Quantitative Studies in Philosophy

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By

Nicholas Rescher

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For James Swindal

Philosophical Neighbor

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PREFACE

Since the days of Pythagoras and Plato in classical antiquity the quantitative perspective has played an important role in philosophical reflection. And for good reason, seeing that quantity betokens exactness and precision, and while the quantitative sector of philosophy is far from being the whole of it, it is an absolutely indispensable part of that whole. Over the years that quantitative approach has played an important role in my philosophizing, and the studies gathered together here, manifest this. Several have appeared in the professional literature over the past decades, and the concluding footnotes to each chapter gives the requisite bibliographic detail. As a whole, this volume jointly bookends—without overlap—my 2009 volume of *Studies in Quantitative Philosophizing* (Frankfurt: Ontos Verlag).

I am grateful to Estelle Burris for her able help in preparing this material for the press.

Nicholas Rescher
Pittsburgh, PA
May 2021

CHAPTER 1

ARISTOTLE'S PRECEPT ON PRECISION

● ARISTOTLE'S PRECEPT AND ITS RATIONALE

At the outset of his *Nichomachean Ethics* Aristotle wrote:

> Precision is not to be sought for alike in all discussions, any more than in all the products of the crafts. . . . . We must be content, then, in speaking of various subjects and with such premisses to indicate the truth roughly and in general terms, and in speaking about things which are only for the most part true and with premisses of the same kind to reach conclusions that are no better. In the same spirit, therefore, should each type of statement be received; for it is the mark of an educated man *to look for precision in each class of things just so far as the nature of the subject admits*; it is evidently equally foolish to accept probable reasoning from a mathematician and to demand from a rhetorician scientific proofs.[1]

Few texts in the history of philosophy offer a wiser and more instructive observation than this one. And the advice of philosophy often holds good every bit as much in our day as in Aristotle's. He was entirely right in holding that we must have very different expectations in regard to generality, exactness, and precision within relation to different branches of investigation. But just exactly what were Aristotle's reasons for taking this position and do those reasons of his still hold good in our time?

Aristotle's reasons were grounded in his views about the nature of natural science which in turn were based on the doctrines of his metaphysics. In briefest outline the situation was as follows.

Aristotle looked in the world's realities from the vantage point of time, maintaining that in describing how things are in nature and how they function we have to distinguish those features that obtain:

(1) timelessly (as with mathematical abstractions)
(2) always and ever
(3) generally and for the most part
(4) sometimes and occasionally
(5) never-ever

Thus temporal regularity in comportment is the key here.[2] And in those pivotal initial cases we deal with matters that prevail always or for the most part, in contrast with those others that are merely occasional and sporadic. As Aristotle saw it, the former define the domain of *science* which addresses what is regularly (though not necessarily invariably) the case.[3] Beyond this there is the domain of the merely occasional and intermittent: the realm of the accidental, which falls outside the purview of science. Accordingly the sciences themselves deal with the timeless (mathematics), the sempiternal (stellar astronomy), and the generally regular (proximate astronomy and terrestrial physics, and certain aspects of the biological and the social realm). Beyond that we enter the realm of chance (*tuchê*) and accident (*symbebekos*), where scientific explanation is not in prospect.

● ARISTOTLE'S SCIENCE

Viewed from this vantage point, science is a matter of the search for patterns of regularity, and temporal stability thus becomes the key to scientific understanding. And this approach meshes smoothly with Aristotle's view of the metaphysics of existence. For as he saw it, the natural world consists of distinct realms, as follows:

(1) the outer heavens, the sphere of the fixed stars
(2) the inner heavens, the realm of the sun, the planets and the moon
(3) the Earth in relation to its physical components, earth, water, air, and fire
(4) the mundane realm in relation to its biological components including humans, animals, and plants

Each sphere exhibits regularities that provide a basis for scientific understanding—but this obtains to very different degrees. The fixed stars function with perfect regularity; the inner heavens exhibit more intricate and convoluted patterns of regularity; the realm of earth-correlative material is a halfway house sometimes admitting accidental departures from the general rule of things; while the biological realm is in part regular and in part replete with accidental irregularity and admits of no general (let alone invariable) laws. The more closely earthbound are the phenomena, the less amenable to strictly scientific understanding, and the more remotely celestial the more open to it. (In consequence, medicine, for example, is for Aristotle, an art rather than a science.)

Aristotle accordingly saw scientific understanding in terms of subsumption under a generalized regularity that stipulates universality (always

and invariably) or at least generality (almost always and very predominantly). Accordingly, mathematics was the quintessential science, since it deals with timeless abstractions, its phenomena exhibited a regularity and uniformity that requires exceptionless universality and timeless regularity. Astronomy comes next in the temporal order, with all of its phenomena subject to lawful regularity, leaving no room for the accidental. The physics of material objects comes next because while its phenomena may on occasion be unruly and accidental, this is only exceptionally so. Finally comes the biological domain where accidents of some sort will occasionally arise. Beyond this came the arts, where irregularity is commonplace and experientially grounded judgment rather that scientifically based understanding is our only guide. Generality and temporal stability are the pivotal considerations for amenabiting to science: The absence or at least infrequency of "accidental" departures from lawful rulishness is to be the crux.

