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AGENCY AND INTEGRALITY

Philosophical Themes in the Ancient Discussions of Determinism and Responsibility

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PREFACE

It is not very surprising that it was no less true in antiquity than it is today that adult human beings are held to be responsible for most of their actions. Indeed, virtually all cultures in all historical periods seem to have had some conception of human *agency* which, in the absence of certain responsibility-defeating conditions, entails such responsibility. Few philosophers have had the temerity to maintain that this entailment is trivial because such responsibility-defeating conditions are *always* present. Another not very surprising fact is that ancient thinkers tended to ascribe *integrality* to "what is" (*to on*). That is, they typically regarded "what is" as a *cosmos* or whole with distinguishable parts that fit together in some coherent or cohesive manner, rather than either as a "unity" with no parts or as a collection containing members (*ta onta* or "things that are") standing in no "natural" relations to one another.[1] The philosophical problem of determinism and responsibility may, I think, best be characterized as follows: it is the problem of preserving the phenomenon of human agency (which would seem to require a certain separateness of individual human beings from the rest of the *cosmos*) when one sets about the philosophical or scientific task of explaining the integrality of "what is" by means of the development of a theory of causation or explanation (concepts that came to be lumped together by the Greeks under the term "*aitia*").

So much by way of explanation of the title of this book. Its content does not lend itself to such a facile (or short) explanation. Although Aristotle was wont to characterize his philosophical predecessors as "searching (in more-or-less crude and untutored ways) after *aitia*," it is arguable that the idea of a "theory of *aition*-hood" develops with Aristotle himself.[2] At any rate, there is evidence of increasing concern in post-Aristotelian ancient thought with the concept of causation as well as with the intimately related concept of conditional necessity or necessitation. There is also an increased concern with the relation between a theory of *aitia* or causes and human responsibility or "freedom." In other words, during the course of ancient philosophy subsequent to Aristotle there developed philosophical discussions bearing a recognizable relation to what the

contemporary student finds in his Introduction to Philosophy textbook under the section entitled "Freedom and Determinism." However, in some cases the resemblance is misleading: it can lead us, for example, to the conclusion that the ancients were capable of amazing non-sequiturs – or even lapses into insanity – when in the throes of philosphical debate on this issue. One source of the problem, I will be suggesting in the following pages, is that ancient discussions of the freedom-determinism issue often involve concepts of causation or conditional necessity that are significantly different from the concepts implicit in post-Newtonian (or post-Laplacean or post-Humean) discussions of the freedom-determinism issue.

This book is primarily devoted to a philosophical analysis of some ancient concepts of *aitia* and of the alethic modalities of necessity and possibility (and their contradictories). I am especially, but not exclusively, concerned with the relation between these concepts and the issue of human responsibility or freedom. In one case, that of Aristotle, the discussions of the issue of determinism and of the issue of responsibility occur separately (in Chapters Two and Seven, respectively). Aristotle has much to say of philosophical interest and historical importance on both issues. My excuse for not relating more closely Aristotle's discussions of the two issues is skepticism on my part as to whether the "dialectic" of the determinism-responsibility issue had developed to the point where the two issues were very closely related *in his own mind*.[3] Indeed, one general thesis of this book is that developments in post-Aristotelian ancient philosophy concerning the relation between causes and explanations (both subsumed, as I have already mentioned, under the Greek term "*aitia*") and developments concerning the relation between the concepts of *aitia* and of time were necessary conditions for the formulation of something the contemporary philosopher would recognize as the "determinism-responsibility issue."

It can correctly be inferred from my use of the phrase "philosophical analysis" in the preceding paragraph that I would put the emphasis on "philosophy" in the phrase "history of philosophy" in characterizing this book. (Hence the book's subtitle.) My conception of the history of philosophy is a "pluralistic" one. In particular, I in no way denigrate history of philosophy that emphasizes the "history." But I do not regard this book – and would not want it to be judged – as a comprehensive historical survey of the philosophical discussions of causation, the alethic modalities, and human responsibility from the mid-fourth century B.C.

to the latter part of the third century A.D. It is nonetheless true that, with the exception of the occasional intrusion of a later commentator such as Boethius or Philoponus, this is the time period (from Aristotle to Plotinus) with which the book is concerned. In working on the manuscript, when I reached a point where I was forced to choose between historical caution and the concoction of a philosophically interesting "likely story," I invariably chose the latter alternative. There are advantages, in addition to the promotion of irenicism, to a pluralistic conception of the history of philosophy!

Despite the philosophical "skew" of the book, which I have now dutifully confessed, the "history" is not altogether lacking in *most* of it. An exception is the last chapter and appendix, where I release some pent-up philosophical ruminations pertaining to the temporal-frequency model of the alethic modalities and to philosophical methodology and the determinism-responsibility issue. These philosophical postscripts are largely ahistorical but have at least some tangential connection to the preceding chapters. Philosophical skew also helps to explain the prominence given to a secondary *leitmotiv* in the book: ancient versions of the temporal-frequency conception of the modalities, and of associated versions of the principle of plenitude. I simply find these concepts intriguing.

The material in this book is "new" in the sense that no extended section of it has, in its present form, previously appeared in print. Parts of it, however, do build upon several of my published articles. The most direct dependence occurs in Sections B and C of Chapter Six and in Chapter Five. The former sections represent, in part, an expansion and reworking of material that appeared in my article 'Time and Determinism in the Hellenistic Philosophical Schools', *Archiv für Geschichte der Philosophie* **65**/1 (1983), 40–62. In the case of Chapter Five, there is some overlap with material in my 'Causes as Necessary Conditions: Aristotle, Alexander of Aphrodisias, and J. J. Mackie,' *Canadian Journal of Philosophy*, Supplementary Volume X (1984), pp. 157–189.

It remains for me to express some regrets and acknowledge some debts. The regrets first. During the last ten to fifteen years there has been a happy renascence of interest in Hellenistic philosophy. The result has been impressive, with significant work in the area appearing quite regularly both in monographs and in classics and philosophy journals. Particularly in view of this fact, I am morally certain that I have entirely overlooked some significant and relevant contributions. There also are

other recent works, with which I am in fact acquainted, that may not have received the attention they merit. Among these, I might mention Dr. S. Waterlow's two recent monographs on Aristotle's physics and on his modal concepts (*Nature, Change, and Agency in Aristotle's 'Physics'* [Clarendon, 1982] and *Passage and Posssibility* [Clarendon, 1982], respectively); Dr. Gerhard Seel's monograph on Aristotle's theory of the modalities (*Die aristotelische Modaltheorie* [de Gruyter, 1982]); and Prof. R. Sorabji's recent book on ancient theories of time (*Time, Creation and the Continuum* [Duckworth and Cornell University Press, 1983]). I regret any such neglect and apologize to any scholar whose contributions have not received the consideration they deserve.

Under the rubric of "debts," I should like to begin with the acknowledgment of the seminal influence on this book of the work of Prof. Jaakko Hintikka and of Dr. R. W. Sharples. Their papers on Aristotle and on Alexander of Aphrodisias, respectively, led me to think about issues that would otherwise probably not have troubled me. I am also grateful to Dr. Sharples and to Professors Jeffrie G. Murphy and Frank Lewis for their kind and helpful comments on the drafts of several chapters of the manuscript. I also appreciate the very valuable advice from an anonymous reader for Reidel's Philosophical Studies Books Series and the general support and encouragement of Prof. Keith Lehrer, general editor of the series. And thanks are especially extended to Mrs. Ruth Bardrick and Mrs. Joy Erickson for their cheerful and patient diligence in typing and retyping large sections of the manuscript.

Although the support and encouragement of a great number of individuals was always a source of gratification, institutional support for this study, particularly institutional support of a tangible nature, was virtually nonexistent. It is, therefore, a pleasure to acknowledge the exceptions and express my thanks to the following: to my colleagues in the Department of Philosophy at Arizona State University, and particularly my former chairman Prof. Ted Humphrey, for providing an academic environment conducive to philosophical thought and research since my joining the department in 1974; to the University Library at Arizona State, and particularly to Ms. Dora Biblarz, acquisitions librarian, for helping me to procure essential (and often expensive) research materials; to the members of the Department of Philosophy at the University of Arizona, for their hospitality during a sabbatical leave in 1981–82, when I began work on this project; to the joint Classics and Philosophy ancient philosophy program at the University of Texas at Austin for providing the framework (through its annual workshops in ancient philosophy) for

trying out, refining – and sometimes abandoning – ideas related to those presented in this book.

Finally, I hope that I have in this book paid sufficient heed to the sound advice of Aristotle:

> καὶ οὗ μὴ ἔστιν ὑπερβολή, τοῦτο ἀγαθόν, ὃ δ' ἂν ᾖ μεῖζον ᾖ ὀεῖ, κακόν.

(And that of which there is not an excess is good; but what is greater than it should be is bad.) *Ars rhetorica* 1.6.1361a2–3

NOTES

[1] Of the two "atypical," radical views, the conception of "what is" as a unity with no parts is obviously historically represented by Parmenides and the other Eleatics. It is more difficult to find historical representatives of the antithetical radical conception: that is, the view that there is no cohesiveness or coherence to be found among the things that are but that, rather, these things constitute a "mere collection." The sort of conception I have in mind is termed "the naive metaphysics of things" by Mourelatos: "Each thing would be (conceptually, we would say) independent of every other thing. There would be no abstract or dependent entities – no qualities, or attributes, or kinds, or modes of reality. All things would be equally real since they are all univocally *in* physical space. To know things would be to know them completely and exhaustively, in and through themselves. Such a world would fit perfectly the adage made famous by Bishop Butler: 'Everything is what it is, and not another thing' " (A. P. D. Mourelatos, 'Heraclitus, Parmenides, and the Naive Metaphysics of Things', in *Exegesis and Argument: Studies in Greek Philosophy Presented to Gregory Vlastos*, ed. E. N. Lee, A. P. D. Mourelatos, R. M. Rorty [Assen, 1973], p. 17).

[2] I have in mind not only Aristotle's discussion of the principles of change in the first two books of the *Physics*, which includes the theory of the "four kinds of causes" in *Physics* 2, but also the theory of *aitia* as reasons or explanations, specifically, causes as "middle terms" in appropriate "scientific" demonstrations, as developed in the *Posterior Analytics*.

[3] The question of whether Aristotle recognized "the problem of whether human responsibility and universal determinism are compatible" is complicated by the variety of conceptions of determinism available for (explicit or implicit) attribution to Aristotle. Perhaps the clearest evidence that Aristotle is concerned with at least *some* versions of a determinism-responsibility problem comes from *De Interpretatione* 9, where he seems to assert the incompatibility between (a) the sort of "determinism" that results from its being necessary that of every pair of contradictories, one "side" should be true and the other false and, (b) the need "to deliberate and exert oneself" (*bouleuesthai . . . pragmateuesthai*) (18b26–33). R. Sorabji considers the issue at greater length in his *Necessity, Cause and Blame: Perspectives on Aristotle's Theory* (hereafter, *NC&B*) (Ithaca, 1980), pp. 243–287. Sorabji, I think, inclines toward the view that Aristotle would affirm the incompatibility of (a) the universal *necessitation* of all events/states of affairs by temporally anterior events/states of affairs (which Sorabji distinguishes from a doctrine of universal *causation*) and (b) any ascriptions of human responsibility. Whether or not this is Aristotle's view, it certainly is – as we shall see – one view advanced by later Peripatetics such as Alexander of Aphrodisias.

Arizona State University, October 1983 M.J.W.

CHAPTER ONE

INTRODUCTION: THE IMMORTAL CHIMPANZEE AT ITS TYPEWRITER

A. PLENITUDE AND THE TEMPORAL-FREQUENCY MODEL OF THE MODALITIES

Suppose that we take an immortal chimpanzee and chain it to a Greek typewriter built to take wear. Suppose, further, that the typewriter has only twenty-five keys (one for each of the twenty-four upper case letters of the Greek alphabet and a blank space key), and that the chimp is compelled to strike one key every five seconds. The assumption is that it does so at random. Is it possible for the chimp to type out, in a given three minute thirty-five second interval of time, the first line of Aristotle's *Metaphysics*:

> "ΠΑΝΤΕΣ ΑΝΘΡ Ω ΠΟΙ ΤΟΥ ΕΙΔΕΝΑΙ ΟΡΕΓΟΝΤΑΙ ΦΥΣΕΙ"?

It certainly seems so. In fact, in the circumstances imagined, it is easy to calculate the probability of the chimp's typing the line in a 3′35″ interval – $1/25^{43}$. Now, is it necessary that the chimp, at *some* time in the infinite interval at its disposal, will type out the line?

Up until the last several centuries, most people would have answered "yes." A great many people still would give the same answer. We can distinguish between two ratios: (A) that m/n of the number m of "favorable outcomes" (the number of times the first line of the *Metaphysics* is typed out in a given number n of 3′35″ intervals, in this particular case) to the total number n of "trials" (here, the number of 3′35″ intervals considered); and (B) the probability p ($= 1/25^{43}$, here) of a favorable outcome in any given trial. Bernoulli's Theorem entails that for any $\epsilon > 0$, the limit of the probability that m/n falls within the interval $p \pm \epsilon$ is 1 as n is indefinitely increased. Does it not follow that if we consider an *infinite* number of trials (equivalent to an infinitely long time span), it is necessary that at least one favorable outcome will occur as long as the probability of such a favorable outcome is greater than 0? While virtually all twentieth-century probability theorists would deny that the entailment holds, there is a strong temptation to think that it should. If we do accept

the entailment, we have, in effect, accepted a version of what Professor A. O. Lovejoy called the "principle of plenitude," the principle that all "real" possibilities must be actualized at some time or other.[1] I will return to the chimp and his sturdy typewriter in the last chapter of this book. My purpose in beginning with this scenario is to point out what a strong appeal the plenitude principle still exercises in an era when it has been officially repudiated by logicians and mathematicians. As we shall see when we return to the chimp and his unending task, the technical and conceptual machinery behind the current rejection of plenitude is elaborate and certainly was not available to Aristotle and his Hellenistic successors. It is thus easy to understand, I believe, why the plenitude principle plays such a central – although not always obvious – role in ancient philosophical issues in which the alethic modal concepts of necessity, possibility, and their contradictories figure. In particular, the principle grounds a temporal-frequency conception of alethic modalities. Such a frequency conception of the modalities equates what is possible with what happens at *some time or other* and what is necessary with what is *always* the case. I purposely present the conception in a highly abstract form, postponing treatment of more concrete forms for the discussions of the historical and philosophical contexts in which forms of the principle figure. In fact, one principal theme of this book is the influence exerted by various versions of the temporal-frequency conception of the modalities, from the time of Aristotle through later antiquity, on the philosophical debates concerning determinism and human responsibility.

Something recognizable by contemporary philosophers as the determinism-responsibility issue begins to take shape in the Aristotelian *corpus*. Aristotle also supplies the first explicit statement of a temporal-frequency conception of the modalities. In fact, most of the Hellenistic positions in the determinism debates which arose after the death of Aristotle seem to be foreshadowed in his work.[2]

This is not to say, however, that the plenitude principle itself necessarily makes its first appearance in Aristotle. As Lovejoy recognizes, there really are at least two versions of what he calls the principle of plenitude. With respect to his investigation of the "great chain of being," the more important version is the "thesis that the universe is a *plenum formarum* in which the range of conceivable diversity of *kinds* of . . . things is exhaustively exemplified."[3] One might call this the *second-order* version of the principle. Although Lovejoy argues that it is to be found in Plato, other scholars have taken issue with this claim.[4]

Rather than "entering the lists" in this dispute, I propose to turn to what I will call the *first-order* version of the principle, which is much more important in the development of the determinism issue. Hintikka presents a clear statement of this version of the principle:

(T) No unqualified [real] possibility remains unactualized through the infinity of time.

If we accept the standard relations among the alethic modalities – in particular, if we hold that what is necessary is the contrary of what is impossible, several logically equivalent alternatives of (T) – also noted by Hintikka – can be isolated:

$(T)_1$ That which never is is impossible
$(T)_2$ That which always is is by necessity
$(T)_3$ Nothing eternal is contingent.[5]

It will be noted that (T) is also logically equivalent to the conditional

$(T)_4$ If something is possible, then it is the case at some time or other.

The converse of $(T)_4$ is a version of the familiar and virtually universally accepted modal principle "*ab esse ad posse valet consequentia*":

$CON(T)_4$ If something is the case at some time or other, then it is possible.

The conjunction of the two preceding principles yields an abstract version of the temporal-frequency conception of the modalities: what is possible is equivalent to what is the case at some time or other; and, if what is necessary is the contrary of the impossible, what is necessary is then equivalent to what is always the case.

Although Lovejoy has denied that Aristotle subscribed to the plenitude principle,[6] Hintikka has presented what seems to me to be overwhelming evidence that he does accept some first-order version of the principle.[7] Since he also accepts the converse of the principle $CON(T)_4$, it seems clear that he is committed to some version of the temporal-frequency conception of the modalities. Consideration of Aristotle's acceptance of the temporal-frequency conception of the modalities, the role that this conception plays in Aristotle's cosmology, and the philosophical problems it causes him with respect to the determinism issue will be the themes of the following chapter.

B. PLENITUDE AND ATOMIST COSMOLOGY?

A prior question of some interest, however, is whether a first-order version of the plenitude principle is to be found in Greek philosophy earlier than Aristotle. At least one scholar has made the plausible suggestion that a first-order version of the principle plays a key role in Presocratic atomist cosmology. How, according to Democritus, do individual *cosmoi* or "world-orders" begin? It seems that Democritus held that atoms are individually possessed of an "innate" random motion.[8] Now, it is surely a physical possibility that the individual motions of a vast number of atoms in a given spatial region "just happen" to be correlated into one huge vortex "sweep" of the atoms. After the initial vortex formation, the communicated, "secondary motion" of the atoms could be invoked to explain the subsequent development of the *cosmos*.

This is basically the interpretation of Democritus given by J. M. Robinson:

> The atoms move random in the void, their movements being combined in an infinite number of possible ways, until at last, in the course of time, they fall by chance into a vortex motion. All that is required is enough time, and Democritus meets this requirement by making time infinite.[9]

Robinson connects this account, quite correctly, with a first-order version of the plenitude principle, remarking that "the process is the same as that by which (so mathematicians assure us) a chimpanzee chained to a typewriter for a sufficient length of time would produce all the books in the British Museum simply by pounding the keys at random."[10] Unfortunately, the source of Robinson's interpretation of Democritus is Lucretius, who in a passage from Book V of *De rerum natura* quoted by Robinson, does indeed appeal to the plenitude principle:

> For surely,
> the atoms did not take their places by volition
> nor did they place themselves by sharp intelligence,
> nor did they agree what movements to produce;
> but many elements in many different ways,
> bombarded with blows and carried along by their own weight,
> from time immemorial, have been wont to move and meet
> in various ways, and try out all the permutations
> that they are able to produce by coming together.
> And so it happens that, after being dispersed for ages,
> attempting every sort of motion and conjunction,
> at last those atoms come together whose combination
> can form the first-beginnings of all great things we know.[11]

The pictures of the initial stages of *cosmos*-formation that come from the earlier atomists, however, are much less clear. According to Diogenes Laertius' report, Leucippus says only that "many bodies of all sorts of shapes move, being cut off from the indefinite into a great empty space, and having 'mustered themselves together', they effect one whirl."[12] And in the single *fragmentum* attributed to Leucippus, he maintains that "nothing comes to be randomly, but all things arise from *logos* and by necessity."[13] Taken at face value, this saying would seem to preclude the doctrine of random generation found in the passage from Lucretius.[14]

Epicurus, too, in the *Epistola ad Herodotum*, speaks simply of the coming-to-be of all *cosmoi* from the indefinite and what appears to be the subsequent "separating off" (*apokrinesthai*) of individual things. If we take into account the *scholia* to the relevant passage of the letter, he proceeds to claim that the *cosmoi* do not necessarily come-to-be, all having one configuration; rather they arise possessing a number of different configurations, "*although not having every possible configuration.*"[15] This last qualification, if it authentically represents Epicurus' views, would apparently constitute a denial of the plenitude principle.

In sum, there does not seem to be any compelling evidence for "reading back" Lucretius' cosmological employment of the plenitude principle into Presocratic atomism or, for that matter, into Epicurus' cosmology. On the contrary, there is, as we have seen, some evidence that such a principle should *not* be attributed to Leucippus or Epicurus. The evidence is admittedly not conclusive: Democritus may have employed the principle in the same way that Lucretius does. However, it seems at least as likely that Lucretius is appealing to a principle which is, to be sure, quite congenial to the Epicurean world view, but which has its origin not in Presocratic atomism but in an Aristotelian doctrine that had eventually become something of a philosophical commonplace. In the following chapter, we turn to Aristotle, specifically, his employment of the plenitude principle and his role as the philosophical father of the Hellenistic debates concerning determinism.

C. SUMMARY AND CONCLUSION

I have begun this basically historical study with an unhistorical, abstract, but familiar illustration of the principle of plenitude, the principle that if something is possible, then it is the case at some time or other. The illustration is that of a chimpanzee randomly striking the keys of a

typewriter: it is sometimes maintained that, "in an infinite amount of time," it is necessary that the chimp type out the first sentence of Aristotle's *Metaphysics,* or *King Lear,* or – serially – all the books in the British Museum (or, indeed, any given finite string of letters). In this chapter I have connected the plenitude principle with what I call the temporal-frequency model of the alethic modalities of necessity and possibility. Although this model is found in Aristotle, it is probably a mistake to read it back into Presocratic atomist cosmology, as has sometimes been done.

The historical role of the plenitude principle and the temporal frequency model is complex and will be explored in the following chapters. In particular, the model grounds what one might call a "proto-empiricist" conception of causal necessitation that eventually issued in the Stoic dictum that a given cause *always* yields the same effect when the surrounding circumstances are the same.

The conceptual underpinnings of the temporal frequency model are also complex. These will be further examined, in relation to contemporary probability theory, in Chapter Eight and its appendix.

NOTES

[1] Arthur O. Lovejoy, *The Great Chain of Being: A Study of the History of an Idea* (New York, 1960).

[2] I expatiate on this point at greater length in the next chapter. There is no consensus of scholarly opinion as to Aristotle's own position with respect to determinism; see Sorabji, *NC&B*, Chs. 1, 2, and 15. The later Peripatetic position seems, in general, to have consisted of (a) a form of "indeterminism" (not all events/states of affairs have temporally antecedent *necessitating* causes) and (b) a form of "incompatibilism" according to which the ascription of human responsibility is incompatible with such determinism.

[3] Lovejoy, p. 52.

[4] In particular, Jaakko Hintikka, *Time and Necessity: Studies in Aristotle's Theory of Modality* (hereafter, *T&N*) (Oxford, 1973), p. 95.

[5] *Ibid.*, p. 96.

[6] Lovejoy, *The Great Chain*, p. 55.

[7] Hintikka, *T&N*, pp. 97–113.

[8] H. Diels, *Die Fragmente der Vorsokratiker* (hereafter, *D/K*), 5th edition, ed. W. Kranz (Berlin, 1934), 68A58, 68A28.

[9] John Mansley Robinson, *An Introduction to Early Greek Philosophy* (New York, 1968), p. 208.

[10] *Ibid.*

[11] Lucretius, *On the Nature of the Universe*, trans. J. H. Martinband (New York, 1965), 5.419–430.

[12] Diogenes Laertius, *Vitae* (hereafter, D.L.) 9.31 (D/K 67A1).

[13] D/K 67B2.

[14] But *cf.* Aristotle's comment about those who make spontaneity (*to automaton*) a cosmological first principle (*Physica* 2.4.196a24–26), a comment traditionally interpreted as applying to Democritus. Kirk and Raven interpret the force of the "*to automaton*" here as simply indicating the absence of the notion of final causation in presocratic atomist cosmology (G. S. Kirk and J. E. Raven, *The Presocratic Philosophers* [Cambridge, 1957], p. 413).

[15] *Epicurea*, ed. H. Usener (Stuttgart, 1966), *Epicuri ad Herodotum* 74, p. 26.

CHAPTER TWO

THE LEGACY OF ARISTOTLE

That the temporal-frequency conception of the modalities plays a key role in the thought of Aristotle has been argued by Jaakko Hintikka, who employs the phrase "statistical interpretation" for what I have called Aristotle's "temporal-frequency conception" of the modalities.[1] One of the principal tasks of this chapter is to build upon the insights of Hintikka and to apply the results to two philosophical problems that face Aristotle, both central to the determinism issue. The first problem is the problem of how there can be contingency in a *cosmos* which has a necessary "first cause." The second problem pertains to the application of modal notions to *individuals*, i.e., to individual things and individual events and states of affairs. It is arguable that, at least in the writings that we possess, Aristotle addresses neither of these problems in a direct and obvious way. However, it is also arguable, I think, that there is material in the *corpus* relevant to these problems. I shall suggest that this material provides the framework for the subsequent philosophical development of the determinism issue in ancient philosophy.

A. PITFALLS

Since my approach to the issues of this chapter is "analytic" rather than "straightforwardly historical-descriptive," it may be well to preface the treatment of the issues just mentioned with a brief discussion of some snares that might be thought to block the way of someone pursuing my path through the jungle of the Aristotelian *corpus*. In general, my position is to acknowledge the existence of these snares while forging ahead with what I hope is due caution.

(1) *First objection:* It is a mistake to speak of Aristotle's temporal-frequency *conception* of the modalities: Aristotle does not *define* the modalities in temporal terms.

Like Hintikka,[2] I believe that Aristotle neither *defines* the possible as what is the case at some time or other nor defines the necessary as what is always the case. To begin with, the argument that Aristotle produces in

De caelo 1.12 – to be discussed later – that eternal existence implies necessary existence would be pointless if Aristotle holds that what is necessary is *definitionally* equivalent to what is always the case. Secondly, as Hintikka also notes,[3] the temporal conception of the modalities is not the only conception to be found in Aristotle's works. For example, we occasionally find an implicit temporal conception of "conditional necessity" or *necesitas consequentiae:* B is conditionally necessary, given A, if *whenever* A is the case, B is also the case (i.e., if it *never* happens that there is a time at which A is the case not "followed by" or "accompanied by" B's being the case). However, Aristotle also holds a conception of *necessitas consequentiae* that equates it with "syllogistic derivability,"[4] a conception that I hope to show to be of considerable cosmological significance in Aristotle's thought.

So, in speaking of "Aristotle's temporal-frequency conception of the modalities," I do not intend to suggest that Aristotle defines the modalities temporally or that the temporal conception exhausts the significance of the modal concepts for Aristotle. Nonetheless, I believe that it is indisputable that Aristotle often conceives of the modalities temporally and that this fact has broad philosophical significance for Aristotle's thought. Although it may seem anachronistic, I believe it actually involves little distortion to think of the temporal-frequency conception of the modalities as a sort of "semantic model" for the modalities similar to contemporary "possible worlds" semantic models. In neither case need the model "exhaust the meaning" of the modal concepts nor preclude other conceptions of the modalities.

(2) *Second objection:* The temporal-frequency conception of the modalities treats modal terms *formally* – i.e., as operators on or predicates of "linguistic entities" such as propositions, statements, sentences or well-formed formulae. Aristotle, however, usually employs modal terms *materially*. Thus, the temporal-frequency conception of the modalities is not straightforwardly applicable to much of what Aristotle says concerning the modalities.

Aristotle does, in fact, recognize what we might call a "formal" as well as a "material" use of the alethic modal concepts. Most of the texts in which a formal use occur are, as we might expect, to be found in the *Organon*.

For example, in *Prior Analytics* 1.15 Aristotle produces an argument that if A entails B and A is possible, then B must be possible as well. It is clear that the schematic alpha and beta employed by Aristotle stand for some sort of "propositional" or "statemental" *logoi.* This supposition is made explicit in an explanatory aside added by Aristotle:

> it is necessary that we conceive of impossibility and possibility not only in coming-to-be but also in true statement (*tō alētheuesthai*) and in attribution (*tō hyparchein*), and in all the additional different ways in which possibility is predicated. For it is similar in all of them.[5]

The source of difficulty in the application of the temporal-frequency conception of the modalities arises not so much from the fact that there are formal and material uses of the modal concepts, but from the fact that we are likely to apply the formal version of the temporal-frequency conception in a manner that Aristotle never intended. Let us call the "basic bearers of truth" *propositions* simply in order to have a term to use, without reading any particular significance drawn from contemporary philosophy of language into the term. A formal version of the temporal-frequency conception of the modalities can then be formulated: a proposition is possible just in case it is true at some time or other, while it is necessary just in case it is always or omnitemporally true.

Difficulties arise because, for Aristotle (as for most ancients), the "basic bearers of truth and falsity" are conceived of as *temporally indeterminate,* i.e., as *not* being "inherently" bound or tied to any particular time.[6] That Aristotle conceives of "propositions," in our special sense of the term, as temporally indeterminate can be inferred from any number of passages in the *corpus.* One example occurs in *Categories* 5: "the same proposition (*logos*) can be seen to be true and false. For example, if the proposition that someone is sitting were true, the very same proposition will be false when the person has arisen."[7] Further on in the chapter Aristotle explains that it is not the proposition that has changed but the "facts" (*pragmata*)[8]

Contemporary philosophers, on the other hand, tend to conceive of the basic bearers of truth and falsity as being temporally determinate, that is, as forever bound to a given time.[9] Consequently, as Hintikka has pointed out,[10] if we attempt to interpret the formal version of the temporal-frequency conception of the modalities as appliable to *temporally determinate* propositions, difficulties ensue. For it seems most intuitive to claim that such a temporally determinate proposition, e.g., "Socrates die in 399 B.C." or "Ronald Reagan is President of the U.S. during 1981

A.D.," is *always false* if ever false and *always true* if ever true. Hence, any such temporally determinate proposition is necessary if true, impossible if false, according to the formal version of the temporal-frequency conception of the modalities. Aristotle, however, apparently does not recognize this "problem" because he does not conceive of propositions as temporally determinate.

However, it is temporally determinate propositions that designate *particular* objects and events. So, the problem remains when one moves from the formal to the material mode: does the temporal-frequency conception of the modalities apply to particular, "non-eternal" objects or particular events? Aristotle certainly does, in places, wish to discuss the modal status of such particulars. I shall argue, however, that Aristotle's "absolute" (*haplōs*) modal concepts, the modal concepts most often associated with the temporal-frequency model, are not straightforwardly applicable to such non-eternal particulars. Although there is no explicit statement of how Aristotle conceives of the modal status of particulars, there is, I believe, sufficient evidence on which to base a "plausible reconstruction."

(3) *Third objection:* The fact that modal terms are "*legomena pollachōs*", "have many senses," precludes the development of a uniform semantic model for Aristotle's use of those terms.

We can indeed distinguish a number of distinct senses that Aristotle attaches to modal terms. These different modal concepts generally bear some relation to each other, however; and the fact that there is more than one set of modal concepts to be found in Aristotle's work does not in itself entail that some sort of unified semantic model cannot be constructed for these concepts. In particular, the possibility of such a "unified" temporal-frequency model of Aristotle's modal concepts will be addressed later in this chapter. At this juncture, however, I shall briefly examine what I take to be the most significant uses of the modal terms to be found in Aristotle.

B. THREE TYPES OF NECESSITY

With respect to the mode of necessity, we can distinguish "absolute" necessity (*to haplōs ex anangkēs*) from conditional or "hypothetical" necessity (*to ex hypotheseōs anangkaion*). A third variety of necessity that I believe to be at least implicit in certain passages from the Aristotelian *corpus* I shall dub the *temporally-relative* conception of necessity.

Absolute necessity is the variety of necessity for which the temporal-frequency model can be most firmly established in Aristotle's works. In *De partibus animalium* Aristotle characterizes it as "obtaining with respect to eternal phenomena" (*hyparchei de to* [*anangkaion*] *men haplōs tois aidiois*).[11] And in *De interpretatione* 13 he produces what is, in effect, an argument:

It is clear from what has been said that what is of necessity is in actuality. So that if what is eternal is prior to potentiality, actuality is prior to potentiality as well.[12]

It is clear that he is here implicitly equating what is necessary with what is eternal. The equation is made quite explicit in *De generatione et corruptione* 2.11:

Hence if something is of necessity, it is eternal; and if it is eternal, it is of necessity. Moreover, if the coming-to-be (*genesis*) of something is of necessity, it is eternal and if eternal, then of necessity.[13]

The context makes it clear that Aristotle is here speaking of absolute or *haplōs* necessity.

The force of the "*haplōs*" in a phrase such as "*to haplōs ex anangkes*" is to distinguish this necessity from necessity that is in any way "relative" to some further condition or circumstances. As Hintikka remarks, the concept serves "some of the same purposes"[14] as our concept of logical necessity. "Logical," of course, is here to be understood broadly – as including at least the consequences of what some contemporary philosophers would call "meaning postulates" as well as the theorems of first-order logic or the Aristotelian logic of classes. While the contradictory of the "law of non-contradiction" is a prime example of an "absolute impossibility" (making the "law" itself absolutely necessary), the geometrical proposition "the diagonal of the square is commensurable" is also evidently absolutely impossible, a fact which makes its contradictory absolutely necessary.[15]

There is some evidence that Aristotle held that "absolute necessity" can pertain only to what is eternal. In *Posterior Analytics* 1.8 he argues that

There is not knowledge or demonstration, absolutely speaking, of perishable things, but only accidental [knowledge/demonstration] because [the predicate's inherence in its subject] is not universal, but only transient and relative.[16]

Aristotle in the *Posterior Analytics* employs the term "*katholou*" ("universally") in a technical sense that implies necessity:

I use the term "*katholou*" for that which obtains *kata pantos* [i.e., in every individual subject and at all times – cf. 73a28-29] and "in itself" (*kath' auto*) and "*qua* itself" (*hē auto*).[17]

So, it seems that the temporal transience of a subject precludes its possessing properties necessarily, in the *haplōs* sense.

Another relevant passage occurs in *Prior Analytics* 1.13, where Aristotle claims that "what obtains naturally," e.g., some predicate that naturally belongs to man,

> does not have a continuous (*syneches*) necessity because of the man's not always existing; but so long as the man exists, it obtains either of necessity or for the most part.[18]

The last clause in this passage alludes to a problem with the doctrine that only eternal things can possess attributes necessarily in the *haplōs* sense. Aristotle surely wants to maintain that a proposition such as "man X is an animal" is necessary, and it seems that the necessity involved should be the "full-fledged" variety. Man X, however, is not eternal.

One strategy for dealing with this problem is to maintain that the variety of necessity that obtains in the case of perishable things' possession of "essential" attributes is really not absolute necessity but a form of conditional or hypothetical necessity. For example, to say that a man X is necessarily an animal is to say that it is conditionally necessary that if man X exists, then he is an animal. In his commentary on the preceding passage, Alexander of Aphrodisias says some things that suggest this sort of conditional approach to the sort of necessity that pertains to perishable things:

> The necessary is both what is eternal and what always [occurs] in a similar way to similar things. One could say that it is possible for a thing to belong of necessity to [a subject] that is not eternal, were it not first destroyed, because it is possible that something does not come-to-be because of [the subject's] having first been destroyed – something, that is, which would have come-to-be if the man [the example of a perishable subject from Aristotle's text] always existed. For example, if every man became gray of necessity upon having reached the age of sixty, it would nonetheless have happened that an individual man, one who, in fact, happened not to attain to such an age, would have turned gray.[19]

Aristotle frequently contrasts absolute necessity with hypothetical or conditional necessity, the latter being termed "qualified necessity" by Sorabji.[20] As Sorabji notes, there are two principal versions of the concept of qualified necessity to be found in Aristotle's text.[21] One version normally arises within the context of discussions of final causation: e.g., in order for there to be a house, it is *necessary* that there be a foundation; for a tool to serve as a saw, it is *necessary* that it be constituted of material of a suitable hardness; etc. However, Aristotle also speaks of a conclusion as being necessary relative to given premises. For example, in *Prior Analytics* 1.10, he points out that the conclusion of a valid syllogism

is necessary relative to the truth of its premises. This relative necessity of the conclusion of any valid syllogism is contrasted with the absolute necessity of the conclusion of a sound "apodictic" syllogism.[22] Another example of conditional necessity is an interesting one from geometry that occurs in *Physics* 2.9

> since "the straight" is the sort of thing it is, it is necessary that [the angles of] a triangle be equal to two right angles.[23]

Elsewhere, as we will see, Aristotle recognizes that if the "antecedent" in a relation of conditional necessity is absolutely necessary, that absolute necessity is "passed on" to the "consequent." But he does not indicate whether such a situation obtains in the case of this example.

Although Aristotle's examples of conditional necessity generally are of the preceding two varieties – they either involve syllogistic reasoning or the necessary conditions for the attainment of some *telos* – he recognizes other sorts of conditional necessity as well. The sort of conditional necessity that involves matter seems closely connected to the "teleological" variety: for such-and-such sort of thing to be generated, it is necessary that the matter be of such-and-such a sort.[24] Aristotle may also recognize the existence of a sort of conditional necessity that involves the necessitation of an effect by "antecedent causes" (*aitia protera tō chronō*), although it is not clear to what extent he thinks this sort of conditional necessity actually obtains in nature.[25]

It is, I believe, fairly clear that all the sorts of conditional or hypothetical necessity can be treated formally as necessary conditionals. Although a rigorous treatment of necessary conditionals postdates Aristotle,[26] there seem to be two principal interpretive models of necessary conditionals implicit in his work.

The first I will call the "syllogistic-implication" model. We have seen that Aristotle explicitly holds that the conclusion of a valid syllogism is necessary relative to the truth of its premises. Aristotle frequently "transposes" what is an essentially logical model into the material mode. The result is that causes "*in rebus*" are often treated syllogistically: causation and logical implication are equated.[27] In view of the rather broad sense of the Greek words "*aitia*" and "*aition*" ("cause," reason, "explanation," etc.), this is not surprising. Nor is it an equation peculiar to Aristotle or ancient philosophy; we find, for example, Spinoza making the same move at the very beginning of the *Ethics*.[28]

A noteworthy employment of this equation occurs in one of Aristotle's

"standard" arguments for a "first cause." A version of this argument occurs in *Metaphysics* 2.2:

> Nor is it possible for a chain of final causes to extend to infinity . . . And the same is the case for a chain of essences. For with respect to intermediates ("middles" – *meson*), of which there is a former and a latter, it is necessary that the former be the *aition* ("cause," "explanation") of those that come after it. If it were necessary to say which of the three is the *aition*, we should say the first. Certainly not the last, for the final term [is the *aition*] of nothing. And not even the middle, for it [is the cause of only one]. (It does not matter whether there is one or more middle, nor whether there are an infinite or finite number). So with respect to a chain that is infinite in this manner, and with respect to the infinite generally, all the terms down to the one now present are middles; so that if there is no first term, there is no *aition* at all.[29]

For Aristotle, the most "scientific" mood of syllogism is "Barbara." What he has in mind in this passage can perhaps best be represented by a sorites of Barbara's. The present "effect" we want to explain is something of the form "All A's are B's". If there is no "first term" in the sorites, the result will look like the following:

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All E's are F's
All D's are E's
All C's are D's
All A's are C's
Conclusion: All A's are B's

Without an "ultimate" middle term X yielding a first or ultimate major premise "All X's are B's," we have no valid syllogism and, hence, no *aition* of the "effect" of all A's being B's at all.

