsumed under this heading, since ties could always be broken by finding out more about the options.

example is randomized bluffing in poker.³⁷ A more complex example is taken from the hunting practices of the Naskapi, an Indian tribe in the Labradorian peninsula.³⁸ To determine the direction in which to hunt, they take the shoulder blade of a caribou and burn it over a fire so as to make appear cracks and spots in it. The blade is then held in a predetermined position with reference to the local topography, and the cracks and spots are used to indicate the direction. It has been conjectured that a useful effect of this randomized procedure is to prevent regularities in the hunting patterns, which might be detected by the hunted.³⁹ Although the randomizing device is probably biased, in that cracks and spots are more likely to form in certain ways than others, the “regularity stemming from this source may to some extent be lessened because the Naskapi change campsites.”⁴⁰ This effect, if indeed it exists, might or might not explain the practice itself, depending on the presence of either intentionality or feedback in the process.

Randomization is most plausible in two-person zero-sum games, in which one person’s gain is always another person’s loss. Since military conflicts often approximate the zero-sum condition, it is not surprising that we find mixed strategies being used in the deployment of troops. On the other hand, nobody cares much about *ex ante* rationality. *Ex post* success is what counts. “Imagine a congressional investigation of a military commander, or an agency chief, who has adopted a specific pure strategy which has been ruinous. What would be the reaction if his defense hinged on the fact that he adopted this pure strategy by the throw of

³⁷As Al Roth has pointed out to me, one can also use pure strategies to decide when to bluff, for example, by bluffing if and only if one is dealt the two of diamonds. Here one random event, the dealing of the cards, is used for two different purposes.

³⁸The following discussion draws upon O. K. Moore, “Divination: A New Perspective,” *American Anthropologist* 59 (1957): 69–74.

³⁹*Ibid.*, p. 71.

⁴⁰*Ibid.*, p. 72.

dice?"⁴¹ If the commander or agency chief acts out of self-interest, he would be best advised to use the maximum pure strategy, even knowing that this may not be optimal against what the opponent will do. In nonzero-sum games randomization is much less plausible, for reasons that I cannot explore here.

I now turn to social lotteries, and begin with a list of cases in which lotteries are currently used to allocate tasks, scarce goods, or necessary burdens to individuals, or in which they have been used in the past for these purposes, or in which their use has been seriously proposed or at least envisaged. In parts II and III, I discuss some of these examples in greater detail.

There are not many instances of social decision making by lot in contemporary Western societies. The two major examples are the draft and the selection of jurors.⁴² Lotteries have been used occasionally to allocate scarce medical resources such as kidney machines, and they play a role in regulating inheritance in some countries.⁴³ Lotteries play a somewhat trivial role as tie-breakers in various political contexts.⁴⁴ In the United States, oil drilling leases are partly allocated by lotteries.⁴⁵ In several countries, admission to high schools, universities, and professional schools sometimes used random drawing, within a pool formed by substantive criteria. Lotteries are frequently used in sports and

⁴¹Luce and Raiffa, *Games and Decisions*, p. 76.

⁴²For a survey of randomization in the draft, see S. A. Fienberg, "Randomization in Social Affairs"; an eloquent argument for lotteries in the draft is found in Harvard Study Group, "On the Draft," *Public Interest* 9 (1967): 93–99. For a full discussion of American jury selection, see Hans and Vidmar, *Judging the Jury*.

⁴³"Scarce Medical Resources," *Columbia Law Review* 69 (1969): 621–92, at p. 660; M. Herzfeld, "Social Tension and Inheritance by Lot in Three Greek Villages," *Anthropological Quarterly* 53 (1980): 91–100.

⁴⁴South Dakota uses lotteries to break ties in congressional elections. In Tennessee the choice between two candidates with the same number of votes is left to the governor. In Massachusetts equality of votes means that no candidate is elected, and the situation is treated as if the incumbent had died in office. If the election is very close, courts will sometimes order a new election.

⁴⁵A. Haspel, "Drilling for Dollars: The Federal Oil-lease Lottery Program," *Regulation: American Enterprise Journal for Government and Society* 9 (July–August 1985): 25–31.

games, to decide who plays first, to match teams with each other, or to match teams with players.⁴⁶ Lotteries and similar procedures are sometimes used to select questions in school and university examinations. Spot checks by the Internal Revenue Service and similar institutions are sometimes done on a quasi-randomized basis.⁴⁷ Public housing is allocated by lotteries in several countries. In Israel, for example, applicants for housing are ranked on a point system that takes account of dependents, present housing, and other variables. Those with many points participate in lotteries for the best housing, those with fewer points in lotteries for the less attractive housing.

In the past lotteries have been used more widely. The best-known cases are probably the choice of political representatives by lot in the Greek and Italian city-states.⁴⁸ Lotteries also played a role in Roman elections. The selection of jurors by lot was introduced in Athens in the fifth century B.C., and the random assignment of magistrates to cases a century later.⁴⁹ The selection

⁴⁶In the United States, more complex sports lotteries include the following. In the National Basketball Association, it was formerly the case that the team that finished last in a given season had the first choice of players for the next season, the next to last had the second choice, and so on. Because of the incentives to lose created by this practice, the order is now determined by a lottery among the bottom eight teams. In the supplementary draft for the National Football League, the rights to choose players are allocated by an inverse weighted lottery. The World Champions get their name placed in a hat once. The last-place team (twenty-eighth) get their name placed in the hat twenty-eight times. (I am indebted to Mark Kishlansky for information about these practices.)

⁴⁷Institutions of this kind face two optimization problems. First, what pattern of randomization should it announce to the public to achieve maximal deterrence? Second, what pattern of randomization should it actually use to maximize revenue from fines and payment of unpaid taxes? Because these institutions are allowed to proceed secretly, and because the public does not have the information to infer the true pattern from observed behavior, the two patterns are not constrained to coincide.

⁴⁸J. W. Headlam, *Election by Lot at Athens* (Cambridge: Cambridge University Press, 1891); E. S. Staveley, *Greek and Roman Voting and Elections* (London: Thames and Hudson, 1972). On Italian city-states see especially J. Najemy, *Corporatism and Consensus in Florentine Electoral Politics, 1280-1400* (Chapel Hill: University of North Carolina Press, 1982).

⁴⁹D. M. MacDowell, *The Law in Classical Athens* (Ithaca, N.Y.: Cornell University Press, 1978).

of religious officials and the assignment of sacred offices has been carried out by lot in many societies, the best-known being the selection by lot of the apostle to succeed Judas (Acts 1:26). The allocation of land to settlers by means of a lottery was a regular practice in the United States in the nineteenth century and is reported at several places in the Old Testament (for example, Num. 26:52-56 and 33:54).⁵⁰ Various kinds of draft lotteries were common in France from the late-seventeenth to the late-nineteenth centuries.⁵¹ The practice of decimation, that is, killing one hostage or one treacherous soldier out of ten, has been very frequent. Often, the choice has been left to the victims themselves, as illustrated in Graham Greene's *The Tenth Man*. It was always part of the custom of the sea to choose the victim of cannibalism by lottery when the situation was desperate enough to justify this step.⁵²

Gataker reports the following examples, among many others. According to Origen, angels have their place in heaven assigned to them by lot (p. 61). In Geneva, priests are selected by lot "to visit the infected at the pesthouse in times of general infection by epidemic disease" (p. 66). "In desperate cases, [the Jews] decided sometimes by lot who should slay each other" (p. 89). "In Egypt it is reported that they were wont yearly by lot to assign each man or each kindred what land they should till" (p. 104). Cambises' army "for want of victuals by lot sequestered a tenth part of themselves to make meat of" (p. 110). A Nestorian abbot cast lots to decide "between his heretical monks and the orthodox bishops, to

⁵⁰For a description of one case of allocation of land by lottery, see E. E. Dale, "Oklahoma's Great Land Lottery," *Great Plains Journal* 22 (1983): 2-41. The procedure used was a combination of lottery, choice, and queuing.

⁵¹G. Sturgill, "Le tirage au sort de la milice en 1726 ou le début de la décadence de la royauté en France," *Revue Historique des Armées* 31 (1975): 26-38; A. Badeau, *Le village sous l'ancien régime* (Paris: Didier 1882), pp. 289ff.; F. Choisel, "Du tirage au sort au service universel," *Revue Historique des Armées* 37 (1981): 43-60.

⁵²A. W. B. Simpson, *Cannibalism and the Common Law* (Chicago: University of Chicago Press, 1984), p. 140.

be thereby informed whether of them held the truth: which being cast, says the story, it went with the bishops, whereupon he and his monks, the most of them, came home unto them” (p. 330).

There have also been many proposals to use lotteries to regulate choices that are now made on other grounds. It has been seriously argued that political representatives should be chosen by random drawings among the votes, to facilitate the representation of minorities.⁵³ Similarly, the proposal has been made that when there are cycling majorities one alternative should be selected at random.⁵⁴ Also, by allowing the alternatives themselves to take the form of lotteries, certain perverse decisions can be avoided, although the procedure also creates problems of its own.⁵⁵ It has been suggested that randomly switching babies among families at birth, although undesirable because of the implied violation of family autonomy, would have the good effect of ensuring equality of opportunity.⁵⁶ It has been proposed, furthermore, that broadcasting licenses and procreation rights might be allocated in this way.⁵⁷ Various writers have argued that employers should use lotteries to choose among minimally qualified applicants for jobs, that layoffs should be decided by lottery, that elections should be randomly timed, that congressmen should be randomly assigned to committees, that custody of children in disputed cases should be decided randomly, and that the allocation of medical resources should rely on lotteries as a main mechanism.⁵⁸

⁵³B. Ackerman, *Social Justice in the Liberal State* (New Haven: Yale University Press, 1980), 286ff.; Amar, “Choosing Representatives by Lottery Voting.”

⁵⁴Ackerman, *Social Justice in the Liberal State*, pp. 291ff.

⁵⁵R. Zeckhauser, “Majority Rule with Lotteries on Alternatives,” *Quarterly Journal of Economics* 83 (1969): 696–703.

⁵⁶J. Fishkin, *Justice, Equal Opportunity, and the Family* (New Haven: Yale University Press, 1983), p. 57.

⁵⁷Greely, “Equality of Allocation by Lot.”

⁵⁸On minimally qualified applicants, F. Hapgood, “Chances of a Lifetime,” *Working Papers for a New Society* 3 (1975): 37–42; T. M. Divine, “Women in the Academy: Sex Discrimination in University Faculty Hiring and Promotion,” *Journal of Law and Education* 5 (1976): 429–51. On layoffs, Greely, “Equality of

There are two famous lotteries in fiction. Shirley Jackson's short story "The Lottery" describes, in chillingly trivial detail, a small New England village in which the inhabitants each June choose, by a multistage lottery, one among themselves to be stoned to death. The impact of the story comes from the utter lack of any perceived point in the sacrificial lottery, except for the mumblings of an old man that the harvest would be bad were they to give up the lottery, as other villages are said to be doing. The biblical ancestors of this story would seem to be the choice by lot of a scapegoat in Lev. 16:7-10 and the lot by which Jonah was selected to be thrown overboard as responsible for the tempest threatening the ship (Jon. 1:7). The analogies are imperfect, however. The goat to be sacrificed was not the scapegoat but the other goat upon which the Lord's lot fell. Rather, the scapegoat was driven into the wilderness, as were most human scapegoats in classical Greece.⁵⁹ When human scapegoats were actually sacrificed, there is no evidence that they were chosen by lot among the population at large.⁶⁰ Rather, the victims tend to be criminals or poor or otherwise repulsive persons. Being like dirt, they symbolize the dirt which is to be wiped out. The story of Jonah, on the

Allocation by Lot," p. 125; N. J. Ireland and P. J. Law, *The Economics of Labour-Managed Enterprises* (London: Croom Helm, 1982), pp. 19ff. On randomly timed elections, A. Lindbeck, "Stabilization Policy in Open Economies with Endogenous Politicians," *American Economic Review: Papers and Proceedings* 66 (1976): 1-19. On assigning congressmen to committees, R. Thaler, "The Mirages of Public Policy," *Public Interest* 73 (1983): 61-74. On custody of children, see J. Elster, "Solomonic Judgments: Against the Best Interest of the Child," *University of Chicago Law Review* 54 (1987): 1-45. On the allocation of medical resources, J. F. Kilner, "A Moral Allocation of Scarce Lifesaving Medical Resources," *Journal of Religious Ethics* 9 (1981): 245-71; for a very specific proposal of this kind, involving alternate stages of lotteries and selection on medical criteria, see A. Katz, "Process Design for Selection of Hemodialysis and Organ Transplant Recipients," *Buffalo Law Review* 22 (1973): 373-418.

⁵⁹W. Burkert, *Greek Religion* (Cambridge, Mass.: Harvard University Press, 1985), pp. 82-83.