When explanatory understanding in science is seen as subsumptive under regularities that are universal—or at least general—we have it that the standard format of syllogistic reasoning is represented by the AAA syllogism:

The *A*s are < all, almost always > *B*s
The *B*s are < all, almost always > *C*s
The *A*s are all < almost always > *C*s

But what are the conditions of validity for such subsumptive arguments? There are four prime possibilities here, of which only two are valid. For consider:

All *A*s are *B*s
All *B*s are *C*s
All *A*s are *C*s — VALID

The *A*s are almost always *B*s
All *B*s are *C*s
The *A*s are almost always *C*s — VALID

All *A*s are *B*s
The *B*s are almost always *C*s
The *A*s are almost always *C*s — NOT VALID

The *A*s are almost always *B*s
The *B*s are almost always *C*s
The *A*s are almost always *C*s — NOT VALID

On this basis, the determinative rules for valid inference are two:

I. The minor premiss must be universal, and not merely general. And with this requirement met,
II. The status of the conclusion—as universal or merely general—must conform to that of the major premiss: *Conclusio sequitur majorem partem.*

And so in a nutshell, Aristotle's theory of scientific reasoning is based on the following principles:

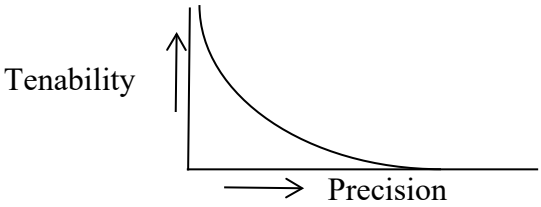
A. Scientific explanation is subsumptive.
B. Such subsumption under general premisses is deductive in nature with AAA syllogisms as paradigmatic.
C. The stringency of subsumptive reasoning depends on the status of the pivotal (major) premiss in point of universality /generality.
D. The sciences can be ordered on the basis of how pervasively the phenomena of the correlate domain averts unrulish anomaly over time.
E. At a certain point such irregularity falls below the threshold of scientific cogency. Here we descend from scientific understanding into the region of cognitive coping—of "art" and "technics." The realm of human affairs—alike physical (i.e., medicine) and behavioral (e.g., ethics and politics) fall beneath such a threshold.

● PRECISION AND TENABILITY

A significant aspect of Aristotle's dictum roots in the facts that added precision can generally be obtained only at a substantial cognitive price. For the fact of it is that increased security can always be purchased for our contentions at the price of decreased accuracy. Thus consider: We estimate the height of a tree at around 25 feet. We are *quite sure* that the tree is 25 ± 5 feet high. We are *virtually certain* that its height is 25 ± 10 feet. But we are *completely and absolutely sure* that its height is between 1 inch and 100 yards. Of this we are "completely sure" in the sense that we are "absolutely certain," "certain beyond the shadow of a doubt," "as certain as we can be of anything in the world," "so sure that we would be willing to stake our life

Display 1

THE TRADEOFF BETWEEN SECURITY AND PRECISION



on it," and the like. For most sorts of claims there is always a characteristic trade-off between their tenability and security on the one hand, and, on the other hand, their contentual *definiteness* (exactness, detail, precision, etc.). The overall situation that obtains has a structure of the sort depicted by the concave curve of Display 1.

The comparison of modern science with an everyday commonplace knowledge is instructive in this regard. The theories of modern natural science take no notice of what happens ordinarily or normally; they seek to transact their explanatory business in terms of high generality and strict universality—in terms of what happens always and everywhere and in all circumstances.

The quest for enhanced definiteness is unquestionably a prime mover of scientific inquiry. An ever-continuing pursuit of increasing accuracy, greater generality, widened comprehensiveness, and improved systematicity for its assertions is the motive force behind scientific research. And this innovative process—impelled by the quest for enhanced definiteness—drives the conceptual scheme of science to regions ever more distant from the familiar conceptual scheme of our everyday life. For the ground rules of ordinary life discourse are altogether different. The aims of ordinary-life discourse are primarily *practical*, largely geared to social interaction and the coordination of human effort. In this context, it is crucial that we aim at credibility and acceptance-that we establish and maintain a good reputation for reliability and trustworthiness. Ordinary-life communication is a practically oriented endeavor carried on in a social context: it stresses such maxims as: "Aim for security, even at the price of definiteness:" "Protect your

credibility"; "Avoid misleading people, or—even worse—lying by asserting outright falsehoods"; "Do not put your reliability at risk by 'crying wolf.'"

A view along the following lines is very tempting: "Science is the best, most thoroughly tested knowledge we have; the 'knowledge' of everyday life pales by comparison. The theses of science are really secure; those of everyday life, casual and fragile." But the very reverse is the case: our scientific theories are vulnerable and have a comparatively short life-span; it is our claims at the looser level of ordinary life that are relatively secure and stable.