While the occurrence of the syllogistic-implication model of conditional necessity and, thus, of "causation" is quite apparent in Aristotle's cosmology, there is another model of conditional necessity often found along side it. This second model represents a natural extension of the temporal-frequency model of absolute necessity to conditional necessity. The model can be abstractly characterized as follows: B is necessary relative to A if *whenever* A occurs, B occurs as well; or alternatively, if there is *no time* at which both A occurs and B does not occur. This temporal characterization of relative necessity is, in effect, the

"Diodorean" characterization of the conditional, which plays a crucial role in the Hellenistic debates concerning determinism.[30]

The influence of the temporal-frequency model of conditional necessity is not always apparent in metaphysical and cosmological contexts in the Aristotelian *corpus*. It is often most obvious where Aristotle is arguing for some modal logical principle. We find him, for example arguing in the *Metaphysics* for the modal entailment that a contemporary logician would represent as $L(A \supset B) \models L(MA \supset MB)$:

> Then it is also clear that if it is necessasry that B be the case if A is the case, then if A is possible, then it is necessary that B be possible. Now if it is not necessary [that B] be possible, nothing prevents its being impossible. Let A be possible. But then, when A is possible, nothing impossible follows if one were to assume the truth of A. But then [when A is assumed true] it is necesssary that B be true. But [B was supposed to be] impossible.[31]

Although the passage continues, the argument is really complete at this juncture. It is obviously a *reductio*. We assume the conditional necessity $L(A \supset B)$, the possibility of A, i.e., MA, and finally, for the sake of *reductio*, the impossibility of B – $\sim$MB. Now, if A is possible, an application of a fundamental Aristotelian modal principle entails that we should be able to assume the truth of A at some time or other without producing a contradiction.[32] But then the conditional necessity of B, given A, entails that B must be true at that same time. But (given the principle that an impossibility is never temporally realized), this contradicts the assumption that B is impossible. QED

This is exactly the sort of semantic argument that a contemporary modal logician, employing a "possible-worlds" semantic model, would produce. The difference is that, for Aristotle, "times" play the semantic role of possible worlds. The thoroughly temporal conception of the argument comes out most clearly in Aristotle's summary at the end of the chapter.

> The principle "if A is possible, then of necessity it is possible that B is the case" means this: that if A is the case at a given time (*hote*) and in the manner it is possible for it to be, then it is necessary that B be the case then (*tote*) and in that way.[33]

For a contemporary logician, this would be the sort of semantic account (possible worlds being substituted for times) appropriate for $L(A \supset B)$, rather than $L(MA \supset MB)$. The problem may in part derive from a reluctance on the part of Aristotle to admit that the conditional necessity of "B is necessary given A" (i.e., in our symbolism $L(A \supset B)$) could be true without A's actually being true. Despite what the contemporary logician

would regard as the confusion of the last lines of the chapter, it is clear that Aristotle's argument appeals to a temporal model of conditional or hypothetical necessity.

The last sort of necessity that I shall consider is both of philosophical interest and of considerable importance to the post-Aristotelian determinism debates. I refer to it here, as I have elsewhere,[34] as the temporally-relative variety of necessity, which pertains to particular or individual events and to the predication of properties of individual subjects.

The existence of this variety of necessity is virtually implicit in a fundamental Aristotelian modal doctrine: all past and present events are necessary. The various statements of this doctrine in the Aristotelian *corpus,* e.g., *Rhet.* 3.17.1418a3–5, EN 6.2.1139b7–9, and *De caelo* 1.12.283b13ff, have been enumerated by Hintikka.[35] Since all "past events" *were once* future events, it is clear that either (a) all events are at *all* times necessary or (b) the modal status of some events can vary relative to the time at which the assessment of modal status is made. If one does not wish to embrace alternative (a) – and Aristotle apparently does not wish to – one is led to a conception of necessity relative to time.

It seems quite natural to conceive of this temporally-relative necessity as a species of conditional necessity. What is necessary relative to a given time t, then, could be equated with what is conditionally necessary relative to "everything that is the case at t or at any time t′ in the 'past' of t." This interpretation obviously preserves the necessity at t of everything that occurs at t or in t's past because any such event *e* would occur as a "conjunct" in the antecedent of the conditional, $L(C_t \supset$ "*e* is the case"), where C_t is a specification of "everything that is the case at t or at any time t′ is t's past." Temporally-relative necessity then becomes equivalent to what some contemporary philosophers have termed "factual necessity."[36] What is factually necessary at a given time t is what is or has been the case at that time plus whatever is "logically or causally necessitated" by the circumstances obtaining at t. This variety of necessity is of particular interest because it seems, intuitively, to coincide with a notion of what events a person can or cannot "influence" at a given time: that is, "event *e* is factually necessary at time t" seems equivalent to "event *e* is *unpreventable* at time t."[37]

Temporally-relative or factual necessity is the variety of necessity implicit, I believe, in two of the best known passages in the Aristotelian *corpus* bearing on the determinism issue. In *De interpretatione* 9 what is at

issue is the necessary occurrence or necessary nonoccurrence (and, perhaps, the actual occurrence or actual nonoccurrence) of a sea battle tomorrow *relative to what is now the case.* In view of Aristotle's doctrine of the relative necessity of the present-and-past, there is no question concerning the necessity of a sea-battle's-occurrence-tomorrow (if one in fact then occurs) *relative to tomorrow and ever thereafter.*

Similarly, in *Metaphysics* 6.3 Aristotle is concerned least of all "future events" be tied by chains of conditional necessity to what is now the case. If all future events were bound to what is now the case, the result would be that all the future is necessary relative to what is now the case:

> Will this be the case or won't it? If it will, then something else will happen; if not, then not. And if this something else happens, then something *else* still, etc. And so it is clear that if time is always taken away from a definite time, one will come to the present. Thus: a given person will die by force if he goes out. And this will happen if he becomes thirsty. And this if something else. And thus one comes to what is the case now or to something that has already happened. For example, [he will go out] if he becomes thirsty. And this will happen if he is eating spicy food. And either this is the case or it isn't. So that, of necessity he will die, or [of necessity] he will not die. And if one should skip over to what has already happened, the same account holds. For this – I mean what has already happened – is still present in something or other.[38]

It is interesting to note that, when Alexander in his commentary on the *Prior Analytics* summarizes Aristotle's account of possibility, it is apparent that he is describing the temporally-relative sense of possibility. Aristotle's account, he says, is "midway between" that of Diodorus Cronus (for whom what is possible at time t is simply what happens either at t or later) and that of Philo (for whom the possibility of something's happening is to be judged by the mere internal "fitness" of the thing's happening regardless of external circumstances). For Aristotle, however,

> the possible is what is capable of coming-to-be, when it is not prevented from doing so, even if, in fact, it does not come-to-be.[39]

As we shall see, this account of possibility, minus the last clause, is identical to the Stoic account of possibility associated particularly with Chrysippus. The import of the last clause obviously is that there may be unrealized temporally-relative possibilities. The last clause in effect suggests a form of causal indeterminism: there may be "inherently possible" events the occurrence of which is *neither prevented nor necessitated* by antecedent circumstances.

We find, then, at least the preceding three varieties of necessity in Aristotle's writings: the "absolute," the "hypothetical" or

conditional, and the temporally-relative or factual. Of course, as was implied in the foregoing discussion, corresponding varieties of possibility can be defined. Still further distinctions can be drawn with respect to Aristotle's use of modal terms. For example, one of the best known is his distinction between possibility that is consistent with necessity and "two-sided possibility" or "contingency," i.e., a variety of possibility in which the possibility of the occurrence of event *e* entails the possibility of *e*'s nonoccurrence as well.[40] In terms of the following sections, however, the three varieties of modalities I have just briefly examined are of particular importance. Having outlined these three types of modal concept, I conclude this discussion of some of the difficulties involved in constructing a systematic account of Aristotle's conception of the modalities. We turn now to a passage in the *De caelo* where Aristotle purports to derive his temporal account of "absolute" necessity and possibility.

C. ARISTOTLE'S FUNDAMENTAL MODAL PRINCIPLE

Aristotle, as we have seen, accepts a "first-order" version of the plenitude principle for his concept of "absolute" necessity:

(T′) No absolute possibility remains unactualized through all time.

This principle, which constitutes the "controversial half" of the temporal-frequency conception of the (absolute) modalities, does not seem to have been regarded as an "ultimate premise" by Aristotle, however. A "metaphysical" derivation of the principle as a special case of the principle that nature does nothing in vain can be found in the commentators: specifically, denial of the principle would imply the existence of a potentiality that never gets actualized, i.e., a "vain" potentiality. And "nature does nothing in vain."[41] Aristotle himself, however, adduces what seems to be a "logical" argument for the principle in *De caelo* 1.12, a passage that has, in recent years, been examined in considerable detail by Hintikka, C. J. F. Williams and S. Waterlow.[42] I hope to establish that Aristotle's argument is more successful than either Williams or Hintikka believes it to be.

The argument relies on a fundamental modal principle frequently stated by Aristotle which, as Hintikka notes, seems almost definitional in character.[43] One statement of the principle occurs in *Prior Analytics* 1.13:

> By "to be possible" and "possibility" [two-directional] I mean that which, not being necessary, when it is supposed to be the case, nothing impossible results. (We speak of the necessary as being possible homonymously.)[44]

In practice, "hypothesizing" the possible as obtaining means supposing that what may or may not be possible is actually the case *at some time or other*. If this supposition or hypothesis, perhaps together with other unquestioned assumptions, entails an "impossibility" – normally an explicit contradiction – the hypothesis or supposition is impossible; if no such impossibility is entailed, the supposition is possible. In other words, the employment of the principle closely resembles the sort of contemporary "semantic" modal arguments in which, if a proposition p is possible, we are entitled to "construct" a possible world at which p is realized. If this procedure, together with some other assumptions, yields a possible world at which a contradiction obtains, we conclude that p, at least relative to our other assumptions, is not, after all, possible. The difference between the Aristotelian method of argumentation and the contemporary modal-semantic method is, of course, that for Aristotle "times" take the place of the "possible worlds" of contemporary modal semantic theory.

Aristotle at 281b16ff., makes what is, in effect, the *sensus divisus-sensus compositus* distinction with respect to *dynameis*. A person who has the *dynamis* (in a "two-directional" sense analogous to Aristotle's two-directional sense of possibility) of sitting also has the *dynamis* of standing (i.e., not sitting); but that does not mean that the person has the *dynamics* of standing *while* sitting, i.e., of sitting and standing simultaneously, "but only at *another* time." Aristotle continues:

> but if something has multiple powers in a infinite time, there is no "other time," but [these must be realized] together.[45]

So, to take a particular case, suppose that an eternally existent thing X is "corruptible" (*phtharton*). "Then it would have the power of not being." The latter is simply to say that it is possible that it does not exist. Suppose that this possibility is realized at any time t; i.e., X does not exist at t. Since X was also supposed to be eternal, it follows by universal instantiation that X exists at t. But as Aristotle says, it then follows (by addition), that there is some time t at which X both exists and does not exist. This is plainly impossible, i.e., a contradiction. Hence, it must be impossible that anything is both eternally existent and corruptible. Since a similar argument applies to eternally existent things that are supposed to be "generable" (*genēta*), it follows that anything that is eternally existent is necessarily existent (on the assumption that the conjunction of "ungenerable" and "incorruptible" is equivalent to "necessarily existent").[46]

Given Aristotle's fundamental modal principle as a premise, we must, I think, accept this argument as valid. In order to avoid the conclusion, Aristotle would have to postulate the existence of "other times" not included in that eternal interval of time throughout which our eternally existing X is assumed to exist. This would amount to postulating a nonlinear structure for time, a structure that includes times that are *never* actualized. A conception of time as a "branching" or "multilinear" structure containing times that are merely possible and never actual is not, I think, a very intuitive conception of time. One might perhaps more intuitively conceive of these "other," merely possible times *not* as possessing "ontological parity" with actual "clock time" but simply as representations of the *same* actual "clock time" characterized by *different* events.[47] This interpretation, however, seems to rely on a conception of times or time intervals as "containers" which are capable of containing different events: it is a merely contingent event that interval t is characterized by one sequence of events or one type of change rather than another. This is not Aristotle's conception of time however. Time, the "measure of motion and being moved" (*metron kinēseōs kai tou kineisthai*), seems to be "determined" by the *kinēseis* which characterize it.[48] So it seems doubtful that Aristotle would find coherent the conception of the "*same* time" being characterized by different events or *kinēseis*. Aristotle is left with actual "clock time" as the range of times at which a putative possibility may be "hypothesized" as realized.

While the application of the fundamental modal principle in *De caelo* 1.12 involves a perspective *sub specie aeternitatis*, it is clear that this sort of temporal perspective, in which time is viewed as a "completed" linearly ordered series of events, would cause Aristotle difficulties in applying the fundamental principle to individual objects and events. For example, is it possible relative to 420 B.C. that Socrates emigrate to Macedonia? According to the fundamental principle, Socrates' emigration is then impossible if there is no time at which this putative possibility can be supposed to be actualized without entailing an impossibility (specifically, a contradiction). If we pick 420 B.C. or any earlier time and suppose that Socrates then emigrates, we immediately produce a contradiction: for at 420 or any prior time, the past is *then* already determined; so it is also true that Socrates does *not* emigrate. Our supposition then entails that there is a time at which Socrates both does and does not emigrate.

Now, if the future relative to 420 B.C. is already *then* determined or

"settled," if, in other words, it is then already true that Socrates lives in Athens up until 399 B.C., at which time he is tried, executed, and therefore is no more, the same sort of argument can obviously be constructed. Suppose that, as the time at which we suppose the putative possibility of Socrates' emigrating is realized, we pick some time after 420 B.C. Then, this supposition, together with our assumption about the truth of future propositions having been already established, entails that there is a time at which Socrates both does and does not emigrate. The upshot is that the fundamental modal principle allows for "unrealized possibilities" *only* if time is not regarded, at least in its totality, as "already" determinate and fixed.

As far as I am aware, Aristotle nowhere explicitly applies his fundamental principle of possibility to putative possibilities pertaining to individual events in exactly this way. It is, however a natural application of the principle and an application explicitly made by the Peripatetic Alexander of Aphrodisias. For exâmple, in *Quaestio* 1.4, we find the following passage:

> Suppose the possible is this: that from which the postulation of its existence nothing impossible follows. Then, for one postulating the existence of anything the contradictory of which is said beforehand [or "antecedently" – *prolegomenon*] to be true, the impossibility will follow that the same thing both is and is not at the same time. None of those things with respect to which one part of a pair of contradictory propositions pertaining to the future rather than the other is separately [or definitely – *aphōrismenōs*] true would exist contingently. And they [evidently, the Stoics] say that with respect to all things, one part rather than the other of a pair of contradictories is separately true.[49]

As Alexander implies, the fundamental principle here yields a contradiction because of the assumption that the truth of future events is already "fixed." As I have argued elsewhere,[50] however, Aristotle does not have the sort of McTaggart B-series conception of time that might naturally give rise to this assumption. Rather, his conception of time combines elements of both the "dynamic-present" (*nunc fluens*) and the "static-relational" models of time. In *Physics* 4 his basic conception is that of the token reflective "now" "laying down" a "static," linearly ordered, continuous series of events or states of affairs. His operative simile is that of the "now" and its present-past to a moving object and its trajectory or to a geometrical point and the line generated by its "fluxion."[51] This dynamic model of time leaves the past fixed but continuously "supplemented," and the future at least partially indeterminate.

The consequences for the application of the fundamental principle of

possibility to putative possibilities pertaining to individual things and events nicely fits Aristotle's actual doctrines concerning the temporally-relative or "factual" modalities. Since the present-and-past, relative to a given time, is fixed, the truth values of any proposition possessing a "*genuinely* present or past" temporal reference will be determinate. Consequently, the hypothesizing of the realization of any putative possibility pertaining to the present or past will yield a contradiction unless the possibility actually was realized at the time chosen for the hypothesization. This consequence corresponds with Aristotle's doctrine of the "necessity of the past": put formally, all true propositions with "genuinely"[52] present or past temporal reference are necessary, relative to the time of assessment; all false ones impossible.

The future, however, is not entirely similarly determinate with respect to a given "now." Consequently, hypothesizing that a putative possibility is realized at some future time need not lead to contradiction even if that possibility "turns out" not to be actually realized. For example, it was perhaps not determinately true in 420 B.C. that Socrates would remain an Athenian citizen and resident up through 399 B.C. and then be executed. If not, hypothesizing the realization, at some then-future time, of the putative possibility of his emigrating to Macedonia would not *then* have yielded a contradiction. Thus, it would *then* have been a genuine possibility, according to the fundamental principle.

Here, I believe, we see something of why Aristotle characterizes possibility (in *Prior Analytics* 1.13), in one of its senses, as "the indeterminate" (*to aoriston*).[53] It is not at all obvious, however, precisely what this indeterminacy amounts to. It is this issue I grapple with in the following sections.

D. ABSOLUTE NECESSITY AND THE ULTIMATE MOVER

One of the salient features of Aristotle's cosmology is his postulation of an absolutely necessary (and, of course, eternal) ultimate cause or principle (*archē*) of change. "Postulation," in its contemporary sense, is perhaps a misleading term to use here, since Aristotle does *argue* for the existence of such a first mover. The argument in *Physics* 8 relies on his fundamental modal principle. If there is not a *necessarily* existent (and *necessarily* "moving") source of motion, it is possible, Aristotle claims, that there should be a time when

none of the things that exist is in motion (*kineisthai*), since the accidental is not necessary, but may possibly not exist. But if we hypothesize that the possible exists, nothing impossible – although perhaps something false – will follow. But the non-existence of motion is impossible; for it was shown earlier that it is necessary that there always be motion.[54]

What appears to be Aristotle's principal argument for the eternity of motion is stated in the first chapter of *Physics* 8:

"if time is the 'number of motion' or some sort of motion, then if time always is, it is necessary that motion be eternal."[55]

And, according to Aristotle, it is conceptually incoherent to postulate a beginning or end of time.

If we look at Aristotle's cosmology in its broadest outlines, then, we find a "chain" of "causes" or *aitia* extending from a necessary first mover. Now, if each link in this chain represents a link of *conditional* necessity (i.e., a necessary conditional), the *absolute* necessity of the first *aition* will be "passed down" to each successive "term" in the chain. For Aristotle accepts the modal principle that from Lp and L(p ⊃ q), Lq follows, an entailment derivable from *modus ponens* and the axiom of "distribution" L(p ⊃ q) ⊃ (Lp ⊃ Lq) of the "minimal" modal logic normally referred to as "K".

Early in the "chain" necessary *being* becomes necessary coming-to-be (*genesis*), as Aristotle explains in *On Generation and Corruption*:

Since (a) we say that nature always strives for the better in all things, (b) being is better than not being . . ., but (c) it is impossible that being should belong to all things on account of their being situated too far from the first source, God, in the remaining way, filled up the universe by having made coming-to-be perpetual. For thus would being be especially closely "knit together": because continual coming-to-be is the sort of coming-to-be that is closest to the being of being (*ousias*). The cause of this, as has often been said, is cyclical motion. For it alone is continuous.[56]

In *De gen. et corr.* 2.11 Aristotle actually argues that absolutely necessary genesis or coming-to-be must be eternally recurrent or cyclical coming-to-be, because it is only cyclical coming-to-be that can be said to be *always* coming-to-be and, hence, by the now familiar equation of "always" and "necessarily," said to be necessarily (in the *haplōs* sense) coming-to-be. The necessary coming-to-be consequent upon the necessary being of the first cause is, Aristotle holds, especially manifest in the supralunary region:

. . . these results [i.e., concerning the identification of cyclical and necessary being] are reasonable, since cyclical motion, that is, the motion of the heavens, has elsewhere been

shown to be eternal, because the motion of the heavens and whatever motions occur on account of (*dia*) it occurs and will occur of necessity. For if that which moves in a cycle is always moving something, it is necessary that the motion of these be cyclical. For example, the upper motion being cyclical, the sun moves in the same way. And since the sun moves thus, the seasons, on account of this, come to be and return upon themselves cyclically; and so also the coming-to-be of the things dependent upon these.[57]

The question, then, is why the asolutely necessary coming-to-be that is "passed along" a chain of *aitia* from the first mover through the heavens does not extend into the sublunary realm as well? In other words, why, in view of Aristotle's general cosmological model, is not *all* coming-to-be absolutely necessary? The most abstract answer to this question seems to be that the "chain" of *conditional* necessity by which the absolute necessity of the first mover is "passed down" through the *cosmos* must be somehow "broken." It is this sort of viewpoint, I believe, that leads to the distinctive and difficult Peripatetic doctrine of "accidental causation."

While we may be tempted to think of the chain of causation extending through the supralunary realm in terms of "Newtonian" efficient causation, it is clear that Aristotle conceives of it chiefly in terms of final causation, which, in the realm of *physis,* coincides with formal causation. In *De caelo* 2.12, for example, he remarks that "it is necessary to conceive [of the heavenly bodies] as sharing in action (*praxeōs*) and life.[58] Thus, they have "goods" or "ends" and "natural motions or *kinēseis*" that are conducive to those ends. In *Physics* 8.4, Aristotle comments that in the case of these natural *kinesēis,* it is difficult to locate the source of the motion. The source is not, in general, the "subject" of the *kinēsis* itself "because this [i.e., self-movement] is characteristic of life and peculiar to ensouled things.[59] At the end of the chapter, Aristotle decides that in the case of natural *kinēseis* that are not "self-derived" the source is either what makes the subject of the sort of thing it is – for example, the light or the heavy is naturally moved "by that which brings it into existence and makes it light or heavy" – or what releases it from "what hinders and prevents" it from attaining its natural end.[60]

The general picture seems to be that something of a given kind receives the *hormē* or *conatus* productive of the natural *kinēsis* leading to its proper good derivatively through the chain of causation extending from the first mover. As Aristotle stresses in *Metaphysics* 9.5 and 9.7, whether the possession of this *hormē* counts as a genuine "potentiality" (*dynamis*)[61] depends on the absence or presence of circumstances that might "prevent" (*kōluein*) the attainment of the proper end through the

related natural *kinēseis*:

> for something has a potentiality that is the power of "doing" (*tou poiein*); it is not a potentiality unrestrictedly but qualifiedly; and among the qualifications is that external preventing circumstances shall be excluded. (*aphoristhēsetai kai ta exō kōluonta*).[62]

The idea that a thing "naturally attains its proper end" or "fulfills its nature" unless prevented from doing so is reinforced by Aristotle's model of the *energeia-kinēsis* distinction. This model derives from Greek grammar. In particular, the Greek verb system is fundamentally aspectual rather than temporal. A basic contrast obtains between the "attained state" associated with the perfect "tenses" (the *syntelestikos*) and the activity leading to the attainment of that state associated with the various imperfective "tenses" (the *paratatikos*). Aristotle tends to associate *kinēseis* with the latter verb forms and the *energeiai,* in which these *kinēseis* issue, with the former.[63] And within this framework, it is natural to view, e.g., being cured (*hygiasthai*) as the "natural outcome" of the *kinēsis* of healing (*hygiazesthai*)[64] unless the process is somehow unnaturally interrupted or "hindered."

So we have a chain of final/formal causation extending from the first mover "down through" the *cosmos.* Unless this chain were broken or disrupted the absolute necessity of the first mover would be passed along the chain with the result that all coming-to-be would also be absolutely necessary. But according to the temporal frequency conception of the modalities, all coming-to-be would then by cyclical or eternally recurrent. In the supralunary region, we in fact find this cyclical pattern of *genesis.* And even in the sublunary region cosmological processes, "painted broadly," tend to be cyclical or recurrent; e.g., there is the cycle of seasons,the cyclical pattern of the "transmutation" of the four elements,[65] and even eternally recurrent patterns of generation, growth, maturation, decay, and perishing among natural kinds of things. But, it is obvious that not all sublunary processes are, in the fine detail, cyclical. This entails, for Aristotle, that the chain of conditional necessity extending from the first mover is somehow broken in the sublunary region. His fundamental explanation of how this rupture occurs invokes circumstances that "prevent" the natural *kinēsis* of a thing from issuing in the attainment of that thing's proper good. These "preventing factors," which were to become so important in later Hellenistic accounts of possibility, seem to be of two basic varieties for Aristotle: accidental (*kata symbebēkos*) causes and rational choice. We shall soon turn our attention to these phenomena.

However, it is first worthwhile to note a certain ambivalence of attitude on the part of Aristotle – and in the later Peripatetic tradition, in general – to these "extrinsic" factors. Our characterization of them has thus far been essentially "negative": they *interfere with* or *prevent* the absolute necessity of the first mover from being transmitted down the chain of causation extending from the first mover by *breaking* the linkage of conditional necessity constituting the chain. On the other hand, Aristotle seems to recognize that certain types of things *require*, in order to realize their proper good, the "assistance" of the very sort of external factor through which the possibility of "outside interference" – in other words, the sundering of the chain of conditional necessity extending from the absolutely necessary first mover – can occur. In *De gen. et corr.* 2.10 Aristotle comments that

> it many times happens that things perish in too short a time because of the combining together (*syngkrasin*) of factors; for their matter being irregular (*anōmalou*) and not everywhere the same, their coming-to-be is necessarily irregular, in some cases too swift and in some, too slow.[66]

In *Quaestio* 3.5 Alexander makes the point even more explicitly. I quote from the translation of R. W. Sharples:

> But summers and autumns and winters are no longer determinate in the same way [as solstices], although they come to be in a circle and they too follow on the motion of the eternal [bodies], because matter too contributes to their coming to be, being affected by the movements of [the eternal bodies]; and since [matter] does not everywhere, in the way in which it is affected, follow the movements and revolutions of [the eternal bodies] in the same way, [for this reason the seasons] are not determinate in the particular details [of the way in which and the time at which they come to be] in the same way [as are the solstices and equinoxes].
>
> And indeterminacy is still more [present] in those things that need more things to contribute [*synergouton*] to their being; and among these is the coming-to-be of living creatures. And for this reason it is true of them, speaking generally, that each of them is eternal as regards the species (and the cause of this [eternity] is the revolution of the divine [bodies]); but [as for] the coming-to-be of individuals, in the case of which the cause from the proximate efficient [factors] has the greatest influence, of these "if what is first, [then] of necessity what is later" is not true.[67]

The more "positive" attitude toward "external factors" manifest in these passages may represent an implicit employment of a "second-order" version of the plentitude principle: the *cosmos* is actually "filled" with all the different possible *kinds* of things, and it is "good" that this should be the case. It then follows that there are kinds of things which require more in the way of "external circumstances" than other kinds of things in order

to realize their proper ends. For these kinds of things the processes involved in realizing their ends are more complicated. And it is *better* that the *cosmos* should contain such sorts of thing than that it should lack them, being constituted, say, only of the heavenly bodies. It may plausibly be suggested that the Aristotelian conception of the proper good and attendant natural *kinēsis* of a thing, which is derived from first mover – or at least, the *hormē* to this *kinēsis* which is derived from the first mover – anticipates the "perfect and principal" (*perfectae et principales*) causes of the Stoics, and of Chrysippus, in particular. And it seems equally reasonable to see in the more favourable attitude toward the external factors operative in change at the sublunary level, an anticipation of the Stoic "assisting and proximate" (*adiuvantes et proximae*) causes identified with the working of fate (*heimarmenē*).[68] This suggestion will be further explored in Chapters IV and VII. We now turn, however, to the central issue of "metaphysical determinism" in the Aristotelian *corpus*.

E. ARISTOTLE AND DETERMINISM

It is a truism that the particular form the "issue of determinism" takes in a particular epoch and a particular place is influenced by the intellectual and cultural history of that epoch and place plus the fundamental philosophical, theological, or scientific concerns of its denizens. For example, in the Renaissance and "Early Modern" period the issue of determinism was invariably connected with the issue of the operation of God's grace.[69] After Newtonian physics had become well established, the issue was often cast in terms of the question of whether the "mental realm" is governed by laws analogous to those mechanistic ones thought to determinately characterize the physical realm. With the advent of quantum physics, the issue is often connected with the question of whether the "probabilistic laws" of particle physics reflect a "metaphysical" or an "epistemological" indeterminacy, and, if the former, what the consequences are at the *macroscopic* level, particularly for "freedom of the will."

In view of the variety of forms that the "issue of determinism" can assume, it is perhaps useful to begin this section with a brief discussion of some of these forms before we move to the question of whether Aristotle is rightly denominated a determinist. Since there is no standard nomenclature for the forms of determinism I discuss, the following several

paragraphs may be regarded, in part, as supplying some definitions for use not just in the following section but throughout this book.

"Fatalism" is a term that derives from the Latin "*fatum*," which was the normal Latin translation of the Greek "*heimarmenē*". As is noted in the pseudo-Aristotelian *De mundo*, a common etymology derived the Greek term from the verb "*eirō*", "to fasten or join together."[70] And the characterization of fate as a "chain of causes" (*heirmon aitiōn*), with the implicit etymology, was also quite common.[71] The different treatments of *heimarmenē* in post-Aristotelian philosophy will be dealt with later. Here I distinguish a contemporary use of the term "fatalism," a sense sometimes attached to the phrase "logical determinism" as well. Fatalism, in this sense, may be characterized as the view that from the "mere" truth of a proposition, its "necessity" (in something like the sense of the "necessity of unpreventability") follows, and from the "mere" falsity of a proposition, its impossibility (in an analogous sense of the "impossibility of uneffectability") follows. Richard Taylor, who has used the term in this way, characterizes the "problem of fatalism" as the problem of "trying to reconcile the generally accepted belief that all statements are either true or false with the view that . . . people sometimes act freely" ("in the sense that they could have avoided doing what they actually did"). He adds that the problem of fatalism has "nothing to do with cause and effect; it has to do instead with true and false."[72]

I extend the term to include the view that from the omniscience *alone* of some omniscient being, it follows that all true propositions are necessary (again, in the sense of necessity of unpreventability), all false ones impossible in the analogous sense. Although this extension of the term is perhaps not standard, I believe that it is justified by the fact that many of the "standard" classical (and contemporary) arguments invoked in support of both these views are instances of the modal fallacy of the inferrence of *necessitas consequentis* from *necessitas consequentiae* (or "Sleigh's fallacy," as it is often called in contemporary analytic philosophical circles). Consider the following two arguments:

(A) Premise 1: Tomorrow I shall have eggs for breakfast.
Premise 2: It is necessary that, if tomorrow I shall have eggs for breakfast, then I shall do nothing beforehand to make it false that tomorrow I have eggs for breakfast.

Conclusion: It is necessary that I shall do nothing beforehand to make it false that tomorrow I have eggs for breakfast.

(B) Premise 1: God foreknew that Peter would deny Him (i.e., Christ).

Premise 2: It is necessary that if God foreknew that Peter would deny Him, then Peter would do nothing beforehand to make it false that he denied Christ.

Conclusion: It is necessary that Peter do nothing beforehand to make it false that he would deny Christ.

In argument (A) universal bivalence plus the "law of excluded middle" entail that either Premise 1 is true or its negation is true. In the latter case, an analogous argument to the effect that it is necessary that I do nothing to make it *true* that tomorrow I have eggs for breakfast could be constructed. In argument (B) the truth of Premise 1 follows from God's omniscience plus the fact of Peter's betrayal of Christ. The second premises of the arguments seem unexceptionable: that of (A) simply explicates part of the sense of "true" and "false," while that of (B) states part of what we mean by "foreknows" or just plain "knows," for that matter. However, in neither case does the respective conclusion follow. The most that we could infer is the "assertoric" (i.e., non-modal) version of the conclusions. But there would be nothing paradoxical or untoward about *those* conclusions, which would simply state "matters of fact" about what I and Peter *actually* do. In order to obtain the "apodictic" conclusions as they stand, the necessitations of the first premises would be required. But that would require some very special, additional assumptions about future truth and falsity and God's nature, respectively: more than "*mere*" bivalence, i.e., the *mere* truth and falsity of every proposition, and more than the "*mere*" omniscience of God would be involved.

In contrast to fatalism or logical determinism, many contemporary philosophers would distinguish causal determinism. This may be loosely characterized as the view that for each and every event or occurrence there is a "necessitating cause" responsible for bringing it about. The "cause" here need not, of course, be "simple" but may be a very complex state of affairs. Although there are conceivable variations, the "modern" conception of causal determinism is, I think, usually a Laplacean one. The universe is conceived as a succession of "world states," each of which can be analyzed as a congeries of "solid, massy" bodies possessing shape,

position, and "instantaneous" velocity. Laplace's own famous characterization of causal determinism is then particularly apposite: an omniscient being, possessing "complete" knowledge of any world state, thus analyzed, and the Newtonian natural laws could deduce the entire subsequent history of the universe.

Although Laplacean determinism depends upon a particular scientific view of the world, a very roughly analogous form of causal determinism is to be found in post-Artistotelian ancient philosophy. Its principal proponents were the Stoics who developed a conception of "invincible" fate. So, paradoxically, *ancient* fatalism is more akin to what I have called causal determinism than "fatalism" in the more contemporary, philosophical sense of the term. This is not to say that one cannot find in antiquity views more or less corresponding to fatalism or logical determinism, in the contemporary sense, and arguments more or less similar to those modally falacious ones that I rehearsed in my characterization of fatalism.

However, due principally to views of time different from the most common contemporary view, fatalism, in the contemporary sense, and causal determinism are not so easily distinguished in ancient philosophical thought as my characterization of them may suggest that they should be. For example, suppose that someone holds (I) that all "genuinely" past or present states of affairs or events are *now* necessary (in the sense of unpreventable or unalterable). Suppose further that this person's conception of time is such that he finds it "natural" to maintain (II) that a proposition pertaining to the future is *now* true only if the event or state of affairs referred to is a causally necessary consequence of some "genuinely" past or present state of affairs and that a proposition with future signification is *now* false only if it is "causally precluded or prevented" by some genuinely past or present state of affairs. For such an individual, it follows that any proposition pertaining to the future is now necessary, in the relevant sense, if now true, now impossible, if now false. If the person additionally wishes to avoid "fatalism," the most plausible move is to maintain that due to the "indeterminacy of the future" the principle of bivalence must be somehow restricted with respect to "future contingent" propositions. Unless all the steps in the argument are spelled out clearly and in detail, it may seem that the person has been led to this conclusion by some version of "Sleigh's fallacy." But this is not so; considerations pertaining to causal determinism are the operative factors here.

With this rather abstract preface, I turn to the question of whether Aristotle may be said to embrace either fatalism or causal determinism. No one, insofar as I am aware, has ever claimed that Aristotle embraced fatalism, in the contemporary sense. Some contemporary authors have concluded, however, – largely on the basis of *De int.* 9 and its future sea-battles – that Aristotle *feared* being forced into fatalism and was led, as a consequence, to restrict the bivalence principle with respect to propositions pertaining to the future. They maintain that Aristotle's fears are unwarranted, however, because he falls victim to "Sleigh's fallacy" or some closely related error in modal reasoning.[73] There is also a "revisionist" view, represented pre-eminently by Professor G. E. M. Anscombe, which maintains that Aristotle begins *De int.* 9 with the consideration of a modally falacious argument that would lead to the unpalatable alternative of either embracing fatalism or restricting bivalence (and perhaps "excluded middle"). But, according to this view, Aristotle comes to see the modal error in the course of the chapter, thus concluding that he can maintain unrestricted bivalence without being committed to fatalism.[74]

With respect to both these views, I must confess skepticism. I find it difficult to believe that Aristotle, in *De int.* 9 falls victim in a rather simple-minded way to a modal fallacy he elsewhere gives evidence of being quite aware of.[75] Aristotle's errors are rarely simple-minded ones. On the other hand, I do not find clear evidence in the chapter that Aristotle sees that what initially troubles him turns out to depend on something like "Sleigh's fallacy."[76] I have, in effect, argued elsewhere that Aristotle, who holds that past and present are relatively necessary and who holds a view of time that entails the present "nonactuality" of the future, fits the abstract scenario of the philosopher whose concern is with the question of whether universal causal determination or "necessitation" obtains.[77]

It is natural for us to conceive of the question of whether Aristotle is a causal determinist in terms of something like the Laplacean paradigm of casual determinism. We should not, however, expect Aristotle, who, after all, did not write in the eighteenth century, to address the issue of determinism in terms of the same paradigm. In order to find some middle ground for discussion, the question of whether Aristotle is a causal determinist can perhaps be recast as the question of whether Aristotle holds that every instance of coming-to-be or *metabolē,* change in general, is the effect of necessitating *aitia.* In other words, the question becomes

whether every such event stands as the "consequent" or "apodosis" in a relation of conditional necessity of which the conjunction of the event's *aitia* constitutes the "antecedent" or "protasis." Artistotle's explicit answer to this question appears to be that not every event stands as the conditionally or hypothetically necessary consequent of some cause or complex of causes. According to Aristotle's conception of "accidental causes," it seems that an accidental cause is not thought by him to be a *necessitating* cause. When the contemporary reader of Aristotle examines his discussions of accidental causes, however, this "short answer" to the question is likely to strike him as unsatisfactory.

I believe that the source of the frustration a contemporary reader of Aristotle is likely to feel with respect to this issue stems largely from the fact that there are two conceptions of causation represented by Aristotle's two models of hypothetical or conditional necessity. The complex, and often obscure, interaction between these two conceptions of causation, which characterizes much of the history of Western metaphysics, perhaps begins with Aristotle.