⁶⁰A possible exception is provided by J. Frazer, *The Golden Bough* (New York: Collier Books, 1963), p. 660, who cites a text that "the human victim chosen for sacrifice . . . may be either a freeborn or a slave, a person of noble or wealthy parentage, or one of humble birth." The actual choice mechanism is not explained, however.

other hand, refers to a specific crisis, not to a periodically recurring sacrifice as in Shirley Jackson's story. Moreover, Jonah was not a scapegoat in the sense of a symbolic victim: he was actually believed to be guilty of something. Hence Shirley Jackson's story unites elements which, as far as I know, have never been found together in actual societies: the periodical character of the sacrifice, the selection of the victim from an unrestricted pool, the use of a lottery to select the victim, the subsequent killing of the victim, and the purely symbolic (nonretributive) significance of the rite.

Jorge Luis Borges's short story "The Lottery in Babylon" describes a society in which virtually all matters are left to chance, including the use of the chance mechanism itself.⁶¹ The very operation of lotteries is tainted by randomness, uncertainty, secrecy, and fraud, until all members of society become their co-victims and co-perpetrators. The story is probably inspired by the story of Heliogabalus, described as follows by Gataker: "that monster of men, Heliogabalus, a second Nero, used to propound to whom he pleased, both in public and private, certain mixed lots, some matter of gift, some matter of charge, of such extreme inequality, that some were neither mended nor impaired at all, but mocked only, some were made, as we say, and others utterly undone" (p. 157). A modern Heliogabalus is described in Graham Greene's *Doctor Fischer of Geneva, or the Bomb Party*. The rich Dr. Fischer likes to humiliate his guests by offering them Christmas crackers which have either a large check or a small bomb in them. In these stories, lotteries are synonymous with capricious and arbitrary behavior, in contrast to Shirley Jackson's story in which they are part and parcel of the social order. These are indeed the two faces of social lotteries, which combine the regularity of an institution with unpredictability of outcome. The great advantage, and sometimes the great disadvantage, of lot-

⁶¹For an attempt to draw some lessons for political theory from this story, see B. Goodwin, "Justice and the Lottery," *Political Studies* 32 (1984): 190-202.

teries is that one can count on not being able to count on the outcome.

As conclusion to part I, I consider some examples in which lotteries have been used to allocate scarce goods and necessary burdens. To bring out the reasons for using chance devices, I shall compare them with other allocative mechanisms. The alternatives I shall consider are equal division; allocation according to need, productivity, or contribution; and market mechanisms. There are other mechanisms too, such as queuing, rotation, or status, which I do not have the space to consider here.

The first and obvious alternative is equal physical division. When a good can be infinitely divided without loss of value, it is often divided equally among all applicants or potential beneficiaries. When it cannot be thus divided, the principle of absolute equality dictates that it should not be given to anyone. Solomon's first decision, to cut the disputed child in half, followed the principle of absolute equality at the expense of efficiency. Usually, however, the principle of absolute equality is not applied when the good cannot be divided without loss of value. Instead, lotteries offer themselves as a natural alternative, substituting equality of chance for equality of outcomes. A clear example is in John 19:23-24: "Then the soldiers, when they had crucified Jesus, took his garments and made four parts, to every soldier a part, and also his coat: now the coat was without seam, woven from the top throughout. They said therefore among themselves, Let us not rend it, but cast lots for it, whose it shall be."

Lotteries are preferred to physical division when division reduces the value of that which is to be divided. Cutting a child in two would reduce its value to nothing. Cutting a seamless coat in four parts would reduce its value substantially. It is often more efficient to have half the age group perform two years of military service than to have the whole group do service for one year. In some cases, division reduces not only the value but the amount of that which is to be divided. To many people, it would

seem obvious that work-sharing is a better solution to the unemployment problem than random layoffs, yet under quite reasonable conditions a shorter working day could lead to increased unemployment.⁶²

In many cases, it might seem obvious that scarce resources should be allocated by *need* rather than by a lottery. Medical resources, unlike grace, should not fall impartially on barren and on fertile ground, but should be directed to the persons whom they can most benefit. To use chance instead of reason is “an abdication of moral responsibility.”⁶³ A general answer to this argument, further discussed in part III, is that the abdication of reason can be a most rational procedure. It remains to be shown, of course, that the answer applies in the present kind of case. To show that it might apply, consider first decision costs. Fine-tuned considerations of differential needs for medical resources might, even when feasible, be excessively expensive for the community.⁶⁴ The temptation to reject such reasoning as inhumane should be resisted. The selection of which patients to treat is a costly element of the medical process which has to be assessed in terms of its benefits no less than any other element in the process, such as costly diagnostical procedures that are used to decide whether or not to treat a given patient.⁶⁵ Another, less controversial kind of decision cost involves costs to the patients rather than to the community. If the selection process is long and time-consuming, there is a risk that patients might die who otherwise would have survived or, at the very least, that they will suffer considerably and

⁶²M. Hoel, “Employment and Allocation Effects of Reducing the Length of the Workday,” *Economica* 53 (1986): 75–85.

⁶³R. A. Belliotti, “Moral Assessment and the Allocation of Scarce Medical Resources,” *Man and Medicine: The Journal of Values and Ethics in Health Care* 5 (1980): 251–62, at p. 255. Belliotti does not suggest that the patient’s need be the sole criterion. Instead he advocates the use of a point system.

⁶⁴This is one of the arguments for random selection in Katz, “Process Design,” p. 401.

⁶⁵See, for instance, P. T. Mentzel, *Medical Costs, Moral Choices* (New Haven: Yale University Press, 1983).

needlessly while waiting. I argue in part II that a similar argument applies to child custody decisions. In such cases more coarse-grained methods of selection, such as random choice, might be preferable. Even then, of course, one would usually have to take some account of need in forming the pool of eligibles among whom to draw lots for the scarce good.⁶⁶

A more fundamental problem arises from the indeterminacy of the very notion of need. First, there is a conceptual indeterminacy. Does allocation according to need mean that one should give the good to the persons who would benefit most from it? Or that it should be given to those at the lowest welfare levels? The two criteria, the first in terms of marginal needs satisfaction and the second in terms of levels of need satisfaction, coincide under some circumstances, but not always.⁶⁷ Some people who are at a very low welfare level because of a handicap that reduces their productive efficiency may also, because of the same handicap, be inefficient converters of goods to welfare. Second, hard problems arise concerning interpersonal comparisons of welfare.⁶⁸ In addition to the usual sort of obstacles to such comparisons, a special difficulty arises in the case of life-saving medical resources. Assuming, for the sake of argument, that a newborn infant may benefit more from life-saving medication than a twenty-year-old person, many would feel that the latter should nevertheless have priority

⁶⁶An elaborate four-stage procedure of this kind is proposed by Katz, "Process Design." A three-stage procedure is proposed by N. Rescher, "The Allocation of Exotic Lifesaving Therapy," in S. Gorowitz et al., eds., *Moral Problems in Medicine* (Englewood Cliffs, N.J.: Prentice-Hall, 1976).

⁶⁷They coincide if all individuals derive the same amount of welfare from a given material situation and if their marginal welfare is always decreasing with increasing amounts of goods.

⁶⁸These problems arise both in comparing welfare levels and in comparing welfare increments. Those who believe that levels are more easily compared than increments might prefer something like the maximin criterion. Those who believe that increments lend themselves better to comparison might prefer utilitarianism. See, for instance, A. Sen, "Interpersonal Comparisons of Welfare," in his *Choice, Welfare, and Measurement* (Oxford: Blackwell, 1982), chap. 12.

because he has more to lose.⁶⁹ Finally, the preference revelation problems associated with the measurement of welfare suggest that we would often find it impossible in practice to carry out finely grained comparisons of needs. These ambiguities suggest random choice as a good procedure in some cases. In many cases, of course, the differences in need are uncontroversial. A person who will die of cancer within a week is a less worthy candidate for a kidney transplant than a young and otherwise healthy person.

One can allocate the scarce resources where they do most good for society, as distinct from allocating them to the person who has the greatest need for them. It might be the case that X has greater need than Y for higher education, in either of the senses distinguished above, but that Y, because of his or her superior resources, would be able to use the education more productively. One person might have greater need for military exemption and yet be chosen for service because of his fighting skills. One worker might have a greater need for her job and still be laid off if she is less efficient than another. From the social point of view, the use of chance rather than productivity might also seem to be an abdication of moral responsibility.⁷⁰ Yet, assuming that we do take that point of view, several difficulties remain. Costs of decision might make it pointless to use very-fine-tuned methods of screening for productivity, even assuming them to be reliable. Moreover, the reliability of screening is quite dubious. Tests for school admission are often bad predictors of school performance and of later job performance.⁷¹ The selection of research proposals according to their scientific merit does somewhat better than random selection but is very far from perfect.⁷² Hence there

⁶⁹Some arguments for abortion seem to assume a similar asymmetry.

⁷⁰This position is strongly argued by M. Basson, "Choosing among Candidates for Scarce Medical Resources," *Journal of Medicine and Philosophy* 4 (1979): 31 3-33.

⁷¹Hapgood, "Chances of a Lifetime."

⁷²S. Cole, J. R. Cole, and G. A. Simon, "Chance and Consensus in Peer Review," *Science* 214 (1981): 881-86.

is something to be said for first forming a pool of those who pass minimal levels of qualification and then selecting randomly within it. Not much is lost by way of efficiency, and much is gained by way of fairness. If necessary, the lottery could use weighted probabilities.

In addition, one may argue that productivity is not the proper criterion. The “Captain’s Dilemma,” invented by Lawrence Kohlberg, is intended to bring out this point.⁷³ In his story, one of three persons in a boat must be thrown overboard lest the boat should capsize and all die. Of the three, one is the captain, who is indispensable for navigating the boat. One is an old man with a broken shoulder. If he goes overboard, there is an 80 percent chance that the other two would survive. The third is a young and strong man in whose absence the others would merely stand a fifty-fifty chance. Kohlberg argues that the captain should draw straws between the old man and the young man. The lottery, while suboptimal from the efficiency perspective, is preferable on the Rawlsian grounds of enhancing the life prospect, as seen from behind the veil of ignorance, of the worst-off member of the group.

Although Kohlberg’s reasoning is multiply confused, something like his conclusion does follow from the Rawlsian premise.⁷⁴

⁷³L. Kohlberg, *The Philosophy of Moral Development* (New York: Harper and Row, 1981): pp. 205ff.

⁷⁴First, Kohlberg misstates Rawls’s original position as one in which the parties know that they have “an equal probability of being the weak man or the strong man.” On that interpretation of the veil of ignorance, the utilitarian conclusion, which he wants to avoid, follows unavoidably. Second, he gets his numbers wrong when he says that “if a lottery is used, the old man’s probability of living is 50%.” The correct number is 25 percent. Third, he inconsistently reintroduces utilitarian considerations when he says that the lottery is justified because “the strong man’s chances of life decrease only 30 percent by the use of a lottery, compared to the 50 percent decrease in life chances of the weak man if he is ordered to go.” Moreover, these numbers are also wrong: the strong man’s chances decline by 40 percent, whereas the weak man’s chances decrease by 25 percent. What follows from the Rawlsian premise is not that the parties would choose an even-chance lottery behind the veil of ignorance but that they would choose a lottery giving the weak man eight chances out of thirteen to remain in the boat and the strong man five.

My opinion, which I would not have the space to justify here even had I thought myself fully able to, which I don't, is that neither efficiency nor maximin is the right approach to distributive justice. The former gives too little protection to the vulnerable, the latter too much protection. Something in-between, like maximizing total utility subject to a floor constraint for each individual, seems to be called for. In this I seem to be in agreement with most non-philosophers, although philosophers understandably dislike the ad hocness of the proposal.⁷⁵ It does not follow, however, that lotteries could be justified to protect the worst-off if that is necessary to get their expected utility above a floor constraint. Protecting the worst-off makes sense if we are ensuring an actual minimal level of welfare. It is more dubious whether it also makes sense to ensure a minimum level of expected welfare when the potentially worst outcome is equally bad for all involved. Expected welfare is *not* a primary good: in fact, it is not any kind of good at all.⁷⁶

Sometimes, goods are allocated according to earlier contributions. They serve, then, as a reward for good behavior (or as punishment for bad behavior). When the link between contribution and reward is established ahead of time so that the individuals concerned can count on it and plan accordingly, I shall refer to it as desert. Contribution and desert are backward-looking principles, unlike need and productivity, which are forward-looking. Reward according to desert may nevertheless have good effects on productivity by creating an incentive to good behavior. The allocation of grades to students or of bonuses to workers are examples. Also, a seniority system of layoffs creates an incentive for workers to stay in their firm, thus reducing turnover rates and increasing

⁷⁵See M. Yaari and M. Bar-Hillel, "On Dividing Justly," *Social Choice and Welfare* 1 (1984): 1-25; J. Frohlich, J. Oppenheimer, and C. Eavey, "Laboratory Results on Rawls' Distributive Justice," *British Journal of Political Science* 17 (1987): 1-21.