Modern natural science eschews the security of indefiniteness. In science we operate at the right-hand side of the Display 1 diagram: we always strive for the maximal achievable universality, precision, exactness, and so on. The law-claims of science are *strict*: precise, wholly explicit, exceptionless, and unshaded. They involve no hedging, no fuzziness, no incompleteness, and no exceptions. In stating that "the melting point of lead is 327.545° C at standard pressure," the physicist asserts that *all* pieces of (pure) lead will unfailingly melt at *exactly* this temperature; he certainly does not mean to assert that most pieces of (pure) lead will *probably* melt at *somewhere around* this temperature. And so, in natural science, however, we deliberately accept risk by aiming at maximal definiteness—and thus at maximal informativeness and testability.

But in this light the contrast between our modern science and that of Aristotle is decidedly instructive, for Aristotle was willing to contemplate a science whose generalizations are just that—generalizations rather than strict universalizations. He was prepared to accept explanatory "laws" that hold "generally and for the most part," rather than insisting in rigid universality. And at the dawn of the scientific enterprise this was not only reasonable but virtually necessary. For when our inquiries into nature had to be based wholly in the data afforded by the unassisted senses, an empirical science committed to strict universalization would have to go empty-handed in the light of the precision/tenability tradeoff. Science would then have been immobilized at the starting line from which the Greeks began, with the domain of pure mathematics standing by itself in splendid isolation.

● WHAT SURVIVES?

It is interesting to ask: What survives today of Aristotle's position on these issues? The answer is "Quite a bit." And it is instructive to consider how and why this is so.

Explanation by Subsumption

The idea that scientific explanation is a matter of inferential subsumption under general laws is very much alive and stirring. It lies at the core of the widely endorsed and influential "Hempelian Model" of explanation articulated by the German-American theoretician Carl G. Hempel in an influential paper entitled "Studies in the Logic of Explanation," co-authored with Paul Oppenheim.[4] A detailed account of the origin and influence of this approach to the theory of scientific explanation is contained in Wesley C. Salmon's very informative book *Four Decades of Scientific Explanation*.[5] On this vastly influential account, the crux of scientific understanding lies in the prospect of a deductively structured subsumption under general laws.

The Duality of Laws

Aristotle envisioned scientific laws as falling into two groups: (1) the rigidly unrestricted, rigorously scientific laws of universality, and (2) the weaker, demi-scientific laws featuring the mere generality of that which holds normally, for the most part and almost always.

A closely analogous distinction is operative in contemporary science via the crucially important cognate orientation between rigidly universal laws of unrestricted generality, and stochastic laws of probability in which merely statistical correlations play a pivotal role.

As Aristotle envisioned a duality of scientific laws in line with rigid universality and substantial generality, so modern science finds its explanatory principles in unqualified universal and merely stochastic (stochastical) laws.[6] And the scientific explanation of present-day theory and practice is essentially a matter of deductively subsumptive coordination with laws of this sort.

So far, then, there is a substantial parallelism with the Aristotelian position. But what of that fourth key Aristotelian issue: the taxonomy of science?

The Taxonomic Order of the Sciences

Aristotle ordered the sciences according to the temporal generality and stability of the laws of the domain at issue, the crucial question being whether the explanatory laws of the domain governed its phenomena:

- in all cases throughout all of time: i.e. invariably and always
- in most cases and at the great majority of times: i.e., generally and usually

With temporal regularity as the key, Aristotle proposed to order sciences across the range: star-astronomy, planetary astronomy, terrestrial physics, biology, ethics. Temporal stability and generality of the relevant laws are the crux here. So in the foreground of the list stands mathematics, which is omnitemporal thanks to its temporality. After its end there follow such disciplines as medicine and politics, which are not really sciences but arts, and where all rules (such as they are) are subject to frequent exceptions.

By contrast, the modern position is based on a different line of approach, one whose metaphysical basis is *developmental* rather than *structural*. The leading idea was initially projected by American polymath C. S. Peirce, who saw the evolutionary development of natural laws as the crux of the matter.[7] Put somewhat anachronistically, the guiding question is one of developmental emergence after the inauguration of cosmic existence through the big bang. Already in the first nanosecond we have quantum physics and from there things move on to the emergence of different forms of natural phenomena each governed by characteristic laws of their own

— quantum physics
— solid state physics
— inorganic chemistry
— organic chemistry
— biology
— psychology
— sociology
— economics
— cybernetics

The unfolding of cosmic history has seen the developmental emergence of ever more complex new kinds of phenomena, each of them governed by characteristic laws of their own. The cognitive domestication of these successively unfolding orders of phenomenology calls for different systems of scientific understanding. The relevant ordering of science is thus straightforwardly historical. (In the early stages of cosmic development there was simply no place for macroeconomics.) So overall, the taxonomic phylogenesis of science retraces the developmental ontogenesis of natural phenomena.

On such an approach time still affords the key to the taxonomy of science—even as with Aristotle. But now the key is not, as with Aristotle, the temporal regularity of the phenomena, but rather the time-order of their developmental emergence, so that the crux is the comparative age of the phenomenal range at issue.