Aristotle's syllogistic-implication model of conditional necessity represents a conception of causation in terms of a conceptual or logical entailment relation. This conception is often identified as the "rationalist" notion of causation. In the "Way of Ideas" tradition of Modern Western philosophy, it becomes a conceptual relation among the "*contents*" of ideas. Benedict Spinoza's proof of Proposition III, Part I of the *Ethics* provides a classical illustration of this conception of causation:

> Prop. III. If two things have nothing in common with one another, one cannot be the cause of the other.
> Demonst. – If they have nothing mutually in common with one another, they cannot (Ax. 5) through one another be mutually understood, and therefore (Ax. 4) one cannot be the cause of the other.[78]

Aristotle's temporal-frequency conception of conditional necessity represents a different, usually competing conception of causation characterized by J. H. Randall, Jr. as "an inherent, nonrelation 'power' or 'force' to produce certain effects that are observable."[79] This conception of causation, although often denominated as "empiricist," is certainly not confined to the thought of the classical Modern empiricists. It is this conception of causation, however, that gives rise to the classical accounts of causation by Hume and Kant: their analyses grow out of the problem of attempting to explain the conditional *necessity* postulated as obtaining

between cause and effect while, at the same time, asserting the lack of a relation of conceptual or logical *entailment* between the "idea of the cause" and the "idea of the effect." To quote from the "Transcendental Deduction" of Kant's *Critique of Pure Reason*:

> For this concept makes strict demand that something, A, should be such that something, B, follows from it *necessarily and in accordance with an absolutely universal rule.* Appearances do indeed present cases from which a rule can be obtained according to which something usually happens, but they never prove the sequence to be *necessary.* To the synthesis of the cause and effect there belongs a dignity which cannot be empirically expressed, namely, that the effect not only succeeds upon the cause, but that it is posited *through* it and arises *out of* it.[80]

One function of the Aristotelian notion of an accidental cause is, as we have seen, to "break" the chain of conditional necessity transmitting the absolute necessity of the first cause "down through" the *cosmos.* The question almost certain to occur to a contemporary reader, however, is whether the "complex" of circumstances involved in the occurrence of an event, which may include "accidental" causes, does not necessitate the occurrence of the event. In supplying a negative answer to this question Aristotle often seems to rely on his syllogistic-implication model of conditional necessity.

Aristotle's stringent account, in the *Posterior Analytics,* of what counts as "scientific knowledge" (*epistēmē*) entails, as he puts it that

> accordingly, if something is known demonstratively, it must obtain of necessity and, clearly, its demonstration must be through a necessary middle term . . . Of accidents that are not essential (*mē kath' hauta*) – in the manner in which I define "essential" – there can be no demonstrative knowledge. For it is not possible to demonstrate an accidental conclusion of necessity, since it may happen that what is accidental, according to my use of "accidental," does not obtain.[81]

Why cannot there be necessary demonstration, in the sense of *conditionally* necessary demonstration, of what is accidental? In *Prior Analytics* 1.13 Aristotle notes that "science and demonstrative syllogistic do not pertain to what is 'indefinite' (*aoristōn*)."[82] And in *Physics* 2.5 he explains that "the essential (*kath' hauto*) cause of something is definite, but the accidental cause is indefinite (*to de kata symbebēkos aoriston*)."[83]

The latter passage, which occurs in Aristotle's well known discussion of chance and spontaneity (*to apo tuchēs* and *to automaton*) in the *Physics,* is followed by an illustration clarifying the import of terms such as "*aoriston*" ("indefinite") and "*apeiron*" ("limitless") in Aristotle's discussion of accidental causation:

For example, someone who is engaged in collecting subscriptions for a feast would have gone [to a certain place] for the purpose of getting money, if he had known. But he did not go for that purpose, and he only chanced to get the money by going there. And this was not due to the fact that he frequented the place often or of necessity. Nor is the end effected, the recovery [of the money], a cause present in the individual – it belongs to the class of things that are chosen and the result of thought. He is then [i.e., when the foregoing conditions are satisfied] said to have gone there "by chance" (*apo tuchēs*) . . .. It is the case that what occurs by chance occurs accidentally, and chance is a cause considered as an accident. But it is not the cause absolutely [i.e., without qualification] of anything (*kata symbebēkos gar gignetai, kai estin aition hōs symbebēkos; hē tuchē hōs d'haplōs oudenos*). For instance, a housebuilder is the cause of a house: accidentally, a flute player [may be]. And the causes of the person's coming and getting the money, when he did not come on account of that, are innumerable: wishing to see someone, following someone, avoiding someone, or going to see a spectacle. Thus to say that chance is a thing contrary to rule (*paralogon*) is correct. For "rule" (*logos*) applies to what is always the case or for the most part the case, whereas chance [is found] among things that happen other than these.[84]

The "indefiniteness" or "indeterminacy" of accidental causes lies in the fact that there are an indeterminate number of *aitia* that might be invoked as explanations of the occurrences of events *of that type.* The contemporary reader is, I believe, likely to question the relevance of this point to the claim that accidental causes do not necessitate their effects. However, if we interpret "necessitation," i.e., the relation of conditional or hypothetical necessity, in terms of *syllogistic implication*, we may be able to see the relevance of Aristotle's point.

According to the syllogistic-implication conception of conditional necessity, B is conditionally necessary, given A, if B is "scientifically" derivable from A. Now, if A in an "accidental cause" of B and if there are an indeterminate or innumerable number of accidental causes of events of the same type as B, we might conclude, with some reason, that in order to "logically derive" the occurrence of B from a proposition expressing the occurrence of *any* of the "accidental causes" of B (i.e., A_1, A_2, A_3, . . .), one would require an infinite number of "axioms" or "ultimate premises" (e.g., "if A_1, then B," "if A_2, then B," "if A_3, then B," . . .) in the relevant "science." But Aristotle is scarcely willing to allow that a legitimate *epistēmē* may have an infinite number of basic axioms or postulates.

Why does not a similar problem arise for the Laplacean determinist, who claims that an observer possessing the Newtonian laws and a specification of an initial "world state" could, in principle, *deduce* the remaining history of the universe? The answer seems to be that Laplacean determinism is reductionistic: the Laplacean determinist holds that there is an adequate scientific description of any "initial state" and any effect in

terms of "matter in motion." Consequently, there is some hope of obtaining a finite set of "covering laws" adequate for deducing the effects of any given "world state" thus reductively described. Aristotle does not subscribe to such a reductionist world view, however. And without some such reductionist view, it does seem implausible that an *epistēmē* with a finite number of axioms or postulates could ever be complete or "rich" enough to allow us to deduce an effect B from any randomly selected accidental cause, in Aristotle's sense of the term, of any event of that type.

Let us assume, with Aristotle, that the appearance of implausibility here is correct, that there indeed can be no finite and, thus, adequate *epistēmē* that allows us to deduce an occurrence of type B from any one of its putative "accidental causes." We might reply that this is merely an "epistemological fact" perfectly compatible with strict causal determinism. In other words, it may be that any purported "accidental cause" A_1 necessitates effect B although I cannot construct an *epistēmē* with a finite set of "covering laws" that allows me to deduce the occurrence of B from the specification of any randomly selected "accidental cause" of events of type B. Note that, in this response, we have moved away from the "rationalist" conception of "cause," "necessitation," or "conditional/hypothetical necessity" as a *relation of logical implication* or a relation among the "contents of ideas" to Randall's "empiricist" conception of cause, necessitation, or conditional/hypothetical necessity as "an inherent, nonrelational 'power' or 'force' to produce certain effects that are observable."

Such, apparently, is the move that Spinoza implicitly makes in the *Ethics*. Prop. XXVII of Part I of the *Ethics* reads as follows:

> An individual thing, or a thing which is finite and which has a determinate existence, cannot exist nor be determined to action unless it be determined to existence and action by another cause which is also finite and has a determinate existence; and again, this cause cannot exist nor be determined to action unless by another cause which is also finite and determined to existence and action, and so on *ad infinitum* . . . . But the finite and determinate could not follow from God, or from any one of His attributes, so far as that attribute is affected with a modification which is eternal and infinite.[85]

The upshot of this proposition is that the existence and affects of "finite modes of substance," that is, the occurrence of *individual* "objects" and events, are not deducible from the axioms, postulates, and definitions of the *Ethics*, which pertain to "infinite substance," *Deus sive Natura*, and its infinite attributes. Since Spinoza preeminently holds a "rationalist" conception of causation or conditional necessity (necessitation), one

might expect him to deny, consequently, that finite modes of substance are necessitated. He does not deny necessitation, however:

> Prop. XXIX. – In nature there is nothing contingent, but all things are determined from the necessity of the divine nature to exist and act in a certain manner.[86]

Spinoza invokes an infinite temporal chain of finite "causes" to account for the necessitation of finite modes of substance. This move seems to be, in effect, an implicit appeal to a different, "empiricist" conception of causation or necessitation as "an inherent, nonrelational 'power' or 'force' to produce certain effects." However, it seems likely that Spinoza was sufficiently influenced by the emerging mechanics of his day to believe that, at least with respect to finite modes of the attribute of extension, the occurrence of such a finite mode could be deduced from the covering laws of a finitely axiomatized physics *plus the statement of an "initial condition."* However, the statement of the initial condition will involve reference to another "finite mode," and in order to deduce *its* occurrence, one must appeal to the "laws of mechanics" plus a further "initial condition," and "finite mode," etc. *ad infinitum.*

For Spinoza the significance of the *"ad infinitum"* seems to be that such finite modes are not "really knowable." For Aristotle, an infinite temporal chain of accidental causes would have at least this significance.[87] However, due to the fact that Aristotle is unwilling to countenance the possibility of a chain of conditional necessity with no ultimate member, it is unlikely that he would recognize such an infinite chain of accidental causes as a chain of *necessitating* causes or conditional necessity at all.

Yet, as we have seen, the "rationalistic" conception of necessitation or conditional/hypothetical necessity is not Aristotle's only conception. There is also his "proto-empiricist," temporal-frequency conception: B is conditionally necessary, given A, if *whenever* A obtains, so does B or, equivalently, if it is *never* the case that A obtains without B's also obtaining. If, in terms of his "rationalistic" syllogistic-implication model of conditional necessity, Aristotle has some basis for his claim that accidental causes do not stand in a relation of conditional necessity to their effects, does he also have grounds for the analogous claim in terms of his "empiricist" model of conditional necessity? Unfortunately, there does not seem to be a straightforward answer to this question, which the contemporary philosopher may regard as central to the question of Aristotle's determinism. In general, Aristotle seems to hold an "indeterminist" position with respect to his "empiricist," as well as his "ration-

alist," conception of conditional necessity. However, whether this position is uncritically adopted and rather naive, or whether it is well-considered and rather sophisticated is an open question. Different texts point in different directions.

In Aristotle's discussions of what occurs "by chance" (*to apo tuchēs*) and what occurs spontaneously (*to automaton*) in the *Physics* and *Metaphysics*, the temporal-frequency conception of conditional necessity, as well as the syllogistic implication conception, are in evidence. In fact, in *Meta* 6.2 there is an argument for the existence of the "accidental," which Aristotle believes to ground both chance events and spontaneous events.[88] The argument is a very simple one:

> so that since not all the things that are or come to be do so of necessity and always, but most things do so only for the most part, it is necessary that that which is accidentally must exist.[89]

"Of necessity" (*ex anangkēs*) and "always" (*aei*) are in apposition here, I believe. By this equation of "always" and "necessarily" it becomes clear, so Aristotle apparently believes, that conditional necessity does not obtain in the case of all causal sequences. For example, a man digs a hole for a plant in his garden with the result that he finds buried treasure. His desire to plant in his garden or, more immediately, his digging a hole in the garden, is, according to Aristotle, the "accidental cause" of his finding buried treasure. But it does not *always* happen that when a man desires to plant or digs a hole in his garden that he finds buried treasure. By the temporal-frequency account of conditional necessity, it follows that the man's desire to plant or his digging a hole in his garden did not necessitate his finding treasure.

There is, I suppose, a rather obvious response to this line of reasoning. Might it not be the case that the lack of necessitation (in terms of the temporal-frequency conception of necessitation or conditional necessity) is here merely an illusion due to the fact that we have not *fully described all the causal factors* involved in the man's finding the buried treasure? As we shall see later in this book, this objection becomes a common Stoic rejoinder to Aristotle's *Meta.* 6.2 anti-determinist argument, adopted by the Peripatetics. It is not clear, I think, what Aristotle's response to the Stoic objection would be. In the remainder of this section I shall consider the principal options that he appears to have. The historical significance of these options will be dealt with in greater detail in later chapters.

(1) *The "Proto-Reconciliationist" Option*

Aristotle might, in effect, admit the objection. That is, he might grant that in any given instance of accidental causation, if enough of the causal factors were taken into effect then, *whenever* all such factors obtain, the effect will *always* follow. Nonetheless, a congeries of accidental causes does not *entail* its effect. This line of argument distinguishes, in other words, between the "rationalist" and the "empiricist" models of necessitation or conditional necessity. In Chapter IV I hope to show that precisely this distinction grounds one version of Chrysippus' reconciliationist or compatibilist approach to the problem of determinism and freedom.

(2) *The "Straightforward" Indeterminist Options*

There are two principal versions of the indeterminist option which have been attributed, with some reason, to Aristotle. The narrower version locates indeterminacy solely in those things possessing "rational potencies" (*dynameis meta logou*). A broader version admits indeterminacy elsewhere in nature, as well, locating it in the "instability" of matter.

(i) *Indeterminacy solely with respect to "what is up to us" (to eph' hēmin).* Aristotle often locates "two-directional potencies," i.e., the capacity both of doing X and of refraining from doing X (or doing the "contradictory" of X) especially in rational beings. A particularly relevant passage occurs in *Meta.* 9.5:

> since that which is capable is capable of something at some time and in some way, and with respect to whatever other qualifications it is necessary to add to the definition, and since some things are capable of changing in conformity to a rational formula (*meta logou*) and their potentialities involve such a formula, while other things are non-rational and their potencies are non-rational, it is necessary that the former potencies be in an animate thing, while the latter may be in both [the animate and the inanimate]. With respect to potentialities of the latter kind, when the agent and the patient come into proximity in the way it is possible for them to do so, it is necessary that the acting and the being acted on occur; but with the former kind of potentiality this is not necessary. For all these [non-rational] potentialities are productive of one effect alone but the rational produce contrary effects so that [if they produced their effects necessarily] they would produce contrary effects at the same time; but this is impossible.[90]

The argument of the passage depends upon the temporal-frequency conception of conditional necessity:

Premise A:	Rational potencies are "two-directional."
Premise B:	Rational potencies necessitate their effects.
Premise C:	If a potency necessitates an effect, then *whenever* the potency is actualized, that effect then occurs. (From temporal-frequency conception of conditional necessity.)
Step D:	If a rational potency necessitates its effects, then, whenever such a potency is brought to actualization, contradictory effects are simultaneously brought into being. (From A, B, and C)
Premise E:	It is not the case that contradictory effects ever simultaneously occur. (From "Law of Non-contradiction")
Conclusion:	No rational potency necessitates its effects. (From E and D, *modus tollens* and B by *reductio*)

The doctrine of this passage need not, of course, be read in such a way that it is incompatible with determinism. It is possible, for example, that *whenever* a rational capacity is brought to actualization *in a type-X complex of circumstances,* the individual possessing the capacity performs action Z; but *whenever* this same capacity is actualized *in a type-Y complex of circumstances,* the individual refrains from performing action Z. Even within the context of the temporal-frequency conception of necessitation, then, the existence of a "two-directional" rational capacity need not imply that, given a "complete" account of the causal factors involved, the actualization of such a capacity does not necessitate its effect.[91]

In fact, Aristotle often seems to regard the behavior of non-rational living things as necessitated in this way, i.e., relative to a given set of attendant circumstances or causal factors.[92] And many of the potencies of non-rational living things are, considered in themselves, also two-directional. For example, the capacity of a cow for moving about is also the capacity for refraining from moving about. However, it seems Aristotle holds that *rational* potentialities do not necessitate their effects *even relative to certain types of causal contexts.* In the passage from *Meta.* 9.5 previously quoted, he appears to be considering potentialities *qua* actualized in a given type of causal context.[93] So the upshot seems to be that Aristotle holds, that at least with respect to things possessing rational

potencies, there is genuine indeterminacy: in the case of such a potency, its actualization, even in a fully specified set of attendant circumstances or causal context, will not *always* result in the same effect. According to the temporal-frequency conception of conditional necessity, then, its actualization in these circumstances cannot be said to necessitate or determine its effect.

This "option" with respect to the determinism issue, which locates indeterminacy solely in "what is up to us" (*to eph' hēmin*)[94] seems to have as its chief representative Boethius, although it perhaps represents the views of some other ancient philosophers as well.

(ii) *Indeterminacy "in nature" as well as with respect to "what is up to us."* In places, Aristotle suggests that matter – in addition to things possessing rational potencies – is a "principle of indeterminacy." In *Meta.* 6.2 he states that "the matter, which can be other than the way it for the most part is, will be the cause of the accidental."[95] And in *Meta.* 9.8, it is said that an eternal mover can move "hither" and "thither" because nothing prevents it having matter of this sort"[96] i.e., matter that permits movement in diverse ways. Furthermore, in *De int.* 13 Aristotle appears to contradict his *Meta.* 9.5 suggestion that *only* rational potencies are "two-directional":

> it is clear that not every potentiality is a potentiality of being or walking *and* their opposites; this is not true with respect to some things. The first of these are things having potentialities not in accord with a rational principle (*mē kata logon*); for example, fire has the non-rational potentiality of heating. Those potentialities with a rational principle are potentialities for more than one effect, that is, of opposite effects; while non-rational potencies are not all of this sort. As we said, fire is not capable both of heating and of not heating. Nor are things always *in actu* capable of opposite effects. But some of the potentialities of those that are non-rational admit of opposite effects.[97]

Here too it is not clear whether Aristotle means to assert "genuine" indeterminacy with respect to the temporal-frequency conception of conditional necessity: that is, it is not clear whether he is willing to admit, in the case of at least some non-rational potencies, that the actualization of such a potency in identical attendant circumstances sometimes yields one effect and sometimes yields its "opposite." However, it seems clear that one later form of Peripatetic doctrine, as well as Neoplatonism – both of which we will discuss in greater detail later in this book – accepted this form of indeterminism. It seems that the adherents of these positions

connected Aristotle's rather casual remarks concerning matter as the ground of "accidental being" and as a source of two-directional potentialities with Plato's conception of matter as a recalcitrant "spontaneous" principle which, in itself, lacks rule or order.[98] The Platonic conception, in turn, is obviously influenced by Presocratic "hylozoist" concepts of the material principle.[99] To what extent Aristotle was influenced by the Presocratic and Platonic conceptions of matter as a principle of spontaneity and, hence, of indeterminacy is very difficult to determine. He was certainly read by a number of his philosophical successors as sharing this conception, however. And it seems that there is at least *some* textual basis, in the Aristotelian *corpus* we possess, for such an interpretation.

(3) *The Future-Indeterminacy/Past Determinism Option*

Perhaps the most philosophically-interesting and most difficult-to-understand interpretation of Aristotle's position on the determinism issue developed within his own Peripatetic school. This position rests squarely on Aristotle's conception of time, which, as I have said, embodies elements of both the "dynamic-present" (*nunc fluens*) and the "static-relational" models of time. The static-relational model conceives of time as an atemporal or omnitemporal, fixed, linear series of temporal instants or intervals, or of the "contents" of these instants/intervals. "Ontological parity" atemporally characterizes all elements of the linear series. The dynamic-present model, on the other hand, sees time itself as a developmental process. The "present" alone is "really real"; but since what is present is continually changing, what is really real is continually changing. We have seen that Aristotle's conception of time, developed principally in *Phys.* 4, embodies elements of both models and that his conception is developed in terms of several analogies. Perhaps the most forceful is the analogy between "the now" (*to nun*) in its primary, token-reflexive sense, describing or "laying down" a fixed, linearly ordered series of present-and-past events and the geometrical point, which can be thought of as generating a line by its "fluxion." Time is thus regarded as a developmental process in the manner of the dynamic-present model; but the result of this process is a linear series of past-and-present events, regarded as "static" or "omnitemporally fixed" (as in the static-relational model) but as being continually supplemented by the fluxion of the now.

It seems clear that the ancient commentators on Aristotle generally held his view to be that if a temporally determinate proposition – that is a proposition forever "bound" to one time, and consequently, forever signifying one event or state of affairs – is now *definitely* true, then the event or state of affairs it signifies is necessary relative to what is now the case; while if such a proposition is now *definitely* false, the event signified is impossible relative to what is now the case. For example, Boethius claims

> and therefore it is correctly asserted that, if every affirmation or denial is definitely true, nothing happens or exists by chance or – to use the common expression, "willy-nilly" (*utrumlibet*) – neither does anything exist or not exist contingently, but rather it exists definitely or does not exist definitely.[100]

Moreover, the commentators interpret Aristotle as holding that all propositions with "pure" present or past temporal reference are either definitely true or definitely false and, hence, either necessary relative to what is now the case or impossible relative to what is now the case. Contingency can pertain only to the future. Consequently, Boethius speaks of a contradictory pair of future contingent propositions as being "indefinitely" (*indefinite*), "changeable" (*commutabiliter*), and "variable" (*varabile*) true/false, and of the "indefinite," "indistinguishable" (*indiscreta*) and "changeable" (*volubilis*) truth/falsity of such propositions.[101] A similar account is to be found in the Greek commentary on *De interpretatione* by Ammonius.[102]

It thus seems that Aristotle was commonly interpreted as (a) holding that *not all* of the future is necessary temporally-relative to the present, (b) holding that the present-and-past is necessary temporally-relative to the present and, (c) equating "now definitely true" with "necessary relative to the present" and "definitely false" with "impossible relative to the present." With respect to this interpretation of Aristotle's indeterminism, a question arises that was to haunt the Peripatetic and Stoic debates on determinism. Simply put, the question is "what is the relation between *this* version of indeterminism, which Ammonius and Boethius see in chapter 9 of *De interpretatione*, and the temporal-frequency conception of conditional necessity?"

The following represents one possible answer to this question, a "rational reconstruction" of an Aristotelian position on determinism that can, I shall later argue, be plausibly attributed to the Peripatetic Alexander of Aphrodisias. As Hintikka has in effect noted, the temporal-

frequency conception of necessitation or conditional necessity is not absent from the "sea battle chapter":

> In any case, it is patent that Aristotle sometimes thinks and talks of what happens or is supposed to happen at some particular moment of time and that he at other times speaks of what happens at a great number of different moments of time . . . when Aristotle discusses the possibility or necessity of a sea fight tomorrow, he clearly has in mind a sea fight on a specific day . . . On the other hand, it is plain that several expressions used by Aristotle presuppose a whole range of different times or different cases.[103]

As Hintikka also notes, adverbial modifiers of temporal-frequency often occur in Aristotle's *De int.* 9 discussion of the determinism issue. For example at 19a18–22 Aristotle states that

> It is clear then that not everything is or comes-to-be of necessity, but in some cases whichever alternative chances to occur, in which cases the affirmation is not "more often" (*mallon*) true than the denial. In other cases one alternative is more often (*mallon*) true or true for the most part (*epi to polu*); but it *can* happen that the *other* alternative occurs, even if it does not.[104]

I have suggested in several papers that what we have here is an implicit appeal to the temporal-frequency conception of conditional necessity. If sea battles *always* occur the day after days that are "relevantly similar" to today, then it is "today definitely true" and conditionally necessary, relative to what is now the case, that a sea battle occur tomorrow. If a sea battle *never* occurs the day after a day relevantly similar to today, then it is today "definitely false" and conditionally impossible, relative to what is now the case, that a sea battle occur tomorrow. If sea battles sometimes occur but sometimes fail to occur on days following days relatively similar to today, then it is today neither definitely true nor definitely false, and a "contingent matter" (i.e., neither conditionally necessary nor conditionally impossible, relative to what is now the case) that a sea battle occurs or fails to occur tomorrow. Within the modal category of contingency, the relative frequency of occurrences to non-occurrences of sea battles on days following days relevantly similar to today may be an indication of the present *probability* of the occurrence of a sea battle tomorrow.[105]

An obviously difficult question is that of the requisite degree of "relevant similarity" that a different time must possess to this time in order to qualify for membership in the "range" of times to be employed in making judgments concerning the modal status of various temporally determinate propositions (ultimately) "bound" to today. If the requirement of relevant similarity is made too stringent, there is a danger that the

temporal-frequency account of conditional necessity will become trivial: the only time sufficiently similar to this time to be employed in making assessments of the modal status of propositions whose ultimate temporal reference is to this time *is this time itself.* In general, as we shall see, the Peripatetic response to this problem seems to have been to deny that *all* of the present "state of the cosmos" is relevant to each event that may or may not come to pass in the future; thus there are different times sufficiently similar to this time that they may be employed in making assessments concerning the modal status of propositions temporally bound to this time, e.g., "There will be a sea battle tomorrow." The Stoic response apparently was to appeal to a doctrine of cosmic cycles in each of which a "counterpart" of the present time can be located.

Although there is discussion of cosmic temporal cycles in the Peripatetic *Problemata* 17, it is dubious whether a doctrine of cosmic cycles, and, more particularly, the "semantic" employment of cosmic cycles, can be ascribed to Aristotle himself.[106] There is more evidence that Aristotle was influenced by his developmental conception of time in such a way that he applied the temporal-frequency conception of conditional necessity differently depending on whether the conditional involved was "*a tergo*" (the event of protasis or antecedent is temporally prior to that of the apodosis or consequent) or "*a fronte*" (the event of the protasis is temporally posterior to that of the apodosis).

In *Posterior Analytics* 2.12, we find Aristotle raising and answering a question concerning temporal-causal *nexus* in which the cause and effect are not simultaneous:

> But what of things that do not occur at the same time in continuous time, of which some, as it seems to us, are causes of others? For example, is something else that has come about [the cause of] the coming about of this, something that will come about, of the fact that this will come about? And is this coming about because something has previously occurred? There is deduction from what has come about later (*esti dē apo tou hysteron gegonotos ho syllogismos*).
>
> For the explanation (*archē*) of these is what has already happened. And similarly in the case of what is in the process of coming-to-be. But there is not deduction from what occurred earlier; for example, since this has happened, this later thing has happened. And similarly with respect to what will happen. It will not be the case, either of indefinite or of definite time, that since it is true to say that this has happened, then it is true to say that this later thing has happened. In the time in between, when the first has already happened, it will be false to say this. The same principle applies to what will happen: e.g., it is not the case that since this *has happened,* this other thing will.[107]

The common ancient practice of treating temporal matters in terms of

verb tense (and aspect) seems to underlie Aristotle's argumentation in this chapter. A rather superficial reconstruction of the argument can be developed using the temporal operators "P" ("it was, at least once, the case that") and "F" ("it will be, at least once, the case that") of contemporary tense logic. Let us suppose that we have a relation, "if p, then q," of a *tergo* conditional necessity: that is, the event designated by "p" is temporally prior to that designated by "q." Then, according to Aristotle, the conditional "Pp⊃Pq" will not *always* be true at the time of the occurrence of the event designated by "p" and thereafter: it will not be true in the interval between the occurrence designated by "p" and that designated by "q" because consequent "Pq" will then be false (although "Fq," of course, *might* then be true). Consequently, by the temporal-frequency account of conditional necessity the *a tergo* "Pp⊃Pq" cannot be a necessary conditional. Similarly for the "future," i.e., when we consider "Pp⊃Fq": here the conditional will not *always* be true because, after the occurrence of the event designated by "p" *and* the occurrence of the event designated by "q", the consequent "Fq" becomes false. The "untensed" conditional "p⊃q" will not work either because, since, *ex hypothesi,* q temporally succeeds p, there is a time at which p is true but q false. A combination that holds more promise, apparently overlooked by Aristotle, is "p⊃Fq." But, in order to maintain the omnitemporal, and hence necessary, truth of this conditional, he would have to count the conditional true at any time when the antecedent is false, something he may have been reluctant to do.[108]

Aristotle's conclusion *seems* to be that the impossibility of forming any omnitemporally true conditional when the antecedent designates an event or state of affairs that temporally precedes that designated by the consequent rules out *a tergo* conditional necessity in all but some very special cases.[109] This, as we shall see, becomes part of Peripatetic doctrine. The argument as I have outlined it, however, seems specious. It depends upon technical difficulties surrounding the truth conditions for tensed verbs and conditionals and really seems not to address directly the question of whether the event designated by "p" necessitates that designated by "q." Similarly, the Peripatetic doctrine that all *a fronte* temporal relations (i.e., the relation of p to q, where p is temporally *posterior* to q) are necessary seems to have a tense-logical basis in this chapter. For, in such a case, the conditional "Pp⊃Pq" is *always* true *after* the occurrence of p; it cannot "become false" with the passage of time.

In order to develop a more philosophically satisfying interpretation of

An. post. 2.12, we must, I think, read it in conjunction with certain other passages from the Aristotelian *corpus.* In several places, as Dorothea Frede has pointed out, Aristotle appears to distinguish a weaker and a stronger "future tense."[110] For example, in *On Phrophecy in Sleep* 2 he claims that

> generally, not everything that was "about to occur" (*to mellēsan*) happens; what "will occur" (*to esomenon*) and what is "about to occur" (*to mellon*) are not the same thing. Nonetheless, things that are "about to occur" must be called beginnings (*archas*), although from them nothing is brought to completion; they are natural signs of what does happen.[111]

The distinction between the weaker future *to mellon* and the stronger future *to esomenon* is also drawn at the beginning of *De gen. et corr. 1.11:*

> for it is clear that some [of the things that, in fact, come-to-be] might not come-to-be; and on account of this, it is immediately seen that "what will be" (*to estai*) and "what is about to be" (*to mellon*) are different. If it is true to say that something will be, it is necessarily the case that, at some time or other, it is true [to say] that it is. But if it is now true to say that something is about to be, there is nothing to prevent it from not happening. For someone who "is about to walk" might not walk.[112]

It is possible to read Aristotle in *An. post.* 2.12 as implying that, in the case of an *a tergo* conditional, the real source of the lack of conditional necessity is this indeterminacy of the future with respect to contingent matters. Thus, in at least some cases, when the temporally prior p occurs, we are not in a position to assert that the temporally posterior q will (strong future) occur. This perspective distinguishes *a tergo* from *a fronte* conditionals. When the temporally posterior q occurs or has occurred, we *are* in a position to assert that the temporally prior p has definitely occurred.

Perhaps the weak future auxiliary "*mellō*" represents the "indefinite truth" and "indefinite falsity" that the commentators connect with Aristotle's doctrine of future contingency. Of course, the precise logical sense that is to be attached to the concept of "indefinite truth/falsity" is not obvious. There seem to be three principal interpretations. The least likely, I think, is a doctrine of truth values *in addition to* "normal truth" and "normal falsity," *viz.*, "indefinite truth" and "indefinite falsity." Although Aristotle was an inspiration for early twentieth-century formal work on many-valued logic,[113] there seems little textual basis, in Aristotle or the ancient commentaries on his logical works, for the belief that Aristotle held there to be truth values beyond truth and falsity. A second interpretation is that Aristotle's view is that, while a *disjunction* of a

future contingent proposition and its contradictory is always true, even before the fact, "one is not able to divide, so as to say that the affirmation is definitely and determinately true or the negation" (to quote Boethius).[114] This may suggest, with respect to the *individual* future contingent disjuncts, the existence of truth-value gaps, which get filled in (become definite) only in the "fullness of time."[115] A third interpretation suggests that, in the cast of a disjunction of a future contingent proposition and its contradictory, there are never any gaps; rather, the individual disjunct and its contradictory may "exchange" the regular truth-values between one another up to the time of the event signified by them. At least by that time, it becomes temporally fixed that either the event signified occurs or it does not.

The last interpretation is worthy of further comment. It seems, at first, to square well with Aristotle's conception of time. To borrow an illustration from Hintikka, the state of the world is now such (e.g., the "admirals are confident and in a fighting mood," "their intelligence underestimates the power of the enemy") that it is now true that there will be a sea battle tomorrow. "But after a couple of hours, the intelligence estimates may have become pessimistic and the admirals timid." At that time it is false to say that there will be a sea battle tomorrow.[116] The question is whether it is *now also true* that in a couple of hours the situation will have thus changed. If so, then it is difficult to see why it is now really true that there will be a sea battle tomorrow (since it is now true that conditions will change in such a way that it will become *false* to say that there will be a sea battle tomorrow). It seems that, in order to avoid contradiction, at least *some* propositions pertaining to the future must now be neither true or false. But then the third, "changing truth-value" interpretation "collapses" into the second interpretation.

An alternative approach is to attach the "changing truth-value" claim to "*mellō*" or "weak future" propositions. One might then interpret "*mellō*" propositions as being always implicitly employed with respect to a certain "closed system" or *limited* set of background assumptions.[117] For example, I wind my alarm clock, set the alarm for 6:00 a.m., and trigger the alarm mechanism. Now, relative to this particular set of assumptions *ceteris paribus,* the alarm "is about to" (*mellō*: "weak future") ring at 6:00 a.m. tomorrow morning. This fact does not preclude my getting up at 4:00 a.m., after a bout of insomnia, and turning off the alarm-trigger mechanism. Then, i.e., at 4:00 a.m., the alarm will *not* be "about to" ring at 6:00 a.m. The upshot of Aristotle's view *may* be that

with respect to this weak future of limited background assumptions, the truth-value of a future contingent proposition can change up until the time of the event designated. But with respect to the strong future of actuality (*esesthai*) there is a genuine but temporary "truth-value gap."

It remains to offer a suggestion of how this indeterminacy-of-the-future perspective might be connected with Aristotle's temporal-frequency conception necessity. Unfortunately, there is little basis for a claim of the historical accuracy for the suggestion I offer. Consequently, it should be understood as a philosophical rather than as a historical suggestion. With respect to a *a tergo* conditionals, [if [the earlier] p, then [the later] q] the temporal-frequency model can be invoked without difficulty. To employ an example of the commentator Philoponus,[118] suppose that I engage in a bout of overeating (p). Is it then conditionally necessary that I experience an attack of indigestion? I examine other similar bouts of overeating occurring at different times to find if they are *always* followed by attacks of indigestion. If they *always* are, I can conclude that there is a "necessitated" belly-ache coming up. If they sometimes are but at least occasionally are not, I am entitled to conclude that the future is indeterminate with respect to my having a belly-ache, although the relative frequency of occurrence of belly-aches after similar bouts of overeating may serve as the basis of a judgment concerning the probability of my experiencing a belly-ache on this particular occasion.

The other times at which similar bouts of overeating transpire serve something like the function as "other possible worlds" in contemporary semantic theory for modal propositions: what occurs at other times (possible worlds) is relevant to a determination of the modal status of (a proposition signifying) an event occuring at *this* time (possible world). The Aristotelian semantic employment of "other times" is, in a sense, more "empirical" however. Since we do not have access to *all* the other times at which similar bouts of overeating occur, it seems that with respect to some modal claims, we can only claim the "likelihood" of conditional necessity. In the absence of a "clear logical or conceptual connection" between antecedent and conseuqent (which in effect appeals to the *other* syllogistic-impliction conception of conditional necessity), the clasical problem of induction can arise with respect to judgments of conditional necessity.

Another assumption necessary for a non-trivial employment of the temporal-frequency conception of conditional necessity in this context is that the conditions that obtain at the other times at which bouts of

overeating occur are *sufficiently similar* to those obtaining at this time in order to be relevant to what will, will not, or is likely to happen temporally posterior to this time. It must be assumed, in other words, that only *part* of the circumstances surrounding this bout of overeating is relevant to the occurrence or nonoccurrence of an attack of indigestion, a part of the circumstances that characterizes the other "times of evaluation" as well.

Perculiarly enough, Aristotle may have been reluctant to employ the temporal-frequency account of conditional necessity to a fronte conditionals, [if [the later] q, the [the earlier] p.] According to what Alexander seems to say,[119] Aristotle holds that *all a fronte* relations are relations of conditional necessity: in other words, it is conditionally necessary that *every* event or state of affairs have precisely the "past history" that it, in fact, has. The basis of this Alexandrian view is likely Aristotle's doctrine of the temporally relative necessity of the present-and-past, the necessity of the present and past relative to the present. This doctrine of universal *a fronte* conditional necessity would guarantee that all the past is conditionally necessary relative to what is now the case. Thus, the necessity of all the past temporally relative to the present could be equated with the conditional necessity of all *a fronte* temporal relations, i.e., relations of the form [if the later q, then the earlier p.] The doctrine of universal *a fronte* conditional necessity does not seem to square well with the temporal-frequency conception of conditional necessity, however. To return to Philoponus' example, attacks of indigestion occurring at other times are *sometimes not* temporally preceded by bouts of overeating, but, to quote Philoponus, by "anxiety, insomnia or other causes." Let us assume that this bout of overeating is, in fact succeeded by an attack of indigestion. According to the temporal-frequency conception of conditional necessity, it then seems that it is *not* conditionally necessary that *this* belly-ache should have been preceded by this bout of overeating (because, at other times, "similar" belly-aches or indigestion attacks are *not* preceded by bouts of overeating). The doctrine of universal *a fronte* conditional necessity implies, however, that it *is* conditionally necessary that this belly-ache be preceded by *precisely* the bout of overeating that preceded it.

Might we supply any philosophical justification for the apparent eschewal of the temporal-frequency conception of conditional necessity with respect to *a fronte* conditionals and its employment with respect to *a tergo* conditionals? One line of argument centers on the fact that for

Aristotle, *individuals* (objects, events, states of affairs), considered as objects of linguistic reference, are generated with the passage of time.[120] In the case of *a tergo* conditionals, we "assume the temporal perspective" of the temporally prior antecedent. In considering the issue of whether the temporally present bout of overeating necessitates the occurrence of a belly-ache later tonight or the present bellicose preparations, sabre-rattling, etc. necessitates the occurrence of a sea battle tomorrow, I am not yet referring to an *individual* or a *particular belly-ache or sea battle. There is not yet* any such individual event or state of affairs to which I can refer. So the consequent of such a condition cannot refer to an individual. In these cases, in which I am concerned with *a* ("indefinite") event/state of affairs, it might be maintained that it is appropriate to consider other "relevantly similar" times, specifically, to consider whether *a* sea battle or *a* belly-ache always, sometimes, or never ensues in similar circumstances, in order to make a judgment as to whether it is conditionally necessary, impossible, or "contingent" (undetermined) that *a* sea battle or *a* belly-ache ensues in *these* circumstances.

In the case of *a fronte* conditionals, however, we assume the temporal perspective of the antecedent as temporally *posterior* to the consequent. Thus, in considering whether it is conditionally necessary that *this* belly-ache should be preceded by this temporally prior bout of overeating, I am, it might be maintained, referring to a *particular* or *individual* event (i.e., this bout of overeating). Given what seems to be an implicit Aristotelian doctrine that "past" objects, events, and states of affairs are "now available for linguistic reference" but that there are not *now* "future objects, events, and states of affairs," we might draw the following conclusion: the fact that even "very similar" belly-aches occurring at other times were *not* preceded by bouts of overeating is not a fact that is relevant to whether it is necessary that *this* belly-ache be preceded by *this* bout of overeating. It might be maintained that once we have, through the passage of time, a relation "fixed" between the individual event/state of affairs designated by the temporal antecedent (e.g., this bout of overeating) and the individual event/state of affairs designated by the temporal consequent (e.g., this belly-ache), what happens at other times is irrelevant to the connection between the events, which cannot now "be changed." In the case of *a fronte* conditionals, in which the consequent must designate a temporally earlier event/state of affairs, we do have such a fixed relation between individuals. However, in the case of *a tergo* conditionals, in which we assume the perspective of the

temporally prior antecedent, the consequent cannot designate an individual event or state of affairs: there are no such "future particulars." Consequently, consideration of what happens at other relevantly similar times is relevant to what is "about to happen" now.