⁷⁶J. Broome, "Uncertainty and Fairness," *Economic Journal* 94 (1984): 624-32.

productivity.⁷⁷ These effects are not forthcoming when, as in the demobilization of American soldiers at the end of the Second World War, the system is not known in advance.⁷⁸ Here the order in which the soldiers were allowed to leave the army depended on how many points they scored on a composite scale in which contributions to the war effort—that is, length and danger of service—were a major component, together with number of family dependents. Another well-known example from the same war saw productivity take precedence over contribution, when scarce penicillin was given to soldiers with venereal disease to get them combat-ready rather than to soldiers who had been hurt in fighting.⁷⁹

Lotteries may be used to supplement the principle of desert in the allocation of punishment for criminal behavior. When it is impossible or undesirable to prosecute all known or easily detectable offenders, the police should not be allowed discretionary power to select whom to prosecute, because they might use it to get back at personal enemies or to obtain favors.⁸⁰ Instead, they should use a nondiscriminatory procedure, such as selecting randomly whom to prosecute or proceeding on a first-come, first-served basis when that is more feasible. The age-old practice of decimation, that is, of executing every tenth soldier in cases of treason or desertion, is an example. The chosen individuals get (we assume) what they deserve, and hence the allocation follows

⁷⁷R. B. Freeman and J. L. Medoff, *What Do Unions Do?* (New York: Basic Books, 1984), p. 107 (positive relation between seniority and turnover rates) and p. 174 (positive relation between turnover rates and productivity).

⁷⁸S. Stouffer et al., *The American Soldier* (Princeton: Princeton University Press, 1949), vol. 2, chap. 11.

⁷⁹H. K. Beecher, "Scarce Resources and Medical Advancement," *Daedalus* 98 (1969): 275-313, at pp. 279ff.

⁸⁰K. C. Davies, *Discretionary Justice* (Urbana: University of Illinois Press, 1971), chap. 6. See also V. Aubert, "Chance in Social Affairs," in J. Dowie and P. Lefrere, eds., *Risk and Chance* (Milton Keynes: The Open University Press, 1980), pp. 74-97, at p. 91, and J. Feinberg, "Noncomparative Justice," in his *Rights, Justice, and the Bonds of Liberty* (Princeton: Princeton University Press, 1980), pp. 265-306, at p. 282.

the principle of desert; yet the choice of whom to select for this treatment is random. Similarly, we have the authority of Augustine and Aquinas for the legitimacy of selecting recipients of charity by lot.

Most of the goods discussed above, including exemption from burdens, can be allocated by auctioning, that is, by creating a market system. This can be combined with a lottery in two ways. First, one can let people pay for a chance of being selected. This is the practice followed in the U.S. oil-lease lottery program. At the present, each person can buy only one lottery ticket for a given parcel of land, but it has been argued that the system could be improved by allowing any number of tickets to be bought, thus more closely approximating a market system.⁸¹ Second, the people selected by lot may be able to sell their right to the good or buy exemption from an undesirable duty. The examples known to me fall in the second category. I do not know of cases in which a recipient of a randomly allocated good is allowed to sell it in the market. By contrast, there are instances in which those chosen by lot for some necessary but unpleasant task can buy someone to take their place. Where draft lotteries have been used, the practice of buying substitutes has sometimes been allowed, although often expressly forbidden.⁸² Alternatively, citizens have been allowed to buy their way out by paying a tax, the proceeds from which were used to induce volunteers.⁸³ A striking example of combined market and lottery is Greene's *The Tenth Man*, in which one of three selected by lot to be shot by the Germans offers his

⁸¹Haspel, "Drilling for Dollars."

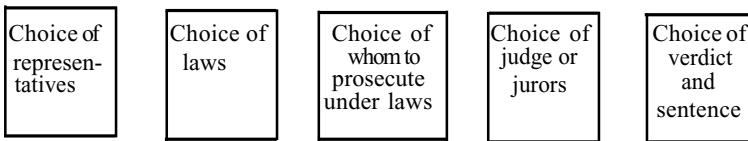
⁸²Choisel, "Du tirage au sort," p. 46. In Norway between the two world wars military service was regulated by a two-stage lottery. In the first stage, about one-third of the age group was exempted by lot from the regular three-month service. In the second, some of the conscripts were chosen by lot for an additional three-week service, for which it was possible to buy a substitute. (I owe this information to Magne Skodvin.) On the forbidding of buying substitutes, Sturgill, "Le tirage au sort."

⁸³In France this system was introduced by Napoleon in 1855. The system of substitutes was reintroduced in 1868 (Choisel, "Du tirage au sort").

whole fortune to anyone who is willing to take his place and finds a volunteer who accepts the offer.

II

In this part, I shall discuss lotteries and randomization in political and legal contexts. To impose some structure on the examples, we may think of the institutional structure of (democratic) societies as organized in five successive stages (see flow chart).



In this process, each stage except the second has occasionally been organized as a lottery. Some have suggested that even the second stage, the choice of laws, could be organized in this way. Part I included some remarks about lotteries in the third stage. The others are considered here.

Today, lotteries have virtually no role to play in the political process beyond that of occasionally being used as tiebreakers. In the past, however, they have been widely used to select members of legislative or executive assemblies. Even today the proposal of random selection of candidates is often discussed, and sometimes advocated. Traditionally the unit of equiprobabilistic political lotteries has been the candidate: each member of a given group should have the same chance of being selected. In addition, lotteries were often used in elections to ensure the fairness of the voting procedure. In modern discussions, by contrast, the unit is the voter: each person should have the same chance of having his or her preferred candidate selected.

Selections of representatives and officials by lot are mainly confined to the Greek and Italian city-states. In Athens all officials and council members were chosen by lot, with the exception of

generals and a small number of magistrates for whom special qualifications were needed, These were chosen by direct election. Excepting these technical tasks, virtually everyone was supposed to possess the competence required for governing the city.

The Athenian system is well known.⁸⁴ Rather than explaining it in detail, I shall say a few words about the more rarely discussed role of lotteries in Rome and then go on to consider an intriguing example of randomization in Italian politics.

Roman elections made subsidiary use of lotteries in two contexts, both of which were related to the fact that the Romans voted in tribes rather than individually.⁸⁵ They used lots to select the tribe in which should vote those Latins who happened to be present at Rome at the time of the vote. More important, they used lots to overcome flaws in the voting system. In some elections, the tribes voted successively, and the returns from certain tribes were announced before others were called to vote. Clearly, the former could easily exercise an influence on the latter. To prevent some tribes from having a systematic advantage over others, the order in which the tribes were called to vote was determined by lot.⁸⁶ In other elections, the tribes voted simultaneously, but the returns were declared successively until as many candidates as there were places to be filled had received a vote from the absolute majority of the tribes. At that point, the counting stopped and the returns from the remaining tribes were discarded. To ensure equality of influence, the order in which the tribes had their returns read was determined by lot. Clearly the problems could have been solved by more direct methods. When tribes voted successively, one tribe could have waited until all had voted before

⁸⁴For a recent discussion which attempts to draw some lessons for democratic theory in general see R. G. Mook, "Lot as a Democratic Device of Selection," *Review of Politics* 46 (1984): 539–60.

⁸⁵The following discussion draws upon Slaveley, *Greek and Roman Voting*, p. 152ff.

⁸⁶This is a simplification, but not, I think, a misleading one for the present purposes.

reading out the results. When they voted simultaneously, one might have chosen the candidates with the greatest number of votes from all tribes. This patchwork solution may have served the goal of equalizing the influence of all tribes over time but hardly that of fairness toward the candidates, which may tell us something about the relative importance attached to these goals.

Fourteenth-century Florence was a society in search of, or at least in need of, constitutional constraints.⁸⁷ The development of the Florentine electoral system in this period could be summarized, perhaps, as the transformation of “instant politics,” in which no institutions could ever be taken for granted, into (or at least toward) a regime capable of commanding durable assent. To understand the tensions which the political process was supposed to resolve, we can first note that Florentine society in this period was divided both vertically and horizontally. The vertical divisions were, first, between the aristocratic oligarchy and the guildsmen and, second, between various groups of guildsmen. The horizontal divisions were factions within the oligarchy, similar to if less violent than those between the Guelfs and the Ghibellines in the preceding century.

The object of electoral politics was the election of members to the city government (the Signoria) and to various committees. Every two months these bodies were appointed anew, by a process which in general included four stages. First, candidates had to be nominated; then, the nominated candidates had to be scrutinized for approval; then, among the approved candidates, a certain number had to be selected by lot; and finally, among the selected candidates, those were rejected who did not satisfy various conditions of eligibility, the main ones being that neither the candidates themselves nor their close relatives should recently have held office.

⁸⁷The following discussion draws upon J. Najemy, *Corporatism and Consensus in Florentine Electoral Politics*.

The legislative assembly chose the mode of election of the government. In part of the period the assembly deliberated anew for each election, thus creating an extremely unstable system in which not only the set of officeholders but also the methods for electing them could change every two months. This extreme of untrammelled democracy was, however, the exception rather than the rule, since the assembly, or those to whom it delegated its authority, could in principle choose many successive governments with one fell stroke, as I shall now explain.

The important task was to overcome the destabilizing forces resulting from the short period of office and the high turnover of officeholders. The solution that came to be worked out was to have the officials for many successive governments nominated, approved, and selected simultaneously, with a selection process based on lottery. Disregarding numerous variations and qualifications, the system in force in the third quarter of the fourteenth century worked roughly as follows. Every three years various bodies, the most important of them the advisory colleges from the sixteen administrative districts, nominated candidates for office. The nomination process resulted in a large number of candidates, usually several thousand. These candidates were presented to a scrutiny committee of 144 members, most of whom were appointed directly by the existing government. The committee voted in secret on each candidate, a two-thirds majority being required for approval. The names of the approved candidates were then placed in bags, from which were drawn at random, every two months, those who would serve on the Signoria for the next period. Since the bags were not exhausted during the three-year period nor discarded after the end of the period, there were always several overlapping bags in existence. The rule was to start with the oldest bags and to proceed to the more recent as the oldest became exhausted or the candidates whose names were drawn were found to be ineligible for some reason. As a consequence there

was a many-many correlation between governments and scrutinies, as distinct from the one-one correlation of modern elections.

The consequences of this complex arrangement were manifold. The fact that a large part of the citizenry was nominated for office contributed to the legitimacy of the system, especially since it was never made public who survived the scrutiny by the 144. The belief that “my turn may come” on some future extraction of names from the bags probably prevented many citizens from rocking the boat, even if in fact they had already been excluded. Here, epistemic randomness was what counted, not the objective chance of being selected. In addition, since the truly random element in the system prevented anyone from knowing who would hold office when, no faction could influence or bribe future officeholders. This was an important guarantee for the guilds against the powerful oligarchy, as were the restrictions on eligibility, which prevented individuals from the same family from holding office frequently. Moreover, the lack of clear correlation between scrutinies and governments ensured that electoral discontent lacked any obvious target of attack. Randomness in itself ensures that a corrupt government cannot be directly traced to a corrupt electoral mechanism, and the system of overlapping bags must have made it even more difficult to perceive any malevolent hand at work behind a bad outcome.

Against this, of course, both the temporal lag between nomination and officeholding and the element of randomness have clear inconveniences, well summarized by Leonardo Bruni in the early fifteenth century:

Experience has shown that this practice was useful in eliminating the struggles that so frequently erupted among the citizens competing for elections [under the previous system]. But as much as extraction by lot is beneficial to the republic in this respect, just as much and even more is it harmful in another, namely, that because of the chance of the draw many unworthy persons are placed in the magistracy of the priorate. For the same care is not taken in staffing offices to be drawn in the

future as in electing present ones, and we certainly give more attentive consideration to present matters and tend to be more negligent in judging those things ordained for an uncertain future. This practice of extraction by lot also extinguishes any motivation for prudent conduct, since, if men were forced to compete in direct elections and openly put their reputations on the line, they would be much more circumspect [in their life and behavior].⁸⁸

In other words, the system reduced the prescrutiny incentive of the nominated candidates to behave well, since the motive of the scrutinizers to pay attention to behavior was reduced by time and uncertainty. It also reduced their postscrutiny incentive, since in a random draw nothing they did could affect their probability of being chosen. For these reasons, perhaps, the procedure was later modified into a two-track system, in which nearly half of the government was drawn from another set of bags filled with names carefully selected by and from the oligarchy. With this final modification the system survived for another century. The *de facto* elite dominance ensured stability and continuity, as well as legitimacy among the oligarchy, while the broad popular participation made for legitimacy among the citizens at large.

Modern discussions of random elections emphasize the voter rather than the candidate as the unit of selection. An election should be decided by choosing a “random dictator” from the electorate. This proposal would appear strange, to say the least, yet there are a surprisingly large number of arguments to be made for it. Not surprisingly, however, the counterarguments are even stronger.

Perhaps the main argument for lottery voting, as I shall call it from now on, is that it reconciles honesty with self-interest.⁸⁹ It has been known for a long time that many methods of aggregating

⁸⁸Cited in *ibid.*, p. 313.

⁸⁹I adapt this terminology from Amar, “Choosing Representatives by Lottery Voting.”

individual votes into social decisions are plagued by the problem that it can pay to be dishonest. By misreporting their preferences, individuals may be able to ensure a social decision which is better — according to their true preferences — than the decision which would be made if they reported them correctly. If people follow their self-interest, however, they often have an incentive to deviate from honesty. If they do, the social decision may be disastrously bad, with no claim to being “the popular will.”