A Parting of the Ways: Social Science

There is, however, one fundamental respect in which scientific modernity is profoundly out of synch with Aristotle. This relates to the powerfully influential role of the social sciences in the contemporary academy and in public life. On Aristotle's principles the very idea of *social science* is a contradiction in terms. For him the investigation of the management of human affairs belongs to the arts and not the sciences. The regularities at work here are just not regular enough and the concepts used in their formulation not sufficiently definite to permit sort of the explanation demanded for science, and the phenomena of this domain lack the temporal stability required for scientific accountability. The management of human affairs is a practical art (*technê*) involved with irregularities and accidental corruptions to an extent that makes even medicine look to be exact science.

Accordingly, the moderns with their hankering after a science of human affairs are profoundly misguided from the Aristotelian standpoint. Like dogs baying for an unreachable moon they are engaged in a futile endeavor, striving after something that is simply not to be had.

And as one looks more closely and deeply into the machinations of contemporary political theory, macro-economics, and social analysis—the "policy sciences" as people like to call them—one cannot but be increasingly drawn to the idea that Aristotle's view of the matter is not all that clearly wrong. And in fact there has been a handful of recent thinkers whose cries in the wilderness have proclaimed substantially analogous views regarding the impracticability of a an actual science of human affairs: witness Friedrich Hayeck in regard to economics, and Karl Popper and Michael Polanyi in regard to human affairs at large.[8]

● BACK TO ARISTOTLE'S DICTUM

And so, back to Aristotle's dictum. For him, different sciences have different explanatory standards for *ontological* reasons, because accidents (i.e., law-nonconformity) enters in differently in diverse ranges of phenomena. Different realms of nature differ ontologically in point of the prominence of accident and chance.

By contrast, for the moderns different sciences have different explanatory standards for *epistemological* reasons, since emergent complexity (i.e., incalculability) renders law subsumption increasingly convoluted.

Nevertheless, the basic thought of Aristotle's dictum survives. And it is impressive to consider how much of the rationale of his position continues to hold good.

— the difference among sciences resides in the nature of the phenomena at issue
— different ranges of phenomena admit of different modes of lawful order
— explanation and understanding are subsumptively law based, and
— the differences in modes of lawfulness accordingly make for differences in the extent and depth of our explanatory understanding in different domains.

And so Aristotle and the moderns are on the same page in much of their meta-scientific thinking. But there is one area of profound disagreement. For Aristotle exiled the study of human affairs from the sphere of scientific understanding to the status of an art whose conduct was to be guided by a merely practical coping guided by judgment on the basis of empirical experiences rather than scientific understanding. For as he saw it, science is dedicated to generality rather than particularity and to timelessness rather than transiency, whereas the practical arts will address a variable particularity that a concrete and time-bound.

For better or worse there have always been those holding that in the realm of policy we should acknowledge that theory is effectively impotent and insist that practice can do no better than to find its way empirically through experience based on the lessons of experimental trial and error. The science-sceptics of this later sort can with good reason claim Aristotle, the founding father of science as we know it, among the originators of their doctrine.

Granted, most of the moderns, with their commitment to a sizable range of social *sciences*, take a very different view of the matter. But it is not all that unfair to say that the jury is yet still out on whether they are correct in this departure from the position of the great Stagyrite.[9]

Notes

1 Aristotle, *Ethica Nichomachea*, I 3, 1094 b12-27. Tr. W. D. Ross. Italics supplied.

2 On the role of time in Aristotle's conception of science see Jaakko Hintakka, *Time and Necessity: Studies in Aristotle's Theory of Modality* (Oxford: Clarendon Press, 1973).

3 On Aristotle's idea of "for the most part qualification of lawful generality" see Gisela Striker, "Notwendigkeit mit Lücken," *Neue Hefte für Philosophie*, vol.

24-25 (1985), pp., 146-64. Its role in Aristotle's theory of science is discussed in Lindsay Judson, "Chance and Always or For the Most Part," in idem (ed.), *Aristotle's Physics: A Collection of Essays* (Oxford: Clarendon Press, 1991), pp. 73-99. On the role of this mode of quantification in logic see the authors "Plurality Quantification" in his *Studies in 20th Century Philosophy* (Frankfurt: ONTOS, 2005), pp. 209-15.

4 *Philosophy of Science*, vol. 15 (1948), pp. 135-75.

5 Minneapolis: University of Minnesota Press 1989.

6 On this development of the probabilistic approach to explanation, see again Wesley C. Salmon, *Four Decades of Scientific Explanation* (Minneapolis: University of Minnesota Press, 1989).

7 On evolutionary development and cosmological process as a recurrent Leitmotiv in Peirce's thinking see Joseph Brent, *Charles Sanders Peirce: A Life*, 2nd ed. (Bloomington & Indianapolis: Indiana University Press, 1998).

8 Granted, such scepticism about the social sciences is debatable. See, for example, John T. Roberts, "There are No Laws of the Social Sciences" vs. Harold Kincaid, "There are Laws on the Social Sciences," both in Christopher Hitchcock (ed.), *Contemporary Debates in Philosophy of Science* (Oxford: Blackwell, 2004). The present author long ago defended a compromise position not too far revised from an Aristotelian perspective: "On the Epistemology of the Inexact Sciences," *Management Sciences*, vol. 6 (1959), pp. 25-52 (co-authored with Olaf Helmer).