Hintikka is concerned that, in effect, the temporal-frequency conception of conditional necessity amounts to *petitio principi* with respect to the modal status of what happens *at this time*. He writes, for example, of the

> rather simple-minded maneuver we caught Aristotle executing in *De. int.* 9, viz the maneuver of (in effect) denying the genuineness of the problem of future contingents by insisting that an attribution of a modal status to a future event is but to compare it with other similar events.[121]

The upshot of Hintikka's complaint is that what happens at other times characterized by "similar" circumstances is irrelevant to the modal status of *this* event. The interpretation I have developed holds that when there is a "this event," i.e., an individual event or state of affairs that can serve as an object of reference, Aristotle (and Alexander) would agree with Hintikka. And in the case of *a fronte* conditionals, the event or state of affairs signified by the consequent is such an indivudal. Hence, what happens at other times, other similar temporal sequences, is irrelevant to the modal status of the conditional. However, in the case of *a tergo* conditionals, there is not yet any individual event or state of affairs for the consequent to designate. In these circumstances, what happens following other times similar to this time (the time of the antecedent of the conditional) is relevant to a determination of what *sort* of thing will happen following *this* time.

There is, perhaps, an apposite analogy from the theory of probability. I calculate, in a large number of cases, the frequency of the occurrence of an event of type P against a background set of circumstances of type Q. Now, the ratio I arrive at bears *some* relevance to the probability of the occurrence of an event of type P in precisely *these* circumstances, which are of type Q. Now, let us consider an individual occurrence of an event of type P. It might be maintained, with some reason I think, that the relative frequency of cases where events of type P occur against a background set of conditions of type Q is irrelevant to the probability of *this* individual event's (where this event is of type P) having occurred in such background conditions.[122] Either it did or did not. And the probability of *this* particular event of type P having occurred in such circumstances – if a notion of "*a fronte* probability" makes any sense at all – must be either 0 or 1.

The notion of probability that might give rise to this view will be discussed in greater detail in the concluding chapter of this book. For the moment, however, I wish merely to suggest that there is an application of the temporal-frequency conception of the modalities consonant with the Peripatetic – and, perhaps, Aristotelian – doctrine of the "conditional contingency" of some *a tergo* relations (which issues in the present, partial indeterminacy of the future) and the conditional necessity of *all a fronte* relations (which issues in the present, complete determinism and unalterability of the past).

We have now examined the "basic interpretations" of Aristotle on the issue of determinism. These interpretations may, as we have seen, be formulated in terms of the relation between Aristotle's "rationalistic" syllogistic-implication conception and his "empiricist" temporal-frequency conception of conditional necessity. According to the first interpretation, while Aristotle would maintain that a congeries of accidental causes does not *entail* its effect, he would admit or would ultimately be forced to admit that *whenever* a congeries of that type occurs, the same effect will *always* occur. The two conceptions of conditional necessity seem, in other words, to yield different answers to the question of whether the *cosmos* is characterized by universal determinism. I terms this interpretation "proto-reconciliationist" because, I shall argue, it closely resembles one reconciliationist view with respect to the determinism issue set forth by the Stoic Chrysippus.

The second interpretation is the "straightforward indeterminist" one. According to this interpretation, the temporal-frequency conception of conditional necessity, as well as the syllogistic-impliction conception, point in the direction of the denial of universal causal determinism. Aristotle would claim that, due to the existence of beings with "rational potencies" or due to the "errant" properties of matter (or both), it is *not* the case that *whenever* all the relevant circumstances are the same, the same effect always follows. This interpretation finds its conceptual analogue in the Middle Platonist (and, perhaps, Stoic) doctrine of cosmic temporal cycles which differ at least slightly from cycle to cycle. The fact that I was not necessitated by the relevant context of circumstances to choose to have eggs for breakfast this morning is indicated by the fact that there is a cosmic cycle, characterized by an "exact counterpart" of the relevant attendant circumstances, in which I do *not* choose to have eggs for breakfast.

Finally, an employment of the temporal-frequency conception of con-

ditional necessitation that is relevant only to the indeterminate future and not to the past, which is conceived as conditionally necessary relevant to what is now the case, characterizes the third, future-indeterminacy/past-determinism interpretation of Aristotle's views on determinism. This interpretation is developed within the Peripatetic school and perhaps is the interpretation that best fits Aristotle's own texts.

We thus find in these interpretations of Aristotle – none of which is totally implausible – anticipations of the major positions in the determinism debate that were to develop in later ancient philosophy. Before turning to later developments, I wish briefly to consider what some scholars have considered an entirely different and "highly sophisticated" approach to the determinism issue, an approach also found in the Aristotelian *corpus*. Although I doubt that this "alternative approach" is really central to Aristotle's attempt to deal with the issue of determinism, it may be much more important to Megarian and Stoic treatments of this issue.

F. THE *ENERGEIA-KINĒSIS* DISTINCTION AND ARISTOTELIAN DETERMINISM

Hintikka, in collaboration with Remes and Knuuttila, has developed an ingenious argument that Aristotle's distinction between *energeiai* ("actualities") and *kinēseis* ("motions," "processes," "changes") has a significant bearing on his doctrine of "unactualized possibilities."[123]

The distinction between *energeiai* and *kinēseis* seems to have a linguistic basis in the aspectual system for Greek verbs. In general, *energeiai* are correlated with the "stative-perfective" aspects (the so-called perfect "tenses") of verbs and can be thought of as *states*, normally states of the subject of the verb, and often acquired states issuing from the completion of a process of some sort. In contrast, *kinēseis* are generally correlated with the imperfective aspects (e.g., the present and imperfect "tenses") of verbs and are developmental processes usually directed toward some "goal" or "final state of affairs." This rough linguistic characterization suggests – correctly, I believe – that *energeiai* sometimes supervene on the "completion" of *kinēseis*.[124]

However, in his more technical discussions of *energeiai* and *kinēseis*, Aristotle recognizes that not all *energeiai* require *kinēseis* "leading up to" or issuing in them. In a difficult and controverted passage in *Metaphysics* (*Meta.* 9.6), Aristotle appears to argue that, in the case of some verbs,

such as "see" (*horan*), "recognize" (*phronein*), "be happy" (*eudaimonein*), the present forms of the verb entail the perfect form.[125] This may suggest (a) that the present form is, in these cases, really "stative-perfective" and not imperfective, as present forms usually are. It *may* also suggest to Aristotle (b) that these "special" verbs denote, in both the present and perfect forms, *energeiai* that are not the end product or resultant state of affairs of developmental processes: in these special cases there is only the instantaneous event (signified by the aorist) initiating the state of affairs denoted by both present and perfect verb forms.

Hintikka's argument concerning the relevance of the *energeiai-kinēsis* distinction rests on what appears to be a formal definition of "*kinēsis*" in *Physics* 3.1: "the actuality (*entelecheia*) of that which is potentially, *qua* being this sort of thing [i.e., *qua* existing *potentially*], is motion (*kinēsis*)."[126] Hintikka contends that, as a consequence of this definition, it is *kinēseis* that allow for the presence of a sort of "unrealized potentiality":

> The thesis [is] that a (full-fledged) potentiality can (apud Aristotle) enjoy full actuality (as a potentiality not yet realized) only in the form of a *kinēsis* toward its realization . . .[127]

In the case of *energeiai* that are not the issue of a *kinēsis* however, – that is, in the case of *energeiai* that are *instantaneously* realized – there are no unactualized potentialities. While, according to Hintikka, the doctrine of *kinēseis* as the entelechies of potentialities "as such" allows for a sort of "real" unactualized potentialities, it does not *really* contravene the first-order plentitude principle, the principle that all "real" or "full" potentialities are eventually manifested:

> For as soon as there exists such a *dynamis*, a *kinēsis* toward its realization is initiated. It fails to be instantaneously realized in its entirety only because it can only be realized as the outcome of a gradual process (a 'coming-to-be'). However, in the same way as a potential *energeia* is instantaneously realized, a potentiality of the other sort [viz., one that involves a *kinēsis*] cannot help initiating a *kinēsis* as soon as it obtains. Although the latter case offers a haven for *unrealized* possibilities, it fails completely to provide room for potentialities which are *not manifested* – either by giving rise to whatever *energeiai* they are potentialities of or else by initiating a *kinēsis* towards what they are potentialities of.[128]

It might seem that "interrupted" or "frustrated" *kinēseis,* that is, *kinēseis* that do not issue in their "proper" end, as a process of healing that is interrupted and, hence, does not issue in the state of being cured, would allow for the possibility of "unmanifested," as well as *temporarily*

"unrealized" potentialities. Hintikka seems to imply, however, that such an interrupted *kinēsis* is not a "real" *kinēsis* (a claim that is plausible if we construe *kinēseis* in the manner of "accomplishments" such as "writing a letter," "crossing the street," the description of which seems to essentially involve reference to their "completion"). Consequently, such interrupted *kinēseis* would *not* be cases of complete potentialities that are never actualized, e.g., the potentiality for being in the state of "having written a letter" or "having crossed the street,"[129] The upshot of Hintikka's argument is that Aristotelian *kinēseis* serve a sort of narrow, technical function for Aristotle: they allow him to introduce "real," temporarily "unactualized" potentialities. But this technical device is not sufficient to allow Aristotle, in Hintikka's words, to

> succeed in disentangling himself completely from determinism. What he obtained through the *energeia-kinēsis* distinction was a way of saying, truly, that a potentiality obtains also when it is not realized . . . There is nothing in Aristotle's improved theory, however, which would show that what happened at any given moment is not completely determined by the *dynameis* operative at that moment.[130]

Unfortunately, there are, I believe, major problems in applying this view of the relation between the *energeia-kinēsis* distinction and determinism to Aristotle. It appears that the most explicit link between the *energeia-kinēsis* distinction and determinism to be found in Aristotelian *corpus* occurs in *Meta.* 6.2 and 6.3. In the former chapter Aristotle notes that "of things that exist in another way there is generation and destruction, but not of things that exist accidentally."[131] And he begins Chapter 3 with the following claim:

> That there are principles and causes that are generated and destroyed (*genēta kai phtharta*) without being (in the process of being) generated and being destroyed (*aneu tou gignesthai kai phtheiresthai*: "present-imperfective" aspect) is clear. If this is not the case, everything will exist of necessity; since it is necessary that there be some cause, and that not an accidental cause, of what is (in the process of) being generated and being destroyed.[132]

What Aristotle seems to be claiming here is that if all states of affairs were to come-to-be through "kinetic" processes (signified by the present-imperfective articular infinitives), then determinism would obtain, i.e., everything would be necessitated by antecedent states of affairs. However, since some states of affairs, *viz.*, the accidental (or "chance" or "spontaneous") ones, occur without a *kinēsis* leading up to them, universal determinism does not obtain. As Hintikka forthrightly admits, this application of the *energeia-kinēsis* distinction to the determinism

issue "is precisely the opposite to what we have been led to expect" from Hintikka's analysis.[133]

Hintikka's solution to this difficulty in applying his view to Aristotle is to deny that Aristotle is really employing the *energeia-kinēsis* distinction in *Meta.* 6.3. Exactly what Aristotle *is* concerned with in this chapter, according to Hintikka, is none too clear. He suggests that Aristotle is here conceiving of *kinēseis* as a sort of "cement" binding together states of affairs and, consequently, attempts to avoid determinism by denying that all states of affairs are the result of antecedent kinetic processes:

> He seems to have been so much impressed by connections between earlier and later states of affairs (with a *kinēsis* serving as the connecting link) that he tended to think of them as having deterministic implications even in cases where the connections in question are not causal but merely 'kinetic'.[134]

Ross interprets Aristotle as claiming that what happens accidentally, *kata symbebēkos,* and, in particular, the acquisition of accidental properties by something, does not involve a "process" but happens "instantaneously":

> the builder gradually by a process of learning (and, we may add, subsequent building) becomes the cause of a house [an example of *necessary* causation]; but the healthiness of the house supervenes instantaneously on this process, and he does not gradually come to be the cause of a healthy house.[135]

The temporal aspect of Ross' interpretation tends to strain the reader's credulity, I believe. It simply seems false that all accidental properties are acquired instantaneously or that no "chance" or "spontaneous" occurrence is the result of a gradual, developmental process. It may be a chance matter that I have discovered buried treasure in my yard and my suntan may be an accidental property. But the treasure was discovered at the terminus of a process that was not instantaneous and my suntan was certainly not instantaneously acquired.

What, then, *is* Aristotle's point? I suspect that a great deal more than the notion of a process that extends through a certain extent of time is built into his use of the present-imperfective "tense" in the passages quoted from *Meta.* 6.2 and 6.3. The Greek system of verb aspect has a "teleological" component built into it. The imperfective aspect normally envisions as its completion some state of completion or perfection, usually signified by the perfect aspect.[136] And similarly for Aristotle's concept of a *kinēsis.* We have already seen that Aristotle tends to associate necessitation or conditional necessity with a chain of *final* causation.

Aristotle *may* in these passages simply be making the point that if all coming-to-be and perishing involved operative final causes, i.e., *end-directed* kinetic processes, signified by the present-imperfective verb forms, the necessity of the ultimate final cause would be "passed along the chain" of causes.

We have also seen, moreover, that a key component in Aristotle's discussions of chance and spontaneity is that chance and spontaneous causation are "parasitic on" or "mimic" telic causal processes: such accidental causal processes produce the sort of results that might be effected by telic processes.[137] However, they do not involve the sort of end-directed *kinēseis* characteristic of final causation. If this is more-or-less the point to which Aristotle is alluding in these passages from *Meta.* 6, the present-imperfective verb forms must, I admit, carry a great deal of weight. They must signify not just developmental processes with temporal duration but *end-directed* developmental processes. It is not unusual, however, for Aristotle to express himself in an abbreviated and, from our point of view, often cryptic manner.

Furthermore, if this is Aristotle's point in these puzzling passages, the passages do not constitute any radically novel approach on Aristotle's part to the determinism issue. They involve an implicit appeal to the syllogistic-implication model of conditional necessity, since it is normally by means of final/formal causes that the demonstrative, "scientific" syllogism is constructed.[138] The whole question of whether non-final/-formal accidental causes can, *in terms of the temporal-frequency model of conditional necessity*, necessitate their effects – in other words, the whole question of the preceding section of this chapter – is left open.

My conclusion with respect to Hintikka's schema of the relation between the *energeia-kinēsis* distinction and the issues of causal determinism and fatalism ("logical determinism") is that there is not much indication that this schema was of great importance in the development of Aristotle's own position. However, I believe that a much stronger case can be made for its importance in undergirding the fatalism of Diodorus Cronus, to whom we turn in Chapter Three.

G. SUMMARY AND CONCLUSION

This chapter has been principally devoted to a consideration of Aristotle's seminal role in ancient thought with respect to the development of the idea of causation. Aristotle's theory of responsibility will be

further discussed in Chapter Seven. The question of whether Aristotle was a causal determinist is complicated, in part, because of Aristotle's use (and frequent conflation) of two models of causal necessitation: the "proto-rationalist" syllogistic-implication model and the "proto-empiricist" temporal-frequency model. However, it seems most likely that Aristotle would not have accepted causal determination formulated in terms of *either* of these models. That is, he would not have held that (specification of) an effect is always syllogistically-derivable from (a specification of) its causes; nor would he have held that it is *always* the case (temporal-frequency model) that a given effect supervenes on the temporal instantiation of a given cause. Sorabji is of the opinion (and believes that it is likely that Aristotle was of the opinion) that causation is not to be equated with necessitation.[139] That is also my view and my "preferred" interpretation of Aristotle with respect both to the proto-rationalist and to the proto-empiricist models of necessitation. However, it is generally recognized that Aristotlelian texts do not definitely decide the issue. Various alternative interpretations, considered as precursors of views to emerge more clearly in the succeeding Hellenistic debates concerning determinism, were considered in Section E of this chapter.

As we saw, the difficult concept of accidental causation is often connected by Aristotle with the denial of causal *necessitation*. Aristotle seems to hold, in general, that an accidental cause X of an event/state of affairs Y (a) does not necessitate (in either the syllogistic-derivability or the temporal-frequency sense) Y, (b) is not a final/formal cause of Y (of events/states of affairs of that type), and (c) tends to "mimic" final/formal causation, i.e., produce the kind of effect that can be produced by final/formal causes. In Section D I also suggested a possible connection between the notion of an accidental cause and a temporally antecedent factor hindering or blocking the "normal" function of final/formal causation. One of the functions of such temporally antecedent causal features in Aristotle's cosmology, I suggested, is to "break" or interrupt the chain of (final/formal) causal necessitation extending from unmoved mover "down through" the supra-lunary to the sub-lunary realm. Such preventing or hindering factors have as much in common with the modern and contemporary conceptions of a cause, I suspect, as does the Aristotelian notion of an "efficient cause" (*aition poiētikon*), which is often taken to be the closest Aristotelian analogue of the modern notion.

In Section C and the last part of Section E, I related my favored interpretation of Aristotle on determinism to the modal and truth-value

status of propositions signifying future events/states of affairs and to the temporal-frequency model of the modalities, respectively. The lack of universal causal necessitation, according to this view, is semantically manifested by the present lack of a *aphōrismenē* truth value in the case of a contingent (not causally [or logically] necessitated) future event/state of affairs. This is the interpretation of Aristotle originally developed by the commentators Ammonius and Boethius. Although their interpretation is sometimes contrasted with the "truth-gap" interpretation, it seems to amount to virtually the same thing if "*aphōrismenē*" is translated "separate." The idea is that the members of a contradictory pair of temporally determinate future contingent propositions do not yet – before the occurrence or nonoccurrence of an instance of the type of event/state of affairs they signify – *separately* have truth values. Considered as a pair, however, they (i.e., their disjunction) has a truth value (truth), and the event/state of affairs they signify will either come to pass or it will not, but not both. So this view would deny "eternal bivalence" (every proposition is always full-bloodedly true or full-bloodedly false) while affirming the "law of excluded middle" (the disjunction of every proposition and its contradictory is always full-bloodedly true).[140] I believe that part of the common contemporary reluctance to embrace this interpretation of Aristotle lies in the fact that the view it attributes to Aristotle is inconsistent relative to classical propositional logic and its normal, truth-functional semantics. The development of non-truth-functional supervaluation semantics for propositional logic, which can model the interpretation, should at least alleviate qualms concerning the attribution of an inconsistent view to the Philosopher.

The last subsection of Section E represented an attempt to relate the preceding interpretation of Aristotle to the temporal-frequency model of the modalities. I suggested that Aristotle's version of "time's arrow" (his conception of the future as indeterminate in a way that the present/past are not) would have allowed Aristotle to apply the temporal-frequency model to the future: since there are no "future particulars or individuals," taking into account what happens in similar circumstances – i.e., appealing to the temporal-frequency model – is appropriate in making modal (and truth-value) assessments about *kinds* of *future* events/states of affairs. For example, since sea battles sometimes ensue but sometimes do not ensue the day following one characterized by circumstances "relevantly similar" to the ones obtaining today. "A sea battle [indefinite, instance of the "kind" sea battle] will occur tomorrow" is now neither

aphōrismenōs true nor *aphōrismenōs* false, and is now contingent (neither necessary nor impossible relative to circumstances that now obtain). However, the past is not now similarly indeterminate: the actual past relative to what is now the case is, in Aristotle's view, "fixed" and necessary. Since there is a particular, individual sea battle that occurred yesterday if one occurred, whether sea battles always, never, or sometimes occur on days preceding days similar to today is not relevant to the truth-value or modal status of "A sea battle [particular or individual sea battle] occurred yesterday." Such a proposition is either *aphōrismenōs* true and necessary (if a sea battle actually occurred) or *aphōrismenōs* false and impossible (if a sea battle did not actually occur). The employment of this future-indeterminacy/past-determinism interpretation of Aristotle by the Peripatetic Alexander of Aphrodisias in his polemic against Stoic determinism will be explored in Chapter Five.

NOTES

[1] Hintikka, *T&N*, p. 103.
[2] *Ibid.*, p. 102.
[3] *Ibid.*
[4] *Cf. An. post.* 2.11.94a20ff.
[5] *An. pr.* 1.15.34a13–16.
[6] "Propositions," so conceived, may be thought of as propositional functions with a "free time variable," the value of which is normally implicitly supplied by the "time of use": "Socrates is alive (at *t*)."
[7] *Cat.* 5.4a23–26.
[8] 4a36–b1.
[9] W. V. O. Quine's concept of an "eternal sentence," "one that is fixedly true or false," is intended to fulfill this function: "So the plan I now propose is to take as truth vehicles . . . eternal-sentence utterance events: utterances of sentences that are eternal sentences for the utterer at the time; or to revert to language language, utterances of sentences that are eternal sentences of the language that the utterer is speaking at the time" ('Propositional Objects', in *Ontological Relativity and Other Essays* (New York and London, 1969), p. 143).
[10] Hintikka, *T&N*, pp. 151–153.
[11] *De partibus animalium* 1.1.639b24.
[12] *De int.* 13.23a21–23.
[13] *De gen. et corr.* 2.11.338a1–4.
[14] Hintikka, *T&N*, p. 130. More accurately, Hintikka claims in this passage that Aristotle's distinction between absolute and hypothetical possibility/necessity "serves some of the same purposes" as a distinction between conceivability and actual realizability or between logical and physical possibility/necessity. However, Hintikka repeatedly stresses the point – as do Sorabji (*NC&B*) and Sarah Waterlow (*Passage and Possibility: A Study of Aristotle's Modal Concepts* [Oxford, 1982]) – that Aristotle does not have a clear distinction between a

logical or conceptual sense of the modalities, on the one hand, and a physical, causal, or natural sense, on the other. I entirely agree and return to this point in the first section of Chapter Eight.

[15] *Meta.* 9.4.

[16] *An. post.* 1.8.75b24–26.

[17] *An. post.* 1.4.73b26–27.

[18] *An. pr.* 1.13.32b8–10.

[19] Alexander Aphrodisiensis, *In analyticorum priorum I 13*, in *Commentaria in Aristotelem Graeca*, Vol. I, Pars. I (*CIAG* **1**/1), ed. M. Wallies (Berlin, 1883), 162.17–23.

[20] Sorabji, *NC&B*, p. 21. As Sorabji notes, the type of qualification in question "will differ from one context to another."

[21] *Ibid.*

[22] *An. pr.* 1.10.30b31–40.

[23] *Phys.* 2.9.200a17–18.

[24] *Cf. Phys.* 2.9. This seems to be the import of Aristotle's claim that "it is clear that in physical things the necessary is that which is spoken of as the 'matter' and the motions of this [matter]" (200a30–32).

[25] This issue, which is perhaps most explicitly treated by Aristotle in *An. post.* 2.12, is discussed at length in Chapter V and in my paper 'Causes as Necessary Conditions: Aristotle, Alexander of Aphrodisias, and J. L. Mackie', *Canadian Journal of Philosophy*, Supplementary Volume X (1984), pp. 157–189.

[26] For a concise historical summary of the Hellenistic debates concerning conditionals, see William Kneale and Martha Kneale, *The Development of Logic* (Oxford, 1962), pp. 128–138.

[27] Perhaps "conflation" is a more accurate therm than "equation" here. Related to Aristotle's lack of a clear distinction between "natural" ("causal," "physical") necessity and "conceptual" ("logical") necessity is his lack of a clear distinction between "natural necessitation" ("causation," in one sense of the term) and "logical/conceptual necessitation."

[28] Cf. "By that which is self-caused, I mean that the essence of which involves existence, *or that of which the nature is only conceivable as existent*" [emphasis added] (Benedict Spinoza, *Ethica*, Part I, Definition I, in *The Chief Works of Benedict de Spinoza*, trans. R. H. M. Elwes, Vol. 2 (New York, 1951), p. 45.

[29] *Meta.* 2.2.994a8–19.

[30] Detailed elaboration of this claim occurs in Chapters Three and Four. *Cf.* also Benson Mates, *Stoic Logic* (Berkeley and Los Angeles, 1961), pp. 42–45.

[31] *Meta.* 9.4.1047b14–21.

[32] Discussed in detail in Section C of this chapter.

[33] 1047b27–30.

[34] 'Necessity and Unactualized Possibilities in Aristotle', *Philosophical Studies* **38** (1980), pp. 287–298; 'Fatalism and Causal Determinism: An Aristotelian Essay', *The Philosophical Quarterly* **31**/124 (1981), pp. 231–241.

[35] Hintikka, *T&N*, p. 183.

[36] E.g., see Theodore Guleserian, 'Factual Necessity and the Libertarian', *Philosophy and Phenomenological Research* **32**/2 (1971), pp. 188–204.

[37] Of course, some compatibilists or reconciliationists will claim that this equivalence does *not* hold, i.e., that although an action may be "factually necessary" in the sense that I have

defined it, it should not be inferred that it is thus "unpreventable." Various ancient forms of compatibilism, specifically, forms of Stoic compatibilism, are further discussed in Chapter IV.

[38] *Meta.* 6.3.1027a32–b8.

[39] Alexander, *In an. pr.* I 15, *CIAG* **2**/1, 184.11–12.

[40] Cf. *An. pr.* 1.13.32a18–21.

[41] E.g., Alexander, [*De anima libri*] *mantissa*, *Supplementum Aristotelicum*, Vol. 1, Pars 1 (*SA* **2**/1), ed. Ivo Bruns (Berlin, 1887–1892), 184.14–20. See the discussion in R. W. Sharples, "Alexander of Aphrodisias, *De fato*: Some Parallels," *Classical Quarterly* **28** (1978), pp. 259–260.

[42] Hintikka, *T&N*, pp. 210–213; C. J. F. Williams, 'Aristotle and Corruptibility', *Religious Studies* **1** (1966), pp. 203–215; Waterlow, *Passage and Possibility*, Ch. Six, pp. 49–78.

[43] Hintikka, *T&N*, p. 110.

[44] *An. pr.* 1.13.32a18–20.

[45] *De caelo* 1.12.281b18–20. For Aristotle's argument to go through, "an infinite (*apeiron*) time" must be taken as implying "all time." Of course, this entailment does not hold for "modern" (i.e., Cantorian) concepts of infinity.

[46] At *De caelo* 1.11.280b7ff. Aristotle distinguishes a number of senses of "*agenēton*" for several of which this implication does not hold. For example, there is a sense of the term that applies to something, "if it now is but formerly was not, without [undergoing any process of] motion or change" (280b7–8).

[47] Rescher and Urquhart discuss the distinction I have in mind here, that is, the distinction between the metaphysical pictures of "branching time," on the one hand, and of the "same time" as characterized by alternative events/states of affairs, on the other: Nicholas Rescher and Alasdair Urquhart, *Temporal Logic* (Vienna and New York, 1971), pp. 70–74.

[48] *Cf. Phys.* 4.10–13, especially 221a1ff.

[49] Alexander, *Quaestio* 1.4, *SA* **2**/2, 12.13–18.

[50] 'Fatalism and Causal Determinism', pp. 232–235.

[51] *Phys.* 4.11, especially 219bff.

[52] The concept of "genuine" past or present temporal reference is similar to Rescher and Urquhart's concept of "temporal purity" (*Temporal Logic*, pp. 138–151). The concept is intended to rule out "implicit" reference to future events/states of affairs through nominally present-or-past events/states of affairs, e.g., the "past" state of affairs of it's being true yesterday that I will have eggs for breakfast the day after tomorrow.

[53] *An. pr.* 1.13.32b11–12.

[54] *Phys.* 8.5.256b9–13.

[55] *Phys.* 8.1.251b12–13.

[56] *De gen. et corr.* 2.10.336b27–337a1.

[57] *De gen. et corr.* 2.11.338a18–338b6.

[58] *De caelo* 2.12.292a20–21.

[59] *Phys.* 8.4.255a6–7.

[60] 256a1–2.

[61] *Meta.* 9.5.1048a16–21; 9.7.1049a5–18.

[62] *Meta.* 9.5.1048a17–20.

[63] *Cf.* M. J. White, 'Aristotle's Concept of *Theōria* and the *Energeia-Kinēsis* Distinction', *Journal of the History of Philosophy* **18**/3 (1980), pp. 253–263.

[64] *Cf. Meta.* 9.6.1048b23–25.
[65] *Cf. De gen. et corr.* 2.10.337a2ff.
[66] *De gen. et corr.* 2.10.336b20–23.
[67] Alexander, *Quaestio* 3.5, *SA* **2**/2. 89.13–23. Translation in R. W. Sharples, ' "If What is Earlier, Then of Necessity What Is Later"?: Some Ancient Discussions of Aristotle, *De Generatione et Corruptione* 2.11', *Bulletin of the Institute of Classical Studies* (University of London) (*BICS*) 26 (1979), p. 31.
[68] *Cf.* Cicero, *De fato* 18.
[69] In late scholastic disputes, the question centers on the relation between sufficient and efficacious grace. Does grace sufficient for salvation, which is given to all, become efficacious because of an act of the will of the individual that is not externally determined (Molinism)? Or is there an intrinsic distinction between sufficient and efficacious grace, the latter having the power "infallibly to procure the assent" of the recipient without destroying his power of refusal (the common Thomistic position)?
[70] *De mundo* 7.401b9–10.
[71] Cf. J. von Arnim, *Stoicorum Veterun Fragmenta* (*SVF*), Vol. II (Leipzig, 1903), Nos. 917, 918, 920 (hereafter, in the form 2.917, 2.918, etc.).
[72] *Introductory Readings in Metaphysics*, ed. Richard Taylor (Englewood Cliffs, 1978), p. 136.
[73] E.g., *cf.* Susan Haack, *Deviant Logic: Some Philosophical Issues* (Cambridge, 1974), pp. 77–82.
[74] G. E. M. Anscombe, 'Aristotle and the Sea Battle, *De Interpretatione*, Chapter IX', in *Aristotle: A Collection of Critical Essays*, ed. J. M. E. Moravcsik (Garden City, New York, 1967), pp. 15–33.
[75] In *An. pr.* Aristotle holds that the conclusion of a valid syllogism is conditionally necessary, given the premises (i.e., that it is necessary that if the premises are true, then the conclusion is true as well – $L(p \supset q)$); he does not conclude, however, that all sound syllogisms (valid syllogisms with [assertorically] true premises) have necessarily true or apodictic conclusions (i.e., that if the premises are true, then the conclusion is necessarily true – $p \supset Lq$). *Cf., for example, An. pr.* 1.10.30b31–40. Haack (*Deviant Logic,* p. 78) suggests that *De int.* 9.19a23–36 may be interpreted as drawing what amounts to the distinction between "$L(p \supset q)$" and "$p \supset Lq$." However, the passage also may be read as distinguishing between an absolute or *haplôs* sense of "necessary" and the temporally relative sense.
[76] I would agree with Anscombe, however, that at 19a29ff. Aristotle does seem to indicate that the necessity of a "disjunction" does not "distribute over the disjuncts." But I believe that his concern with one or the other of the disjuncts' becoming necessary derives from sources *other* than the "purely logical" fallacy of inferring the necessity of the disjuncts from the necessity of a disjunction. If it were the latter fallacy that concerns Aristotle, it seems that he should be concerned with the transferal of the necessity of a disjunction of a pair of contradictory propositions to *both* disjuncts.
[77] White, 'Fatalism and Causal Determinism'.
[78] Spinoza, *Ethica*, Part I, Prop. III, in *Ethic*: *From the Latin of Benedict Spinoza*, trans. W. Hale White, 4th edition (London, 1923), p. 3.
[79] John Hermann Randall, Jr., *The Career of Philosophy*, Vol. 1 (New York, 1962), p. 607.
[80] Immanuel Kant, *Critique of Pure Reason*, trans. Norman Kemp Smith (New York, 1965), A 91 (B 124), p. 125.

[81] *An. post.* 1.6.75a10–20.
[82] *An. pr.* 1.13.32b18–19.
[83] *Phys.* 2.5.196b27–28.
[84] 196b33–197a20.
[85] Spinoza, *Ethica*, Part I, Prop. XXVIII, trans. W. H. White, pp. 28–29.
[86] *Ibid.*, Prop. XXIX, p. 29.
[87] *Cf. An. post.* 1.19ff. and the discussion in Jonathan Lear, *Aristotle and Logical Theory* (Cambridge, 1980), Ch. Two, 'Completeness and Compactness', pp. 15–33.
[88] *Phys.* 2.5.197a5–6. The other necessary condition of a chance or spontaneous occurrence is that it "mimic" a telic occurrence: in the case of chance, this telic occurrence will involve choice, but in the case of the broader spontaneous occurrence, conscious choice need not be involved. "So that it is clear that among those things that, generally speaking, come-to-be for the sake of something, when their cause is external and they do not come-to-be for the sake of what results, then we say that they come-to-be spontaneously. [And we say that those things come-to-be] by chance that come-to-be spontaneously, having been chosen by those [agents] having the capacity of choice" (197b18–22).
[89] *Meta.* 6.2.1027a8–11.
[90] *Meta.* 9.5.1047b35–1048a10.
[91] It is not, I think, clear whether Aristotle's considered opinion is that (i) a rational potentiality is a *single* potentiality for two opposing or contradictory effects or (ii) a rational potentiality has a single effect but implies the existence, in its possessor, of *another* distinct potentiality for the opposing effect. It is obvious that in the preceding argument view (i) much better serves Aristotle's purpose.
[92] These "attendant circumstances" are perhaps most often conceived of negatively: i.e. a given potentiality will "naturally" be actualized in the absence of "preventing" (*kōluonta*) factors. For further discussion of the "asymmetrical" treatment of causal factors, see Ch. Seven, Section B.
[93] See the beginning of the passage: 1047b35–1048a2.
[94] This Aristotelian phrase becomes a technical phrase connoting the responsibility of the agent for actions in the Hellenistic determinism – responsibility debates. The interpretation of Boethius as limiting "indeterminacy" or contingency to causal chains begun by the "new starts" of human decisions has been suasively defended by Norman Kretzmann, "*Nos Ipsi Principia Sumus*: Boethius and the Basis of Contingency" (unpublished manuscript).
[95] 1027a13–15.
[96] 1050b21–22.
[97] *De int.* 13.22b36–23a4.
[98] I have in mind, of course, Plato's account of the receptacle, and his closely related conception of (a kind of) necessity and "errant cause," in the *Timaeus*. Cf. Cornford: "I have maintained that Plato recognizes in the working of the universe, a factor which confronts the divine Reason and is neither ordained nor completely controlled by it. This means that irrational and merely necessary motions and changes, with casual and undesigned results, actually occur in Nature at all times, as well as those which are subservient to rational ends. It is only 'for the most part' that Reason can persuade Necessity. Were it otherwise, Plato's Demiurge would be represented as an omnipotent creator who had designed the whole contents of the universe, not as a craftsman who 'takes over' materials in disorderly motion and does the best he can with them" (F. M. Cornford, *Plato's Cosmology: The 'Timaeus' of Plato* (London, 1937), p. 209).

A very Neoplatonic-sounding identification of "not-being" (*to mē on*) as the ground of chance and spontaneity in "external causes" and of "what is up to us" (*to eph' hēmin*) in the case of human beings is found in Alexander's *Mantissa* (*SA* 2/1), 171.1–172.15. Sharples has discussed the question of whether this passage (and the position it sets forth) can be attributed to Alexander: R. W. Sharples, "Responsibility, Chance and Not-Being (Alexander of Aphrodisias *mantissa* 169–172)," *BICS*, No. 22 (1975), pp. 37–63.

[99] However, in *De gen. et corr.* 2.9, Aristotle contrasts Plato's account, in the *Phaedo*, of coming-to-be solely in terms of "participation in the Forms" with an account of *kinēsis* solely in terms of matter. Although he thinks the latter account less far from the truth than the former, he seems to criticize it for making matter "too active": "for to undergo (*to paschein*) and to be moved is characteristic of matter, to move and to act of some other power" (335b30–31).

[100] Boethius, *Commentaria in librum Aristotelis 'Peri hermeneias'*, (*editio secuna*) ed. C. Meiser (Leipzig, 1877), Vol. 2, 208.

[101] Boethius makes it clear (ibid., 208) that this "mutability" of truth-value is "not a consequence of our ignorance or knowledge."

[102] Ammonius, *In Aristotelis de interpretatione commentarius*, ed. A. Busse, *CIAG* 4/5, 128–131.

[103] Hintikka, *T&N*, p. 169.

[104] Cf. the discussion of Hintikka, *ibid.*, pp. 170–171.

[105] Technical problems encountered in identifying necessity with the "upper limit" of degrees of probability (i.e., the "most probable") and impossibility with the lower limit are discussed in Ch. Eight, Section A.

[106] Alexander, for example, holds (and attributes to Aristotle the view) that *individuals* are not capable of temporal recurrence: *Quaestio* 3.5, *SA* 2/2, 88.13–16.

[107] *An. post.* 2.12.95a24–36.

[108] For further discussion of Aristotle on conditional necessity involving relations between non-contemporaneous events/states of affairs see Ch. Five and my paper "Causes as Necessary Conditions."

[109] Those are cases where the "consequent" is eternally recurrent, a fact that also entails that the relation is also one of *a fronte* conditional necessity (perhaps through some "intermediate" states of affairs). See the discussion in Ch. Five and in White, 'Causes as Necessary Conditions'.

[110] Dorothea Frede, *Aristoteles und die "Seeschlacht": Das Problem der Contingentia Futura in De Interpretatione 9* (Goettingen, 1970), pp. 24–27.

[111] *De div. per somn.* 2.463b28–33.

[112] 337b3–8.

[113] In particular, the three-valued propositional logic of J. Lukasiewicz. See Lukasiewicz, 'On 3-valued Logic', and 'Many-Valued Systems of Propositional Logic', translated and reprinted in *Polish Logic* (Oxford, 1967).

[114] Boethius, *In librum Arist. PH*, (*editio prima*), ed. Meiser, 123.

[115] The formal logical difficulty in preserving the "law of excluded middle" (the disjunction of any proposition and its denial is always [logically] true) while denying 'bivalence" (i.e. allowing for propositions that are neither true nor false) has, I think, rendered this interpretation of the position of Aristotle (and of a number of his commentators) unpopular among contemporary scholars. However, several scholars (e.g., Haack, *Deviant Logic*, pp.

85–87) have recognized that the consistency of this interpretation can be rigorously demonstrated using B. van Fraassen's "supervaluational" semantics for (classical) propositional logic. Such a formal modeling of the interpretation has been carried out in some detail in my paper 'Necessity and Unactualized Possibilities in Aristotle'. See also, for formal details concerning supervaluational semantics, van Fraassen, 'Presuppositions, Supervaluations, and Free Logic', in *The Logical Way of Doing Things*, ed. K. Lambert (New Haven, 1969), pp. 67–91.

[116] Hintikka, *T&N*, p. 173.

[117] For a discussion of the relation among the notion of a relatively closed system, the temporal asymmetry of inferences (temporally prior to posterior and the converse), and the anisotropy of time, see A. Gruenbaum, *Philosophical Problems of Space and Time* (New York, 1963), pp. 281–329.