Even if one denies, as I think one should, the assumption of public-choice theorists that all behavior is based on opportunistic self-interest, it would be desirable to have a political system that economized on the need for honesty. Could one not design a system in which it is never in people’s interest to misrepresent their preferences? It turns out that lottery voting is the only system which achieves this. Somewhat more precisely, the only voting procedure which is Pareto-optimal, nondictatorial, and strategy-proof is “random voting,” the simplest case of which is when the probability of an option’s being chosen is equal to the proportion of individuals who rank it as their first choice.⁹⁰

A second advantage of lottery voting is that of reducing the problem of the “wasted vote.” Under a deterministic voting system there is little point in voting for a candidate whose victory is confidently expected in any case, whence the traditionally low participation rates in the American South. Similarly, there is no point in voting for a candidate who has virtually no chance of being elected, whence the difficulties of new parties in attracting votes. Sometimes, of course, one may want to increase the majority with which one’s candidate is elected, so as to give him or her the moral authority or mandate needed to carry out major reforms. Similarly, a vote for a doomed candidate can give a show of respectability to his or her cause. These, however, are second-decimal

⁹⁰A. Gibbard, “Manipulation of Voting Schemes: A General Result,” *Econometrica* 41 (1973): 587–601; Gibbard, “Manipulation of Voting Schemes That Mix Voting with Chance,” *Econometrica* 45 (1977): 665–81.

considerations. The problem of the wasted vote is real enough. It would be reduced by lottery voting, which ensures that each vote counts equally, that is, increases by the same amount the likelihood of the candidate's being elected. Under lottery voting, the power of an individual — measured by the probability of casting the decisive vote — is $1/n$ where n is the size of the electorate. Under deterministic majority voting, the power of an individual equals the chance that he or she will be pivotal, that is, that the other votes will be exactly evenly divided between the candidates. Under all plausible circumstances, this probability is much smaller than $1/n$.⁹¹

Another advantage of lottery voting is that it ensures that there will be no permanently unrepresented minorities. In many societies there exist minorities whose members differ from the majority along many of the critical political dimensions, such as race, religion, language, and wealth. If the creation of a separate polity is impossible because the numbers of the minority are too small or because its members are dispersed over the whole national territory, lottery voting can ensure that their voice is nevertheless heard.

Finally, lottery voting has the populist value of blocking the emergence of professional politicians. The system “would create a legislature of rotating citizen-legislators instead of a group of lifetime lawmakers.”⁹² The pressure from special-interest groups on legislators would be less effective because their ability to influence reelection chances would be reduced. Hence legislators would be freer to enact the public interest. Moreover, a steady stream of new representatives would improve the assembly's ability to perceive what that interest consists in, since it would largely be made up of people who have recently been active in community life.

⁹¹Estimations of that probability are given in G. Owen and B. Grofman, “To Vote or Not to Vote: The Paradox of Nonvoting,” *Public Choice* 42 (1984): 311–25.

⁹²Amar, “Choosing Representatives by Lottery Voting,” p. 1298.

Against all these advantages, lottery voting has several disadvantages which explain why it has never been adopted and suggest that it never will be. Most obviously, the lack of continuity among the representatives counts against the proposal. Lottery voting would make it more difficult for representatives to learn from experience. What Alexis de Tocqueville identified as a major problem of democracies, that “each generation is a new people” and that “[a]fter one brief moment of power, officials are lost again amid the everchanging crowd,” would be vastly exacerbated under a system of lottery voting.⁹³ Disproportionate power would accrue to the bureaucracy, which would, even more than today, be an element of stability in the ceaseless flux of politicians who come and go. On balance, therefore, populist goals would be badly served by the system.

Moreover, having to think about reelection is not simply a source of vulnerability to special-interest groups. It is also a form of accountability to the electorate without which the temptation to plunder the spoils of incumbency might be overwhelming. Furthermore, the predictable rise of numerous small parties would make the Fourth French Republic a paradigm of stability by comparison. With a combination of lottery voting and a large number of small parties, the laws of probability would ensure that even a large majority on a specific issue would often be reversed after the next election. The system might soon take on the surrealistic air of the “lottery in Babylon.” Finally, the risk that some lunatic fringe might come into power is not acceptable, even if the chance would be very small. If we are concerned about the risk of nuclear accidents with a probability of about 10^{-7} of happening, we might well have reason to be afraid of less likely political accidents which could have disastrous effects on a much larger scale.

The second stage of the political and legal process could also be organized on a random basis. I do not know of any regime

⁹³A. de Tocqueville, *Democracy in America* (New York: Anchor Books, 1969), pp. 473, 207.

which has actually adopted this practice, but it is not inconceivable that the proposal might be implemented as a practical solution to the problem of cycling majorities. If an individual prefers *a* to *b*, *b* to *c*, and *c* to *a*, we would probably say that he hasn't thought carefully about the problem and that he would get his preferences straight by reconsidering. Ideally, one might want to say the same about an assembly of cyclical majorities. If the assembly gave itself more time for deliberation and rational discussion, it would achieve or at least approach unanimity.⁹⁴ In practice, for reasons that need not be spelled out in detail, this will not happen. There will often be a need to aggregate preferences which are sufficiently different from each other for cycles to arise. In such cases one might say that, for all practical purposes, the assembly has no preference and that one might as well choose one motion at random. This proposal would be certain to meet strong opposition. We have, I believe, a deep-rooted desire that the proximate causes of our decisions should be reasons. A similar and probably more acceptable device, one step removed, would be to have the order in which the alternatives are held up against each other set at random, to remove the possibility of agenda-manipulation. Since the motion finally adopted depends crucially on the order of voting, random agenda-setting effectively approximates random legislation.⁹⁵

Consider two general arguments for democracy. On one conception, democracy is good because and to the extent that it allows expression of the popular will, or at least does so better than any other system. In light of the Arrow-McKelvey-Schofield impossibility theorems, this view cannot be defended, since the notion of the popular will is incoherent.⁹⁶ On another conception, democ-

⁹⁴This view is notably associated with Jürgen Habermas. For a discussion, see my *Sour Grapes* (Cambridge: Cambridge University Press, 1983), chap. 1, sec. 5.

⁹⁵For a summary of recent findings see W. Riker, *Liberalism against Populism* (San Francisco: Freeman, 1982), chap. 7, and P. C. Ordeshook, *Game Theory and Political Theory* (Cambridge: Cambridge University Press, 1986), chap. 6.

⁹⁶Kenneth Arrow showed, loosely speaking, that no system of aggregating preferences can eliminate the possibility of cyclical social preferences. Richard

racy is to be recommended on procedural grounds, “as a way of picking out, without reference to inherently arguable claims to superior competence, a unique” decision.⁹⁷ Neither agenda manipulation nor random choice satisfies the first conception, since nothing does. Random choice, unlike agenda manipulation, satisfies the second conception of democracy.

I shall also consider, in increasing order of plausibility, three other proposals to randomize aspects of the political process. First, elections could be randomly timed, to prevent or dampen the “political business cycle” created by the tendency of each government to begin in potlatch and end in austerity.⁹⁸ Against this advantage one would have to consider the negative effects of lack of predictability. The government would be unable to plan effectively, and others would be unable to count on the (relative) stability of governmental action and policies. Also, governments might end up giving more rather than less thought to reelection, effectively acting as if each quarter were the last.

Second, the assignment of members of Congress to congressional committees might be done randomly.⁹⁹ Once again, the advantages and disadvantages are fairly obvious. On the one hand random assignment would break the system of entrenched power by seniority, which has been a major obstacle to rational policy making in the United States. On the other hand, there would be a loss of continuity and no possibility of matching committee membership with experience or inclination. On balance, the proposal might be a good idea, at least compared with current U.S.

McKelvey and Norman Schofield showed that this possibility is the rule rather than the exception and that, moreover, the cycles cover the whole policy space rather than being restricted to a small subset of it. See Riker, *Liberalism*, pp. 181ff.

⁹⁷B. Barry, “Is Democracy Special?” in P. Laslett and J. Fishkin, eds., *Philosophy, Politics, and Society*, fifth series (Oxford: Blackwell, 1979), pp. 155–96, at p. 195.

⁹⁸Lindbeck, “Stabilization Policy,” p. 18n.

⁹⁹Thaler, “The Mirages of Public Policy.” M. Kishlansky, *Parliamentary Selection* (Cambridge: Cambridge University Press, 1986), p. 36, has a brief reference to a similar proposal in the seventeenth-century House of Commons.

practice. It might be a good thing for congressmen to get varied experience. They ought, after all, to be generalists rather than specialists. Being professional politicians with a trained staff, they would suffer smaller transition problems than most other people.

Third, one might consider random redesigning of electoral districts.¹⁰⁰ Ideally, reapportionment following population changes should be guided only by the principle of ensuring equal influence of all voters.¹⁰¹ In practice, the parties in power can and do use reapportionment to increase their electoral chances. To avoid this, one could institute random redesigning of the districts whenever the inequality exceeds a certain level, constrained by the principle of equal influence and by topological considerations such as convexity. A good side effect of the random reapportionment could be the reshuffling of the political cards, so as to break the power of old alliances and create, on a small scale, the possibility for the periodical renewal of politics called for by Thomas Jefferson and others.

The final two stages in the flow chart set out above are the selection of judiciary decision makers and their decision making. The practice of choosing judges and jurors by a random device is frequently observed and easy to justify. The use of lotteries to choose a verdict or sentence has also been observed, although more infrequently. Although it might be thought to be inherently repulsive and irrational, I shall argue that there are cases in which the best way for courts to decide is by the flip of a coin or some similar device.

Compared with the choice of jurors, the assignment of judges and magistrates to cases is a little-discussed issue. Magistrates in

¹⁰⁰As observed by Amar, "Choosing Representatives by Lottery Voting," p. 1294ff., lottery voting would also eliminate incentives to gerrymandering. The present proposal achieves the same aim without incurring the prohibitive costs of lottery voting.

¹⁰¹Behind this simple phrase lies a very complex reality. See J. W. Still, "Political Equality and Election Systems," *Ethics* 91 (1981): 375-94, and R. Rogowski, "Representation in Political Theory and in Law," *Ethics* 91 (1981) : pp. 395-430.

Athens and judges in Rome were sometimes allocated by lot.¹⁰² I briefly report some current Norwegian practices.¹⁰³ In one local court, each of three judges is assigned three or four of the numbers between 0 and 9. Cases are numbered in order of arrival and matched with judges by their last digit. For all practical purposes, this is a lottery system. In other courts the assignment is at the discretion of the chief magistrate. These practices are probably to be explained on grounds of convenience; at least nobody seems to attach any other significance to them. The assignment of judges to cases has been more consequential in the American context. Benjamin Cameron, a judge on the Fifth Circuit Court of Appeals, which dealt with a number of civil rights cases arising in the wake of *Brown v. Board of Education*, claimed that judges were systematically assigned to these cases in order to favor liberal and progressive views. Although the claim had little substance, it led to the development of a “‘fail-safe’ system that separated the assignment of judges to panels from the scheduling of cases.”¹⁰⁴ Assuming no communication between the judge who assigned panels to sit on designated dates in specific cities and the clerk who would calendar the cases, this is an epistemically random procedure.

Random selection of jurors is widely practiced. It was invented, together with the democratic jury itself, in Athens sometime before the middle of the fifth century B.C.¹⁰⁵ From those who volunteered, 6,000 were chosen by lot to be jurors for the year. Juries for the various courts were made up out of this list of 6,000. In the beginning each juror was allocated to one

¹⁰²In Athens this practice was introduced well a century after the establishment of randomly selected jurors (MacDowell, *The Law in Classical Athens*, p. 40). For the Roman lotteries *inter collegas*, see Pauly-Wissowa, *Real-Encyclopädie des klassischen Altertums*, s.v. “Lösung,” pp. 1497ff.

¹⁰³I am indebted to Kirsten Sandberg for information about these practices.

¹⁰⁴J. Bass, *Unlikely Heroes* (New York: Simon and Schuster, 1981), p. 241.

¹⁰⁵The following discussion draws upon MacDowell, *The Law in Classical Athens*, pp. 33ff., 252ff.

court for the year. Later, probably because of trouble with corrupt juries, a different system was introduced. At the beginning of the year the 6,000 were divided into panels (probably ten), and each morning panels were randomly assigned to the various courts. Later still, the units of random assignment became the individual jurors, possibly because of the need to have an odd number of jurors so as to avoid ties.

Juries are widely, but not universally, used in modern Western societies. Their strongholds are in the Anglo-Saxon and the Scandinavian countries. In the United States, on which the following discussion will be concentrated, the process has at least two stages: selection of a panel of jurors and selection of the jury from the panel. Sometimes the panel itself is chosen from a larger subset of the adult citizens. In Norway, that larger subset is appointed nonrandomly by the municipal council. To settle the defendant's guilt or innocence, fourteen people are drawn at random from the subset, seven men and seven women. Of these, both the defense and the prosecution reject two, leaving a total of ten. The gender constraint does not operate in these challenges, so that in theory the final jury might have as much as a 7–3 bias. The four jurors selected to fix the sentence are, however, constrained by law to be two men and two women.