9 This chapter was originally published in *Studia Neoaristolelica*, vol. 10 (2013), pp. 121-33.

CHAPTER 2

THE PHILOSOPHERS OF GAMBLING

● INTRODUCTION

We humans live our lives under conditions where the actual outcomes of our actions lie in substantial measure beyond our knowledge and control, our wishes and efforts to the contrary notwithstanding. When things go well it is all too often the result of happenstance—and the same when things go ill. Accordingly, life is in large measure a gamble—a game of chance, like roulette, rather than one of skill, like chess! The very words "luck" and "lot" links our topic to the theme of gambling.

Probability theory is the standard instrumentality for exact reasoning in chancy and uncertain matters. But where did this mechanism come from? In an informative study of the origins of mathematical theory of probability, Ian Hacking has maintained that "the decade around 1660 is the birthtime of probability."[1] And he expounded a convincing case for regarding the period 1650-1670 as the time of the mathematical taming of chance because it was then that a calculus of probability was developed by mathematicians Pascal, Fermat, and Huygens, and others who addressed their efforts largely to problems of the division of gambling stakes. It is interesting to realize, however, that the preceding period, 1610-1650, the unsettled era of the Civil War in England and the Thirty Years' War on the Continent, witnessed a new concern on the part of philosophers with gambling, gaming, and role of chance, accident, fortune, and luck in human affairs. In this way, the intellectual climate of a *philosophy* of chance set the stage for the development of the *mathematics* of chance. Only after initially attracting the attention of moralists and philosophers—who now resumed under new conditions the ruminations about chance, fate and fortune inherited from classical antiquity—did intellectual preoccupation with matters of chance pass into the hands of the mathematicians who revolutionized thought on the subject by developing the "calculus of chance" that we now characterize as the theory of probability.

For in elucidating this historical perspective, it is helpful to consider the ideas of four very different thinkers working in four reciprocally distant corners of Europe: Gataker, Gracián, Pascal, and Leibniz working in London, Madrid, Paris, and Hanover, respectively.

- THOMAS GATAKER (1574-1654)

Born in London and educated in Cambridge, Gataker was, for a time, preacher to the society of Lincoln's Inn.[2] He was a versatile scholar and influential Puritan divine who was nevertheless one of the forty-seven London clergyman to sign the address of 18 January 1649 against the trial and execution of the King. His 1652 edition of the works of Marcus Aurelius was described by Henry Hallam as the "earliest edition of any classical writer published in England with original annotations."[3]

In 1619 Gataker first published his tractate *Of the Nature and Use of Lots*.[4] The topic was apparently put on the agenda of the day by the great lottery of 1612, described in Stow's *Annales* as follows:

> The King's maiestie in speciall favor for the present plantation of English Colonies in *Virginia*, granted a liberall Lottery, in which was contained five thousand pound in prizes certayne, besides rewards of casualtie, and began to be drawne in a new built house at the West end of *Paul's*, the 29th of June 1612. But, of which Lottery, for want of filling uppe the number of lots, there were then taken out and throwne away three score thousand blanckes, without abating of any one prize; and by the twentieth of July all was drawne and finished. This Lottery was so plainely carryed, and honestly performed, that it gave full satisfaction to all persons. *Thomas Sharpliffe*, a Taylor of London, had the chiefe prize, *vis*. foure thousand Crownes in fayre plate, which was sent to his house in very stately manner: during the whole tyme of the drawing of this lottery there were always present diuers worshipfull Knights and Esquiers, accompanied by sundry graue discreet Citizens.[5]

Gataker's book, however, does not focus exclusively upon lots and lotteries, but takes gaming in general into its purview, a lot being construed very generally as an event whose outcome is due to chance.

Gataker's treatise was a work of substantial erudition running to over 300 pages. It comprised an elaborate survey of historical examples of the use of lots in the Old and New Testament, for example: in the selection of a successor to the apostle Judas, *Acts*, 1:23-26; in the assignment of priesthoods and public offices in Greece; in the allocation of benefits in Hebrew, Greek, Roman, and other legal practice; in customs governing the division of booty and the spoils of war; and the like. (All four gospels state that the

Roman soldiers used lots to divide the garments of Jesus.[6]) Gataker defined a "lot" as an "event merely casual purposely applied to the deciding of some doubt" (p. 9), "casual events" being "such as might fall out in like sort diversely, and are not determined by any art, foresight, forecast, counsel, or skill of those that either act in them, or make use of them" (p. 14). He quotes with approval the dictum that "chance in founded, and dependeth upon Man's ignorance (*fortuna in ingorantia nostra fundatur*)" (p. 37).