[118] Philoponus, *In Aristotelis de generatione et corruptione*, ed. H. Vitelli, *CIAG* **14**/2, 308.

[119] Alexander, *Quaestio* 3.5., *SA* **2**/2, 88.25ff. The passage is discussed in Sharples, '"If What is Earlier, . . .'".

[120] This I take to be a corollary of those elements of Aristotle's conception of time to which the terms "*nunc fluens*" or "dynamic present/past" might be applied. For details, see my discussion in 'Fatalism and Causal Determinism: An Aristotelian Essay.' Lloyd suasively argues that the Stoics worked out the technical details of such a view: "The upshot of this would be that verbs in a genuine past or future tense did not refer, in the technical sense, to things or events in the past or future. Therefore, unlike verbs in the present tense, they did not imply the existence of any particular in the sense of identifiable time" (A. C. Lloyd, 'Activity and Description in Aristotle and the Stoa," *Dawes Hicks Lecture on Philosophy, British Academy* (London, 1971), p. 13).

[121] Hintikka, *T&N*, p. 175.

[122] According to some versions of the frequency conception of probability, the idea of the probability of occurrence of an *individual* event, relative to some set of background conditions, is "literally meaningless."

[123] J. Hintikka, with U. Remes and S. Knuuttila, *Aristotle on Modality and Determinism*, *Acta Philosophica Fennica* **29**/1 (Amsterdam, 1977).

[124] See Daniel W. Graham, 'States and Performances: Aristotle's Test', *Philosophical Quarterly* (St Andrews) **30** (April, 1980), pp. 117–130; White, 'Aristotle's Concept of *Theōria* and the *Energeia-Kinēsis* Distinction'.

[125] *Meta.* 9.6.1048b18–36.

[126] *Phys.* 3.1.201a9–11.

[127] *Aristotle on Modality and Determinism*, p. 72.

[128] *Ibid.*, pp. 73–74.

[129] Cf., for example, *ibid.*, pp. 18–21; "As our quotations show and as was already mentioned, the absence of external hindrances has to be built (according to Aristotle) into the full definition of the potentiality in question" (p. 37); "When a change is not yet taking place, there is no evidence of a full-fledged *dynamis* being present at all. At most a lower-order *dynamis* can therefore be operative in such circumstances" (p. 62).

[130] *Aristotle on Modality and Determinism*, p. 75.

[131] *Meta.* 6.2.1026b22–24.

[132] *Meta.* 6.3.1027a29–32.

[133] Hintikka, *Aristotle on Modality and Determinism*, p. 102.

[134] *Ibid.*, pp. 103–104.

[135] W. D. Ross, *Aristotle's Metaphysics: A Revised Text with Introduction and Commentary*, Vol. I (Oxford, 1924), p. 362.

[136] See, for example, Pierre Chantrain, *Histoire du parfait grec* (Paris, 1927); John Lyons, *Structural Semantics: An Analysis of Part of the Vocabulary of Plato* (Oxford, 1972), pp. 111–118.

[137] Aristotle, *Physics* 2.5.196b21ff.

[138] Cf., for example, *An. post.* 1.13–14; 1.,18, 1.31, 2.3–4.

[139] Sorabji, *NC&B*, Ch. Two, 'Is Cause Related to Necessitation or to Explanation?'.

[140] Most contemporary scholars contrast the interpretation of Ammonius and Boethius with the (temporary) truth-gap interpretation, usually reserving the rubric "traditional interpretation" for the latter. Thus, Sorabji, *NC&B*, pp. 91–103. There may have been other "traditional" interpretations, differing from that of Ammonius and Boethius in denying for future contingents either excluded middle or, less plausibly, noncontradiction. Cicero seems to allude to an Epicurean conception of future contingents of this sort at *De fato* 16.37: "nisi forte volumus Epicureorum opinionem sequi, qui tales enuntiones nec veras nec falsas esse dicunt, aut, cum id pudet, illud tamen dicunt, quod est impudentius, veras esse ex contrariis disiunctiones, sed quae in his enuntiata sint, eorum neutrum esse verum." There obviously are two views being reported here. The second I would take to be identical – or at least very similar – to Ammonius' and Boethius' interpretation of Aristotle. The first view – Cicero implies (by contrasting it with the second) but does not actually state – restricts excluded middle for future contingents. This may be the sort of view of future contingents enshrined in an interpretation of Aristotle ascribed by Boethius to "the Stoics" (among others) but explicitly rejected by him: "Putaverunt autem quidam, quorum stoici quoque sunt, Aristotlem dicere, in futuro contingentes nec veras, nec falsas" (Boethius, *In librum Arist. PH* [*editio secunda*], ed. Meiser, 208). Aristotle himself (at *De int.* 9.18b16–25) maintains that "it is not possible to say that neither [of a contradictory pair of future contingents] is true, for example (*oion*) that it neither will-be nor will-not-be." He proceeds to argue that such a view would take away contingency (*hopoter' etuchen*), leading to such conclusions as that "it would be necessary that a sea battle neither come-to-be tomorrow nor that it not-come-to-be tomorrow." It also seems to be the case that noncontradiction would be violated by such a view if "not not-come-to-be" is equivalent to "come-to-be."Boethius states that the view Aristotle here consideres and rejects, *viz.*, the view that neither of the contradictory future contingents is true, is equivalent to the view that both are false; Boethius also implies that some have mistakenly read Aristotle as asserting this view and contrasts it with his own interpretation: "Neque enim idem est dicere neutra vera est quod dicere neutra vera est definite. Futurum enim esse cras navale bellum, et non futurum, non dicitur, quoniam utraeque omnino falsae sint, sed quoniam neutra vera sit definite, aut quaelibet ipsarum definite sit falsa, sed haec quidem vera, illa vero falsa, non tamen una ipsarum definite, sed quaelibet illarum contingenter" (*editio secunda*, ed. Meiser, 215).

CHAPTER THREE

DIODOREAN FATALISM

A. DIODORUS THE MEGARIAN?

One of the great "dialecticians" (i.e., logicians) of antiquity was Diodorus Cronus, who flourished in the latter part of the fourth and very early part of the third century B.C. His life seems to have slightly overlapped that of Aristotle (who died in 322); but it is questionable whether Diodorus could have had any philosophical influence on the Philosopher.[1] Until very recently, Diodorus was considered to have been an adherent of the Megarian school, which originated with Euclides of Megara, a pupil of Socrates, in the early fourth century.[2] Diogenes Laertius comments that

> those who followed him [Euclides] were called Megarics [or Megarians], then Eristics, and later Dialecticians, Dionysius of Chalcedon having first thus named them on account of their formulating their arguments by question and answer.[3]

The received view, then, is that there was sufficient "community of philosophical interests or method" among the philosophers designated by these three names for us to say that they were all members of the Megarian (or Eristic or Dialectical) "school," even though none of the philosophers might have been designated by all three labels by any of his contemporaries.

David Sedley has recently argued, however, that the received view is mistaken. Distinguishing sharply between a "school" or *hairesis* ("a unified sect recognised as such by its members") and a "succession" or *diadochē* ("a neat family tree of philosophers constructed by Hellenistic biographers"), he argues that the triple "Megarian-Eristic-Dialectical" constitutes a "succession" and is not a record of names successively applied to the same "school".[4] The implication is that there is no appreciable community of philosophical interest among the Megarians, the Eristics, and the Dialecticians. And, in fact, Sedley neatly distinguishes the three groups: the *Megarikoi* were "Cynically inclined moral philosphers best represented by Stilpo,"[5] the *Eristikoi* – an unflattering name obviously not self-applied – were "logic-choppers" "who built their philosophical method around the use of logical puzzles,"[6] and are represented pre-

eminently by Aristotle's contemporary Eubulides; and the *Dialektikoi*, whose most eminent member was Diodorus, "took up the constructive study of logic," a study that yielded the beginnings of propositional logic.[7] Sedley concludes that, as a consequence of these distinctions, it is an error to refer to Diodorus, who is regularly denominated a "Dialectician" in the ancient sources, as a "Megarian."

The principal argument Sedley adduces for thus distinguishing the Megarians and the Dialecticians is based on a passage from Diogenes' discussion of Stilpo. In illustrating the great popularity and influence enjoyed by Stilpo, Diogenes quotes Philippus the Megarian:

> for from Theophrastus he dragged away Metrodorus the Theoretician and Timagoras of Gela; from Aristotle, Clitarchus the Cyrenaic and Simmias; and from the Dialecticians, Paeonius from Aristides. Diphilus of Bosphorus, the son of Euphantus, and Myrmex, the son of Exaenetus, both of whom had come to refute him, he had as zealous admirers.[8]

Sedley comments on this passage as follows:

> This achievement would scarcely be to Stilpo's credit if the Dialecticians and the Megarians were one and the same school.[9]

Although there may be reason to think that the Greek terms "*hairesis*" and "*diadochē*" are not synonyms, I believe that we must reject the most philosophically substantial corollary of Sedley's argument – that is, the claim that there is no real community of philosophical interest or method that characterizes the philosophers variously denominated as Megarians, Eristics, and Dialecticians. To begin with, Sedley's principal argument is scarcely apodictic. To assume that since Stilpo (a Megarian) "stole" pupils from one or more philosophers (whom Diogenes calls "Dialecticians"), these Dialecticians must have belonged to other schools (i.e., were not Megarians) seems to carry the adage concerning "honor among thieves" too far! Intra-school rivalry is the rule, rather than the exception, in the history of philosophy.

There is also positive evidence to support the contention that the "Megarians," "Eristics," and "Dialecticians" shared both the same philosophical method and many of the same philosophical interests and views. The approach of all, including those termed "Megarians" by Diogenes, was strongly "logical" or "dialectical." Euclides, the founder of the Megarian school, is reported to have attacked the conclusion (*epiphora*) rather than the premises (*lēmmata*) when he "disputed a demonstration":[10] this is precisely the way to attack the validity of an argument. He is also reported by Diogenes to have rejected the argument

from analogy, questioning the logical validity of arguments of this form.[11] Stilpo, whom Sedley recognizes as a Megarian, is also characterized by Diogenes as excelling in "logical inventiveness and sophistic" (*euresilogia kai sophisteia*).[12] In fact, in a fabulous anecdote typical of Diogenes, Diodorus is represented as wasting away and dying of shame when he was unable to respond immediately to "certain dialectical arguments" (*logous tinas dialektikous*) put to him by Stilpo at the court of Ptolemy Soter.[13]

The Megarians-Eristics-dialecticians shared more than the "dialectical approach" to philosophical issues, however. There is a fusion of Socratic moral concerns with Eleatic metaphysics that seems to characterize the entire succession. The Eleatic element is of most importance with respect to the topic of this chapter, Diodorus' fatalism. If we are to believe Diogenes Laertius, the Eleatic influence was present from the beginning of the Megarian tradition: he characterizes Euclides as "pursuing Parmenidean matters" (*ta Parmenideia metecheirizeto*).[14]

One distinctive Parmenidean doctrine is that of the unity of "what is." Perhaps this doctrine, together with what appears to have been the Socratic doctrine of the unity of the virtues,[15] is reflected in Euclides' doctrine that "the good is one."[16] The doctrine is intimately connected with Parmenides' exhaustive dichotomy between what is of necessity (*hopōs estin te kai hōs ouk esti mē einai*) and what *cannot* be (*hōs ouk estin te kai hōs chreōn esti mē einai*).[17] Parmenides denies the possibility of a "middle ground," something between necessary being and necessary not-being. "Unactualized possibilities" would certainly seem to be prime candidates for such middle-ground status. So Diodorus' eschewal of such unactualized possibilities – to be discussed later in this chapter – is very much in the Eleatic spirit.

Another distinctive Eleatic doctrine is the denial of motion or change, a doctrine that is dialectically defended by Zeno's "paradoxes" against motion.[18] This doctrine seems to have been adopted, in some form or other, by the Megarian-Eristic-Dialectical succession. In *Meta.* 9.3, a passage to be dealt with in greater detail later in this chapter, Aristotle charges that a consequence of the "Megarian" conflation of possibility and actuality is that both "movement and becoming" (*kinēsis kai genesis*) are done away with.[19] And with respect to the *Dialektikos* Diodorus, Sextus Empiricus says that, "Diodorus was of the opinion that nothing moves" (*areskei tō Diōdōrō mēden kineisthai*).[20] That Eleatic influence,

derived through the "first Megarians," is operative in the case of Diodorus seems very likely, particularly in view of the fact that Sextus attributes to Diodorus an argument against motion virtually indistinguishable from the "Arrow" paradox attributed to Zeno by Aristotle in *Phys.* 6.9.[21] The influence of Eleatic metaphysics on the Megarian-Eristic-Dialectical succession also may help to explain the great emphasis of members of that succession on logic. As Parmenides and Zeno themselves demonstrated, great "dialectical" skill is required to prevent the dismissal as ludicrous of a metaphysical view so apparently at odds with "appearances" and common sense as the Eleatic (-Megarian) metaphysics.

I believe that we can conclude, then, that Diodorus represents a logico-metaphysical tradition which traces its origins through the Megarian-Eristic-Dialectical succession back to the Eleatics.[22] However, much of the following philosophical analysis is independent of this historical conclusion. I begin the analysis with a more detailed examination of Diodorus' "denial of motion."

B. DIODORUS' DENIAL OF MOTION

The Megarians whom Aristotle criticizes in *Meta.* 9.3 assumed a sort of "positivistic" attitude toward potentialities: they were willing to countenance them only "in act," as Aristotle states at the beginning of the chapter:

> there are some who say, as do the Megarians, that something has a capacity only when the capacity is actualized, and when the capacity is not actualized, a thing does not have the capacity. For example, someone not engaged in house-building is not able to house-build, but only the one engaged in house-building, when he is house-building, has this ability; and similarly in other cases.[23]

The main argument Aristotle adduces against this view relies on a premise relating the alethic modality of impossibility to time:

> someone saying that the impossible either is or will be will speak falsely. [$\sim Mp \models \sim(p \vee Fp)$, in the notation of contemporary modal-tense logic.][24]

From this premise, together with the Megarian conflation of "the possible" and "the actual," Aristotle claims that it follows that there is no motion or change. Suppose that someone is standing. Then, according to Megarian doctrine, he does not have the capacity for sitting (since it is false that he is *actually* sitting). Consequently, according to Aristotle's

premise, he will not now nor ever sit; he must forever remain standing.[25] Since this argument can be generalized, it seems that no "change" from the present world state would be possible. For Aristotle, the fact that the Megarian doctrine has a consequence so patently at odds with "appearances" is sufficient reason to dismiss it. The earlier Eleatics might well have been willing to "bite the bullet" and respond "so much the worse for appearances."

Diodorus Cronus, however, apparently sought a middle position, one that appears, in many ways, very modern. Hintikka has suggested that Diodorus may have been influenced by Aristotelian criticism of earlier Megarian doctrine,[26] and I believe that a fairly strong case can be made for the plausibility of this suggestion.

The basic elements of Diodorus' view are not difficult to ascertain. He retains a "positivistic" or "extensional" conception of the modalities but modifies slightly the conception attributed to the "Megarians" by Aristotle. According to Aristotle's account, the Megarian doctrine apparently is that "what is possible," from the present temporal perspective, is equivalent to "what is *now* actually the case." There is, however, what I believe is a natural tendency to interpret "what is, at present, possible" in such a way that "present" has "widest scope": and, as a consequence, we tend to apply the phrase "what is, at present, possible" not only to what *might* be happening *at the present moment*, but also to what *might* happen in the future relative to the present time. There is, in other words, a temporally *prospective* aspect to the modality of possibility, or at least to some ordinary conceptions of possibility.[27] It is this temporal prospectivity that lends credibility to the premise Aristotle invokes against the Megarians in *Meta.* 9.3. Note that without the implicit assumption of the temporal prospectivity of possibility, the fact that the occurrence of an event is impossible *now*, at the present moment, is apparently irrelevant to the question of whether that event shall occur or fail to occur *at some future time*.

As we shall see, the account of the alethic modalities adopted by Diodorus takes into account the temporal prospectivity of possibility and, thus, avoids Aristotle's criticism of the Megarian equation of possibility and actuality. Diodorus is *not* willing to deny the existence of change or motion in one sense of these terms: he wishes to allow that the *cosmos* can "be different" at different times. However, Diodorus' account of the modalities remains radically "extensional": there are no potentialities not eventually fully actualized. In other words, the only possibilities that

now exist are possibilities that are actual now *or* at some time in the future. This doctrine apparently is related to Diodorus' denial of the existence of Aristotelian *kinēseis*. It is with respect to this issue, i.e., the relation between Diodorus' doctrine of "no unactualized possibilities" and his rejection of *kinēseis,* that the discussion of the *energeia-kinēsis* distinction and determinism by Hintikka, Remes, and Knuuttila becomes very helpful.

In Sextus' *Adverus grammaticos* 311–12 (*Adv. math.* 1.311–12), we find the following passage:

> for it belongs to the philosopher to explain that Diodorus is of the opinion that nothing moves. For what moves either moves in the place where it is or in the place where it is not. Neither the first nor the second: therefore nothing moves. And it follows from the fact that nothing moves that nothing perishes: for, as nothing moves on account of its neither moving in the place where it is nor in the place where it is not, so also, since a living thing neither dies during the time it is living nor during the time it is not living, therefore, it never dies. But if this is the case, we are always alive and, according to him, will continue to exist (*authis genēsometha*).[28]

The last clause in the quotation seems to be the conclusion of Sextus, who is attempting to explain the phrase "*authi genēsometha*" in an epigram on Diodorus by Callimachus.[29] It is evidently not a conclusion that Diodorus was prepared to accept, however, as Sextus elsewhere indicates. Sextus in several places attributes to Diodorus a doctrine of "minimal and indivisible bodies" (*elachista kai amerē sōmata*).[30] This doctrine of atomic bodies seems to have been extended by Diodorus to both space and time. The result is discussed by Sextus at *Adv. physicos* 2.85ff.:

> And another weighty "reminder" of the non-existence of motion is provided by Diodorus Cronus, through which he shows that although nothing *is moving*, it, nonetheless, *is moved* (or *has moved*). That nothing is moving is a consequence of his hypothesis of indivisibles: for it behooves an indivisible body to be contained in an indivisible space [or place, "*topō*"], and, on account of this, it is not moving in the place where it is (for it fills up that place, but it is necessary that a moving thing have a larger space in which to move) nor in the place where it is not; for it is not yet in that place, so as to move in it. Consequently, nothing *is moving*. But, according to reason, it *has moved*. For what was formerly observed to be in this place is now observed to be in another place.[31]

A consequence of this argument is that the "perfect" verb form translated by "is moved" must be capable of being true without the corresponding "present-imperfective" form, translated "is moving," having been previously true. According to Sextus, Diodorus recognized and, in fact, argued for this consequence: sentences containing a "syntelestic" ("perfective," "completed state") verb form can be true without a sentence

containing the corresponding "paratatic" ("imperfective," "continuous action") verb form ever having been true.[32] The most germane argument for this claim reported by Sextus is more-or-less a version of the "Arrow." It involves an examination of the action of throwing a ball onto a roof. Diodorus argues that until the ball has touched the roof the "paratatic proposition" "The ball is touching the roof" (*hapetai hē sphaira tēs orophēs*") is *not yet* true since the ball is still in flight.

> But when it once touches (*hapsētai*) the roof, the "syntelestic" "The ball has touched the roof" becomes true.[33]

So the "paratatic" form can *no longer* be true.

The metaphysical import of Diodorus' position can now, I think, be ascertained. The "history of the *cosmos*" is a fixed and "static" (and, it would seem, linear) series of states, signified by the syntelestic verb forms. In the terminology of Aristotelian metaphysics, Diodorus, in "abolishing" the corresponding paratatic forms, has exiled *kinēseis* from the *cosmos*, retaining only *energeiai*. To return to the argument of Hintikka and his collaborators, the result is that, in Aristotelian terms, there can be no "actuality" of what exists potentially *as such* without *kinēseis*.[34] Diodorus is left with his "extensional" account of possibility as what either is or will be the case. Diodorus' "derivation" of this extensional account of the modalities is the topic of our next section.

C. DIODORUS' ACCOUNT OF THE ALETHIC MODALITIES AND HIS FATALISM

There has been considerable discussion during this century, and especially during the last thirty years, of Diodorus' "modal logic." I do not propose to attempt to deal with this secondary literature – although much of it is both of interest and of value – in an exhaustive or even fairly thorough fashion. Rather, I propose to focus on the relation between Diodorus' account of the alethic modalities and his fatalism or logical determinism.

First of all, it seems certain that Diodorus was understood in antiquity to be *some* sort of determinist.[35] Cicero makes this point in his discussion of Diodorus in *De fato* 6–7:

> For he says that only that which is true or will be true is able to happen. And whatever will be the case, that, he says, happens necessarily; and whatever will not be the case, he denies is capable of happening.[36]

In this passage, and in his discussion of Diodorus in general, Cicero tends to mix rather indiscriminately formal and material uses of the modal terms (and of "true" and "false"). This "laxity" on the part of Cicero does not give rise to insuperable problems of interpretation, however. It is, I think, fairly clear that Cicero is referring to the "modal status" of *individual* events or states of affairs in his discussion of Diodorus. From a formal point of view, then, Diodorus' principal concern would be with the modal status of what the contemporary philosopher would call "temporally determinate" propositions.[37]

Most contemporary analyses of Diodorus' account of the modalities, however, have had the effect of interpreting him as applying modal terms primarily to temporally indeterminate propositions. The fullest account of Diodorus' conception of the alethic modalities appears in Boethius' second commentary on Aristotle's *De int.* 9:

> Diodorus determines that the possible is that which either is or will be the case; the impossible is that which, since it is false (*cum falsum sit*), will not be true; the necessary is that which, since it is true (*cum verum sit*), will not be false; and the nonnecessary is that which is already or will be false.[38]

Those contemporary reconstructions of the Diodorean modalities that are based on tense logic utilize two temporal operators, F ("it will, at least once, be the case that") and its dual G (~F~, "it is always going to be the case that"). Then the alethic modal operators L ("it is necessary that") and M ("it is possible that") are defined by the following equivalences:

$$\begin{aligned} Mp &\equiv p \vee Fp \\ \sim Mp &\equiv \sim p \wedge G\sim p \\ Lp &\equiv p \wedge Gp \\ \sim Lp &\equiv \sim p \vee F\sim p \end{aligned}$$

One appealing feature of this tense-logical account of the Diodorean modalities is that it preserves the duality relation between L and M: i.e., $Lp \equiv \sim M\sim p$.

The main historical difficulty with tense-logic interpretations of Diodorus' account of the modalities is that tense logic implicitly assumes that the "atomic propositions" with which it deals are temporally indeterminate propositions.[39] It is assumed that these propositions are, in effect, equivalent to propositional functions with a "free time variable." If we consider a temporally *determinate* proposition, a proposition bound to one time and consequently signifying only one individual event or

state of affairs, the customary assumption is that such proposition is something like a Quinean "eternal sentence" and is thus either always true or always false.[40] This assumption entails that such a temporally determinate proposition is always true if and only if it is ever true; and this consequence collapses the distinctions among the temporal operators for such propositions. That is, for this class of propositions, tense logic becomes trivial: it collapses into standard propositional logic.[41]

From the admittedly meager evidence that we have, it seems that Diodorus was concerned mainly with the *material* use of modal terms, that is, with the modal characteristics of individual events and states of affairs. But such individuals must be signified by temporally determinate propositions that are, by some means, bound to a particular time. It thus seems that tense logic formulations of Diodorus' account of the modalities are likely to be at least misleading. A case in point is Cicero's claim that Diodorus held that whatever is future is necessary. It seems to be the case that Diodorus – as well as virtually all ancient commentators on his Master argument and theory of the modalities – considered his account of the modalities to entail, and perhaps even to be logically equivalent to, this deterministic claim. In its tense-logical paraphrase, the claim seems to amount to $Fp \models LFp$ or, perhaps, $Fp \models Lp$. But neither entailment obtains in the standard modal-tense logics representing the "Diodorean" modalities, in terms of which the two entailments become equivalent to $Fp \models p \wedge GFp$ and $Fp \models p \wedge Gp$. The reason why the entailments do not obtain is, I think, fairly obvious: the implicit assumption "built into" tense logic is that the 'p' represents a temporally indeterminate proposition; but, according to the normal conceptions of time, there is no reason to hold that, from a temporally indeterminate proposition of the form Fp, such as "it will be the case that Socrates dies," it should follow that "Socrates is always going to be about to die" (GFp), as in the first entailment, or that "Socrates is and always will be dying" ($p \wedge Gp$), as in the second.[42]

Diodorus, as we have seen, seems to think of his modal terms as basically applicable to *individual* events or states of affairs, which must be represented by temporally determinate propositions of some sort. The point of his account of the possible as equivalent to what is or will be the case seems to be to rule out "unactualized" events or states of affairs as impossible. If this cloak will, in fact, never be cut apart, or if the stone at the bottom of the ocean will, in fact never be seen, then it is now impossible that the coat be cut apart or that the stone be seen. The force

of his account of necessity, however, is not so clear: "the necessary is that which, since it is true, will not be false." I believe that the account appeals to the connection between "fixed" or "determinate" truth and necessity, which was to become a commonplace in Hellenistic discussions of the modalities and determinism. In his *De fato* Alexander of Aphrodisias comments that a proposition expressing "coming-to-be" is judged necessary by "its not being able to change from true to false."[43] The picture of the relation between propositions and what they signify that grounds this view is set forth by Boethius:

> So that if, as he [Aristotle] says, true propositions [or "discourse": *orationes*] and facts [or "things": *res*] are in a certain way similar, he appropriated this view from Plato, who said that discourse is "cognate" with what it signifies. So if the facts with respect to something were unchangeable and permanent, with a fixed basis, the proposition (*oratio*) expressing these would be true and necessary. If, on the contrary, there were a thing which always remains in constant variation, there would be no fixed truth in the propositions concerning it, and no demonstration would arise through propositions of this sort.[44]

We have already briefly discussed this difficult doctrine of lack of a "fixed" truth value in the chapter on Aristotle and will return to it again when we turn to later Peripatetic doctrine. I allude to the doctrine here in order to point out that it is quite possible to interpret Diodorus' account of necessity (and of impossibility) as an instance of it – perhaps in fact, one of its first explicit instances. The necessary is that which, when or since it is true, will remain true and will not change to false; and the impossible is that which, when or since it is false, will remain false and will not change to true.[45]

If this interpretation of Diodorus' account of the modalities is adopted, it is possible to discern a relation among his account of the modalities, his conception of time, and his fatalism. A state of affairs is now a possible state of affairs if and only if it is now or will be true that it comes about. And it is now necessary that this state of affairs come about just in case it is now true and will "remain" true (i.e., just in case it is now *determinately* or "*fixedly*" true) that it comes about. Since Diodorus conceives of time as a fixed, static, and linear series of states, it seems certain that he would hold that if it is ever true that such a state occurs, it "remains" true that it occurs. Temporarily determinate propositions signifying such individual states of affairs, in other words, remain true if ever true and remain false if ever false. Diodorus' conception of time is not a conception of time as "developmental," as is Aristotle's conception. In fact, his conception seems to anticipate the conception of "timeless time" (i.e., fixed, linear

time) that was to develop in the Platonic tradition and which ultimately yielded the "spacetime" of twentieth century physics.[46] Consequently, a state of affairs is possible only if it is or will be true that it occurs. But if it is or will be true that it occurs, it is "fixedly true" (i.e., is true and will remain true) that it occurs. The result is a strong form of fatalism or logical determinism: a possible state of affairs is a necessary state of affairs. This is precisely the doctrine that Cicero, in *De fato* 7, attributes to Diodorus:

> He says that only what either is or will be the case can happen, and whatever will be the case, that he says happens necessarily; and whatever will not be the case, that he denies is possible.[47]

The reason for referring to Diodorus' determinism as "logical determinism" is that he appears to derive deterministic consequences from his doctrine of the modalities (and the nature of time), rather than a doctrine of universal causal necessitation. If this impression of the source of Diodorus' determinism is correct, an argument in support of his account of the modalities would correctly be regarded as also an argument for determinism. Diodorus' notorious "Master" is such an argument.

D. THE MASTER ARGUMENT AND DIODOREAN FATALISM

Diodorus' Master has perhaps received more attention during the last thirty years or so than any other single argument from the history of ancient philosophy. Although there has arisen considerable diversity of opinion concerning the precise logical structure the argument is likely to have had, it seems certain that it was used by Diodorus to support a principle of no unactualized possibilities: *viz.*, there is nothing that is now possible that will not eventually be actualized.[48] This principle is equivalent to the "left-to-right" direction of Diodorus' "definition" of the possible as what either is or will be the case. The most complete extant account of the Master occurs in Epictetus' *Dissertationes*:

> The Master argument seems to have been propounded from something like the following basis. There is a joint inconsistency among these three propositions:
> (1) every true thing that is past is necessary;
> (2) the impossible does not follow from the possible;
> (3) what neither is nor will be true is nonetheless possible. Seeing the inconsistency, Diodorus employed the plausibility of the first two propositions in showing that what is not and will not be true is not possible.[49]

Epictetus proceeds to point out that, since the argument is in effect a *reductio*, one can avoid Diodorus' no-unactualized-possibilities conclusion by denying the truth of one of the other propositions, i.e., either (1) or (2). We will return to the various Hellenistic responses to the Master later. In this section, however, we concentrate on the structure of the argument itself. Since it is not immediately or self-evidently obvious that the three propositions constitute a jointly inconsistent set of propositions, it seems likely that Diodorus produced some argument (not reported by Epictetus, who either did not know or did not care how the argument went) for the inconsistency of the set.[50] A number of reconstructions, utilizing to various degrees the apparatus of contemporary symbolic logic, have been devised.

A few of these interpret the "follow" (*akolouthein*) of (2), "the impossible does not 'follow' the possible," *temporally*: what is once possible must remain possible and cannot "become" impossible. Although it is probably rash to rule out as *completely* impossible any reconstruction of the Master, reconstructions relying on such a temporal interpretation of (2) seem to me to be questionable on a number of grounds. One source of doubt is philological: "*akolouthein*" is a standard Stoic term for "logical consequence,"[51] and it seems reasonable, in the absence of any special circumstances that would suggest some alternative interpretation, so to understand it here. Further, proposition (2) does make good sense when "*akolouthein*" is read as "is a *logical* consequence": it states the principle of "*reductio ad impossibile*,"[52] which has been accepted by virtually all modal logicians and is, given propositional logic and the duality relation between the modalities ($Lp \equiv \sim M \sim p$) equivalent to one of the distinctive axioms for the "minimal" normal modal logic usually denominated as K: $L(p \supset q) \supset (Lp \supset Lq)$.[53] Also, Chrysippus, who *denies* the truth of the proposition, obviously interprets it as asserting logical consequence rather than temporal succession.[54] Finally, to interpret (2) temporally, as stating that a possibility does not "turn into" an impossibility with the passage of time, would amount to interpreting (2) simply as a bald denial of a principle that many ancients, especially Aristotle and the Peripatetics, wanted to affirm. At the core of Aristotle's conception of the modalities is the view that "future contingent" (temporally determinate) propositions must eventually become either necessary or impossible when the passage of time has rendered them "past." As Sorabji comments, with respect to such temporal interpretations.

a major doubt is whether Diodorus would have got anybody to believe the premise that what is once possible never becomes impossible.[55]

If the temporal interpretation of proposition (2) is eschewed, there remain, I believe, two principal types of interpretation of the argument. One type relies on what I, following M. A. E. Dummett, refer to as the "truth-value link" principles. Truth-value link principles relate the truth values, at a given time, of temporally prospective and retrospective statements to the truth values of "analogous" present-tense statements. For example, according to a truth-value link principle, "there will be a sea battle tomorrow" is to be accounted true on day *d* just in case "there is a sea battle going on" is true sometime during $d + 1$. In fact, the truth value the present-tensed statement is conceived of as "explaining" the truth values of the "analogous" temporally prospective and retrospective statements.[56]

The other sort of interpretation, which I suspect approximates later Hellenistic versions of the argument, employs the assumption of universal causal determinism. Both types of interpretation, in effect, use proposition (2) in order to "project" the necessity characteristic of the past or of "what will become past" (from proposition (1)) onto the "rest of time."

(i) The "Truth-Value Link" Versions

One version of the argument utilizing the truth-value link more-or-less approximates the tense-logical version of Arthur Prior, about which I have more to say elsewhere.[57] This version goes as follows:

(I) It is now not true that event *e* will occur tomorrow; but, nonetheless, it is possible that event *e* occurs tomorrow. (Assumption for *reductio*; in effect, proposition (3)).

(II) It was, in the past, not true that event *e* will occur tomorrow, or, equivalently, it was, in the past, true that event *e* will not occur tomorrow. (From (I) and truth-value link)

(III) It is necessarily the case that it was, in the past, true that event *e* will not occur tomorrow. (From (II) and proposition (1) of the Master)

(IV) It is not possible that it has always been true that event *e* will occur tomorrow. (From (III) and necessary-possible and "it was the case" – "it has always been the case" duality principles)

(V) It follows from the fact that an event occurs that it has always been true that it will occur. (Tense logic thesis $p \models HFp$; arguably also an expression of the truth-value link)

(VI) If it is possible that an event occurs, it is possible that it has always been true that it will occur. (Proposition (2) of the Master applied to (V))

(VII) If it is not possible that it has always been true that an event will occur, it is not possible that that event occurs. (From (VI) by contraposition))

(VIII) If it is not possible that it has always been true that event *e* will occur tomorrow, it is not possible that event *e* occurs tomorrow. (From (VII) by universal instantiation))

(IX) It is not possible that event *e* occurs tomorrow. (From (IV) and (VIII), *modus ponens*))

Clearly the first "conjunct" of (I) and (IX) yield an explicit contradiction. Diodorus will, of course, consequently assert the denial of (I): it cannot both be not true that event *e* will occur tomorrow and yet be possible that *e* occur tomorrow.

Hintikka raises what is, I believe, the most substantial philosophical problem with this type of interpretation of the Master:

> Suffice it to say that Prior's interpretation is entirely based on the assumption that Diodorus would have taken a statement concerning the truth of past predictions, i.e., a statement made in the past "about" the future, as being a statement concerning the past in the sense of Diodorus' first premiss (1).[58]

Hintikka is perfectly correct. An interpretation of the "necessity of the past" premise (1) entailing that since some past-tensed statements "about the future" are true, then they must be necessary is crucial to Prior's tense logical version of the argument.[59] It is an assumption that is also embodied in step (III) of the preceding informal "Prioresque" version of the argument. In fact, it is precisely this assumption that, together with the truth-value link principles, permits the "transmission" of the necessity of the past to the future.

Another approach to the argument uses the truth-value link in a rather more subtle fashion. This approach strongly resembles, I believe, Hintikka's own version of the argument.[60] It relies on the fact that what is future will eventually become past, and, therefore, due to proposition (1) of the Master, all events or states of affairs (or the temporally determinate propositions signifying them) will eventually become either

necessary or impossible. A truth-value link principle and proposition (2) of the Master can then be used to "transmit" this impossibility (or necessity) *backwards* in time:

(1) It is not true today that event *e* will occur tomorrow; nonetheless, it is possible today that event *e* occur tomorrow. (Assumption for *reductio*; proposition (3) of the Master)

(2) From the fact that it is not true today that event *e* will occur tomorrow it follows that it is not true the day after tomorrow that event *e* occurred the preceding day. (Truth-value link principle)

(3) It is not true the day after tomorrow that event *e* occurred the preceding day. (From 1 and 2, simplification and *modus ponens*)

(4) It is necessarily not true the day after tomorrow that event *e* occurred the preceding day. (From 3 and proposition (1) of the Master)

(5) It is impossible the day after tomorrow that event *e* occurred the preceding day. (From 4, duality principle for alethic modalities)

(6) From the fact that it is true today that event *e* will occur tomorrow it follows that it is true the day after tomorrow that event *e* occurred the preceding day. (Truth-value link principle)

(7) It is impossible today that event *e* will occur tomorrow. (From 5 and 6 *via* proposition (2) of the Master, which may be schematically represented as follows: if p entails q and q is impossible, then p is impossible)

There is, then a contradiction between 7 and the second "conjunct" of 1.

In order to avoid fallacy in inferring 7 from 5 and 6 *via* proposition (2) of the Master, it is necessary to interpret the "is" in phrases such as "is not true the day after tomorrow" (step 3) and "is true the day after tomorrow" (step 6) in an omnitemporal or "timeless" manner. It might be maintained, with some reason, that one cannot legitimately derive 7

above as follows:

(3′) It *will become* not true the day after tomorrow that event *e* occurred the preceding day.

(4′) It will become necessarily not true the day after tomorrow that event *e* occurred the preceding day.

(5′) It will become impossible the day after tomorrow that event *e* occurred the preceding day.

(6′) From the fact that it is true today that event *e* will occur tomorrow it follows that it will become true the day after tomorrow that event *e* occurred the preceding day.

Now, in order to infer 7 from 5′ and 6′, *via* proposition (2) of the Master, one would have to interpret (2) as follows: "what *will, at some time, become* impossible cannot follow from what is *now* possible." But to so interpret proposition (2) is, in effect, to revert to the *temporal* version of the proposition. Proposition (2) would thus amount to a flat contradiction of the Peripatetic principle that contingent (neither necessary nor impossible) events "turn into" either necessary or impossible ones with the passage of time. With respect to this sort of interpretation, Sorabji comments as follows:

> If this is how Diodorus argued, his mistake will have been to overlook the difference between being possible or impossible at a particular time and being possible or impossible (*tout court*). He will have shifted from his original premise (that the impossible does not follow from the possible) to the illegitimate premise, that what is impossible *on Wednesday* does not follow from what is possible *on Monday*.[61]

If, however, *truth values* are regarded as eternally fixed with respect to individual events or states of affairs (or the temporally determinate propositions signifying them), this criticism can be avoided. In fact, this version of the argument shows that if the assumption of truth-value "fixedness" is made, it follows by truth-value link principles and proposition (2) (in its "legitimate" sense) that the "modal value" of such individual events or temporally determinate propositions must also be externally fixed.[62] Thus, if it ever *becomes* impossible that such an event *e* has occurred, it was always previously impossible that it would occur. And if it is *false* that it will occur, then it will become impossible that it occurred.

This interpretation of the argument, then, seems to square well with

the views of Diodorus: he certainly seems to have regarded the truth-value status of such individual events/states of affairs as eternally fixed. The major difficulty with the interpretation is that it relies, implicitly, on a premise that the Peripatetics apparently found exceedingly problematic. The Peripatetic philosopher would have no reason to hold that it follows from the fact that it turns out to be true (false) the day after tomorrow that event *e* occurred the preceding day that it is *now* true (respectively, false) that event *e* will occur tomorrow. Thus, he would be inclined to reject the eternal fixedness of truth values and the related truth-value link principles.