There are a number of arguments for choosing jurors at random. First, all citizens ought to have an equal chance to assume the privilege (or the burden) of jury service. Call this the *equal-chance argument*. If jury service is seen as a privilege, as it usually is, the equal-chance argument can be justified by the educative effects of jury service. As Tocqueville makes clear, one cannot take as a given that what is good for the citizens is also good for the parties in the case. "I do not know whether a jury is useful to the litigants, but I am sure it is very good for those who have to decide the case. I regard it as one of the most effective means of popular education at society's disposal."¹⁰⁶

¹⁰⁶Tocqueville, *Democracy in America*, p. 275.

Second, random selection of jurors has good incentive effects by making it more difficult to bribe or threaten those who have to decide the case. Call this the *incentive-effect argument*. This consideration has always been an important argument in jury selection, at least in societies with a generally high level of violence and corruption. Unlike the first argument, it is clearly grounded in concern for the goodness of the decision.

Third, random selection of jurors is often defended on the grounds that the defendant has a right to be judged by an impartial and representative group of his or her peers. Call this the *fairness argument*. It will be further discussed below. I shall assume, for the time being, that fairness requires the actual jury to be a representative cross section of the community and not simply drawn from a larger panel with this property.

To these three goals correspond three different concepts of randomness. The equal-chance argument requires an objectively random process in which each person has the same chance as any other of being selected. For the incentive-effect argument, epistemic randomness is sufficient. If the point of random selection of jurors is to eliminate the risk of bribery, the epistemic impossibility of knowing who will be selected is more important than objective equiprobability of being selected.¹⁰⁷ The fairness argument, as I have specified it, requires stratified randomization. In Norway this takes the form of selecting equal numbers of men and women, but on other dimensions of stratification the groups will not have equal representation. If the jury is stratified on race, for instance, the races will be represented in the jury according to their representation in the population. There is a clear hierarchy among these methods. Stratified randomization will achieve all three goals. Unstratified randomization will achieve the first and the second goals but not the third. An epistemically random process which is in fact biased will achieve only the second.

¹⁰⁷See testimony by H. Zeisel, "Federal Jury Selection," Wednesday, March 20, 1967, U.S. Senate Subcommittee on improvements in the judicial machinery of the Committee of the Judiciary, p. 131.

I shall consider the fairness argument in more detail.¹⁰⁸ In American legal doctrine no defendant has a right to a representative jury, only the right to have a jury drawn from a representative cross section.¹⁰⁹ The process shall not be biased, although the end state may well be. Yet, often, end states are what we care about. To get the question in focus, I shall quote from the dissenting opinion of Justice Thurgood Marshall in the recent case of *Lockhart v. McCree*.¹¹⁰

[T]here is no basis in either precedent or logic for the suggestion that a State law authorizing the prosecution before trial to exclude from jury service all, or even a substantial portion of a “distinctive group” would not constitute a clear infringement of the defendant’s Sixth Amendment right. “The desired interaction of a cross section of the community does not take place within the venire; it is only effectuated by the jury that is selected and sworn to try the issues.” . . . The right to have a particular group represented in the venire is of absolutely no value if every member of that group will automatically be excluded from service as soon as he is found to be a member of that group. Whether a violation of the fair cross section requirement has occurred can hardly turn on *when* the wholesale exclusion of a group has taken place.

It is clear, from the sentence quoted by Justice Marshall from a dissenting opinion he gave in an earlier case, that he wants to justify the right to a jury drawn from a fair cross section by end-

¹⁰⁸I am indebted to Akhil Amar for clarifying my mind (or at least making it less confused) on these issues.

¹⁰⁹See, for instance, John Ely, *Democracy and Distrust* (Cambridge, Mass.: Harvard University Press, 1980), p. 139. See also *Taylor v. Louisiana* 419 U.S. 522 (1974): “It should also be emphasized that in holding that petit juries must be drawn from a source fairly representative of the community we impose no requirement that petit juries actually chosen must mirror the community and reflect the various distinctive groups of the population. Defendants are not entitled to a jury of any particular composition . . . but the jury wheels, pools of names, panels, or venires from which juries are drawn must not systematically exclude distinctive groups in the community and thereby fail to be reasonably representative thereof” (majority opinion, Justice Marshall joining, Justices Rehnquist and Burger dissenting).

¹¹⁰106 S. Ct. 1758 (1986).

state considerations.¹¹¹ The decision reached by the jury will be substantively better, and not simply procedurally more just, if the jury contains a variety of viewpoints. The effect of excluding “any large and identifiable segment of the community . . . is to remove from the jury room qualities of human nature and varieties of human experience.”¹¹² A related but slightly different argument is the importance for defendants of having someone on the jury capable of understanding their situation, behavior, culture, and language. “What may appear to white jurors as a black defendant’s implausible story may ring true to black jurors with a greater knowledge of the context and norms.”¹¹³

From this it seems to follow that the jury should be a stratified random sample, ensuring that there will be some men and some women, or some whites and some blacks, proportionately to their presence in the community. To ensure the desired variety and communication, their presence on the jury itself, not simply on the earlier panels, would have to be guaranteed. This is especially true when juries are small.

The objection will be raised that a small jury can be stratified only along a small number of dimensions, whereas there is a potentially unlimited number of dimensions that could be relevant. No jury of ten or twelve can be a microcosm of a large community. To this I have three answers. First, the number of dimensions of stratification can exceed the number of people on the jury, if each person represents several dimensions. Instead of having, say, a young person, a black, and a woman on the jury, one might have a young black woman. Second, one might limit oneself to a small set of dimensions which historically have given rise to massive and systematic bias, race and gender being the most important. For civil-liberty reasons the set would probably have to be severely

¹¹¹*McCray v. New York*, 461 U.S. 961 (1982).

¹¹²*Taylor v. Louisiana*, p. 532. The cited sentence is actually a quotation from the opinion of Justice Marshall in an earlier case.

¹¹³Hans and Vidmar, *Judging the Jury*, p. 50.

restricted in any case. One could hardly, for instance, ask people selected for the panel about their sexual orientation, even when this would be relevant to the case. Third, and this is my main reply, one might give the defendant the right to choose the dimension(s) of stratification.¹¹⁴

The conclusion that I draw from Justice Marshall's opinion is not the one he wants to draw himself. He was concerned exclusively with the *systematic* exclusion of certain groups, not with the exclusion that may happen through accidents of random selection. Yet if both kinds of exclusion can lead to the same end result, and if end results are what matter, how can the distinction be justified? The answer must be that biased end results will happen less frequently if the process is truly random. The reply might not satisfy the black defendant facing an all-white jury drawn in an impeccably random manner, but, or so the argument would go, in the long run the goals of the legal system are best served in this way. Against this I submit that a stratified random selection would have the same long-term benefits as unstratified selection, as well as being more fair in individual cases.

I turn now to the final stage of the legal system, that of legal decision making. By and large, of course, random selection is not allowed at this stage. When it occurs, it is punished. One example comes from England, where a "decision of 1665 allowed . . . juries to cast lots to resolve their differences as an alternative to a retrial when agreement could not be reached. (This decision was set aside eleven years later, however, and by the eighteenth century it had become a serious misdemeanour for juries to reach their decision in this way.)"¹¹⁵ More recently, the Louisiana Judiciary Commission recommended disciplinary action against a Baton

¹¹⁴Would the same right have to be granted to the prosecution? I do not think so. The equal right of defense and prosecution to eliminate jurors does not imply an equal right to ensure the presence of jurors of a certain kind. The rationale for the defendant's right would be his need to have someone on the jury capable of understanding his language, culture, and norms. There is no corresponding rationale for the prosecution.

¹¹⁵Thomas, *Religion and the Decline of Magic*, p. 141.

Rouge city judge who gave the appearance of deciding cases by tossing coins, on the model of the judge in Rabelais who, after laborious and time-consuming presentation of evidence, invariably decides his cases by the fall of dice.¹¹⁶ There are, nevertheless, civil-law cases in which the practice would seem to be justified. And there are several older cases in criminal law which show that random judgments have not always been perceived as abhorrent even if they would not be accepted today.

In a classic article John Coons discussed the curious lack of any place for compromise in the law, arguing that it is related to the “winner take all” attitude that underlies Western law, as distinct from the law of many other societies.¹¹⁷ In the light of the possibility of random decisions, this cannot be quite right. A lottery is a form of compromise in which the winner does get all. Rather, resistance to compromise must be due to the resistance to acknowledge indeterminacy of fact or law. The elaborate system of the law presupposes that judges must and therefore can reach a clear-cut decision. The decision may be close but is not allowed to be indeterminate. As arguments for this principle, Coons mentions incentive effects on litigants, juries, and judges. More cases might be brought and each case might be less carefully considered if compromises were allowed. “Resolving factual issues against good men is often a distasteful duty. Remove that duty, and it is likely that more and more cases will begin to seem close.”¹¹⁸

Nevertheless, there are cases in which compromises seem to be inevitable. Coons discusses the case of two men who are equally likely to be the father of a given child and says that under American law “precedents suggest” that one of them will be held solely

¹¹⁶P. Fishburn, “Acceptable Social Choice Lotteries,” in H. W. Gottinger and W. Leinfellner, eds., *Decision Theory and Social Ethics* (Dordrecht: Reidel, 1978), 133–52, at p. 137; *Gargantua and Pantagruel*, 3.39–40.

¹¹⁷J. E. Coons, “Approaches to Court-imposed Compromise: The Uses of Doubt and Reason,” *Northwestern University Law Review* 58 (1964): 750–94.

¹¹⁸*Ibid.*, p. 762.

and fully responsible.¹¹⁹ The selection of one rather than the other might be made by a lottery, but other considerations, such as income, could also be relevant.¹²⁰ In Sweden, however, the possible fathers share equally in the financial responsibility, thus substituting “an unvarying error of fifty per cent in all such judgments for an error of one hundred percent in half of these same judgments.”¹²¹ The Swedish practice seems to recommend itself on utilitarian grounds, assuming decreasing marginal utility of money and roughly similar utility functions.

If 50-50 chances of paternity call for a lottery or for equal division, what should we do in 51-49 cases? (I assume these to be reliable, objective probabilities.) Coons would apparently follow the mainstream and make the man with the slightly greater chance of paternity fully responsible. This, however, seems absurd. Rather, a 51-49 compromise should be imposed, whether a physical or a probabilistic one. A compromise would also be called for in 80–20 cases, since a 20 percent chance of innocence would certainly constitute “reasonable doubt” according to the usual criteria. In that case, however, a lottery might not be acceptable. If full responsibility was given to the man with only a 20 percent chance of being the father, he would probably think the decision monstrously unjust, whereas he might well accept to pay 20 percent of the child support.

Let us assume, however, that the latter option is not available, that is, that we are dealing with a case in which (a) we can assign unequal objective probabilities concerning the relevant facts and (b) no physical compromise is possible. In such cases, if there are any, a lottery using weighted probabilities might seem to recommend itself. As to the perceived injustice of the less probable

¹¹⁹Ibid., p. 758.

¹²⁰Financial considerations are doubly relevant. Giving financial responsibility to the more affluent man is in the interest of the child (and of the mother). Also, under standard circumstances (see note 114, above) the more affluent man will be less hurt by the financial sacrifice.

¹²¹Coons, “Approaches to Court-imposed Compromise,” p. 757 n. 4.

candidate's being chosen, we may appeal to an insightful observation by Francis Allen.¹²² We should not ask, Who is the father? but Who engaged in illegitimate or illicit activity which was within the scope of risk, of which this little bundle now is the concrete manifestation?¹²³

Another argument for legal lotteries arises in child custody litigation.¹²⁴ According to current legislation in most Western countries these cases are to be decided according to the best interest of the child. This is usually interpreted as the question of which parent is the most fit for raising the child. I believe, however, that this question is largely indeterminate, barring the small number of cases in which evidence of neglect, abuse, or psychiatric disorders shows one parent to be clearly unfit. In the majority of cases, there is no way of establishing the probabilities and value judgments that would allow us to say that the child's expected welfare will be higher with one parent than with the other. This indeterminacy is in itself an argument for using a lottery to award custody.

A more decisive argument, however, relies on the costs of legal decision making. Even assuming that fine-tuned distinctions of parental fitness can be made, the process of making them will be time-consuming and costly. I do not refer to the costs to the parents or to the legal system. Important as these may be, they should not prevent us from doing what is in the child's best interest. Rather, I have in mind the costs to the child of protracted litigation. Contested child custody cases usually lead to escalation of hostility between the parents, with devastating impact on the child's welfare. Trying to decide in the child's best interest may not be in the

¹²²In the "Comments" on Coons's article, *Northwestern University Law Review* 58 (1964) : 795-805, at p. 798.

¹²³On the issue of "moral luck," which arises here, see B. Williams, *Moral Luck* (Cambridge: Cambridge University Press, 1981), chap. 2, and T. Nagel, *Mortal Questions* (Cambridge: Cambridge University Press, 1979), chap. 3.

¹²⁴The following discussion draws heavily on Elster, "Solomonic Judgments."

child's best interest. Lotteries, by contrast, offer a swift, mechanical decision procedure that minimizes "process damage" to the child with no loss in "outcome value." Some have found the proposal to be "callous, an evasion of responsibilities both to children and to 'justice.'"¹²⁵ Others, with whom I sympathize more, have argued that "simplicity is the ultimate sophistication in deciding a child's placement."¹²⁶ I return to this argument in part III.