Gataker follows St. Thomas in dividing the use of lots into the *divisory (sors diversoria*) for effecting distributions or allocations of goods or evils, the *consultory (sors consultatoria*) for settling on courses of action or determining matters of fact,[7] and the *divinatory (sors divinatoria*) for seeking the will of God or the decrees of Fate as to what will happen in the future. Despite the common use of lotteries to finance charitable causes, Gataker approved of their divisory use alone. The use of lots to divide the land of Israel (*Numbers*, 26:52-56) was, after all, expressly commanded by God (pp. 14ff.). Granting (with *Proverbs*, 16:24) that God knows the outcome of lots, Gataker rejected and criticized the view that "a Lot discovereth to men God's hidden will" (p. 25), arguing that "Lots are not to be used in [a] question of Fact past and gone . . for what is no ordinarie Lot is able to decide; but where some question is who has the right to a thing; in which case, notwithstanding the Lot is not used to determine who in truth hath right to it, but who for peace and quietnesse sake shall enjoy it" (p. 148). Accordingly, Gataker insisted that, "concerning the matter of business wherein Lots may lawfully be used, the rule of Caution in general is this, that Lots are to be used in things indifferent onely" (p. 125), for,

> many good things there are that may at sometime be done, where of a man may made choice whether of them hee will doe, being not necessarily tied unto, or enjoyned any of them: As for a student having divers bookes about him in his study, it is indifferent to choose one, this or that, refusing the rest, for present employment, there being no special occasion to urge the use of one more than another: Or for a man that carrieth a pair of knives about him, it is indifferent to draw and use either when occasion requireth (as Plutarch says, *De Stoicorum contradictiones*, 128).

As Aquinas observed, St. Augustine had maintained that, "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." (*Epistola ad Honor*, 180). Gataker agreed that it should be decided 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).

Poor Gataker! In the wake of his book, his promising clerical career was put in jeopardy by accusations of favoring games of chance through his defense of the use of lots.[8] This charge was certainly unjust. For Gataker's thesis was merely the employment of random-selection devices as a means of resolving matters of choice in cases where some preferential selection is desirable "for peace and quietnesse sake." Often, after all, lots are used in a perfectly harmless way—for example in the assignment of starting positions in swimming or rowing races (p. 119). Moreover, as the Bible notes. "The lot causes contentions to cease, and parteth between the mighty."[9] (A modern example of the sort of thing Gataker had in mind is afforded by the circumstance that when Hawaii was admitted as the fiftieth state of the Union, and two new senators were elected conjointly, random devices were used by the Senate to decide which of the two new Hawaiian senators would have seniority, with the decision made by a coin-toss, and which would serve the longer term, with the decision made by card-drawing.[10])

In Chapter X, "Of Extraordinary or Divinatory Lots," Gataker expatiated against the use of lots "either for the discovery of some hidden matter past, or present or for the presaging and fortelling of some future event." The ensuing chapter argues at length that this sort of thing is superstitious and unlawful. However, other uses of lots can, in principle, be appropriate.

Gataker's position, in fact closely paralleled that of Cicero's *De Divinatione*. There, Cicero approved the use of divination, and especially of augury, as a practice that had certain social and political benefits in fostering cooperative action and communal solidarity, and not at all because it had any prophetic utility—any predictive efficacy.[11] He distinguished between an inappropriate (superstitious) use of signs, auguries, and portents for making informative prognostications about the future, and an appropriate use of them for making communal *decisions* in controversial matters. The latter purpose promoted the preservation of public peace, since the authorities were relieved of the burden of choosing between the pro-faction and the anti-faction forces; the politically inexpedient matter was put "in the lap of the gods." For the sake of fairness and impartiality, people want to be assured that human desires and predilections do not influence the exercise of official choice. The use of lots clearly is an effective way to attain this objective.

It was in this spirit that Gataker sought to maintain the principle that there is nothing heretical or immoral in the use of lots *per se*. In the realm of human affairs, we sometimes want assurance that things occur "by

chance" rather than "by design," and the use of lots is simply a way of insuring this neutrality.

However, in the last third of this treatise, Gataker ventured upon more dangerous ground. He suggested that games of chance can (and should) be harmless playthings. Gaming had its "lawful use" for diversion—good recreations—as well as its "unlawful abuse" (p. 194):

> But is it one thing to play at dice or cards and another thing to be a Dicer or Carder; as it is one thing to *drink wine*; and another thing *to be a wine drinker* or, as we use [sic] to say *a wine bibber* [p. 229].

Provided people do not overindulge in such diversions to the point of neglecting their business, and do not gamble for money, no harm is done. "Play [is to] be used as play; for pleasure, not profit; for game, not for gain" (p. 251). It was doubtlessly this part of his discussion that led Gataker into difficulty with his pious critics.

The very circumstance that Gataker had to defend himself against the charge of favoring games of chance testifies to a rising concern with gambling, which religious people have generally regarded as not only a manifestation of private imprudence and time-wasting, but also a mode of immorality and even impiety, because gambling abandons the use of God-given reason and bases a decision on the mediation of chance or fate.[12] Indeed, there is something impious about thinking that there are any "casual" or "chance" occurrences. It is only from our human point of view that "casual events" exist at all; an omniscient God keeps track not only of the flight of sparrows, but of the toss of a coin as well.[13] Despite his contention that chance has a useful role as an issue-settler in human affairs, Gataker was at one with his theological critics in believing that God does not play dice with his world.