According to the preceding two versions of the argument the Peripatetic would have only to deny the truth-value link and "fixedness" principles in order to avoid the unpalatable deterministic consequence of Diodorus' argument. This means that the argument, so construed, would not be a very impressive polemical weapon against Peripatetic indeterminism; and this fact might be thought to count against this interpretation of the argument. I do not think such a consideration is decisive, however. We do not seem to have any Peripatetic response to the argument. Perhaps this lack is entirely a matter of historical accident. However, it is also possible that Peripatetics such as Alexander of Aphrodisias realized that they had nothing to fear from the argument: that it relies on some such principle (suppressed, in Epictetus' discussion) as that of truth-value linkage and "fixedness," which they would reject.

Alexander does mention the argument in his commentary on Aristotle's *Prior Analytics*, remarking that "the Master argument was adduced by Diodorus in support of his construal (*kataskeuēn*)"[63] of the possible as what either is or will be the case. He also seems fully aware of the deterministic implications of this account of the modalities. He claims that

> My coming-to-be in Corinth, according to him, is possible if I am in Corinth or if I certainly (*pantōs*) shall come-to-be there. If I should not come-to-be there, it was not possible.[64]

The fact that Alexander does not attempt any refutation of the argument suggests, I think, either that he did not know how the argument went or that he was not particularly perturbed by it.[65]

We do, on the other hand, have testimony of Stoic concern with the argument. As we shall see, the Stoic doctrine of "fate" (*heimarmenē*) was generally interpreted by them as implying the "eternal fixedness" of the "truth-value status" of individual events/states of affairs (or the tempor-

ally determinate propositions signifying them). Thus, what may have been the rather easy Peripatetic response to the argument was not open to them. They would seem to be in the position of either having to accept Diodorus' no-unactualized-possibilities consequence, which they were apparently unwilling to do,[66] or to deny proposition (1) or (2), which seems to have been the course they followed.[67] In short, the apparent Stoic concern and Peripatetic lack of concern with the argument is at least consistent with the hypothesis that principles such as that of truth-value link and fixedness were somehow employed or assumed by Diodorus in his formulation of the argument.

The preceding versions of the Master are both "semantic" in the following sense of the term: the truth-value link principles are the entailments that are used in order to "transmit" the necessity of the past to the future (the first version) or the "future impossibility" of what is false, which will "supervene" when that falsity becomes *past* falsity, back to the present (the second version). There is another argument, which occurs in Cicero's discussion of Diodorus in the *De fato*, which might be regarded as a version of the Master relying on causal or "astrological" entailments, rather than the semantic truth-value link entailments, to tie the future to the past.

(ii) The "Causal-Astrological Link" Version

In his discussion of Diodorus at *De fato* 7.14, Cicero rehearses the following argument:

> If this is a true entailment, "If you have been born at the rising of Sirius (i.e., the "Dog star," Canicula), you will not die at sea," and if the antecedent of the entailment "You have been born at the rising of Sirius" is necessary – for all things true in the past are necessary, as is the opinion of Chrysippus in dissent from his master Cleanthes, because such past things are immutable and cannot be changed from true to false – if, therefore, the antecedent in the entailment is necessary, the proposition that follows from it also becomes necessary.[68]

The structure of this argument is quite clear: it involves the transmission of the necessity of the past to the future *via* the conditional necessity of a true entailment. Proposition (1) of the Master is explicitly stated (although the Master is not mentioned by name by Cicero). And Cicero's claim that if the antecedent of an entailment is necessary, what follows from it is also necessary is logically equivalent, given the duality relation between necessity and possibility, to proposition (2) of the Master: the impossible does not follow from the possible.

The entailment that is the vehicle by which necessity is conveyed from past to future (or impossibility from future to past) is not a *semantic* entailment, however, but an "astrological" one. It is fairly clear that those Hellenistic philosophical schools that were sympathetic to astrology viewed the validity of the "Chaldeans'" law-like conditionals as being grounded in "natural causal necessitation": they viewed astrological conditionals either as representing the causal efficacy of supralunary happenings, directed toward the sublunary regions, or as one sort of manifestation of the all-encompassing causal nexus of fate.[69] Cicero, in fact, views the "astrological law" he uses as a sign of causal necessitation:

> if there is a natural cause why Fabius should not die at sea, it is not possible for Fabius to die at sea.[70]

A question that arises, in view of Cicero's discussion, is whether Diodorus himself might have employed an assumption of universal *causal* necessitation to supply the entailment-vehicles for the transmission of the modalities. The possibility that Diodorus did use some sort of causal entailments probably should not be entirely discounted. The principal element that appears to be lacking in Epictetus' summary of the Master is any suggestion of *what sort* of entailment relations Diodorus might have applied propositions (1) and (2) to in order to effect a "transmission" of *necessitas praeteriti* to the remainder of time. Most contemporary reconstructions of the argument (contemporary reconstructions, that is, which interpret proposition (2) in a logical sense) have assumed some sort of *semantic* entailment relations, such as the truth-value link principles. The only evidence from antiquity bearing on this question that approaches to direct evidence, insofar as I am aware, comes from this passage of Cicero's *De fato*. And in his argument, the entailment vehicle is causal.

I think that it is likely, however, that Cicero's argument represents a later, Stoic understanding of Diodorus' Master or some essentially similar argument. Cicero's argument occurs within the context of a rather extended discussion of the difficulties the Stoic Chrysippus encounters in attempting to avoid the sort of determinism or fatalism Cicero attributes to Diodorus.

Cicero represents Chrysippus as holding that every proposition is eternally true or eternally false *and* that this "semantic fact" is grounded in the cosmological or physical fact that every event is the effect of an eternal chain of "antecedent" causes he identifies with fate:

Chrysippus argues in this manner: "If there is motion without a cause, not every statement (which the logicians call an "ἀξίωμα") will be either true or false, for that which does not have efficient causes is neither true nor false. However, every statement is either true or false; therefore, there is no motion without a cause; because this is so, all things that happen in conformity with antecedent causes; but if this is so, all things happen by fate; therefore, it follows that whatever happens happens by fate."[71]

So, according to Chrysippus, the reason for the "eternal fixedness" of the truth-value status of an individual event/state of affairs (or the temporally determinate proposition signifying it) is the presence of an eternal chain of antecedent sufficient causes of the event or state of affairs. It is, therefore, quite natural for Cicero to see *causal* entailments (or astrological "laws" representing causal connections) as creating difficulties for Chrysippus. These entailments can serve as vehicles for transmitting the necessity of the past to the future, as well.

Chrysippus (together with the Epicureans and, perhaps Aristotle)[72] sees the truth of future events of states of affairs as dependent on the causal or logical necessitation of these events/states of affairs.[73] Since he is a causal determinist, there would be only a nominal distinction to be drawn, from his point of view, between the semantic and the astrological/causal entailment relations that could serve as vehicles, in an argument such as Diodorus' Master, for transmitting the necessity of the past to the rest of time. In his monograph on the Master, P. -M. Schuhl quotes another determinist, Leibniz, with respect to the conflation of three sorts of argument for "la détermination"; "argumentation logique (par la vérité des futurs), argumentation physique (par l' enchainement des causes) et argumentation théologique (par la prévision et la causalité divines)."[74] As Leibniz notes in the preface to the *Theodicy*, these types of argument

qui paraissent différentes concourent entin comme des lignes d'un mème centre: car il y a une vérité dans l'événement futur, qui est prédéterminé par les causes, et Dieu l'a établi en établissant les causes.[75]

It seems clear that what Leibniz says with respect to the "argumentation logique" and the "argumentation physique" holds true for Chrysippus, although we have yet to examine the "argumentation théologique" in his case.[76]

It is much more difficult to say whether Diodorus himself might, like Chrysippus, have regarded the fixedness of truth values and the related truth-value link principles as merely the semantic manifestation of relations of causal necessitation. I believe that the impression conveyed

by what little information we have is that Diodorus would have regarded the fixedness of truth values and the truth-value link principles as being grounded in his Eleatic ontology rather than in universal causal necessitation. That is, Diodorus had metaphysical reasons for regarding the history of the cosmos as composed of a static linear series of discrete "world states."[77] There is little indication that he accounted for fixedness of this series by postulating causal links between the discrete states. If this impression of Diodorus' motivation is correct, his own version of the Master is likely to have been "purely semantic": the entailments he would have used as vehicles for the transmission of necessity or impossibility to the rest of time are likely to have been something like the truth-value link principles rather than the causal entailments found in Cicero's version of the argument.

According to this view, Diodorus' fatalism or determinism would be a logico-metaphysical determinism, grounded in the fixedness of the linear series of events or states of affairs that constitute cosmic history and the attendant eternal truth or eternal falsity of (temporally determinate) propositions pertaining to this history.

The idea that the issue of the eternal fixedness of truth values can be separated from the issue of universal causal necessitation was, as we shall see, not a common idea in antiquity. The view that these issues can, and indeed should, be separated seems to be explicitly set forth in no extant material earlier than Cicero's *De fato*, where it is clearly present. The view then seems to find a home in the Academic tradition.[78] Such considerations may raise doubts as to whether we should attribute a "pure semantic" version of the Master to anyone as early as Diodorus. We have seen, however, that he has a fundamental ontological basis for regarding truth values as eternally fixed. Consequently, he has no particular need for a "physical" justification of this doctrine in terms of universal causal necessitation. It is thus possible, I think, that his version of the Master was purely semantic.

Few ancients, however, wished to accept the sort of determinism that Diodorus seems to have been quite willing to embrace. Even a Stoic such as Chrysippus, who accepted universal causal determination, was concerned (at least in some moods)[79] to avoid the sort of fatalism enshrined in the claim that "everything that happens happens of necessity." The topic of Section A of the next chapter will be Chrysippus' attempt to develop a reconciliationist position with respect to his acceptance of universal causal determination and his rejection of the Diodorean doctrine of no

unactualized possibilities. That is, he developed what I shall call a "modal" form of compatibilism, which attempts to formulate an account of necessitation according to which if a future event/state of affairs is caused, it does not follow that it is necessitated.

E. SUMMARY AND CONCLUSION

Although Diodorus is certainly an intriguing figure, there is probably no major figure in the history of ancient philosophy about whom there has been more scholarly and philosophical controversy. The controversy extends even to Diodorus' basic philosophical motivation. Was he merely a Dialectician of the most "eristic" variety, that is, a propounder of puzzles and paradoxes with no point beyond the impressing and mystifying of his hearers? I am inclined to the view of Sorabji and others who hold that it is likely that there was more to Diodorus than a collection of riddles. Sorabji pictures Diodorus as responding to Aristotle's paradoxes concerning the "reality of time" set forth in *Physics* 4.10:

> It is not certain whether he tried to solve Aristotle's paradoxes of time. But there is a certain likelihood that he did, since many of the paradoxes he is known to have tackled are related to Aristotle's . . . I shall only claim, however, Diodorus' atomism gave him the *materials* for solving the paradoxes of time.[80]

I should not want to quarrel with the last claim in this quotation. But, if the picture of Diodorus developed in this chapter, particularly in Section A, is at all close to being accurate, it seems exceedingly unlikely that Diodorus would have viewed himself as defending the reality of time by resolving Aristotle's paradoxes, or indeed, any paradoxes designed to cast doubt on the reality of time or motion. The suggestion of this chapter has been that Diodorus desired (a) to defend the denial of the reality of time and motion by his Eleatic "philosophical forefathers" against an ontological view according to which *processes* (*kinēseis*) are fundamental and (b) to reconcile what he would have considered to be the Eleatic metaphysical view with the view of common sense: things are different at different times. He attempted to satisfy these desiderata by "analyzing away" processes into a fixed series of (atomistic) states. According to Russell's interpretation of the nineteenth century mathematician Weierstrass's work,[81] Weierstrass

> has at last shown that we live in an unchanging world, and that the arrow in its flight is truly at rest. Zeno's only error lay in inferring (if he did infer) that, because there is no such thing as a state of change, therefore the world is in the same state any one time as at any other.[82]

My suggestion has been that Diodorus would have shared this view.

With respect to the issue of determinism, Diodorus' Master argument is surely one of the most important anti-compatibilist arguments in the history of philosophy. Despite controversy surrounding the logical details of Diodorus' argument, its basic structure is, I think, quite clear. The necessity of the past (premise 1) is transmitted to the future via a modal distribution principle (premise 2) applied to necessary conditionals of some sort. The result is that the intuitive distinction between a "fixed" or relatively necessary past and a "partially indeterminate" or relatively contingent future becomes untenable. We saw a version of this argument reappearing in Cicero's *De fato*. And versions of it are found in the fifteenth-century scholastic Peter de Rivo[83] and beyond. The necessary conditionals transmitting past necessity to the future may be either "semantic" (e.g., the tense-logic theses used by Prior, Hintikka, *et. al.* in their reconstructions of the argument) or "causal," as in Cicero's version. Recently some incompatibilists have rediscovered this form of argument. P. van Inwagen, for example, has claimed that "the English sentence 'If some state of affairs entails the falsity of some true proposition about the way the world was before I was born, then I can't bring about that state of affairs' is analytic."[84] This, in effect, is a "necessity of the past" premise. Van Inwagen proceeds to argue that universal causal determinism plus the hypothesization of my performing any future action other than those that I, in fact, actually perform entail the truth of the antecedent of this "analytical" conditional. The consequence is obvious: either universal causal determinism is false or I can't bring about any states of affairs other than those I actually effect.

I do not here propose to adjudicate between van Inwagen and the critics of his argument.[85] I would only point out that even if his Master-like argument is sound and if universal causal determinism is true, the *responsibility* of a human agent for his actions is called into question only if it is *additionally* assumed that, in order for such an agent to be responsible for an act X, it must be possible for him "to do other than X." As we shall see in the following chapter, while a Peripatetic such as Alexander of Aphrodisias accepted the truth of this conditional, some Stoics were prepared to deny it, i.e., to develop what I shall refer to as a "nonmodal" form of compatibilism.

NOTES

[1] Sedley is of the opinion that the most commonly accepted date for Diodorus' death, ca 307 B.C., is about twenty years too early, that 334 is "the earliest possible date at which his influence might have been felt," but that "even this is against the odds" (D. Sedley, 'Diodorus Cronus and Hellenistic Philosophy', *Proceedings of the Cambridge Philological Society* **207** [1977], p. 280).
[2] See D.L., 2.106ff
[3] D.L., 2.106.
[4] Sedley, p. 75.
[5] *Ibid.*, p. 77.
[6] *Ibid.*
[7] *Ibid.*
[8] D.L., 2.113.
[9] Sedley, p. 75.
[10] D.L., 2.107.
[11] *Ibid.*
[12] *Ibid.*, 2.113.
[13] *Ibid.*, 2.111–112.
[14] *Ibid.*, 2.106.
[15] See Sedley, p. 74.
[16] D.L., 2.106.
[17] Parmenides D/K 28 B2.
[18] I am here, of course, adopting the interpretation of Zeno's work set forth by Plato at the beginning of the *Parmenides*.
[19] *Meta.* 9.3.1036b29–33.
[20] Sextus Empiricus, *Adversus mathematicos* (hereafter, *M*) 1.311.
[21] Cf. Sextus, *M* 10.85–87, *Hypotyposeis* (*Outlines* [*of Pyrrhonism*], hereafter cited as "*PH*") 2.242–245, 3.71. While the argument attributed by Aristotle to Zeno involves time (specifically, the claim that, since in a given "now," a body is occupying a space equal to itself, it cannot be moving in the "now"), the analogous argument attributed by Sextus to Diodorus involves space (specifically, the premise that a body cannot move in the space where it is [for that space, being equal to itself, does not afford it space for motion]). Diodorus' argument is spelled out in a way that connects it with time at *M* 10.119–120: "if something is moving, it is moving now; if it is moving now, it is moving in the present time; if it is moving in the present time, it is moving, therefore, in an indivisible time. (For if the present time is divided, it will certainly be divided into the past and the future, and thus will no longer be present.) If something is moving in an indivisible time, it is traversing indivisible places. If it is traversing indivisible places, it is not moving. For when it is in the first indivisible place, it is not moving: for it is still in the first indivisible place. When it is in the second indivisible place, again it is not moving, but it *has* moved. Therefore, it is not the case that anything is moving." If, as Sorabji believes, the "now" in which Zeno's arrow occupies a space equal to itself and, therefore, is not moving is an "instant" (temporal "point") rather than an indivisible time atom, there is perhaps less in common between Zeno's "Arrow" and the arguments of Diodorus than at first seems to be the case (R. Sorabji, 'Atoms and Time Atoms', in *Infinity and Continuity in Ancient and Medieval Thought*, ed. N. Kretzmann [Ithaca and London, 1982], pp. 43–44). However, as the

discussion in the following section indicates, it is certainly the case that Diodorus did not regard his "denial of motion" as entailing that the world cannot be "different" at different times. It is far from certain that Zeno would have been willing to go this far with Diodorus.

[22] This is not to say, of course, that there are not other philosophical influences to be discerned in the succession as well.

[23] *Meta.* 9.3.1046b–32.

[24] 1047a12–13. M="it is possible that . . ."; F="it will, at least once, be the case that . . ."

[25] 1047a14–17.

[26] Hintikka, *T&N*, pp. 199–200.

[27] Hintikka makes essentially the same point in his discussion of the passage (*T&N*, pp. 197–199). However, far from being a "rather peculiar concept of possibility" (*ibid.*, p. 197), the concept being exploited in the passage by Aristotle strikes me as a very commonly encountered concept.

[28] Sextus, *M* 1.311–312.

[29] I agree with Sedley that Sextus' explanation is exceedingly problematic (Sedley, p. 108, Note 35). The correct interpretation, I suspect, is that "*authi*" is to be understood as the contracted form of "*autothi*," here an adverb of *place*. The crows are asking "how shall we come to be *there*?" or "how shall we get over there?" in allusion to Diodorus' denial that anything is ever mov*ing* (*kineisthai*).

[30] Sextus, *M* 9.363.

[31] *M* 10.85–86.

[32] *M* 10.91–92.

[33] *M* 10.101.

[34] Cf. Hintikka *et al.*, *Aristotle on Modality*, p. 79: "According to what was said above in Section 24, a potentiality which gives rise to an *energeia* – and which in the sense explained coincides with this *energeia* – cannot be a contingency, for such a potentiality is *necessarily* realized, unlike a *dynamis* which gives rise to an outcome to be reached through a *kinesis*. In the latter case, a potentiality exists only while the change toward the goal is taking place, and then the potentiality has not yet been realized. Hence in the case of a potential *energeia*, the only situation in which we can truly say that it *possibly* exists is one in which we can say that it *in fact* exists, whereas a potentiality which is realized through a *kinesis* obtains only when it is true to say that in certain circumstances it would be realized."

[35] Dr. R. W. Sharples suggests (in private communication) the possibility, however, that "our evidence is distorted by the desire to use Diodorus as a stick with which to beat the determinist Stoics."

[36] Cicero, *De fato* 7.13.

[37] Other terms are sometimes used: e.g., Waterlow (*Passage and Possibility*, pp. 111ff) uses the term "dated propositions." The idea, as was pointed out in the preceding chapter, is that such propositions are "eternally (or atemporally) bound" to a particular time and, hence, can connote only an event/state of affairs obtaining at that time.

[38] Boethius, *In lib. Arist. PH*, ed. Meiser, *editio secunda*, 234. The conjunction "*cum*" in the clauses "*cum falsum sit*" and "*cum verum sit*" is normally translated as "when" and the *logical* import of the resulting accounts of impossibility and necessity consequently interpreted as a simple conjunction: the impossible=that which, when it is false, will not be true=that which is false and will always remain false; the necessary=that which, when it is true, will not be false=that which is true and will always remain true. However, one would, I

think, expect the indicative mood rather than the subjunctive if the sense of "*cum*" were the straightforwardly temporal "when" or "whenever." I suggest that "*cum*" has a causal or quasi-causal sense here – hence, my translation of it as "since." The point is that *since* a temporally determinate proposition or the event/state of affairs it connotes is false (true), it cannot become true (false) with the passage of time. Diodorus is, therefore, implicitly appealing to a doctrine of the eternal fixity of truth values (of *temporally determinate* propositions or events/states of affairs) in his "definition" of impossibility and necessity.

[39] In the normal semantic interpretation of tense logic, propositional variables or "sentence letters" are (arbitrarily) assigned a set of "times" or "possible times" at which they are understood to be "instantiated" or "made true."

[40] This assumption is clearly made, e.g., by Waterlow: "The dated propositions cannot change in truth-value" (*Passage and Possibility*, p. 111). However, the assumption can be consistently and rigorously denied, as I did in my "Aristotelian" treatment of unactualized possibilities ('Aristotle and Unactualized Possibilities').

[41] I consider such a collapse in my 'An S5 Diodorean Modal System', *Logique et Analyse* **88** (December, 1979), pp. 477–487. I now believe, however, that the assumption underlying the article, that "Diodorean modalities" should be interpreted as applying to *temporally indeterminate* or *indefinite* propositions, is seriously mistaken.

[42] In the *Logique et Analyse* article cited in the preceding note, as well as in 'Facets of Megarian Fatalism: Aristotelian Criticisms and the Stoic Doctrine of Eternal Recurrence', *Canadian Journal of Philosophy* **10**/2 (June, 1980), pp. 189–206, I suggest that the first of the entailments in the text ($Fp \supset GFp$) could be saved for temporally indeterminate propositions by the added postulate of the eternal recurrence of cosmic history (or the logically equivalent postulate of circular time). We have no evidence that *Diodorus* subscribed to a doctrine of eternal recurrence or circular time, however; and I now think that it is extremely unlikely that he would have interpreted his definition of the modalities "tense-logically" (i.e., as applying to temporally indeterminate propositions) and, consequently, that it is unlikely that he would have attempted to "save" the deterministic thesis ($Fp \supset GFp$) by appeal to the doctrine of eternal recurrence.

[43] *De fato* 10, *SA* 2/2, p. 177.20–21.

[44] Boethius, *In lib. Arist. PH*, ed. Meiser, *editio secunda*, 246–247.

[45] Cf. note 38 *supra*.

[46] Cf. Paul C. Plass, 'Timeless Time in Neoplatonism', *The Modern Schoolman* **60** (November, 1977), pp. 1–19; Michael J. White, 'Time and Determinism in the Hellenistic Philosophical Schools', *Archiv für Geschichte der Philosophie* **65**/1 (1983), pp. 40–62.

[47] *De fato* 7.13.

[48] This is, of course, a version of the ("first-order') principle of plenitude.

[49] Epictetus, *Dissertationes ab Arriano digestae*, ed. H. Schenkl (Leipzig, 1898), 2.19.

[50] In view of the context of Epictetus' report – the discussion of "unprofitable" scholarly pedantry in philosophy – it seems most likely that Epictetus did not care.

[51] Hintikka, *T&N*, pp. 188–189.

[52] Cf. F. S. Michael, 'What is the Master Argument of Diodorus Cronus?', *American Philosophical Quarterly* **13** (1976), p. 234. I have previously ('Diodorus' "Master" Argument: A Semantic Interpretation', *Erkenntnis* **15** [1980], pp. 69ff) expressed some reservations concerning this interpretation of the second premise, but now agree completely with Michael.

[53] Actually, (all substitution instances of) K are also theorems of all *regular* modal logics, which are weaker than the minimal *normal* modal logic K, which (unlike regular logics) has as a rule of inference $\vdash p \Rightarrow \vdash Lp$.

[54] Alexander, *In Arist. an pr. lib. I*, *CIAG* **2**/1, pp. 177ff. I shall examine Chrysippus' view in detail in the following chapter. His example of an impossible proposition that follows from a possible one is "That man is dead" (Dion being pointed to) and "Dion is dead," respectively.

[55] Sorabji, *NC&B*, p. 108, Note 16.

[56] M. A. E. Dummett, 'The Reality of the Past', reprinted in *Truth and Other Enigmas* (Cambridge, Mass., 1978), pp. 358–374. "If I now (2.45 p.m. 12 February 1969) say, 'I am in my College room', I make a present-tense statement which is, as I say it, true: let us call this statement *A*. Suppose now that exactly one year later someone makes the statement (call it *B*) 'A year ago Dummett was in his College room'. Then it is a consequence of the truth-value link that, since the statement *A* is now true, the statement *B*, made in one year's time, is likewise true" (p. 363).

[57] For a summary of Prior's work on the Master, see A. Prior, *Past, Present and Future* (Oxford, 1967), pp. 32–34. I have, I think, shown that issue of the *logical* role of Diodorus' doctrines concerning the discreteness of time in the Master is a red herring raised by Prior's syntactic tense-logical approach to the reconstruction of the argument: Michael J. White, 'The Necessity of the Past and Modal-Tense Logic Incompleteness', *Notre Dame Journal of Formal Logic* **25**/1 (January, 1984), pp. 59–71.

[58] Hintikka, *T&N*, pp. 179–180, note 3.

[59] In terms of Prior's tense logic, this interpretation amounts to allowing unrestricted substitution (including wffs prefaced by the tense-logic "simple future" operator 'F') for the propositional variable 'p' in the tense-logical version of premise (1): $Pp \supset LPp$.

[60] In 'Aristotle and the "Master Argument" of Diodorus', reprinted as Ch. nine of *T&N*, pp. 179–213. Sorabji (*NC&B*, pp. 107–109) distinguishes two principal classes of interpretations of the Master in much the same way that I do.

[61] *Ibid.*, p. 108, note 16.

[62] This conclusion does not apply straightforwardly to modal-tense logic because of its implicit interpretation of propositional variables as temporally indeterminate. But there are modal-tense logic analogues of this fact: for example, in a modal-tense logic in which the modal component is the minimal normal modal logic K plus premise (1) of the Master and the tense component is some tense logic for linear, backwards serial time, from FPp it follows that $L(Pp \vee p \vee Fp)$. See my 'The Necessity of the Past', p. 60.

[63] *In Arist. an pr.*, *CIAG* **2**/1, p. 184.5–6.

[64] *Ibid.*, p. 184.2–5.

[65] Sharples comments (in a private communication) that "I feel it would be *quite* in character for Alexander simply to recognise that the argument involved assumptions which he would regard as *false* (i.e.: un-Aristotelian); though one might have expected him to point this out rather than just to pass over it."

[66] Cicero, for example, indicates the reluctance of Chrysippus to embrace Diodorus' fatalism in *De fato* 6–8.

[67] Epictetus (*loc. cit*) reports that Cleanthes denied the first, necessity-of-the-past premise, while Chrysippus denied that the second, *reductio-ad-impossibile* premise holds universally. Cf., Cicero, *De fato* 7.14. Chrysippus' response, which seems so strange and unsatisfactory from the contemporary perspective, will be further discussed in the next chapter.

[68] Cicero, *De fato* 7.14.

[69] The distinction here refers to the difference between the "Middle Platonist" and Stoic conceptions of fate, to be discussed in greater detail in Chapter Six. Cf. the opinion expressed by Quintus in Cicero's *De divinatione*: after defining "*heimarmenē*" as "ordinem seriemque causarum, cum causae causa nexa rem ex se gignat," he remarks that "Ita fit, ut et observatione notari possit, quae res quamque causam plerumque consequatur, etiamsi non semper (nam id quidem affirmare difficile est), easdemque causas veri simile est rerum futurarum cerni ab eis, qui aut per furorem eas aut in quiete videant" (*De divinatione* 1.55.125–126). The standard contemporary work on ancient conceptions of fate, especially as they relate to divination, is that of David Armand (E. Armand de Mendieta), *Fatalisme et Liberté dans l'Antiquité Grecque* (Louvain, 1945).

[70] *De fato* 7.14.

[71] *Ibid.* 10.20–21.

[72] *Ibid.* 10.21–22, for Epicurus. The case of Aristotle is less certain, although he was certainly interpreted by Ammonius and Boethius as holding that the *aphōrismenē* truth of future events/states of affairs is dependent on the causal or logical necessitation of those events/states of affairs. Cf. my 'Fatalism and Causal Determinism: An Aristotelian Essay'.

[73] See my 'Time and Determinism in the Hellenistic Philosophical Schools' for more on this; also Chapters Two and Six of the present work.

[74] P.-M. Schuhl, *Le Dominateur et Les Possibles* (Paris, 1960), p. 28, Note 2.

[75] *Theodicy* (p. 470 *b*, ed. Erdmann), as quoted by Schuhl, *ibid.*

[76] Chrysippus' identification of fate and providence will be further discussed in the following chapter.

[77] In other words, Diodorus would have in some sense accepted the ontological priority of McTaggart's B-series temporal relations and, to quote Sorabji (who is not speaking of Diodorus), "McTaggart's point that the relations of earlier, simultaneous, and later apply changelessly, when they apply at all (R. Sorabji, *Time, Creation and the Continuum* [London, 1983], p. 390). Although this conception of time bears some resemblance to the "timeless time" of Neoplatonism, it may be, as Sorabji suggests (*ibid.*), a mistake to overemphasize the similarities.

[78] For example, pseudo-Plutarch's distinction between what is "in fate" (*en heimarmenē*) and what is "according to or in conformity with fate" (*kath' heimarmenēn*) in his *De fato* seems to be a working-out of the idea that although all events/states of affairs that are "ever actual" have a changeless place in the linear time series constituting a *annus magnus*, this fact does not entail that each is a necessitated consequence of temporally antecedent events/states of affairs. See my 'Time and Determinism in the Hellenistic Schools' and Chapter Six below.

[79] In the following chapter, I distinguish between two versions of Chrysippean compatibilism one of which distinguishes between universal *a tergo* causal determinism and universal *a tergo* necessitation and one of which does not. For another discussion see Ch. Four, 'Stoic Embarrassment over Necessity', of Sorabji's *NC&B*, pp. 70–88.

[80] R. Sorabji, *Time, Creation, and the Continuum* (*TC&C*) (London, 1983), p. 17.

[81] Weierstrass completed the rigorous development of the concept of the limit of a covergent sequence by means of the so-called "delta-epsilon method," thus showing that the mathematics of the calculus did not require the postulation of infinitesimals.

[82] B. Russell, 'Mathematics and the Metaphysicians', reprinted in *Mysticism and Logic* (London, 1917), p. 76.

[83] "A Quodlibetal Question on Future Contingents," in manuscript translation by N. Kretzmann.

[84] P. van Inwagen, 'Reply to Narveson', *Philosophical Studies* **32**/1 (1977), p. 96. Van Inwagen's original paper was 'The Incompatibility of Free Will and Determinism', *Philosophical Studies* **27** (1975), pp. 185–199. Cf. J. Narveson, 'Compatibilism Defended', *Philosophical Studies* **32**/1 (1977), pp. 83–87; A. Gallois, 'Van Inwagen on Free Will and Determinism', *ibid.*, pp. 99–105; van Inwagen, 'Reply to Gallois', *ibid.*, pp. 107–111.

[85] In a recent interesting paper, Michael Slote has provided a counterargument which is, in essence, the following: any sense of the modalities which validates the "necessity of the past" thesis (premise 1 of the original Master) will not validate the distributive thesis K or its logical equivalents (premise 2 of the Master). See his 'Selective Necessity and the Free-Will Problem', *The Journal of Philosophy* **79** (1982), pp. 5–24.

CHAPTER FOUR

CHRYSIPPUS' COMPATIBILISM

Of all the losses of ancient philosophical works, the loss of the *corpus* of the third-century B.C. Stoic Chrysippus is perhaps the most tragic. Although most of the *testimonia* we possess come from hostile sources, it is, I believe, clear from the information we have that Chrysippus was a philosopher and logician of the first rank. Josiah Gould provides a succinct characterization of his stature in antiquity:

> That Chrysippus was believed to have revived the Stoa after the crushing blows dealt it by Arcesilaus and other Academics appears to be the purport of the ancient saying "If there had been no Chrysippus, there would be no Stoa" (II. 6). In antiquity, then, even outside the school, Chrysippus was regarded as an eminently capable philosopher, as an extraordinarily skillful dialectician, and as one who came to the defense of the Stoa in a crucial moment, namely, when it was about to encounter its death blow from a rival school of Athens, the Academy, which had then become the stronghold of skepticism.[1]

Chrysippus enjoyed particular eminence as a logician: Diogenes Laertius reports that

> he became so renowned in dialectic that it is the opinion of most people that if there were dialectic among the gods, it would not be any other than that of Chrysippus.[2]

However, it seems to have been the common view in antiquity that Chrysippus was far from a perfect philosophical expositor. He wrote a prodigious amount, apparently without much attention to 'niceties' of style such as avoidance of repetition, clarity of expression, judicious use of quotation, etc. He also seems not to have hesitated in 'correcting' views that he himself had previously set forth.[3]

As a consequence of Chrysippus' philosophical style and of the fragmentary nature of the evidence we possess concerning his views, a problem arises. It is often difficult to determine whether, with respect to the pieces of evidence relating to a particular philosophical issue, we should attempt to fit them together into a *single*, coherent position or whether we possess fragments of several, not necessarily compatible positions on the same issue. This difficulty is exacerbated by the fact that much of the evidence comes from explicitly polemical sources, such as

Plutarch's *De Stoicorum repugnantiis* and *De communibus notitiis adversus Stoicos*, the general theme of which is that Chrysippus and other Stoics are particularly prone to self-contradiction and to the "contradiction" of common sense.

In this chapter I shall examine two versions of reconciliationism or compatibilism. The first version, which I believe can definitely be attributed to Chrysippus, is based largely on material in Cicero's *De fato* but also essentially depends, I shall argue, on Chrysippus' account of conditionals. The second version is reconstructed, principally, from material in Alexander of Aphrodisias' *De fato*. Whether it also is to be attributed to Chrysippus is unclear; however, it does seem to represent a Stoic position developed on the basis of distinctions drawn by Chrysippus.

Although the terms "reconciliationism" and "compatibilism" are frequently used in contemporary philosophical circles, there is not, insofar as I am aware, any standard usage that specifies exactly what terms or concepts or philosophical doctrines are supposed to be reconcilable or compatible. I think that, most frequently, the terms "reconciliationism" and "compatibilism" are used to characterize the claim that the existence of human freedom (or "freedom of the will") is compatible with universal causation, i.e., with the existence of a cause (or "complex of causes" jointly) sufficient for bringing about every event/state of affairs that is ever "instantiated." However, perhaps the deeper issue underlying concern about the compatibility of universal causation and freedom is the issue of whether such universal causation is compatible or reconcilable with the ascription of moral responsibility, at least in some cases, to human beings. The doctrine that universal causation and such ascriptions of responsibility, at least on some occasions, are compatible is another form of compatibilism/reconciliationism. If this form is not often very sharply distinguished from the former variety, the conflation is doubtless due to the fact that it is usually assumed that the possession of freedom is a necessary condition for being morally responsible for one's actions. This assumption can, of course, be denied; and it has been denied for some common conceptions of freedom.[4]

Finally, there is a form of reconciliationism/compatibilism that pertains to universal causation and the alethic modal concepts. This form of compatibilism maintains that the postulation of universal causation does not entail that every event/state of affairs that comes to pass is necessary. In other words, it is claimed that there are at least some acts performed by human beings of which it is true to say that it is *possible* for the agent

concerned to refrain from performing the act. It is now generally agreed that, in order for this form of compatibilism to be "interesting," the concept of possibility to which it appeals must be more restrictive than "mere logical possibility": in other words, the concept of possibility employed must be narrow enough that the claim "it is possible for agent A to refrain from performing act X" is recognized as entailing that A is, in these circumstances, "free." Of course, there may be disagreement concerning just how restrictive the concept of possibility needs to be in order for such an entailment to obtain.

A. THE AVOIDANCE OF NECESSITY AND RETENTION OF FATE

There is evidence from Cicero's *De fato* that Chrysippus developed a form of compatibilism of the last variety:

> Chrysippus, however, since he both rejected necessity and determined that nothing transpires without anterior causes, distinguished kinds of causes in order that he might flee necessity and retain fate.[5]

In the preceding chapter Cicero has characterized Chrysippus as an "honorary arbiter" and as having wished "to strike a compromise" between those "who were of the opinion that all things happen by fate in such a way that this fate bears the force of necessity" and others "to whom it seemed that the motions of minds are voluntary, [occurring] without any fate"[6]

Although Cicero attributes to Chrysippus a "physical" argument for distinguishing fate and necessity (which will be further discussed in Chapter Seven), there are also indications that Chrysippus appealed to a "logical" argument in order to draw the distinction.

Cicero explicitly represents Chrysippus as rejecting Diodorus' "no unactualized possibilities" account of the alethic modalities:

> You [Chrysippus] say that some things that will not be are also "able to occur"; for example, it is possible that this gem be broken even if it never will be, and it was not necessary that Cypselus rule Corinth although this had been announced by the oracle of Apollo a thousand years previously.[7]

Further information on "Stoic" modal concepts, which probably can be attributed to Chrysippus, is to be found in Diogenes and in Boethius' commentary on Aristotle's *De interpretatione.* I quote both passages:

> the possible is what admits being true, things external to it not contradicting [or "opposing"]

its being true (*tōn ektos mē enantioumenōn pros to alethēs einai*), such as "Dion is living." The impossible is that which does not admit of being true, such as "The earth is flying." The necessary is what is true and does not admit of being false, or if it admits [of being false], things external to it "contradict" its being false, such as "Virtue is beneficial." That which is not necessary is what is true and able to be false, external conditions not contradicting [its being false], such as "Dion is walking."[8]

The Stoics, indeed, have postulated as possible that which is susceptible of true affirmation, nothing of those things that are external to but happen in connection with it preventing [its true affirmation]. The impossible is that which never admits of any truth, other things beyond its own outcome preventing [its true affirmation]. The necessary is that which, when it is true, admits of false affirmation for no reason.[9]

Mrs. Kneale has conjectured, on the plausible assumption that Chrysippus would not have rejected the duality relation between possibility and necessity, that these accounts represent compressed and at least in one case – Diogenes' requirement that the non-necessary be, in fact, true – corrupted versions of the originals. In her reconstruction, however, Mrs. Kneale perhaps does not distinguish as closely as she might between disjunctions and conjunctions.[10] The following is a version of her account, with conjunctions and disjunctions altered to perserve the relations of duality and opposition among modal concepts.

The possible: That which both admits "internally" of truth *and* is not "prevented" by external circumstances from being true.

The impossible: that which either does not admit "internally" of truth *or*, while admitting of truth, is prevented by external circumstances from being true.

The necessary: that which either does not admit "internally" of falsity *or*, while admitting of falsity, is prevented by external circumstances from being false.

The nonnecessary: that which both admits "internally" of falsity *and* is not prevented by external circumstances from being false.

It is striking that, as was noted in Chapter Two, this Chrysippean account of possibility is virtually identical to the account of possibility Alexander ascribes to Aristotle in his commentary on Aristotle's *Prior Analytics*:

> the possible is that which is capable of coming
> to be and it "unprevented" [or "unhindered": *akōluton*],
> even if it does not come to be.[11]

The import of the last clause in this account, as I previously mentioned, seems to be to allow that there *are* some events or states of affairs with are

possible and, thus, are not *prevented* from coming to pass, but yet in fact fail to come to pass; in other words, the account apparently allows for "present possibilities" that will never be actualized.