I conclude with some examples of how lotteries have been used in criminal cases. I do not think there are any arguments for incorporating lotteries in present-day criminal law. In old legal codes lotteries have nevertheless been used to decide the most serious cases, such as murder. An instance comes from old Frisian law.¹²⁷ When a man was killed by an unknown hand, a two-stage lottery was held among seven suspects selected by the accusers. In the first stage, an even-chance lottery was held to decide whether one of them was guilty, or whether all were innocent. If the lot showed one of them to be guilty, a second lottery was held to find the culprit. In all likelihood, the Frisians believed that the lottery was a divinely inspired method of proof, not just a man-made method of decision. Another intriguing case comes from "several Swedish and Finnish law cases from the 17th and 18th centuries in which by drawing lots it was decided who of several accused should be sentenced to death for murder. In those cases all those accused had attacked the victim but it was impossible to ascertain which of them had dealt the mortal blow."¹²⁸ The underlying idea probably was that of *lex talionis*: a life should be given for a life, but not more than one for one.

¹²⁵D. Chambers, "Rethinking the Substantive Rules for Custody Disputes in Divorce," *University of Michigan Law Review* 83 (1984): 480-569, at p. 485.

¹²⁶J. Goldstein, A. Freud, and A. J. Solnit, *Beyond the Best Interests of the Child*, 2d ed. (New York: Free Press, 1979), p. 116.

¹²⁷Lea, *The Ordeal*, p. 107-108.

¹²⁸T. Eckhoff, *Justice: Its Determinants in Social Interaction* (Rotterdam: Rotterdam University Press, 1974), p. 216.

III

I now turn to the four questions raised at the beginning of part I. The focus will be on social lotteries, with occasional references to individual decision making.

The first question concerned the factual problem: when have lotteries, in one form or another, actually been used to resolve individual or social decisions?¹²⁹ I have tried to provide a reasonably exhaustive answer to this question. I am sure there are cases that have escaped me, but I would be surprised if I had missed any major examples. The question is, What pattern, if any, emerges from the survey? Here are some rough generalizations.

First, as observed by Gataker (p. 68), “lotteries are most frequent in democracies or popular estates.” The Italian city-states, though not democracies in our sense, provide an example. Here political lotteries were used to prevent or dampen conflicts among factions of the oligarchy and between the oligarchy and the guilds. Athenian democracy was different. Here, selection by lot was a natural compromise between the principle that the people should rule directly and the practical impossibility of having everybody involved in day-to-day matters of government. To Gataker’s claim we have to add, however, that modern democracies invariably favor elections over lot. Lotteries may be more frequent in democracies than elsewhere, but they are not the most frequently used selection mechanism in democracies.

Second, lotteries are more common when they can be interpreted as the expression of God’s will. In Athens itself the selection of officials by lot may have had a religious origin, although later it became a wholly secular institution.¹³⁰ Although official Christian doctrine after the twelfth century did not favor this interpretation of lotteries, it lived on for a long time. Thus under-

¹²⁹Here I disregard cases in which lotteries have merely been proposed, to concentrate on those in which they have actually been used.

¹³⁰Staveley, *Greek and Roman Voting*, pp. 56, 241 n. 90.

stood, the outcome of a lottery is not a random event but the result of an intentional act.

Third, the most pervasive uses of lotteries throughout history appear to be in assigning people to administrative legal and political tasks and in allocating burdens to people. The selection of jurors and of soldiers are recurring examples. The use of lotteries to allocate scarce goods is, by contrast, less frequent. I offer this generalization with some hesitation, but it seems to be supported by the facts I have surveyed. Although any allocation of a burden can also be represented as the allocation of a good — namely, exemption from the burden — there is a clear difference in practice between selecting one soldier from a village for military service and selecting one person from a large pool for a kidney transplant. There seems to be an asymmetry between using lotteries to allocate gains and using them to allocate losses.

The second question I raised concerned the normative justification of lotteries, in terms of individual rationality, economic efficiency, or social justice. Let me begin by discussing one frequently cited and in my view invalid reason for adopting lotteries: they prevent loss of self-esteem of those who are not chosen for the scarce good. It has often been noted that a perfect system of reward according to contribution, desert, or productivity can have bad effects on the self-perception of the losers.¹³¹ It is easier to retain one's self-respect after a bad grade or failure of promotion if one can blame it on some nonrational element in the screening process, such as the selecting agent's bias, corruption, or incompetence. The denial of custody may not be felt as stigmatizing if the judge is obviously biased and irrational. Psychological studies suggest that procedural fairness together with an unfavorable outcome generates dissatisfaction, contrary to the frequently held view that people prefer losing fairly to losing unfairly.¹³² (Later,

¹³¹Hapgood, "Chances of a Lifetime," p. 38; Greely, "Equality of Allocation by Lot," p. 120; "Scarce Medical Resources," p. 663.

¹³²On dissatisfaction, L. Musante, "The Effects of Type of Evidence and Favorability of Verdict on Perceptions of Justice," *Justice of Applied Social Psy-*

however, I cite studies suggesting that the losers in lotteries experience loss of self-esteem.)

Arguments like these might seem to provide an argument for introducing a known element of randomness in the selection process, but a moment's reflection shows that this would hardly work. If a cheap and reliable system of screening according to the relevant criterion was available, the deliberate choice of an imperfect system for the purpose of enhancing the self-respect of the losers would not be acceptable. Imagine, for instance, that in a class of fifty students it is known that one out of ten A papers is randomly selected to receive the grade of B, in addition to the papers correctly graded B. Surely the knowledge that a prior, correct ranking had been made would make some of the B-grade students insist on getting the correct grades. By contrast, a naturally imperfect system, as distinct from one deliberately designed to be imperfect, might well have preservation of self-respect as a desirable side effect. If an employer uses a lottery because of the decision costs associated with fine-tuned screening, the applicants might welcome the procedure, but this is not the same as to say that they would ask him or her to use a lottery were there no such costs. Here, as elsewhere, self-respect is essentially a by-product that cannot be achieved by actions designed for the sole purpose of enhancing it.¹³³

An apparent counterexample to this argument is found in the use of lotteries to avoid loss of esteem and self-esteem in seventeenth-century parliamentary elections in England. Mark Kishlansky argues that before the Civil War, a predominant con-

chology 14 (1985): 448-60. On the popular view that people prefer to lose fairly, J. L. Mashaw, *Due Process in the Administrative State* (New Haven: Yale University Press, 1985), pp. 162-63.

¹³³For other arguments to this effect see Elster, *Sour Grapes*, chap. 2, sec. 8, and "Is There (or Should There Be) a Right to Work?" in A. Guttman, ed., *Democracy and the Welfare State* (Princeton: Princeton University Press, forthcoming).

cern of the electorate was to achieve consensus and avoid contests:

The principle of parliamentary selection — and, judging from the available evidence, the reality as well — was unified choice. “By and with the whole advice, assent and consent,” was how the town of Northampton put it when enrolling the selection of Christopher Sherland and Richard Spencer in 1626. Communities avoided division over parliamentary selections for all the obvious reasons — cost, trouble, fear of riot, challenge to magisterial authority — and for one other: The refusal to assent to the choice of an M.P. was an explicit statement of dishonor. Freely given by the will of the shire or the borough, a place in Parliament was a worthy distinction. Wrested away from competitors in a divisive contest, it diminished the worth of both victor and vanquished.¹³⁴

Sometimes, nevertheless, consensus was not reached and election day approached with more candidates than seats to be filled. The local gentry would then, often successfully, try to persuade the candidates to get out of the impasse “by lot or hazard . . . or any other equal way.”¹³⁵ When the number of candidates matched that of seats, disagreement might still arise over who was to have the first place. On one such occasion, “the justices explained to the two candidates, ‘we have bethought ourselves of some mediation therein and such as can be no blemish to either of your reputations to consent unto.’ They proposed that on the evening before the county day [the candidates] meet with the sheriff at Chelmsford and draw lots for the first place. ‘And by that means fortune to be the director without touch to either of your credit.’”¹³⁶

To be rejected by fortune was less dishonorable than to be rejected by the community. It could be inferior, nonetheless, to

¹³⁴Kishlansky, *Parliamentary Selection*, pp. 16-17.

¹³⁵Ibid., p. 78. The phrase is from a contemporary report on an election in 1614. On that particular occasion the offer to use a lottery was rejected by one of the candidates. For cases in which lotteries were successfully employed, see *ibid.*, pp. 71, 141.

¹³⁶Ibid., p. 68.

being selected by the community. One candidate, explaining why he refused the casting of lots proposed by the magistrates, said that he would not have it appear “that the freeholders of the said country had forborne to make election of him in regard of these rumors and reports.”¹³⁷ Ideally, one would present oneself for office only if one was certain to be selected. When misunderstandings or lack of coordination led to a surfeit of candidates, a lottery might save the honor of all concerned, unless too many insults had been exchanged, for then nothing short of victory would do. The process was essentially noncompetitive, and lotteries were used only to resolve unwanted contests in a peaceful way. Hence they do not really constitute a counterexample to the claim that one cannot deliberately introduce a random element to console the losers in competitive processes.

Indeterminacy is a fundamental reason for using lotteries. The simplest form of indifference is equi-optimality. When there are several candidates who are equally and maximally good, one might as well toss a coin among them. In social decisions, this presupposes that “goodness” is measured in an objective, rigorous way. Counting votes to choose between political candidates is an example. Other examples are the point systems used for admission to medical school in several countries, for promotion in the U.S. Civil Service, or for demobilization in the U.S. Army in 1945. With equality of votes, or points, lotteries can be used as tie-breakers.

A more complex form of indeterminacy is equi-optimality within the limit of what it pays to find out. The costs of fine-tuned screening of candidates who pass a threshold of minimal qualification may be prohibitively high, compared with the social gains from choosing the best. If several candidates are equally good as far as one knows or would want to know, one might as well choose randomly. This argument works best when the selection criterion is productivity. Hiring workers, selecting soldiers,

¹³⁷Cited in *ibid.*, p. 81.

or admitting students to law school are choices properly guided by social gains rather than by the needs or deserts of the applicants. Exceptions, such as admitting women or members of minority groups, do not involve expensive screening. Similarly, in the choice of a custodial parent one should weigh the costs and the benefits to the child of fine-tuning, whereas parental rights or needs are secondary at best. Applicants who are rejected by the lottery may well think that their right to a fine-tuned evaluation has been violated, but I do not believe they have any such right. They have a right to equal concern and respect, and that right is not violated by the lottery. In principle, the decision-cost argument could also be applied when applicants are selected mainly according to their need, but in practice it will rarely be the case that the relevant welfare differences are large enough to be detectable and small enough to be offset by the cost of detecting them.

A third variety of indeterminacy is sometimes referred to as incommensurability. Here, comparison of the claims or the options is inherently impossible or unreliable, not just costly or difficult. In individual choice this situation can arise when preference orderings are incomplete or when it is impossible to assign numerical probabilities to the outcomes of action. In social allocation it can arise in several ways. First, within a given dimension of choice interpersonal comparisons may be inherently controversial. Consider the allocation of medical resources according to such proposed criteria as social utility, need, and past contributions to society. How do we compare the social utility of a tax lawyer and a public defender?¹³⁸ How do we compare a teenager and a middle-aged man with respect to levels or increments in needs satisfaction? How do we compare the past contributions to society of a general and a factory worker? I am not implying that such comparisons are always impossible, only that they often are. Second, there is in general no reliable, intersubjectively valid trade-off across these dimensions. The point system used for

¹³⁸“Scarce Medical Resources,” p. 662

demobilization in the U.S. Army may seem to be an exception. The assignment of weights to the several dimensions, as well as the choice of the dimensions themselves, were made after a careful opinion survey among the civilian and noncivilian population.

It is unlikely, however, that the scheme could be duplicated in more complex settings, such as the selection of transplants or the drafts of soldiers for an ongoing war. The choice of observable proxies for contribution, productivity, and need would be highly controversial, as would the assignment of weights to these variables. In any case, Arrow's impossibility theorem tells us that we cannot in general expect to be able to construct a social ranking on the basis of individual rankings. Somewhat more precisely, we cannot hope to piece together the interpersonal comparisons made by different individuals into one consistent ranking with a claim to be *the* social comparison.¹³⁹ The demobilization scheme succeeded because the main variable, contribution to the war effort, was easily quantified, and because there was general agreement that this *was* the main variable. When consensus fails, we might as well use a lottery.

To say that we might as well use a lottery is not to say, however, that a lottery is rationally or morally required. If there is no detectable, relevant difference between the candidates, all are equally worthy, and hence it might appear that no wrong is done by using other methods of allocation. It has been proposed that one might select the most beautiful, the ugliest, the tallest, and (presumably) the shortest people in the pool.¹⁴⁰ One reason for preferring lotteries is their salience. Among the innumerable criteria that could be used in situations of indeterminacy, they stand out as being simple, mechanical, and universally applicable. An-

¹³⁹This statement is made precise in unpublished work by Aanund Hylland, extending (and slightly weakening) Arrow's theorem to the problem of aggregating interpersonal comparisons.