● BALTHASAR DE GRACIÁN Y MORALES (1601-1658)

Gracián was a Spanish moralist who was educated in Toledo and entered the Jesuit order there as a novice at the age of 18. He published his books under the name of Lorenzo Gracían, pseudonymous publication being advisable to avert the disapproval of the ecclesiastical authorities of discussions rather worldly for a priest. Gracián's *Pocket Oracle (Ordculo manual y arte de prudencia*), first published in 1647, was a series of three hundred pithy precepts, each accompanied by a brief commentary, setting out the guidelines of prudent action. The book enjoyed a great popularity, was echoed by La Rochefoucault, and admired and translated into German by Schopenhauer.[14]

Gracián's book depicted the human situation as an analogy with card games and formulated practical advice on this basis. His position in this regard stood as follows:

> In this life, fate mixes the cards as she lists, without consulting our wishes in the matter ("*Baraja como y cuando quierre la suerte*," sec. 196).
>
> And we have no choice but to play the hand she deals to us. But the wise man bides his time and places his bets when conditions are favorable ("*Pero el sagaz atienda al barajar de la suerte*," sec. 163).
>
> He tests the waters, as it were, before getting in too deep, and if matters look inauspicious withdraws to play again another day ("*Conocer el dia aciago, que los hay*. *Nada saldrá bien, y aunque se varie el juego, pero no la mala suerte*. *A dos lances, convendrá conocerle y retirarse, advirtiendo si está de diá o no lo está*." sec. 139).
>
> The sagacious gambler never counts on luck's lasting and prepares for adversity amidst good fortune ("*Prevenirse en la fortuna próspera para la adversa . . . Bueno es conservar para el mal tiempo, que es la adversidad cara y falta de todo*," sec. 113).
>
> There are *rules* for coping with risks and the sagacious person can facilitate good fortune ("*Reglas hay de ventura, que no toda es acasos para el sabio; puede ser ayudado de la industria*," sec. 21).
>
> Of these rules the most important is to play well whatever hand fate may have dealt ("*La mejor treta del juego es saberse descartari: más importa la menor carta del triunfo que corre, que la mayor del que pasó*," sec. 31).
>
> Another cardinal rule is to know when to quit: the knowledgeable gambler never "pushes his luck" ("*Saberse dejar ganando con la fortuna es de tahúres de reputatión*. . . *Continuada felicidad fue siempre sospechosa: más sequra es la interpolada y que tenga algo agridulce aun para la fruición: Cuanto más atropellándose las dichas, corren mayor riesgo de deslizar y dar al traste con todo*. . . *Cánsase la fortuna de llevar a uno a cuestas tan a la larga*." sec. 38).
>
> Thus one crucial rule is not to deem oneself as destined for domination. To think oneself to be the ace of trumps is a fatal flaw ("*No ser malilla*. *Achaque es de todo lo excelente que su mucho uso viene a ser abuso*." sec. 85).

In this way Gracián analogized the conduct of life to card-play and reinterpreted the guidelines of good card sense as principles of life. As he saw it, life and playing cards are both games of chance, and the precepts for effective operation in both contexts are fundamentally akin.

Gracián's perspective struck a resonant note among his countrymen. Gambling has long been a prominent facet of Spanish life. (The *Lotería Nacional*, established by Carlos III in 1763, is the oldest surviving national lottery.) Official estimates indicate that money spent in gambling currently

amounts to some 15 percent of family income, making Spain a world leader in this regard.[15] Spaniards have long tended to view gambling not as a human weakness or vice, but as a plausible opportunity for improving one's condition.

The general attitude and outlook of Gracián's book accordingly made a substantial impact on Spanish philosophy, which has long resisted the tendency to rationalize human affairs which has characterized developments in northern Europe. And there is further good reason to see this as unsurprising. For while the Western philosophical mainstream has striven to imbue our understanding of the world with the intelligible order of rational system, the Spanish philosophers of the anti-scholastic tradition have generally viewed the world as an uncertain, unpredictable, and unreliable setting for human life. Their position runs roughly as follows: Nature and we humans ourselves conspire in creating a difficult and largely intractable environment for us. Spanish philosophy has tended to keep reason in its place. It inclines to see reality, or at any rate that part of it that constitutes the setting for human life, is chaotic, incoherent, pervaded by disorder. Life is precarious. In all of our doings and dealings we cannot count on things going "according to plan!" Planning, prudence, foresight, and the like can doubtless help to smooth life's path, but they are far from sufficient to assure a satisfactory outcome to our efforts. Chance, accident, and luck—fortune, in short—play a preponderant and ineliminable role in human affairs. In all of our doings and undertakings we humans give hostages to fortune. The outcome of our efforts does not lie in our control: fortune (chance, contingency, luck) almost invariably plays a decisive part.

This fortunism did not, however, carry Spaniards to the extreme of an un-Christian fatalism. They were not drawn to the endorsement of inaction, lethargy, and a supine resignation to the inevitable. In their view, active enterprise is called for because our actions set the stage for luck—someone who buys no ticket cannot win the lottery. To a degree—although a very limited degree—people are the authors of their own fortune. Although fortune disposes, man nevertheless proposes.