According to Cicero, Chrysippus also wished to allow for present possibilities that will never be actualized.[12] However, if the "contradict" or "prevent" in his account of the modalities is understood to signify antecedent causal conditions that are a part of the "chain of fate," it seems that his account of the modalities precludes any such unactualized possibilities. For Chrysippus' doctrine of fate really is a doctrine of temporally antecedent causes for all events. So suppose that an "internally" consistent event *e* does not occur at a given time t. Then there must be some other event or state of affairs that is actualized at t; and Chrysippus' doctrine of universal causation entails that there must be an eternal chain of antecedent causes that bring to pass the event of state of affairs that is actualized at t *rather than* or *to the exclusion of e*. But this would amount to the existence of an eternal chain of antecedent causes "preventing" the occurrence of *e*, and *e* would be, according to Chrysippus' account of the modalities, impossible relative to any earlier time. Thus, if an event is not actualized, it is impossible, and Chrysippus cannot affirm the existence of unactualized possibilities. This sort of argument is, in fact, found in several ancient anti-Stoic polemics, to be discussed later.

There is some evidence from Cicero's *De fato*, however, that Chrysippus had a response. Cicero constructs a dispute between Diodorus Cronus and Chrysippus, the essence of which is as follows: Diodorus is, in effect, attempting to persuade Chrysippus that there are no unactualized possibilities. Chrysippus holds (a) that "what is past," relative to a time t, is necessary relative to that time, and (b) that each event/state of affairs *e* that is future, relative to time t, has a temporally antecedent cause *e'* in the past of t. Claim (b) is a corollary of Chrysippus' doctrine of fate or *heirmarmenē*. Now, if (c) the relation between temporally antecedent cause (occurring in the past, relative to t) and temporally posterior effect (occurring in the future relative to t) can be cast as a "true conditional" (*conexum*), and if (d), when the antecedent of such a conditional is necessary, its consequent must be necessary as well, then the necessity of the past, relative to t, will be "transferred" to all the future of t. The example of a true conditional "manufactured" from the relation between a "natural cause" (*naturalis . . . causa*) and its effect is the perhaps somewhat ironically employed "astrological law" quoted in

the preceding chapter: "if anyone was born at the rising of Canicula, he will not die at sea."

Cicero reports the following response, on Chrysippus' part, to this fatalistic argument:

> At this point, Chrysippus, becoming agitated, hopes that the Chaldeans [i.e., astrologers] and other divines are mistaken, and that they will not use connections of propositions so as to set forth their observations in the form "If someone has been born at the rising of Canicula, he will not die at sea," but rather so as to say "It is not the case both that someone has been born at the rising of Canicula and that he will die at sea."[13]

Although Cicero makes fun of this move by Chrysippus – and may not, in fact, really understand it – it constitutes, I think, a rather subtle response to the fatalistic argument. Chrysippus is claiming that the cause-effect relation he identifies with the working of fate is *not* to be identified with the relation of conditional necessity or entailment.[14] Although Chrysippus' name is not explicitly associated with an account of conditionals, Cicero repeatedly used the term "*conexum*" ("connection") and its cognates (e.g., "*conectitur*") when speaking of Chrysippus' concept of conditionals. And when Mrs. Kneale associates Chrysippus with the third account of conditionals in a well known passage from Sextus' *Hypotyposeis*,[15] she is, I believe, quite likely to be correct:

> those who bring in "connection" (*synartēsin*) say that a hypothetical proposition (*symmenon*) is valid when the contradictory of its consequent is inconsistent with [literally, "fights with": *machētai*] its antecedent.[16]

The idea seems to be that there is a conceptual or logical incompatibility between the antecedent and contradictory of the consequent of a true conditional. The sort of conceptual/logical relation that must hold between antecedent and consequent is probably illustrated in what seem to be Chrysippus' examples of "condestinate" matters, reported by Cicero in the *De fato*:

> But if it is fated the Oedipus will be born to Laius, it will not be possible to say "whether Laius was with a woman or was not with a woman"; for the matter is conjoined and condestinate . . . So that if it were said "Milo will wrestle at the Olympic games," and someone replied "Therefore, he will wrestle whether he has an opponent or not," he would be mistaken; for "He will wrestle" is "conjoined" because there is not wrestling without an opponent.[17]

We might say that there are two types of "incompatibility" represented by these examples. In the second, the imcompatibility between "Milo will wrestle at the Olympic games' and "Milo will not have a wrestling

opponent at the Olympic games" seems a conceptual incompatibility; in the former case the incompatibility between "Oedipus will be born to Laius" and "Laius does not (at any previous time) mate with a woman" seems an incompatibility relative to the laws of biology. While we might, I think, be inclined to draw distinctions here, Chrysippus evidently was not. Perhaps "male parthogenesis" *did* strike him as a conceptual impossibility. Whatever the case, it is likely that the sort(s) of incompatibility we find illustrated here enters into Chrysippus' account of a true or "sound" (*hygies*) conditional. Consequently, he would regard "If Milo is going to wrestle at the Olympic games, then he will have a wrestling opponent at the games" and "If Oedipus is going to be born to Laius, then Laius will (at some previous time) mate with a woman" as sound conditionals.

Evidently, Chrysippus also means to maintain, in the argument reported by Cicero, that the conditional "If someone was born at the rising of Canicula, then he will not die at sea" is *not* a sound conditional beause there is not a similar "conceptual" incompatibility between "Someone has been born at the rising of Canicula" and "That person will die at sea." Of course *ex hypothesi* Chrysippus believes that the rising of the Dogstar at someone's birth is a "natural cause" (or at least an inevitable concomitant of a natural cause) of that person's not dying at sea. But, because the relation is not one of conditional necessity, it cannot serve as a "vehicle" for transmitting the necessity of the past to the future; thus, fatalism in the sense of the *necessary* occurrence of all events that, in fact, occur is avoided. Chrysippus would say that "necessity has been avoided." However, "fate is retained" in the form of the all-encompassing, eternal "chain of causes."

With respect to Chrysippus' account of the modalities, the preceding considerations suggest that the sense to be attached to the clause "prevented or opposed by external circumstances" is that of conceptual/logical "prevention." In other words, we are to understand this clause as signifying the same sort of incompossibility as that involved in Chrysippus's conception of the condestinate matters. Consequently, (a) although (i) this gem will never, in fact, be broken, (ii) it is possible that it will be broken because its "own internal nature" is such as to permit its being broken *and* the state of affairs of the gem's being broken is not *logically/conceptually* incompatible with any currently existent state of affairs. However, (b) if the proposition that the gem will never be broken is now true, this is so because of the external nexus of causes Chrysippus

indentifies with fate. So, (c) there are currently existing causes sufficient to prevent the gem's being broken. Call this cause or complex of causes *e*. According to the report in the *De fato*, Chrysippus holds that although the conditional "If someone was born at the rising of Canicula, that person will not die at sea" is *not* true or "sound," the negation "It is not the case both that someone was born at the rising of Canicula and he will die at sea" is true. Similarly, Chrysippus would evidently maintain that although the conditional "If *e* is the case, then this gem will never be broken" is not true, the negation "It is not the case both that *e* and that this gem will be broken" is true.

It might seem that the negations of conjunctions are to be understood as involving the "Philonian" or contemporary material interpretation of the conditional.[18] The implication of the argument is that the truth of such a conditional is not "strong enough" to transmit the *necessity* of the antecedent (the "past" event/state of affairs) to the consequent (the "future" event/state of affairs). Contemporary modal logicians would agree.[19] However, Chrysippus' "fatalism" (i.e., causal determinism) seems to commit him to something stronger than the truth of such Philonian conditionals. At the beginning of Chapter 15 of Alexander of Aphrodisias' *De fato*, Alexander's opponents (the Stoics) are characterized as maintaining the principle that "if, when the circumstances (*periestōtōn*) are the same, someone at one time (*hote*) acts one way, and at another time (*hote*) acts differently, then motion without a cause (*anaition kinēsin*) is introduced."[20] It seems likely that Chrysippus would have subscribed to this doctrine. Its import is to identify the causal relation with the temporal-frequency account of conditional necessity: an event/state of affairs of type X is the cause of an event of type Y if and only if *it is always the case* that when an event of type X occurs, it is followed by an event of type Y. This temporal-frequency account of conditionals amounts to the same thing as the account ascribed by Sextus to Diodorus: that conditional is sound "of which it neither was nor is possible to begin with a true antecedent and end with a false consequent."[21] As Benson Mates has pointed out, given Diodorus' account of possibility, this account is equivalent to "*never* begins with a true antecedent and ends with a false consequent."[22]

Chrysippus' account of the relation between cause and effect in the all-encompassing nexus of fate is, in effect, an account in terms of the temporal-frequency or "Diodorean" conception of conditionals: according to a number of *testimonia* he holds a doctrine of the "identical

restoration or recurrence" (*apokatastasis*) of the history of the *cosmos*. To quote Origen,

> Socrates will not come to be again, but some counterpart of [someone 'indistinguishable from': *aparallaktos*] Socrates, who marries someone indistinguishable from Xanthippe and is accused by persons indistinguishable from Anytus and Meletus.[23]

It is clear, I believe, that this doctrine is an expression of the Stoic doctrine of causation alluded to by Alexander in the *De fato*. If something of type X is the cause of something of type Y, *whenever* X comes to be, the coming-to-be of Y follows. Since Chrysippus holds a "strong" doctrine of universal causal determination, in which everything is connected in the chain of causes constituting the history of the *cosmos*, the doctrine of the eternal recurrence of this history in identical detail represents this strict causal determinism in terms of the temporal-frequency/Diodorean dictum, "If a world-state of type A is the cause of a succeeding world-state of type B, then whenever a world-state of type A occurs, it will be succeeded by a world-state of type B."

One form of compatibilism developed by Chrysippus, then, rests on the distinction between two conceptions of conditional or "necessary connection" between events/states of affairs. He retains "fate" (i.e., causal determinism) by interpreting the causal relation in terms of the temporal-frequency model of conditionals. He "escapes necessity" by appealing to a "logical/conceptual implication" model of conditionals in characterizing "relative necessity and possibility." Thus although some future event or state of affairs *e* is now causally determined to occur (it is *always* the case that when circumstances exactly like those that now obtain come about an event/state of affairs like *e* ensues), it is not *now* (i.e., relative to what is *currently the case*) necessary that *e* come to pass (because, among the circumstances that now obtain, none is *conceptually incompatible* or incompossible with the non-occurrence of *e*).

Although this is a very sophisticated position, it certainly is not immune to criticism – and was not so regarded in antiquity. Two types of attack come to mind. If the models of necessary conditionals or of the necessary connection between events/states of affairs – the temporal-frequency and the logical/conceptual implication models – really *are* different, why choose the latter rather than the former for developing an account of what is necessary or possible relative to a given time or to the circumstances obtaining at that time? Is there any non question-begging justification – that is, any justification apart from Chrysippus' desire to "retain fate" and "escape necessity" – that can be provided for the conceptual-

implication rather than the temporal-frequency model of necessary connection? Second, if the two models are *not* really distinct – if all true Diodorean conditionals can, in principle, be "reduced to" or "explicated in terms of" conceptual-implication conditionals – Chrysippus' escape from necessity seems illusory. The concept of a contingent future event, an event that will come about but which is not necessary relative to what is now the case, is an impossible concept: such an event may merely *seem* non-necessary to me because my knowledge is not extensive enough to enable me to grasp the conceptual incompatibility between its *non-occurrence* and some (complex of) events(s)/state(s)of affairs that are "now occurrent."

I think that both of the preceding types of criticism can be discerned in several anti-Stoic polemics, which we shall later examine more fully. However, I first wish to consider a further problem, the inheritance passed on by Diodorus, which Chrysippus might well have encountered in his attempt to retain fate while escaping necessity. It seems that the material (Philonian) conditional is not strong enough to serve as a vehicle for transmitting the necessity of the antecedent to the consequent. Chrysippus evidently holds that the "causal conditional" (which is, in a sense, equivalent to the Diodorean or temporal-frequency conditional) is not strong enough either. Consequently, *causal* determinism does not entail the transmission of necessity of the past, relative to a time t, to the future of t.

The "semantic" versions of the Master argument still cause difficulties for Chrysippus, however. He holds that, due to the eternal chain of causes, the truth values "of all events/states of affairs" (i.e., the truth values of the temporally determinate propositions signifying all events/states of affairs) the "eternally fixed." Consider an event *e*, say, a sea battle, which will not, in fact, transpire tomorrow. It seems that the conditional (A) "If it is the case that today it is true that a sea battle occurs tomorrow, then it is the case that the day after tomorrow it is true that a sea battle occurred the preceding day" is true or "sound" in Chrysippus' "strong" logical/conceptual sense: there is a conceptual incompatibility between the affirmation of the antecedent and the denial of the consequent. Due to the Chrysippus' acceptance of the doctrine of the necessity of the past, it would seem that he must hold that from the fact that a sea battle fails to transpire tomorrow, it follows that (B) "It is false that the day after tomorrow it is true that a sea battle occurred the preceding day" and (B′) "It is impossible that the day after tomorrow it is true that a sea

battle occured the preceding day." Due to Chrysippus' doctrine of the eternal fixedness of truth values, and his acceptance of the doctrine of the necessity of the past, the failure of a sea battle to transpire tomorrow would seem to commit him not only to the *falsity* of its-being-true-the-day-after-tomorrow-that-a-sea-battle-occurred-the-preceding-day but also to the impossibility of this state of affairs. But from (B′) "It is impossible that the day after tomorrow it is true that a sea battle occurred the preceding day" and conditional (A) *and* proposition (2) of the Master ("the impossible does not follow from the possible") it follows that "It is impossible that today it is true that a sea battle occurs tomorrow."[24] This argument can be generalized to demonstrate the "current" and, in fact, omnitemporal impossibility of any "unactualized" event/state of affairs. The argument suggests that, even if Chrysippus is permitted to employ his "strong" logical/conceptual account of conditionals in his characterization of necessity and impossibility, he may have difficulty in "escaping necessity."

There is some evidence that Chrysippus may have recognized that drawing the distinction between stronger and weaker conditionals is not sufficient to escape necessity – that the "no unactualized possibilities" consequence which Diodorus drew from the Master argument cannot be avoided without either (A) denying one of the first two propositions of the Master or (B) restricting the principle of bivalence with respect to temporally prospective propositions. Chrysippus evidently was unwilling to follow course (B).[25] Because of the relation he held to exist between the truth values of propositions pertaining to events/states of affairs that are not "temporally present" and the causal determination of those events/states of affairs by "fate," to restrict the bivalence principle would, for him, be tantamount to denying that fate constitutes an all-encompassing causal nexus.

We are, in fact, told by Epictetus and Alexander that Chrysippus denied the universal validity of the second proposition of the Master: the impossible does not follow from the possible.[26] Moreover, Cicero mentions – almost in passing – that Chrysippus did not hold it to be universally true that what follows from the necessary must also be necessary.[27] It seems most likely that Cicero is referring to the denial, by Chrysippus, of the "same" modal principle as that the denial of which is attested to by Epictetus and Alexander. In other words, it seems likely that Chrysippus recognized the logical equivalence between the principle

mentioned by Cicero, which might be represented by the "K" thesis,

$$L(p \supset q) \supset (Lp \supset Lq),$$

and the second proposition of the master, which may be represented as

$$L(p \supset q) \supset (Mp \supset Mq)$$

or

$$L(p \supset q) \supset (\sim Mq \supset \sim Mp).$$

In order to recognize these as logically equivalent propositions, one needs to recognize the equivalence between M~p and ~Lp, an equivalence which, together with "double negation elimination" and *modus tollens*, yield the duality principles for the alethic modalities:~M~p is equivalent to Lp and Mp is equivalent to ~L~p. For this reason, among several others soon to be discussed, I am not persuaded by the interesting and subtle argument of Mignucci[28] to the effect that, while Chrysippus accepts the entailments $Lp \models \sim M \sim p$ and $Mp \models \sim L \sim p$, he does not accept their converses and thus, in effect, denies the duality equivalences.

Chrysippus' denial of the second proposition of the Master, as well as Mignucci's argument that Chrysippus additionally rejects the alethic modal dual equivalances, is based on a conterexample that seems very strange to us but squares well with Stoic philosophy of language.

The counterexample is discussed in some detail by Alexander in his commentary on Aristotle's *Prior Analytics*. Alexander's description of it reads as follows:

> for he [Chrysippus] says that in the conditional "If Dion is dead, then that is dead" (Dion being pointed to), which is true, the antecedent "Dion is dead" is possible because it can at some time become true that Dion is dead; but the consequent "That is dead" is impossible because, when Dion has died, the proposition "That is dead" is destroyed since there is no longer any referent for it. For the reference pertains to and is about what is living. So that if, when he is dead, there cannot still be a "that." nor can Dion subsist (*hyphistatai*) in such a way that it is possible to attribute "That is dead" to him, the proposition "That is dead" is impossible.[29]

The Stoics generally distinguished, according to Sextus, among the "signifier" [*to sēmaion*] (e.g., the articulate speech), the "significant" [*to sēmainomenon*] (the "meaning" or "that thing indicated by [the signifier] and which we grasp with our intellect as subsisting together [with the sound], but which foreigners do not understand, although they hear the sound"), and "what obtains" [*to tuchanon*] ("the external substance").[30]

The "normal" constituents of "propositions" (*axiōmata*) are the "significants" (*sēmainomena* or *lekta*), which, since they are "incorporeal," can be said only to "subsist" (*hyphestēkenai*).[31] However, the Stoics evidently distinguished a class of propositions, which Sextus refers to as "*hōrismenon*" and Diogenes as "*katagoreutikon*,"[32] that are the propositions expressed by sentences having demonstrative pronouns as subjects. From the illustration concerning "That is dead," Chrysippus evidently regarded such a sentence as expressing, relative to a context of use, a proposition that essentially "contains" the object denoted by the subject in that context of use. The idea is not dissimilar to that of a "singular" proposition, recently (re)popularized by David Kaplan.[33]

I suspect that the argument Chrysippus had in mind goes in something like the following way: (I) The proposition expressed by "If Dion is dead, then that is dead," in a context of use where Dion is the object of demonstration, is a "valid" (necessary) conditional (or represents a valid entailment). (II) "Dion is dead," in this context of use, surely expresses a possible proposition; there is no inconsistency involved in supposing Dion to be dead. (III) But the proposition expressed, in the context of use we are assuming, by "That is dead" is impossible. Why? An inconsistency is involved in attempting to suppose that it is true. Any attempt to suppose the proposition true must involve a state of affairs in which the denotation of the demonstrative is destroyed. As Alexander notes, the "identity conditions" Chrysippus is assuming for the denotation of the demonstrative are sufficiently stringent that Dion and Dion's corpse are not to be counted the same.[34] But when the denotation of the demonstrative is destroyed the "proposition" or *axiōma* is destroyed; so there is nothing to bear a truth value. (IV) Therefore, it is not universally true that a proposition following from a possible proposition must itself be possible; there are, in other words, some cases where a proposition that is possible entails an impossible proposition.

Mignucci's argument that Chrysippus rejects the duality equivalences for possibility and necessity rests largely on the passage from Alexander. His argument, in brief, is the following: If Chrysippus accepted the entailment $\sim Mp \models L\sim p$, he would be committed to saying that since the proposition expressed by "That is dead" in Alexander's discussion is impossible, its negation is necessary. But to say that its negation is necessary is to say that its negation is *always true*. However, since the proposition is destroyed, its negation (which is, in the Stoic view, "com-

pounded" from it) must also be destroyed and, hence, cannot be *always true*.[35] Mignucci claims to find some additional support for Chrysippus' denial of this entailment in the accounts of the "Stoic" modal concepts in Diogenes and Boethius (previously quoted).

The principal problem with this argument is that it depends on the assumption that Chrysippus, explicitly or implicitly, appealed to a *temporal* account of a necessary proposition as a proposition that is always true. We have seen that such a temporal conception is to be found in the Peripatetic tradition; and the Megarians also certainly held an essentially temporal view of the modalities. However, there is no reliable evidence that Chrysippus did. In fact, his argument for escaping necesity and retaining fate, as reported in Cicero's *De fato*, depends on his *not* adopting a temporal account of necessary conditionals such as that of Diodorus. And if the following accurately represents Chrysippus' account of necessity – the necessary is that which either does not admit "internally" of falsity or, while admitting of falsity, is prevented by external circumstances from being false – it is quite consistent to say that a proposition that is destroyed can, *at a time when it exists*, nonetheless be necessary. As Mignucci notes, there is certainly a temporal "cast" to Alexander's discussion of Chrysippus' example, and Alexander's criticism of it relies on a temporal account of necessity. Since Alexander is a Peripatetic, this temporal dimension to his discussion is not surprising. I do not believe, however, that the discussion provides any evidence that *Chrysippus* tacitly or explicitly employed a temporal notion of the modalities in connection with the formulation of his counter example.[36]

The confirmation of Chrysippus' denial of the duality equivalences Mignucci claims to find in the account of the "Stoic" conceptions of the modalities is also susceptible to the same criticism, I believe. After a careful and, in my view, right-headed consideration of the quotations from Diogenes and Boethius, Mignucci comes to the denouement of this argument:

> Si nous représentons 'p est vrai' par 'A', 'p est capable d'être faux' par 'B', 'les circonstances extérieures s'opposent à ce que p soit faux' par 'C', nous avons: (2.1) Lp si et seulement si A & (B → C). Or -M-p singifie: 'il n'est pas vrai que p soit capable d'être faux et que les circonstances extérieures ne s'opposent pas à ce que p soit faux', et donc, en employant nos abréviations, nous avons: (2.2) -M-p si et seulement si B → C. Mais alors il est évident que: (2.3) (A & (B → C)) →(B → C) est vrai . . .[37]

However, according to Mignucci, the converse of (2.3) does not hold; hence, Lp is not equivalent to ~M~p, although the former does entail

the latter. However, if the conditionals $\sim B \supset A$ and $C \supset A$ hold, the converse of (2.3) follows. When the proposition represented by 'p' "exists," Chrysippus' acceptance of the principle of universal bivalence would apparently commit him to the truth of both $\sim B \supset A$ and $C \supset A$. In order to falsify either conditional Mignucci must maintain that, while one cannot predicate either "is true" or "is not true" of a "nonexistent proposition" (i.e., a singular proposition that has been "destroyed"), one can predicate modalized predicates (e.g., "is not capable of being false" or "is prevented by external circumstances from being false") of such nonexistent propositions. But we have no reason to think that we can say *anything* about the *present* characteristics of such a nonexistent proposition except, perhaps, to make a negative existence claim concerning it. Consequently, there seems to be no difficulty created by propositions that can by "destroyed" for the duality principles, according to Chrysippus' own non-temporal account of the modalities. According to his account, the ascription of necessity to a non-eternal proposition (*while it exists*) involves no contradiction. It is only the Peripatetic equation of "necessary" with "eternally true" which creates the difficulties for the duality principles discussed by Mignucci.

I shall assume, then, that Chrysippus' argument that what is possible can, *in certain cases*, entail what is impossible does not commit him to the denial of the duality equivalences for the alethic modalities of necessity and possibility. An important question that remains, however, is whether the *particular sort of case* in which the second proposition of the Master fails can be of any help to Chrysippus in "escaping necessity," i.e., in blocking the transmission of the necessity of the past (which he accepts) to the future by means of necessary conditionals expressing truth-value link principles (which he also might plausibly accept).

The answer is that there seems to be a way of applying the Stoic doctrine of "definite" propositions that are destroyed to block at least some of the untoward consequences of the Master or Master-like arguments. However, whether Chrysippus actually applied the doctrine in this way is essentially a matter of conjecture. Consider the conditional "If there will be a sea battle tomorrow, then the proposition expressed by an utterance sometime tomorrow of 'A sea battle is *now* going on' will be true." Since the denial of the consequent of this conditional apparently is conceptually inconsistent with the antecedent, the conditional would qualify as a legitimate necessary one, according to the Chrysippean doctrine. It might be argued that Chrysippus regards the propositions

expressed in a given temporal context, by sentences such as "The sea battle is *now* going on" as "definite" propositions. According to an interpretation suggested by A. C. Lloyd, such a sentence is "deictic," picking out, relative to context of utterance, a certain temporally determinate proposition that is necessarily "about" or "bound to" the time of the utterance.[38] However, to paraphrase Lloyd, the Stoic conception of time is not that of an "empty" container having the potential to "contain" various events or states of affairs. Rather, the "identity" of a time seems to depend on the event or state of affairs characterizing it. Consequently Chrysippus might regard the temporally determinate proposition picked out by a context of utterance of a sentence such as "A sea battle is now going on" as a "definite" (*hōrismenon* or *katagoreutikon*) proposition, one that "contains" the time (and, hence, the event/state of affairs) to which it is bound. Such a proposition would be necessary if true: the only circumstances in which it "might" be falsified would be ones in which the "subject" time to which the proposition is "bound" would be destroyed; but then the proposition would be "destroyed." Hence, there is no way to falsify a true "temporally determinate" proposition of this sort and no way to make true a false one. It follows that with respect to *any* such temporally determinate proposition expressed by an utterance of a present-tensed deictic sentence, a true proposition is necessary and a false one is impossible.[39]

Suppose, then, that present circumstances are not sufficient to "logically/conceptually preclude" the truth of the proposition (expressed by) "There will be a sea battle tomorrow" but that, in fact, no sea battle transpires tomorrow. Since there is nothing "internally" inconsistent about the occurrence of a sea battle tomorrow, "There will be a sea battle tomorrow" expresses, according to Chrysippus' account, a possible proposition. According to the preceding account of the "definite" propositions expressed by "deictic" present-tensed sentences, however, the propositions expressed, throughout tomorrow, by utterances of "A sea battle is *now* going on" are impossible if false; but since, by supposition, no sea battle in fact occurs tomorrow, such propositions are false. Consequently, propositions expressed throughout tomorrow by utterances of "A sea battle is *not now* going on" are necessary (due to the alethic modal duality principles).

Let us return to our necessary conditional, "If there will be a sea battle tomorrow, then the proposition expressed by an utterance sometime tomorrow of 'A sea battle is now going on' will be true." The antecedent

is possible, according to the preceding account. But since all utterances tomorrow of "A sea battle is *now* going on" yield propositions that are impossible, it is impossible that any utterance tomorrow of "A sea battle is *now* going on" yields a true proposition. Chrysippus is left with a necessary conditional the antecedent of which is possible, but the consequent of which is impossible. In preference to (a) questioning the possibility of the antecedent or (b) questioning the impossibility of the consequent or (c) questioning the necessity of the conditional, he elects to deny the universal validity of the second proposition of the Master: what follows from the possible is itself possible. However, the peculiar Stoic (Chrysippean?) doctrine of "definite" propositions, which are capable of being "destroyed," supplies non-*ad hoc* grounds for the denial of the second premise of the Master. In effect, such propositions "rigidly denote" their subjects, a fact that gives them rather peculiar modal properties. If his conception of definite propositions is extended to the propositions expressed, in a given context of use, by present-tensed deictic sentences in such a way that a given proposition of this sort is understood to rigidly denote the time (and hence the "contents" of the time) to which it is bound, Chrysippus has a relevant rationale for denying the second premise of the Master. Because of his commitment to bivalence, he may not be willing to deny the necessity of conditionals expressing the truth-value link principles, which can transmit the necessity and impossibility of what is present-or-past (or what will become present-or-past) to the "remainder of time." But these principles can serve this function *only if the second premise of the Master is accepted.* Chrysippus uses the doctrine of definite propositions to call into question the universal validity of the Master's second proposition. This much is certain from the evidence. What is far from certain is whether he extended the doctrine to conclude that a proposition temporally bound to a given time rigidly denotes that time and hence the event/state of affairs that is its "content." If so, the doctrine becomes directly applicable to conditionals expressing the truth-value link and, hence, to Chrysippus' attempt to escape from the Master's clutches.

Whatever the extent of Chrysippus' employment of the doctrine of definite propositions in order to deny the universal validity of the second proposition of the Master, this stratagem seems largely a "technical" move designed to allow him both to retain the doctrine of universal bivalence (which commits him to various truth-value link principles as necessary conditionals) and to avoid the fatalistic consequences of a

Master-like argument, perhaps a Master-like argument employing necessary semantic, truth-value link conditionals as the vehicles for "transmitting" the necessity of the past, or of what will become past, to the rest of time. Cicero, for example, mentions Chrysippus' denial of proposition 2 of the Master (or its logical equivalent, given the duality principles) in passing, without giving any indication that this denial is *central* to Chrysippus' reconciliationist goals. According to Cicero's presentation,[40] what is central to Chrysippus' reconciliationism is his distinction between causal determinism (which, as we saw, can be "semantically" analyzed in terms of the Diodorean or temporal-frequency account of conditionals) and relative necessity and impossibility (which involves the sort of logical/conceptual incompossibility Chrysippus employs in giving his *own* account of necessary conditionals). Thus, Chrysippus can maintain that some future event *e* is causally determined to occur, relative to what is now the case, but deny that it is necessary, relative to what is now the case, that *e* occur because its non-occurrence is not logically/conceptually incompatible with what is now the case. Of course, it would be necessary, relative to what is now the case, that *e* occur *according to the Diodorean temporal-frequency account of conditional necessity* because Chrysippus' account of causation together with his conception of fate as an all-encompassing causal nexus evidently entail that *whenever* conditions exactly like those that now obtain occur an event such as *e* will follow. This other Diodorean/temporal-frequency account of necessary conditionals lurks in the background of Chrysippus' attempt to formulate a reconciliationist doctrine, damping the enthusiasm of other ancient philosophers for his approach to the problem. In the following section, I discuss the negative response this form of Chrysippean compatibilism elicited.

B. "OBSCURE CAUSES" AND CHRYSIPPUS' COMPATIBILISM

In the preceding section I mentioned that the form of compatibilism developed by Chrysippus by using his logical/conceptual-incompatibility account of necessary conditionals to define relative necessity, possibility, etc., did not prove immune to criticism in antiquity. One form of criticism, found in the *corpus* of Alexander, depends on the assumption that the Diodorean, temporal-frequency account of necesary conditionals is, in principle, explicable in terms of or "reducible" to the Chrysippean account of conditionals in terms of logical/conceptual

entailment. The Stoic position is interpreted as maintaining that some causes are "obscure": it is not easy to ascertain the entailment relation binding them to their effects (or, rather, the "incompatibility" relation obtaining between them and the "contradictories" of their effects); but the Stoics are interpreted as holding that there is such a relation between cause and effect. According to this interpretation, the modal status of an event/state of affairs becomes an epistemic matter, relative to the knowledge of the individual making the judgment concerning that modal status. For an individual with "perfect" knowledge, the two relations of cause-effect (or the corresponding temporal-frequency account of conditionality) and of logical/conceptual entailment would coincide; and, due to the Stoic doctrine of universal causation, *every* event/state of affairs would be either relatively necessary or relatively impossible for such an individual.

In order to consider this criticism in greater detail, let us suppose that there is a future event *e* which is, relative to what is now the case, possible but non-necessary. Then, due to Chrysippus' "retention of fate," the occurrence of *e* has an antecedent cause or complex of antecedent causes constituting (part of) what is now the case, But, then, *whenever,* a state of affairs like what is now the case occurs, an event like *e* will supervene; so, *according to the temporal-frequency (Diodorean), account of necessary conditionals,* it is necessary, relative to what is now the case, that *e* should occur. The underlying assumption of the sort of criticism we are considering is that it is also necessary, in the *Chrysippean sense*, that, relative to what is now the case, *e* should occur. The two accounts of necessary conditionals only seem different to a given individual because, due to ignorance, he is unable to see the "necessary logical link" between (some part of) what is now the case and the occurrence of *e*.

This assumption forms the basis of Alexander's description and criticism, in Chapter 10 of the *De fato,* of a Stoic attempt at reconciliationism:

> It is said that the possible and the contingent are not excluded by the coming-to-be of everything in accordance with fate because of its being possible that something come-to-be which is not prevented by anything from coming-to-be, even if it does not in fact come to be, (The contraries of those things that happen in conformity with fate are not prevented from coming-to-be because, although they do not come-to-be, it is nonetheless possible that they should.) This supplies a demonstration that they are not prevented from coming-to-be: that the things preventing them, although they exist, are completely unknown to us. (For those things that are the causes of the contraries' of some events/states of affairs coming-to-be, these are also the causes of these [events/states of affairs] not coming-to-be, if, as they say, it

is impossible that the contraries should come to be when the surrounding circumstances are the same.) But because what some [of the preventing causes] are is not known to us, for this reason they say that [the events/states of affairs in question] are not prevented from coming-to-be.[41]

The consequence of this interpretation of Chrysippus' reconciliationist view is that the extent to which a person is willing to refrain from attributing relative necessity to events/states of affairs that, in fact, come about and to refrain from attributing relative impossibility to events that, in fact, do *not* come about is merely a measure of his ignorance. According to Alexander's judgment, this form of reconciliationism, so interpreted, is the behavior of "those who make jokes in discussions in which jokes ought not to be made."[42]

Whether this passage represents a misunderstanding, willful or otherwise, of Chrysippus is not clear. We have no clear indication that *Chrysippus* held that the causal relation is, in principle, reducible to the "logical/conceptual entailment" relation represented by his account of necessary conditionals. In fact, his stratagem for escaping necessity and retaining fate seems to depend on his *guarding against* the conflation of the two relations. Chrysippus' doctrine of the cause-effect relation requires that a cause yield its effect "with strict (temporal) universality." As Hume has pointed out, there is perhaps a natural "rationalistic" human tendency to think that the causal relation involves more than this, that it involves some necessary connection between cause and effect. And the paradigm of necessary connection is that of logical or conceptual connection. It is not puzzling, then, to find Chrysippus' critics assuming that there must be such a relation underlying that of cause-effect. However, Chrysippus seems committed to avoiding the doctrine that a cause necessitates its effect in this way.

However, it is perhaps not unfair to note that the (mis)understanding of the Stoic doctrine represented by Chapter 10 of Alexander's *De fato* (if it *is* a misunderstanding) is abetted by Chrysippus himself. A number of fragments in the Chrysippus volume of von Arnim's *Stoicorum Veterum Fragmenta* indicate that "the Stoics" were accustomed to refer to what occurs by chance (*hē tuchē*) as due to a cause or causes "hidden from or obscure to human reckoning" (*adēla anthrōpinō logismo*).[43] Alexander, at least, understands the phrase "*aition adēlon*" as implying a subjective concept of chance. This account, he says, is not an account of those who "postulate some nature of chance" but of those who locate chance "in a certain sort of attitude (*poia skesei*) of men toward causes."[44] He

evidently assumes that it is in principle possible for what is "*adēlon*" to become "*dēlon*" or for what is "*adēlon*" for one person to be "*dēlon*" for another. And it is natural to interpret this difference in the following terms: for the person who does not grasp the conceptual connection between the "obscure cause" and its effect, the effect is a "chance event," but for the person who sees the conceptual connection there is no "obscurity" and, hence, no chance.

We saw in Chapter Two that, for Aristotle, there is a close relation among (i) what is contingent, (ii) what is the result of an "accidental cause," and (iii) what occurs "by chance" or "spontaneously." It would not, then, be peculiar for a Peripatetic such as Alexander to apply the inferences he draws – rightly or wrongly – from the Stoic terminology concerning chance to his interpretation of the Stoic doctrine of "contingencies," that is, nonneccessary possibilities. This is apparently what happens in Chapter 10 of his *De fato*.

While the foregoing criticism of Chrysippus' attempt to frame a reconciliationist doctrine depends on the assumption that the cause-effect relation can, in principle, be explicated in terms of logical/conceptual entailment, another type of criticism assumes that Chrysippus' cause-effect relation (which can be formulated in terms of the temporal-frequency account of conditionals) and his logical-conceptual entailment relation (upon which his account of necessary conditionals and, ultimately, relative possibility and necessity is based) are really distinct: the former, in other words, is not "in principle reducible" to the latter. The question can be posed whether Chrysippus is justified in identifying the former, weaker variety of connection with the action of fate and employing the latter, stronger variety to define relative necessity, possibility, and their contradictories.

In *De Stoicorum repugnantiis* Plutarch adduces the following argument against Chrysippus' treatment of fate and the alethic modalities:

> if everything is possible which is "susceptible" (*epidektikon*) of coming-to-be, even if it is not going to come-to-be, many of the things which are not according to fate will, nonetheless, be possible. So that either fate will lose its power, which [Chrysippus assumes] is invincible, incapable of being overpowered, and prevalent over everything; or, if [fate] were to be as Chrysippus judges, what is susceptible of coming to be would, in many cases, fall under the impossible. And everything that is true will be necessary, being constrained by the most powerful necessity of all; and everything that is false will be impossible, since it will have the greatest cause opposing its becoming true. For how can one for whom it has been destined to die at sea be "susceptible" of dying on land? And why is it possible for the person at Megara to go to Athens when he is prevented by fate from doing so?[45]

A problem with this passage is that the conception of possibility (the possible is what is "susceptible" of coming-to-be even if it, in fact, does not) looks more like the conception usually attributed to Philo than the "Stoic" (i.e., Chrysippean) conception. However, the term "*epidektikon*" is the same as that which is used by Diogenes Laertius in his account of the Stoic conception;[46] and if we supply in the passage from Plutarch the crucial, missing qualifying phrase "things external to it not contradicting or 'opposing' (*enantioumenōn*) its being true," the passage still has a point to make, although its rhetorical force may be somewhat diminished.

According to our reconstruction of the reconciliationist strategy of Chrysippus alluded to by Cicero, the following situation obtains. While fate, the nexus of causes constituting the sequence of events in a cosmic cycle, invariably (i.e., *always*, in each cycle) produces all its effects, it does not "contradict" or "oppose" (in Chrysippus' technical sense of "be conceptually/logically inconsistent with") the *non*-occurrence of all its effects. In other words, Chrysippus has identified the action of fate with the weaker Diodorean/temporal-frequency account of necessitation and has used his stronger logical/conceptual entailment account to define relative necessity, impossibility, etc. By a little "creative" reading of Plutarch, we can understand him to be posing a dilemma for Chrysippus. If Chrysippus *does* identify the action of fate with a sense of necessitation (e.g., the Diodorean one) that proves weaker than the sense he uses in his account of the modalities, he has sacrificed the invincible character of fate (which, Plutarch implies, Chrysippus takes pains to emphasize). On the other hand, if fate it "as he says," – i.e., invincible, the greatest of causes, etc. – it must "contradict" or "oppose" (in Chrysippus' *logical/conceptual sense*) the non-occurrence of its effects But that is to conceive of the action of fate in such a way that Chrysippus' attempt at reconciling the retention of fate with the avoidance of necessity fails: as Plutarch says, whatever is now true (with respect to the future as well as the present and past) will be necessary, relative to what is now the case, and whatever is now false will be impossible, relative to what is now the case.