¹⁴⁰G.I. Mavrodes, "Choice and Chance in the Allocation of Medical Resources," *Journal of Religious Ethics* 12 (1984): 97-115.

other reason is that criteria related to manipulable properties of people create incentives to wasteful behavior. More generally, any given property may turn out to be highly correlated with other criteria that one would *not* want to use for allocating the scarce goods. Tall and beautiful people, for instance, tend to earn more. The general presumption against needless departures from equality counts against giving them preferential access. To prefer short and ugly people would reinforce the irrational social attitudes that define these traits as handicaps which justify compensation.

Another fundamental reason for using lotteries derives from incentive effects. The uncertainty surrounding the impact of lotteries on individuals cuts both ways. Ignorance of the future can remove the incentive for wasteful behavior — but also for socially useful behavior. Which effect dominates depends on the general level of honesty and on the complexity of social organization. For the Florentines it probably made sense to have political officials chosen randomly and to have them serve for a very short period, lest they use the office to enrich themselves or to consolidate their faction. The lottery may have prevented their society from degenerating into anarchy, given the general level of dishonesty and distrust.

Incentive effects can justify lotteries even when rational criteria are available and fully determinate. We may be confident that citizen X is more qualified than citizen Y to hold office and yet believe, assuming equal degrees of honesty, that a forwarned X would be more dangerous than an unforwarned Y and a fortiori more dangerous than an equal chance of an unforwarned X and an unforwarned Y. We might think that physical ability, an easily measurable factor, is the only relevant criterion in the selection for military service and yet use a lottery to reduce the incentive to self-mutilation. We might believe that people with professional experience ought to have some priority in the admission to medical school and yet use a lottery to prevent people from wasting years of their life accumulating points.

There are two sorts of undesirable incentive effects that are removed by lotteries. Consider the argument for choosing jurors and political officials by lot and the argument for random timing of elections. If the alternative to randomization is to have the decisions made by those who stand to profit from them, one would expect the prosecution to choose the jurors most likely to be favorable to them or the government to choose the date of election that maximizes its chances of winning. If, however, the alternative to randomization is to have the decisions made by an impartial mechanism that allows them to be anticipated, one would expect the defendant to bribe the jurors or the government to let the timing of economic policies be governed by the date of election. By creating maximal uncertainty about the outcome, on-the-spot randomization can be superior both to discretionary decision and to predetermined selection.

The incentive effects arise at several levels. Random selection prevents officials from using their discretionary power to play favorites, punish enemies, enrich themselves, or simply bask in the arbitrary exercise of power. In addition to this top-down effect there is a bottom-up effect that prevents potential appointees or recipients from bribing and threatening the officials. More generally, randomizing prevents recipients of scarce resources from trying to make themselves more eligible, at cost to themselves or to society. Self-mutilation to avoid military service is well known from many societies. Self-mutilation to increase the chance of medical treatment is at least conceivable. Finally, to the extent that the chosen individuals have themselves favor to dispense, randomization can deter third parties from extending bribes or threats. Often, the presence of third parties is the reason why officials and appointees would conspire in the first place, since they provide the kick back funds out of which both are paid.

On the other hand, uncertainty about who will do what and what will happen later can often be inefficient. Nobody has an incentive to invest time and effort to qualify themselves for posi-

tions which are assigned randomly. One might think that allocating research grants by random choice would not make much difference, since peer review is both costly and unreliable. That argument, however, assumes that the pool of applicants would remain the same in the random system, which it would obviously not if grants were known to be allocated in this manner. I have quoted Leonardi Bruni's comments on the Florentine electoral system, and notably his observation that the "practice of extraction . . . by lot extinguished any motivation for prudent conduct." Since the anticorruption and antifactionalism arguments for random assignment to office also presuppose that the term of office must be short, the system also removed the incentive for long-term planning in office.¹⁴¹ It is similar in that respect to the systematic rotation of officials practiced in Imperial China to prevent them from forming alliances with the local gentry or to the Soviet practice of rotating managers.¹⁴² Lotteries and rotation have better worst consequences and worse best consequences than a system that allows officials to form bonds with the local population. They would, therefore, be chosen by a constituent assembly acting on Hume's "maxim, that in contriving any system of government, and fixing the several checks and controls of the constitution, every man ought to be supposed to be a knave, and to have no other end, in all his actions, than private interest."¹⁴³ Yet in mature political systems, in which some measure of public-spiritedness in public officials can be counted on, the uncertainty has more bad effects than good ones.

Incentive-effect arguments also apply against John Harris's proposal to have a "survival lottery" that would allocate scarce

¹⁴¹This point is related to but distinct from Tocqueville's argument, cited above, that high turnover rates prevent officials from learning.

¹⁴²G. W. Skinner, "Cities and the Hierarchy of Local Systems," in G. W. Skinner, ed., *The City in Late Imperial China* (Stanford: Stanford University Press, 1977): pp. 275–352, at p. 341.

¹⁴³D. Hume, *Essays; Moral, Political, and Literary* (New York: Oxford University Press, 1963), p. 40.

resources for transplantation by choosing donors randomly in the Population.¹⁴⁴ Each donor would give several organs, thus allowing many lives to be saved at the expense of one.¹⁴⁵ The proposal has met with numerous objections. On utilitarian grounds, which are also the basis for the proposal itself, it has been argued that the scheme would remove “the natural disincentives to imprudent action,” since the potential recipients would know, for instance, that they can eat what they like without worrying about heart problems.¹⁴⁶

As noted earlier, lotteries are sometimes used to regulate inheritance, but never to my knowledge to allocate the whole estate randomly to one heir.¹⁴⁷ One might ask why the latter practice has never been observed. Equal division of a property may be fair, while efficiency often requires a single heir, usually chosen by primogeniture. Would not random choice of the sole heir be a superior system, combining fairness and efficiency? The answer (or part of it) is that random choice would lack one of the two efficiency features of primogeniture. It would, like primogeniture, allow for economies of scale. It would not, however, give the heir time to prepare himself or herself for the job of running the family farm. In fact equal division may also be more efficient than random assignment of the whole estate to one person, if the inefficiency generated by uncertainty exceeds that generated by diseconomies of scale. The negative incentive effect that would be

¹⁴⁴J. Harris, “The Survival Lottery,” *Philosophy* 50 (1975) : 81-87.

¹⁴⁵A state of technology is assumed that allows all organs to be transplanted with certain success.

¹⁴⁶P. Singer, “Utility and the Survival Lottery,” *Philosophy* 52 (1977): 218–22.

¹⁴⁷A partial exception is found in Danish law. When several heirs want the same object in the estate, it is allocated by a lottery. In the final accounting, the object thus allocated is evaluated below market value, so that the surplus is effectively allocated randomly (O. Krabbe, “Om lodtrækning i fortid og nutid” (On lotteries past and present), *Juristen* 1944, 157–75). The earlier law said that the whole estate should be divided into an equal number of equally valuable parts, to be allocated randomly. Presumably postallocation trade could reduce inefficiency in both cases.

created by lotteries may be the explanation why they are never observed in these cases.

Let me summarize the discussion up to this point. Lotteries are rationally allowed or permissible in cases of indeterminacy. Because of their simplicity and universal applicability, and because of the undesirable incentive effects that would be created by most other criteria, they are in fact rationally prescribed. Moreover, the presence of incentive effects can warrant the use of lotteries even when there is no indeterminacy. These are, it seems to me, the main arguments for using lotteries.

A final and frequently cited value of lotteries is that of promoting fairness.¹⁴⁸ It is difficult to assess this claim, because of the vagueness of the notion of fairness.¹⁴⁹ In most cases it probably reduces to the view that when there are no relevant differences among the candidates or applicants, one should use a lottery, since the alternative — that is, using irrelevant differences — would be unfair. Fairness, on this conception, simply means that relevantly like cases should be treated alike. But there could be a stronger version of the claim. It would argue that even when there are relevant differences, people should be treated alike. In a fundamental sense, which lexicographically dominates the relevant differences, all persons are equally worthy. Any human life, for instance, is as valuable as any other, irrespective of quantity (that is, expected life span) and quality (that is, ability to enjoy life). Hence any person should have equal access or, in cases of indivisibility, equal chance of receiving scarce resources.¹⁵⁰

¹⁴⁸We must distinguish between two issues. The first, discussed in part II, is, When is a lottery fair? The second, discussed below, is, When is it fair to use a lottery?

¹⁴⁹For a useful discussion, see J. Broome, "Selecting People Randomly," *Ethics* 95 (1984): 38-55.

¹⁵⁰Jewish ethic, for instance, endorses the premise of this claim (F. Rosner, *Modern Medicine and Jewish Ethics* (New York: Yeshiva University Press, 1986), p. 346). The conclusion drawn is not, however, that one ought to use a lottery. Rather the principle advocated is that of equal physical division, or when the good is indivisible, not giving it to anyone. For an explicit version of the strong fairness claim, see Kilner, "A Moral Allocation of Scarce Lifesaving Resources."

Thus starkly stated, the argument is unacceptable. At the very least it would have to be extended in a maximin direction: unequal access or unequal chances are acceptable if they increase the access or chances of those who are worst situated. “In a lifeboat, we may want especially to treat those without whom the boat will probably not reach shore. Similarly, in a disaster, the best course may be to treat first any one who can help treat others.”¹⁵¹ Using a weighted lottery could increase everybody’s chance of getting the scarce good, if the inequality creates opportunities or incentives that in the end make it less scarce. The regulation of access to medical or technical education by a weighted lottery could be understood in this sense.

Even thus improved, the argument is unacceptable. Productivity is not the only reason to deviate from equality. We can and do and should make distinctions on grounds of need. A person who is sure to die in a few weeks should not be a candidate for a kidney transplant. We can and do and should make distinctions on grounds of contribution and desert. In many contexts, fairness as equity — to each according to contribution — is more plausible than fairness as equality.¹⁵² There was nothing unfair about the demobilization scheme used by the American army.

In these cases, we might still ask whether the function relating individual properties such as need or contribution to allocation should be deterministic or probabilistic. John Broome has argued that when people have unequal claims to a scarce, indivisible good, fairness requires that their probability of receiving it should be proportional to the strength of their claim.¹⁵³ The claim of old people to a kidney transplant being weaker than that of young persons, they should have a smaller (but nonzero) chance of

¹⁵¹Kilner, *ibid.*, p. 265.

¹⁵²For this distinction see, for instance, M. Deutsch, “Equity, Equality, and Need: What Determines Which Value Will Be Used as the Basis of Distributive Justice?” *Journal of Social Issues* 31 (1975): 137-49.

¹⁵³In the discussion following the Tanner Lectures.

receiving it. Lottery voting may also be interpreted in this way, as a way of matching strength of claims with probability of being chosen. Under Broome's proposal, all claims are respected, not in the sense of being satisfied, but in the sense of having a nonzero chance of being satisfied.

One objection to the proposal is that in small groups there is a nonnegligible chance that all or most winners would be people with weak claims. Here, fairness *ex post* would be violated at the expense of fairness *ex ante*. This difficulty could be removed by using stratified randomization. Assume that ten kidneys are to be allocated among twenty recipients, ten old people with an expected lifetime (with a kidney) of five years and ten young with an expected lifetime of twenty years. Using expected lifetime to weight the probabilities, each old person would have one chance in five of receiving a transplant and each young person four chances in five.¹⁵⁴ Under an unstratified weighted lottery, all or most recipients might turn out to be old. A stratified randomization would ensure that two old people and eight young people are selected.

Even thus modified, the fairness of the proposal is not obvious. Is it fair to select two old people at the expense of two young who (by assumption) are more needy? Tentatively, I would argue against Broome's proposal. Once we have decided to use need as the criterion for allocating the scarce resource, it seems perverse to adopt a procedure that withholds the good from some very needy persons while giving it to some who need it much less. The proposal lacks psychological stability, because it would appear monstrously unjust to the high-need persons who are denied the good. But the question needs further clarification.

¹⁵⁴I assume that expected lifetime could be a measure of need. Similar arguments could of course be carried through using number of family dependents as a measure of need. One might also decide to use a different criterion altogether, such as length of combat service when the potential recipients are soldiers. Or one could use a point system incorporating several criteria. The argument presupposes only that society somehow has reached agreement on what the relevant considerations are for allocating the good.

The third question—what explains the use of lotteries in situations where normative reasoning counts against using them?—will be discussed briefly, since I do not believe there are many such cases. When lotteries were interpreted as God's will, there must have been occasions on which one consulted the die without the justification of indeterminacy. Although the church insisted that one should not ask God to spare one the trouble of acting prudentially, the warning was far from always heeded.¹⁵⁵

Gatiker argues (p. 68) that in democracies lotteries tend to be used “though such indifference indeed be not always allowable, nor such equality stand ever with equity.” The democratic passion for equality could force the use of (even-chance) lotteries even when need, contribution, productivity, or entitlement would point unambiguously to a different allocation. This argument might be taken in two ways. If it refers to claims grounded in the inherent superiority of some over others—the more virtuous over the less, the more worthy over the less—it is unacceptable. That democracy has removed references to inherent superiority from political argument, is all to the good. If thereby it has also increased the use of lotteries, it has not led to more unjustified lotteries. The argument might also be, however, that democracies lead to lotteries which are unjustified within the framework of democracy itself. The democratic way of assigning priority is by voting, not by reference to natural superiority. One might argue that democracy is subverted if excessive democratic zeal leads to equality of chances rather than equality of influence in determining inequalities. Against this we must remember that the democratic aggregation of individual rankings is not always feasible.