The changeable and unpredictable nature of the human situation means that flexibility and adaptability are major human virtues. People have to be many-sided, able to adapt to changing circumstances and play very different sorts of roles. Like a good actor, a successful person must be prepared to play very different parts. (Spanish literature offers the influential model of *el picaro* as a chameleon, a person who manages to attune himself to the requirements of the moment and is able to be all things to all people.)

On this basis, versatility and adaptability were seen by the Spanish anti-scholastics from the time of Gracián onwards as crucial aspects of prudence.

People whose life is too orderly—who place too great a reliance on the regularity of an established system—thereby risk disaster. The sagacious man is one who has the prudence to develop this flexibility to accommodate himself to difficult and changing conditions. He strives to be able to emulate the Abbé Sieyès, political theorist of the time of the French Revolution, who when asked about his activities during the heyday of Robespierre and the terror, responded, *j'ai vécu*.

In this way, Spanish philosophers took the prominence of fortune in man's affairs to betoken the limits of human power, setting the stage for a fundamentally pessimistic appreciation of the power of human reason for guidance in this sublunary sphere. We find this attitude prominent not only in the great figures of the Golden Age of Spanish literature who were more or less contemporaries of Gracián (in particular Quevedo and Calderón), but also much later—in Unamuno's insistence that human reason is inadequate and unsatisfactory as a guide to life, and in Ortega y Gasset's rejection of the utility of scientific reason as directrix of human affairs. The idea that life is too chancy and fortuitous a thing to be manageable by rational means runs as a recurrent leitmotif through the history of Spanish thought. Gracián's recommendation of the gambler's perspective fell on fertile ground among the people of a society drawn to cultivating the prospects of good luck.

- BLAISE PASCAL (1623-1662)

Though he died at the early age of 39, Pascal's many-sided genius flowered early, and despite the brief span of his life he managed to make an astonishing array of contributions in mathematics, physics, philosophy, and theology. During his early years, he was a member of fashionable society and a fixture of Parisian salons, but after a profound religious experience in 1654, he joined the Jansenite community in Port Royal where he lived a reclusive and scholarly life, dedicating his pen to theological exposition and controversy. His *Thoughts (Pensées*) was a collection of brief notes and drafts jotted down during the years 1657-62 in preparation for writing an *Apology for the Christian Religion*. Published after his death, Pascal's sketches enjoyed great popularity and proved to be a work of enduring value and popularity.[16]

Pascal saw the role of chance in human affairs as pervasive:

> Everyone ponders how best to make the best of his condition, as for the choice of condition and country, chance [*sort*, destiny] gives them to us. It is a pitiable thing because they have been taught that this is best. And it is this that determines each to his condition of locksmith, soldier, etc. (*Pensées*, ed. Brunschvicg, no. 98).

Change and caprice pervade human affairs. "Truth on this side of the Pyrenees, error on the other" (*ibid*., no. 294). In living this life we constantly "take our chances." And this holds with regard to the next life as well.

In one brief passage of two sheets that form part of Pascal's rather haphazard assemblage, he presented his famous Wager in favor of the religious life. It was addressed to his former fashionable friends, such as the clever but somewhat shady Chevalier de Méré, a typical worldly *libertin*: "Brilliant talker, fearless freethinker, and inveterate gambler."[17] The core of the Wager argumentation ran as follows:

> When there is an equal risk of winning and of losing, if you had only two lives to win, you might still wager; but if there were three lives to win, you would still have to play (since you are under the necessity of playing); and being thus obliged to play, you would be imprudent not to risk you life to win three in a game where there is an equal chance of winning and of losing. But there is an eternity of life and happiness. That being so, if there were an infinity of chances to which only one was in your favor, you would still do right to stake one to win two, and you would act unwisely in refusing to play one life against three, in a game where you had only one chance out of an infinite number, if there were an infinity of an infinitely happy life to win. But here there is an infinity of infinitely happy life to win, one chance of winning against a finite number of chances of losing, and what you stake is finite. That removes all doubt as to choice, wherever the infinite is to be won, and there is not an infinity of chances of loss against the chance of winning, there are no two ways about it; you must risk all.[18]

This is not the place to enter into the complexities of Pascal's analysis. Suffice it to observe that, in effect, the Wager discussion says: "When gambling, you people act on the sensible principle of evaluating wagers by blending the chances of an outcome with the gain to be realized. Be consistent and do the same in matters of religion. You will then have to agree that no matter how small you deem the chances of God's existence, the infinite reward that will come to the faithful, should He exist, serves to render the gamble of religious commitment worthwhile." Pascal too saw chance as a pervasive rogue factor in human affairs: "By chance you are the son of a duke, and your very existence is due to an infinity of chances. Your birth is due to a marriage, or rather to a series of marriages of those who have gone before you. But these marriages were often the result of a chance meeting, of words uttered at random, of a hundred unforeseen and unintended occurrences."[19] Our very lives are a gamble. The Wager is an invitation to think about the big issue of life in this world and the next in the manner of a gambler.