More conjecturally, there may be instances of misplaced use of lotteries that derive from overemphasis of the positive incentive effects created by uncertainty and neglect of the negative effects. I have alluded to this problem before, in the discussion of Florentine politics. I can well imagine that firms that make random spot

¹⁵⁵Thomas, *Religion and the Decline of Magic*, p. 99ff.

checks of their employees could neglect the negative “atmosphere effects” created by such practices.¹⁵⁶

The final question is why lotteries are so rarely used when there are so many good arguments for using them. I shall discuss several closely related explanations. They are all connected with the argument from indeterminacy.

Visibly arbitrary chance is often repulsive. Even when we have no reason to decide one way or another, we would like the outcome to be determined by reasons. To have it both ways, we can tie our decision to natural causality in the hope that it will reflect some underlying purpose or pattern in the universe, such as fate, God’s will, or the natural interconnections among all things. There is a large overlap between lotteries and the various forms of divination, from prayer through astrology to witchcraft, memorably described by Keith Thomas in *Religion and the Decline of Magic*. Theologians made clear distinctions among these practices. Some of them were legitimate, but most of them were blasphemous and superstitious. In the popular mind they all came together, in an undifferentiated belief that the universe was not random and that it was possible to unlock its secrets. The permutations were endless. Sometimes people used a lottery to choose the best time to consult the astrologer.¹⁵⁷ Sometimes it was held that “no prayer could be effective unless offered at an astrologically propitious moment,” whereas one famous astrologer “said prayers before setting a figure.”¹⁵⁸ According to Sir Thomas Browne, “’Tis not a ridiculous devotion to say a prayer before a game at tables.”¹⁵⁹ Several “went so far as to declare that astrological diagnosis was the only sure way in which witchcraft could be discovered.”¹⁶⁰ And so on.

¹⁵⁶For a discussion of such effects, see O. Williamson, *Markets and Hierarchies* (New York: Free Press, 1975), pp. 37-39.

¹⁵⁷Thomas, *Religion and the Decline of Magic*, p. 402 n. 86.

¹⁵⁸*Ibid.*, pp. 432, 450.

¹⁵⁹Quoted in *ibid.*, p. 135.

¹⁶⁰*Ibid.*, p. 757.

The purpose of these techniques was partly cognitive, partly practical. In a world of uncertainty and misery — writing about seventeenth-century England, Thomas refers to “the hazards of an intensely insecure environment” — people want to know the causes of their misfortunes as well as what to do about them.¹⁶¹ The idea that suffering can strike blindly and randomly is hard to tolerate. While the most satisfactory belief is perhaps that someone else is to blame for one’s misfortunes, it may be better to think oneself blamable than to believe that nobody is to blame.¹⁶² If people, for instance, believe that the world is basically just, we would expect them to devalue and derogate victims of purely chance events, such as the people selected by lot for military service. Indeed, we would expect the unfortunate victims also to blame themselves. There is some evidence for this view in the “just world” studies initiated by Melvin Lerner.¹⁶³ The explanation, even if unfavorable to oneself, at least provides a *meaning* for the events in question. Since human beings are meaning-seeking animals, they are uncomfortable with the idea that events are merely sound and fury, signifying nothing.¹⁶⁴

Human beings are also reason-seeking animals. They want to have reasons for what they do, and they create reasons when none

¹⁶¹Ibid., p. 5.

¹⁶²Thomas argues (ibid., p. 763) that the tendency of many of these practices, including witchcraft, to make the sufferer believe in his or her own guilt was also socially valuable. Although he does not explicitly say that the social benefits enter into the *explanation* of this tendency, this conclusion is almost irresistibly suggested by the highly functionalist bias of his book taken as a whole.

¹⁶³See notably M. Lerner and D. T. Miller, “Just World Research and the Attribution Process: Looking Back and Looking Ahead,” *Psychological Bulletin* 85 (1978): 1030–51, and S. Rubin and A. Pepau, “Belief in a Just World and Reaction to Another’s Lot: A Study of the Participants in the National Draft Lottery,” *Journal of Social Issues* 29 (1973): 73–93. The strongest result in this article is not the reaction to the losers in the draft lottery but the reaction of the losers, who tended to lose self-esteem. Other findings point in different directions. E. Hoffman and M. H. Spitzer, “Entitlements, Rights, and Fairness: An Experimental Examination of Subjects’ Concepts of Distributive Justice,” *Journal of Legal Studies* 14 (1985): 159–97, did not find that lotteries generate moral entitlements that can serve as the disagreement point for bargaining games.

¹⁶⁴See also chap. 2, sec. 10, of Elster, *Sour Grapes*.

exist. Moreover, they want the reasons to be clear and decisive, so as to make the decision easy rather than close. Several findings support this view. We do not like making close decisions, perhaps because of the potential regret associated with them. There is a tendency for the arguments that went into a close decision to be rearranged, in retrospect, so that the chosen option emerges as clearly superior to the others.¹⁶⁵ Sometimes this process of adjustment takes place before the choice, to permit avoidance of the unpleasant state of mind associated with a close race between the options. It has been suggested that in such cases one unconsciously looks around for a framework within which one option, no matter which, has a clear advantage over the others, and that, having found such a framework, one adopts it for the time being and chooses the option which it favors.¹⁶⁶

Similar findings about the tension created by predecision ambiguity are reported in an unpublished work by Amos Tversky.¹⁶⁷ In his experiment, subjects were given a description of two apartments that differed in price and in distance from campus and were told that they could either choose one of them now or go on looking at some other apartments that might or might not be available. If they took the latter option, there was a risk that the two apartments might become unavailable. Some subjects were placed in a high-conflict condition, in which one apartment scored high on the first dimension and lower on the second, and vice versa for the other. Both apartments, however, were quite good on both dimensions. Other subjects were placed in a low-conflict condition, in which one apartment scored higher than the other on both

¹⁶⁵See, for instance, J. Brehm, "Postdecision Changes in the Desirability of Alternatives," *Journal of Abnormal and Social Psychology* 52 (1956): 384–89; L. Festinger, *A Theory of Cognitive Dissonance* (Stanford: Stanford University Press, 1957); P. Veyne, *Le pain et le cirque* (Paris: Editions du Seuil, 1957), p. 708 and passim.

¹⁶⁶R. N. Shepard, "On Subjectively Optimum Selection among Multiattribute Alternatives," in M. W. Shelley and G. L. Bryan, eds., *Human Judgment and Optimality* (New York: Wiley, 1964).

¹⁶⁷Personal communication.

dimensions. Here, however, both apartments were relatively poor in both respects. In the first condition, more subjects decided to search further than in the second. The desire to resolve ambiguity and to make a clear-cut decision apparently mattered more than the desire for a good apartment.

Keith Thomas argues that one cause of the decline of magic in the late seventeenth century was the increased “ability to tolerate ignorance, which has been defined as an essential characteristic of the scientific attitude.”¹⁶⁸ It follows that explicit lotteries should be more frequently used, with no attempt to dress them up as an expression of fate or God’s will. But Thomas also suggests that people in contemporary societies are just as averse to the recognition of uncertainty, ignorance, and indeterminacy. “The investment programmes of modern industrial firms, for example, often require decisions to be taken about future policies at times when it is often impossible to form a rational view of their outcome. It is not surprising that industrialists sometimes use barely relevant statistical projects to justify what is essentially a leap in the dark.”¹⁶⁹ Speculating along similar lines, I would suggest that Bayesian decision theory itself is an expression of the desire to have reasons for everything. The idea that in the absence of specific information all outcomes should be deemed equally probable cannot be justified in logic because of the problem of individuating states of the world. It does, however, have firm psychological foundations, in the desire to force a determinate solution to all decision problems. The toleration of ignorance, like the toleration of ambiguity more generally, does not come easily.¹⁷⁰

People want to have reasons for what they do.¹⁷¹ More specifically, they want reasons to be the proximate determinant of

¹⁶⁸Thomas, *Religion and the Decline of Magic*, p. 790.

¹⁶⁹*Ibid.*, p. 791.

¹⁷⁰S. J. Loevinger, *Ego Development* (San Francisco: Jossey-Bass, 1976).

¹⁷¹“[H]umans generally prefer to order their affairs through reason rather than through random or arbitrary action” (R. S. Summers, “Evaluating and Improv-

their choice. In the argument for using a lottery, reason also intervenes, but at an earlier stage in the decision process. The decision not to use reason to make the final choice may be the most rational one, as recognized in Pascal's "Il n'y a rien de si conforme à la raison que ce désaveu de la raison" or Descartes's "La principale finesse est de ne vouloir point du tout user de finesse."¹⁷² In an earlier work I have discussed other examples of this rational abdication of reason, using Ulysses binding himself to the mast and addiction control as paradigm examples.¹⁷³ In that case, the argument for abdication was that one could not trust oneself to make the right decision when the time comes to make it. Here, the argument is that there is no right decision.

The two arguments are somewhat related. Sometimes we know that we could find the decision that would have been optimal if found costlessly and instantaneously. By investing more time, effort, and money we may be able to rank the options on the relevant dimension of choice. We may also know, or be in a position to know, that the benefits from finding out are small compared with these costs. Yet because of what one might call *an addiction to reason* we do not use a lottery but go on looking for reasons, until triumphantly, we find one. I believe the child custody case brings this out with special poignancy. To promote the best interest of the child, the rationality addict searches for evidence of fitness and unfitness of the parents while, in the meantime, the damage done to the child by the process of searching exceeds the benefits to be expected from the search. It is more rational, then, to resist the sirens of reason.

ing Legal Processes: A Plea for "Process Values," *Cornell Law Review* 60 [1974]: 1–52, at p. 26). In Summers's view, procedural rationality is to be valued independently of the outcome to which it leads: "of two legal processes yielding more or less the same results, only one of which is a rational process, we should generally prefer the rational one" (ibid.).

¹⁷²B. Pascal, *Pensée* 272. R. Descartes, *Oeuvres complètes*, ed. Adam and Tannery, vol. 4, p. 357.

¹⁷³Elster, *Ulysses and the Sirens* (Cambridge: Cambridge University Press, 1984), chap. 2.

People also dislike making close decisions, as shown by the evidence for prechoice and postchoice tension when the decision looks likely to be a close one. To reduce the tension, they adjust the weights of the various criteria so as to make one option appear clearly superior to the others. Fear and anticipation of regret may be the driving force in this mechanism.¹⁷⁴ The explicit and conscious use of a lottery implies that the decision is extremely close, and hence that there is a large likelihood for later regret if more becomes known about the situation. Again, this may lead to overinvestment in the search for more information.

A further, related reason is the inability to keep the *ex ante* perspective firmly in mind. A decision that turns out to be wrong in an *ex post* sense may nevertheless have been the best that could be made at the time of choice. A military commander who chooses his plan of attack by the flip of a coin to confound the enemy may be harshly criticized if it goes wrong. To reduce anticipated blame, he may choose the pure strategy with the highest security level attached to it. Equality *ex ante* can also be a fragile motivation. It may seem acceptable as long as the coin is hovering in the air, but when it comes down the losing party may protest that he or she was never given a fair hearing.

The basic reason for using lotteries to make decisions is honesty. Honesty requires us to recognize the pervasive presence of uncertainty and incommensurability, rather than denying or avoiding it. Some decisions are going to be arbitrary and epistemically random no matter what we do, no matter how hard we try to base them on reasons. There is a remark of Dr. Johnson to Boswell that perfectly illustrates the point: “Life is not long, and too much of it must not pass in idle deliberation how it shall be spent:

¹⁷⁴This language should not be taken to be as intentional as it may appear to be. I do not suggest that people consciously adjust the weights because they consciously anticipate regret. If they tried, they would not succeed, because they would still remember the unadjusted weights (see Elster, *Sour Grapes*, chap. 2). Rather, the experience of regret following close decisions sets up a reinforcement process which, unknown to the persons themselves, shapes their attitude in later decisions of this kind.

deliberation, which those who begin it by prudence, and continue it with subtlety, must, after long expence of thought, conclude by chance. To prefer one future mode of life to another, upon just reasons, requires faculties which it has not pleased our Creator to give to us."¹⁷⁵

Chance will regulate a large part of our lives no matter how hard we try to avoid it. By *taming chance* we can bring the randomness of the universe under control as far as possible, and keep free from self-deception as well. The requirements of personal causation and of autonomy are reconciled by the conscious use of chance to make decisions when rational argument fails.¹⁷⁶ Although the bleakness of this vision may disturb us, it is preferable to a life built on the comforting falsehood that we can always know what to do.

¹⁷⁵J. Boswell, *The Life of Samuel Johnson* A.D. 1766 (Aetat 57) — a letter from Johnson to Boswell dated 21 August 1766. I owe this reference to John Broome.

¹⁷⁶R. De Charms, *Personal Causation* (New York: Academic Press, 1968), pp. 269ff. On the requirements of autonomy, see Elster, *Sour Grapes*, chap. 3.