It might seem obvious that the first horn of the dilemma is the less objectionable one. After all, if Chrysippus accepts the first horn, fate remains "causally potent": an event of type X invariably (i.e., *always*, in each cosmic cycle) produces its effect, say an event of type Y, even if there is no logical/conceptual incompatibility between the occurrence of

an event of type X and the subsequent non-occurrence of an event of type Y. It is likely that Chrysippus himself would not have viewed the dilemma in quite this way, however. Unlike Cleanthes, he identified fate with divine providence.[47] According to Plutarch, for example, Chrysippus

> says that nothing either remains as is or changes, not even the least of things, other than in conformity with the reason (*logon*) of God, which is the same thing as fate.[48].

From Chrysippus' perspective, then, any weakening of the role of fate, i.e., any relaxing of the all-encompassing nexus of causes, would amount to a weakening of the role of providence. It seems paradoxical to (A) identify fate with divine *reason*, (B) identify the working out of fate with the Diodorean/temporal-frequency acount of conditionals, and (C) claim that there are instances of conditionals of the temporal-frequency variety that can not, even in principle, be "reduced" to or explicated in terms of Chrysippus' *conceptual/logical* entailment account of conditionals. If fate is going to be identified with providence or divine reason it seems that its action should be accounted for in terms of the stronger "rationalistic" conception of necessitation as logical/conceptual entailment. However, if Chrysippus were thus to "give fate/providence its due," he would not be able, as Plutarch points out, to "escape necessity" while "retaining fate."

I conclude, then, that Chrysippus' identification of fate or the causal nexus with divine reason or providence does indeed raise problems for the sort of reconciliationist stratagem to which Cicero appears to be alluding in the *De fato,* a stratagem that rests on the identification of the action of fate with the temporally invariable efficacy of a cause to produce its effect and the definition of relative necessity, impossibility, etc., in terms of a stronger logical/conceptual-entailment conception of necessitation. We also have evidence, however, for a rather different sort of Stoic attempt at reconciliationism, an argument for the compatibility of Stoic fate, in its fullest sense, with the existence of actions that are "up to us" (*to eph' hēmin*), a characteristic of actions which, by implication, renders us morally responsible for them.

C. "WHAT IS UP TO US" AND FATE

The variety of reconciliationism we have been examining maintains, in effect, that, for some event/state of affairs, although it was "determined" by its causes, there is nonetheless a legitimate sense of relative possibility for which it is true to say that it was, before the fact, *possible* that it not

come about. The focus, in other words, is on "avoiding necessity." Such forms of reconciliationism, which are grounded in the development of modal concepts (specifically, modal concepts that can non-trivially be applied to human actions) that are independent of causal determination, still occur in contemporary discussions of determinism.[49] There are forms of reconciliationism without this modal focus, however. It is possible to admit that, in terms of "real necessity," all states of affairs or events are necessitated by their causes – or, equivalently, to admit that they are necessary, in this sense of "necessary," relative to any time prior to their temporal instantiation – but to *deny* that this modal fact entails that no human action "is up to" its agent or that the agent bears no moral responsibility for any such action. The Stoics seem to have developed a "non-modal" form of compatibilism of this sort. Some information suggests that Chrysippus was responsible for the development of this variety of a reconciliationism theory, as well as the "modal" variety mentioned by Cicero. For example, according to Theodoret,

> Chrysippus the Stoic says that what is necessitated (*to katēnangkasmenon*) does not differ from fate and that fate is an eternal continuous, and ordered process (*kinēsin*).[50]

A number of other selections in von Arnim also conflate, for Chrysippus or the "Stoics," the concepts of fate and of necessity.[51]

In Chapters 18 and 19 of the *De fato*, Cicero outlines, in a rather confused fashion, a view that he attributes to Chrysippus. The view depends on the distinction between two classes of causes, those that are "perfect and principal" (*perfectis et principalibus*) and those that are "assisting and proximate" (*adiuvantibus et proximis*). The former seem to be identified with the "internal" essential nature of a thing and the latter with "external" antecedent causes.[52] In brief, the view seems to be that an event or action can truly be said to be "in the agent's power" (*in potestate*) if the agent's "nature" is necessarily a part of the causal explanation of the action:

> for although assent cannot take place except by an exciting (sense) presentation, nonetheless since this presentation is a proximate and not a principal cause, the position we have just now stated supplies an explanation for this, as Chrysippus would have it. – not indeed that that [assent] could occur without being elicited by any external force (for it is necessary that an assent be excited by a presentation). But he returns to his cylinder and top, which cannot begin to be moved unless they are impelled; however, when this has happened, he thinks that it is left to the cylinder to roll and the top to spin of their own nature.[53]

Cicero views this doctrine as a Chrysippean stratagem for avoiding

necessity and retaining fate. In fact, his interpretation of it seems at places almost indeterministic in character.[54] I believe, however, that the comparison of the doctrine with a very similar "Stoic" one discussed and criticized by Alexander in his *De fato* suggests that *this* stratagem may not involve any particular attempt to "escape (relative) necessity," and, *a fortiori*, any attempt on Chrysippus' part to relax his rigid determinism: rather, it represents an attempt to argue that causal determinism, even causal *necessitation*, is compatible with the claim that at least some actions are "up to" their agents.[55]

In Chapter 13 of the *De fato* Alexander begins his criticism of a reconciliationist view advanced by those who deny an Aristotelian principle he has enunciated at the end of Chapter 12: "the phrase 'what is up to us' is predicated of those things, the contradictories of which we have the power to choose."[56] Alexander's adversaries, however, "concoct" a concept of "what is up to us" that does not entail that if an action x is up to us, then it is possible for us to *refrain* from doing x:

> taking away from man the power of choosing and of doing the opposites (of what he does), they nonetheless say that what is "up to us" is the same thing that happens "through us."[57]

From the discussion that follows, it becomes clear that the doctrine Alexander is criticizing postulates a certain "proper nature" (*oikeia physis*) for, say, living things (*zōa*), and proceeds to identify "what is up to the living thing" in question with those actions which necessarily involve the "instrumentality" of the essential nature of the thing. The Stoic doctrine appears to be that the antecedent causes, identified with the action of fate, are indeed "necessitating" causes;

> they say that these things are up to the living thing, on the one hand holding that they will be done by it of necessity (for it is not possible that things should happen otherwise), and on the other hand holding that the acts are "up to" the living thing because it is not possible that they should occur through any other means than this one [i.e., the living thing in question] nor in any other manner than this.[58]

This doctrine provides a basis for Chrysippus' refutation of what appears to have been a common misconception of Stoic "fatalism." According to one variety of fatalism, if it is fated that event e occur, then the occurrence or non-occurrence of e is not contingent on the occurrence or non-occurrence of any other, preceding event.[59] This view is summed up in the "Lazy Argument" (*argos logos*), as reported by Cicero in *De fato* 12–13:

> if it is fated for you to recover from this disease, you will recover whether you summon a doctor or not; likewise, if it is fated for you not to recover from this disease, you will not

recover whether you summon a doctor or not. But one or the other is fated; therefore, your summoning a doctor is of no consequence.[60]

The proper response seems to be that my summoning a doctor may be a necessary condition of my recovery and, hence, not at all irrelevant with respect to the way in which the matter of my recovering or not recovering is resolved. This is precisely the response Cicero represents Chrysippus as making in his criticism of the argument. Chrysippus responds, in effect, that some events are "condestinate" (*confatalia*): the coming-to-be of one is a necessary condition of the coming-to-be of the other.[61]

There is, however, considerable ambiguity in Cicero's discussion of the doctrine of condestinate events/states of affairs. Most of his examples of such events/states of affairs involve an apparent "logical/conceptual" relation: e.g., that between Laius' begetting Oedipus and his lying with a wife and between Milo's wrestling at the Olympic games and his having an opponent. But Cicero also represents Chrysippus as maintaining, in direct response to the Lazy Argument, that it is at least conceivable that the relation between my recovering from a disease and my summoning a doctor is also an example of condestinate events.[62] A further complication arises from the fact that Cicero depicts Chrysippus as arguing that, in addition to "conjoined" (*copulata*) events/states of affairs, there are also "simple" (*simplicia*) ones:

a simple event is, for example, "Socrate will die on a certain day"; the day of his dying has been set, whether he does something or not.[63]

The import of the several paragraphs Cicero devotes to the Lazy Argument and Chrysippus' criticism of it may be that Chrysippus' criticism was formulated within the context of his "other" attempt at reconciliationism, i.e., his attempt to escape necessity and retain fate by distinguishing causation and necessitation. I will take up this suggestion in Chapter Seven. But, from the perspective of the sort of reconciliationism that does *not* distinguish causation and necessitation, Chrysippus would evidently be committed to the doctrine that for every event/state of affairs, there are temporally prior events/states of affairs that are condestinate with it. However, those events/states of affairs whose coming-to-pass has as a "principal cause" some aspect of the "proper nature" of an agent (that is, whose coming-to-pass necessarily involves the actualization of some potentiality grounded in the "proper nature" of the agent) are "up to" the agent. There may be other events, more "loosely" connected with an "agent," whose coming-to-pass is not

necessarily dependent upon the "proper nature" of the agent.[64] These events, according to the sort of compatibilism we are discussing, would *not* be "up to" the agent. Both classes of events, nonetheless, would be necessitated by preceding "world states": relative to a preceding world state, it is not possible that an event of either class that actually occurs should fail to occur.

One fundamental criticism of this attempt at reconciliationism pervades Alexander's discussion of it. This criticism is a very Aristotelian one: the Stoic account of what it "up to" an agent does not allow that the *contrary* of what is "up to" an agent is, in any real sense, possible. The Stoic move, Alexander claims, is to equate what takes place "*through* living things," at the "behest" of fate, with what is "up to" the living things in question.[65] However, this criticism is essentially merely a denial of what the Stoic position asserts. The Stoics assert that the necessitation, relative to antecedent world states, of everything that transpires is compatible with the existence of a class of acts that may be said to be "up to" their agents, and give an account of "up to" in terms of "through." Alexander replies that this is not an adequate account of "up to" because it does not allow that the contraries of acts "up to" their agents are possible, relative to any preceding world states. But this criticism merely amounts to the complaint that the Stoic position asserts a doctrine of the necessitation, relative to antecedent world states, of everything that transpires.

Alexander also has what is, I believe, a more telling argument against the Stoic position. Chrysippus (or the other Stoics responsible for the doctrine criticized by Alexander) evidently intended their account of what is "up to" something to be applicable only to "living," "ensouled," or "animate" (*zōa*) things.[66] But, Alexander argues, this seems an arbitrary limitation of the concept; the concept seems, in other words, equally applicable to inanimate "agents":

> for neither could what comes about through fire come about through any other agency nor in any other way than through fire or its heating. So that, since the things that come about through fire could not come about otherwise than by fire's heating, and when this heating occurs they will exist, when it does not occur, they will not, these things would be "up to" the fire.[67]

Alexander's argument is simple but cogent: the Stoic account of the relation of being "up to" something is too broad; if we were to apply the concept, as they analyze it, consistently, we would have to speak of some

events as being "up to" inanimate "agents," and this would *clearly* do violence to our ordinary conception of what is "up to" an agent.

The Stoic response seems to have been to limit what is "up to" an agent to what arises "through" the instrumentality of *only certain kinds* of natures, *viz.*, natures capable of "impulse" (*hormē*) and "assent" (*syngkatathesis*).[68] Alexander, in fact, comments that "they" say that "what is up to us resides in impulse and assent."[69] This same idea underlies a striking simile attributed to Chrysippus and Zeno

> they (*scil.* Chrysippus and Zeno) steadfastly held that everything happens in conformity with fate, adducing the following sort of illustration: just as a dog, when it is tied to a cart, both is pulled and follows if it wills to follow, so there is "free choice" (*to autexousion*) of this sort along with necessity [that is, fate]. If it does not will to follow, it is entirely constrained. The same situation doubtless obtains in the case of human beings. And those not willing to follow are entirely constrained to come to their appointed lot.[70]

The simile, while striking, is open to several interpretations. It might be understood as implying a sort of dichotomy between "the mental realm" and "the physical realm": while all that comes to pass in the physical realm is knit together in the causal nexus of fate, i.e., is necessitated by antecedent cosmic states, at least some instances of human "assent" are not thus consequences of fate. Assent and its contrary fall "outside" the causal nexus of fate, and hence, are "up to" the untrammeled decision of the agent. Of course, in terms of the simile, the giving or withholding of assent is just as irrelevant to "what happens" ("in the physical world") as the "decision" of the dog is irrelevant to whether it goes where the cart goes.

While the foregoing represents a possible interpretation of the simile, it is not, I think, likely to be the correct interpretation. Perhaps the most telling point against it is that it would constitute an uncharacteristic Stoic "dualism": a realm where universal causal necessitation obtains set over against a "mental realm" not characterized by the sort of universal causal necessitation associated by the Stoics with fate. Another interpretation of the simile does not assume that the giving or witholding of assent is any less necessitated by antecedent world states, that is, is any less a part of the all-encompassing nexus of fate, than any other sort of event/state of affairs. Alexander implicitly fastens on this interpretation of "assent" in order to maneuver his Stoic opponents back onto Peripatetic ground. The Stoics have identified what is "up to" an agent with that occurs "*through*" the essential nature of the agent. But they have proceeded to limit this account of what is "up to" something to what occurs "through" a

particular sort of nature, *viz.*, the power of "impulse" and "assent" that constitutes the essential nature of "ensouled things."

In Chapter 14 there is a good deal of confusion on Alexander's part concerning the relation between "responsibility" (what is *epi*, "up to" or "attributable to," an agent) and "rational choice." Alexander begins the chapter by implying that the Stoics hold that *any* ensouled or living being is capable of impulse and assent and, hence, is an agent with actions "up to" (*epi*) it. As we saw, his initial argument is that, given their anlysis of "*epi*" in terms of "*dia*," the Stoic limitation of responsibility to animate things is arbitrary. Alexander adds that the Stoic account of *to eph' hēmin* in terms of impulse and assent would be a more appropriate account of what is "voluntary" (*hekousion*).[71] Evidently, it is only man, possessing a rational faculty for making judgments concerning "impinging impressions" (*phantasiai prospiptousai*), who is the author of actions that can be truly described as "up to" him.[72] In this regard, R. W. Sharples comments that "Alexander indeed probably wishes to argue, not that responsibility is confined to cases where we do in fact deliberate, but rather that the fact that we are rational and can deliberate shows that we are responsible for all our actions, whether or not we actually deliberate on any paricular occasion."[73] Toward the end of the chapter, however, Alexander criticizes Stoics who locate responsibility or "what is up to us" in deliberation (*en tō bouleuesthai to eph' hēmin*). The thrust of his criticism of *this* Stoic move is that it cannot be defended in terms of the Stoics' own identification of what is up to us with what is accomplished "through" us and their analysis of the latter in terms of a sort of necessary condition. According to this Stoic view, what is "up to" a human being, in the fullest sense of the phrase, is what involves *reasoned* or *deliberate* assent, assent which is not merely the "automatic," necessitated consequence of a "stimulus" or "presentation" (*phantasia*), but which is the terminus of a deliberative process mediating presentation(s) and the giving or witholding of assent.[74]

Indeed, according to the report of Calcidius, Chrysippus did clearly distinguish between sensation and the "rational working-over" of sensation: while sensation has as its objects only "present stimuli,"

> It is the proper function of inward deliberation and reflection to grasp the affection of each sense and from what the senses report to infer (*colligere*) that which exists, and certainly to apprehend what is present, but also to remember what is absent and to foresee what will be the case. He defines this inward deliberation of mind (*intimam mentis deliberationem*) thus: it is an inward motion of the rational power of mind (*animae*).[75]

Alexander's argument, then, is the following: if the Stoics ultimately locate what is "up to" us in what issues from deliberation

> then it no longer follows for them that it is not possible that the things that happen through the agency of man could happen in any other way because man, although being capable of deliberation, does not effect all things that happen through his agency after having deliberated.[76]

Alexander, in other words, is claiming that the deliberation leading up to an act of assent is not a *necessary condition* of that act of assent and, hence, the act of assent and what follows from it cannot be said to occur "through" (*dia*) the deliberation or deliberative ability of the agent, in the technical, Stoic sense of "through." Consequently, the "final" Stoic analysis of "what is up to us" as "what occurs 'through' our deliberation or deliberative ability" breaks down.

Although Alexander's argument is directed very specifically against a Stoic doctrine, it reflects a general Aristotelian/Peripatetic conception of "practical" ratiocination. In order for us to deliberate, at a given time or in a given set of circumstances, whether to do or to refrain from doing something, it must be a "contingent" matter (i.e., neither necessary or impossible), relative to that time or those circumstances, that we do (and that we refrain from doing) the act in question.[77] Deliberation, which could (relative to circumstances that obtain when we begin deliberation) issue in only one way would be vain and "superfluous";[78] indeed such intellection should not be termed "deliberation" at all. This is the note on which Alexander ends Chapter 14 of the *De fato*:

> If we have by nature the power of doing something after having deliberated, it is clear that we should have the power of also doing something else through deliberation, and not merely that which we elected to do having deliberated.[79]

D. CHRYSIPPEAN AND SPINOZISTIC RECONCILIATIONISM

The material concerning Chrysippus' reconciliationism and the responses to it that we have considered in this chapter represent in inchoate form, I believe, what have become "classical moves" in the Western philosophical treatment of the free will-determinism issue. I shall conclude the chapter by briefly commenting on these moves.

A "modal" form of Chrysippean compatibilism can be reconstructed, I argued, from passages in Cicero's *De fato* together with the Stoic account of sound conditionals in terms of a relation of logical/conceptual incompossibility between the antecedent and denial of the consequent.

Descendents of this form of compatibilism are still to be found in contemporary philosophical literature.[80] The basic strategy is (1) to affirm a universal causal determinism while (2) developing an account of the alethic concepts of relative or "conditional" necessity and possibility and their contradictories that allow at least *some* events/states of affairs to possess the modal status of being possible and nonnecessary relative to *some* time t (or to the "cosmic state" obtaining at t). This form of compatibilism, however, is susceptible to a quite intuitive criticism.

It can be maintained that the "relevant" alethic modal concepts are those that capture the idea of its being "really possible," at a given time, for an agent to do something other than what he subsequently, in fact, does. It may be further maintained that it is precisely causal determination, whatever that amounts to, that is to be equated with necessitation or relative necessity, in the "relevant" sense of necessity. In other words, some future event/state of affairs *e* is necessary relative to (what is the case at) some prior time t just in case *e* has an antecedent sufficient cause constituting a part of what obtains at t; the event/state of affairs *e* is impossible relative to (what is the case at) t just in case there is an antecedent sufficient cause that "prevents" *e* from coming-to-pass because it determines that some *other* event/state of affairs will come to pass "in *e*'s place." Then, from the postulate that every event/state of affairs has an infinite series of antecedent sufficient causes extending backwards in time, it follows that every event/state of affairs that, in fact, comes to pass has been necessary relative to (what obtains at) any time prior to the time at which the event/state of affairs in question is "instantiated." While for any event or state of affairs that fails to come to pass at a certain time t, it is impossible relative to (what obtains at) any earlier time that the event/state of affairs in question should be instantiated at t. It may finally be concluded that since an event/state of affairs is either necessary or impossible relative to *all* its perhaps infinite past, and since an agent appears to have no causal influence over the past, it is not "really possible" for an agent to effect any events/states of affairs other than those that, in fact, transpire.

Several responses to this line of reasoning are open to the compatibilist. Perhaps the most obvious is to insist that the account of relative possibility/necessity in terms of the causal relation itself is too restrictive: it does not do justice to what we mean by its being possible, relative to a given time, for an agent to do something other than what he in fact ends up doing. The compatibilist may attempt an account of what it is

possible, relative to a given time t, for an agent to do in terms of subjunctive conditionals: It is possible, at t, for an agent to perform a given action just in case there is a set of antecedent circumstances *E* such that if *E were to have obtained* at t, the agent would have performed the action.[81] The disputant with incompatibilist inclinations, however, is unlikely to judge such an account of relative possibility favorably. According to the reconciliationist's account, what it is possible for an agent, relative to a given time t, to do amounts to the range of various effects that might be elicited from the nature the agent possesses at t by different sets of antecedent causal circumstances. The incompatibilist is likely to regard this as irrelevant to what is "really possible" for the agent to do at t because some specific set of antecedent causal circumstances "really" obtains at t and that, together with the "nature" of the agent at t, will "surely" yield one and only one outcome according to the postulate of universal causal determination.

At this stage of the argument, the source of the disagreement between the compatibilist and the incompatibilist may perhaps be brought into sharper focus. The compatibilist is willing to accept an account of an agent's being responsible, at time t, for an action if the coming-to-pass of the action somehow essentially involves what is taken to be the "nature" of the agent at t. The incompatibilist is drawn to a more stringent conception of the responsibility of the agent at time t: he wants to maintain that the agent is responsible for an action only if it is really possible at time t for the agent *not* to perform the action. And he is likely to feel that it is "really possible" at time t for the agent not to perform the action only if it is not causally determined by temporally prior circumstances that the agent perform the act. This stage of our abstract dispute is reflected in the Peripatetic and "Stoic" (Chrysippean?) dispute concerning the import of the phrase "what is up to [an agent]."

The Stoic position first analyzes the responsibility of "agent" of X for the coming-to-be of an event/state of affairs *e* in terms whether some aspect of the "nature" of X is involved as "principal cause" in the coming-to-be of X.[82] Alexander's response is to argue that this account of responsibility allows for inanimate things to be responsible for some events/states of affairs, a consequence that, he implies, contradicts our common conceptions. It is not clear to me that this type of response is correct. We,for example, speak of the "tie rod" in an automobile as being responsible for an accident if it is established that the rod was defective in some way and that this defect was involved in its breaking when a certain

sort of stress ("proximate or assisting cause") came to bear. A certain sort of responsibility for the coming-to-pass of some events/states of affairs *is* sometimes attributed to inanimate "agents," in other words.

Yet there is the suggestion in Alexander's *De fato* that the Stoics, too, wanted to limit the concept of what is "up to" something to animate beings; and perhaps *some* Stoics wished to limit the concept to *rational* beings.[83] So, ultimately, what is "up to" an agent, according to this Stoic view, is what essentially involves the "rational assent" of the agent. Here the Stoics and Alexander come to an ultimate parting of ways. Alexander's view is "classically Peripatetic": "assent" is a sort of choice and "rational assent" would have to be a choice attendant upon deliberation. But deliberation, in order to be *deliberation*, must be "two-sided," i.e., must be capable of issuing *either* in the choice that is, in fact, made or in its opposite. He implies that the Stoic advocacy of universal causal determination would militate against their acceptance of this conception of two-sided deliberation. And with respect to the Stoic doctrine in which necessitation in not distinguished from causal determination, his implication is probably correct. According to such a view, the fact that the outcome of a process of deliberation has (a complex of) antecedent, determining causes constituting part of the "cosmic state" of each time prior to the outcome implies that the outcome is necessary relative to each of those prior times; hence, any different outcome is impossible relative to any such time, or to the cosmic state characterizing it.

For a variety of compatibilism such as the Stoic variety criticized by Alexander, which attempts to reconcile the necessitation or temporally antecedent relative necessity of all events/states of affairs with human responsibility for at least some actions, the Aristotelian-Peripatetic conception of practical reasoning will not be of much help. Within the context of such a compatibilist's analysis of responsibility in terms of "rational assent," the sort of rationality involved will more likely have to be "understanding" or "theoretical" intellection, in the Aristotelian sense of "theoretical."

Perhaps Spinoza's treatment of "freedom" and causal determination represents the ultimate working out of this form of Stoic compatibilism. His definition of "freedom" in Part I of the *Ethics* is surely a "classical compatibilist"[84] one:

> That thing is called free (*libera*) which exists of its own nature alone, and is determined to action by itself alone. That thing, on the other hand, is called necessary, or rather compelled (*coacta*), which *by another* is determined to existence and action in a fixed and prescribed manner.[85] [Italics mine]

Of course, Spinoza holds that only God or Nature (*natura naturans*) fully satisfies this definition.[86] Nonetheless, even the perfect freedom of *Deus sive Natura* does not require that it be possible for God to act in any other manner than the manner in which He/It does, in fact, act.

> Things could have been produced by God in no other manner and in no other order than that in which they have been produced.[87]

So, Spinoza clearly is not advancing a modal variety of compatibilism such as the Chrysippean variety reconstructed from Cicero's *De fato* and the "Stoic" account of the relative modal concepts. Rather, Spinoza maintains that universal causal necessitation[88] is compatible with a distinction between "what is up to" a human agent ("*actiones*") and what is not ("*passiones*"). This doctrine is summarized in the appendix to Part IV ("*De Servitute Humana*") of the Ethics:

> All our efforts or desires follow from the necessity of our nature in such a manner that they can be understood either through it alone as their proximate cause, or in so far as we are a part of nature, which part cannot be adequately conceived through itself and without the other individuals.
>
> The desires which follow from our nature in such a manner that they can be understood through it alone, are those which are related to the mind, in so far as it is conceived to consist of adequate ideas. The remaining desires are not related to the mind, unless in so far as it conceives things inadequately, whose power and increase cannot be determined by human power, but by the power of objects which are without us. The first kind of desires, therefore, are properly called actions, but the latter passions; for the first always indicate our power (*nostram potentiam*), and the latter, on the contrary, indicate our impotence and imperfect knowledge.[89]

Cast in Stoic terminology, Spinoza's doctrine seems to be that what can be attributed *solely* to the rational "nature" of the human agent ("principal cause") is a "free act" of the agent; while what involves external "proximate and assisting causes" is not. He holds that a human being can never be entirely free from "affect" or *passio*;[90] hence, a human being can never act *entirely and exclusively* "from his own nature" and is thus never *entirely* free, complete freedom being enjoyed only by *Deus sive Natura*. However, Spinoza holds that different human beings can exemplify different degrees of "imperfect freedom" corresponding to the degrees to which they are motivated by "adequate ideas" rather than "external" causes.[91]

Spinoza seems to view the "Stoics" as holding that human beings can, in principle, achieve a state in which "*passio*" has no causal influence whatsoever over them or, at least, over their "rational interior life."[92] He

may, in fact, have some warrant for this conclusion in the Stoic picture of the "sage."[93] However, Chrysippus seems to hold that assent cannot take place apart from a presentation, which he considers to be an external "proximate and assisting cause" of the assent.

Indeed, Spinoza's compatibilism and the version of "Stoic" compatibilism criticized by Alexander, which seeks to reconcile universal causal necessitation and the existence of some acts that are "up to" their human agents, appear to differ merely in emphasis. Spinoza holds that only *Deus sive Natura*, which does not "operate" contingently but which, nonetheless, is free from all external causal influence, is free. Human beings can approach this freedom to greater and lesser degrees corresponding to the extent to which their actions are motivated by their own nature, the principles of "pure reason," and not "external causes." According to one form of Stoic compatibilism we have considered, an act is "up to" its agent insofar as it "involves" as "principal and perfect cause" the rational assent of the agent. The emphasis seems to be on establishing a dichotomy between *acts* that are "up to" the agent and acts that are not. But it involves little extrapolation to construct a Stoic conception of relative freedom based on the extent to which a person's various acts are "up to" him: the greater the number of actions that are rational as opposed to "knee-jerk" responses to external stimuli, the more free the person is.[94] This conception of freedom is essentially that of Spinoza. Such a conception may, in fact, possibly be found in the form of the Chrysippean doctrine of virtue, the paradigm of which is the Stoic conception of a sage.

E. SUMMARY AND CONCLUSION

It is, I think, clear from this chapter that it is possible to discern in Stoic doctrine the fundamental outlines of several philosophically significant varieties of compatibilism that have resurfaced, in slightly varying forms, throughout the course of the history of Western philosophy. What I have termed the modal form attempts to define relative necessity or necessitation in such a way that from the fact that a future event/state of affairs Y is the *causal* consequence of some temporally prior event/state of affairs X, it does not follow that X *necessitates* Y. A Chrysippean compatibilism of this type was discussed in Section A of this chapter, and some of the difficulties with it examined in Section B. Non-modal compatibilism admits that causation constitutes a form of necessitation or relative

necessity. It denies, however, that the causal determination/necessitation of an action by an "eternal chain" of temporally prior events/states of affairs entails that the immediate agent of the action is not responsible for it. I have argued in Section C that traces of Stoic compatibilism of this sort (although perhaps not as clearly distinguished from the modal variety as it might be) are to be found; and I proceeded in Section D to compare this reconstructed form of Stoic compatibilism with what is perhaps the most famous example of non-modal compatibilism, that of Spinoza.

The non-modal form of Stoic compatibilism, like its Spinozistic analogue, introduces rationality into the determinism-responsibility issue. There is an underlying "essentialist" assumption that a thing has a particular proper nature. Then, the thing in question is said to be responsible for an action that is determined by "its nature alone," to quote Spinoza.[95] In the particular case of human beings, the proper nature in question has something to do with reason or rationality. Therefore, according to this rather schematic and oversimplified account of non-modal compatibilism, a human being is responsible for those actions that "proceed from his rational faculty." A key question involves the interpretation of the phrase "actions that proceed from the rational faculty" or, more pointedly, the sense of "alone" in "determined by its [rational] nature alone." Both the Stoic view discussed in section B and the view of Spinoza seem to be truly compatibilist: that is, it does not seem to be the case, according to either view, that the presence of various "proximate and assisting" ("physical") causal factors in the performance of an action entails that the action did not "proceed from the rational faculty." In other words, an agent can be responsible for an action that proceeds from the faculty of reason even if there are *also* various "physical" determinants of that action. Superficially at least, it seems that Plotinus adopted a similar view. However, in Chapter Seven I shall argue that Plotinus' view is more akin to an *incompatibilist* position: he would interpret the "alone" in the phrase "determined by reason alone" stringently, that is, in such a way that all physical factors, even physical factors considered as necessary conditions of the action in question, are ruled out.

In the next chapter, however, I return to the issue of causal determinism itself, without particular regard to its relation to the issue of the responsibility of human beings for their actions. I attempt to sort out some of the complexities of the debate on this issue between the Peripatetic Alexander of Aphrodisias and his Stoic opponents.

NOTES

[1] Josiah Gould, *The Philosophy of Chrysippus* (Albany, 1970), p. 9.
[2] D. L., 7.180.
[3] *Ibid.*, 7.180–181.
[4] Cf. John Locke, *An Essay Concerning Human Understanding*, ed. P. Nidditch (Oxford, 1975), pp. 246–248 (Book II, Ch. XXI, Secs. 24–28): "Liberty consist[s] in a power to act, or to forbear acting, and that only . . . Since then it is plain, that in most cases a Man is not at liberty, whether he will *Will*, or no; the next thing demanded is, *Whether a Man be at liberty to will which of the two he pleases, Motion of Rest*. This Question carries the absurdity of it so manifestly in itself, that one might thereby be convinced, that Liberty concerns not the Will . . . In this then consists Freedom, (*viz.*) in or being able to act, or not to act, according as we shall chuse, or *will*."
[5] *De fato* 18.41
[6] *Ibid.*, 17.39.
[7] *Ibid.*, 7.13.
[8] D. L., 7.75.
[9] Boethius, *In lib. Arist. PH*, ed. Meiser, *editio secunda*, pp. 234–235.
[10] Kneale and Kneale, *The Development of Logic*, p. 124. Kneale also suggests the possibility that these accounts represent *two* conceptions of the modalities, one "absolute" and one "relative." However, I agree with Sorabji that "it is easier to suppose that in each case there is single sense defined by *two* necessary conditions" (*NC&B*, p.79). Cf. M. Frede, *Die stoische Logic* (Goettingen, 1974), pp. 107–117.
[11] Alexander, *In an. pr.*, *CIAG* 2/1, 184.11–12.
[12] *De fato* 7.13.
[13] *Ibid.*, 8.15.
[14] This is, in effect, the fourth of the "Stoic attempts to escape from saying that all events happen of necessity" discussed by Sorabji (*NC&B*, pp. 74–48), who distinguishes "no less than eight [such] attempts to retreat from necessity" (*ibid.*, p. 71). In what follows I individuate forms of Stoic compatibilism in a somewhat broader fashion. My reasons for doing so will, I hope, become more apparent as this chapter develops.
[15] *The Development of Logic*, p. 129.
[16] Sextus, *PH* 2.110.
[17] *De fato* 13.30.
[18] Of course, the negations of conjunctions reported by Cicero explicitly *are* Philonian/material conditionals, a fact recognized by a diverse group of scholars: e.g., S. Sambursky, *Physics of the Stoics* (New York, 1959), p. 79; M. Frede, *Die stoische Logik*, pp. 80ff; P. L. Donini, 'Fato e Volunta umana in Crisippo.' *Atti dell' Accademia delle Scienze di Torino* 109 (1974–75), pp. 1–44; Sorabji, *NC&B*, pp. 74–78. A consequent problem is that a *simple* material conditional seems obviously to be too weak to capture the common Stoic conception of the causal relation and the "nexus of *heimarmenē*" even if the Stoics recognize the point made by Sorabji: "it is not easy to see how cause and effect could be represented as always having a logical link" (*NC&B*, p. 76). However, if what Chrysippus had in mind was not the Philonian/material conditional but something more like the Diodorean, *viz.*, "*never* p but not q," the result would both be somewhat more philosophically satisfying and also better accord with the motion of "invariance" (discussed in the text) that the Stoics connected with the cause-effect relation.

[19] The inference of Lq from Lp and p ⊃ q is fallacious in virtually all contemporary modal systems.
[20] *De fato* 15, *SA* 2/2, 185.8–9.
[21] *PH* 2.110.
[22] Benson Mates, *Stoic Logic* (Berkeley and Los Angeles, 1961), pp. 45–47.
[23] Origen, *Contra Celsum* 4.68 = *SVF* 2.626.
[24] This version of the Master is the "Hintikka-like" version discussed in the preceding chapter, where I argued that truth-value link principles and the assumption of the eternal fixedness of truth provide the material for a response to the objection that this version of the argument appeals to an illegitimate premise, "what will, at some time, become impossible cannot earlier be possible." I argued, in effect, that the Master plus these additional assumptions can be used to constitute an *argument* for the legitimacy of this premise.
[25] Cf. Cicero, *De fato* 10.20–21.
[26] Epictetus, *Dissertationes*, 2.19; Alexander, *In an. pr.* I 15, *CIAG* 2/1, 177ff.
[27] Cicero, *De fato* 7.14.
[28] M. Mignucci, 'Sur La Logique Modale des Stoïciens', in *Les Stoïciens et Leur Logique* (Paris, 1978), pp. 317–346.
[29] Alexander, *In an. pr.* I 15, *CIAG* 2/1, 177.28–178.1.
[30] *Adv. math.* 8.11–12.
[31] *Ibid.*, 8.12, 8.69, 8.70.
[32] D. L., 7.69–70; Sextus, *Adv. math.* 8.96–98.
[33] Kaplan's concept derives "from the kind of proposition considered by the early Russell" and can be represented (for the case of simple, assertoric, "subject-predicate form" sentence) as an ordered pair of property and "individual." (David Kaplan, 'Dthat', in *Syntax and Semantics*: *Pragmatics*, Vol. 9, ed. P. Cole [New York, 1978], p. 226). Cf. Andreas Graeser, 'The Stoic Theory of Meaning', in *The Stoics*, ed. J. Rist (Berkely, 1978), pp. 77–100.
[34] Alexander, *In an. pr.* I 15, *CIAG* 2/1, 177.32–33.
[35] Mignucci, p. 320. The account in the text elaborates a bit on what Mignucci actually says: that the proposition that is destroyed, while it can never be true, "n'est pas pour autant toujours fausse."
[36] The evidence that Mignucci cites for his claim that "pour Chysippe en particulier, une proposition necessaire est toujours vraie" (p. 320), *viz.* Cicero, *De fato* 7.14 and Alexander, *De fato* 10, *SA* 2/2, 177.21–22, *at most* establishes that, for Chrysippus, a necessary proposition cannot change from true to false. This condition entails that a necessary proposition is always true only in the case of a proposition that always exists and, thus, always is *either* true of false. I find that Sorabji has anticipated (both in *NC&B*, p. 73 and in 'Causation, Laws, and Necessity', in *Doubt and Dogmatism: Studies in Hellenistic Epistemology* (hereafter *D&D*), ed, M Burnyeat, and J. Barnes [Oxford, 1980], p. 265) my principal objection to Mignucci's argument.
[37] Mignucci, pp. 329–330.
[38] A. C. Lloyd, 'Activity and Description in Aristotle and the Stoa', *loc. cit.*, p. 11–14, My suggestion, however, involves considerable extrapolation from what Lloyd actually says, an extrapolation with which he might not entirely agree.
[39] Of course, this characteristic amounts to a form of limited fatalism ("fatalism" in the sense of "logical determinism" and "limited" to the class of *katagoreutikon* propositions).

Such a view does have contemporary advocates, e.g., L. B. Lombard, 'Events and the Essentiality of Time', *Canadian Journal of Philosophy* **12**/1 (March, 1982), p. 9: "I would like now to put forward an argument for the *essentiality* thesis, an argument which, if successful, shows that an event cannot occur at any other time than the time at which it in fact occurs, that each event occurs at the same time in every possible world in which it occurs. I offer this argument because it seems to me to be correct and because it seems to capture some important intuitions I believe we have about the relations between events and other entities.'

[40] At *De fato* 6–8; Cicero's account, later in the *De fato,* of Chrysippus' distinction among types of causes as a strategy for avoiding *necessitas fati* may represent another argument, to be discussed more fully in Chapter Seven.

[41] Alexander, *De fato* 10, *SA* **2**/2, 176.14–23.

[42] *Ibid.*, 176.23–24. For more on Alexander's interpretation of the Stoics as reducing the concept of possibility to an *epistemic* notion see A. A. Long, "Stoic Determinism and Alexander of Aphrodisias *De fato* (i–xiv)," *Archiv für Geschichte der Philosophie* **52** (1970). pp. 247–268; Sorabji, *NC&B*, pp. 83–84; M. Reesor, 'Necessity and Fate in Stoic Philosophy', in *The Stoics*, ed. Rist, p. 194.

[43] *SVF* 2.965–973.

[44] Alexander, *De anima libri mantissa*, *SA* **2**/1, 179.6–10 = *SVF* 2.967.

[45] *De Stoicorum repugnantiis* 46.1055e–f.

[46] D. L., 7.75.

[47] Calcidius, *In Timaeum* 144 = *SVF* 2.933.

[48] Plutarch, *De Stoic. repugn.* 47.1056e = *SVF* 2.937.

[49] One common contemporary form, perhaps most notably represented by G. E. Moore (*Ethics* [New York and London, 1912]), is the suggestion that perhaps the "sense of 'could have,' in which it simply means 'could or should have if I had chosen,' is all we need to satisfy our hankerings after Free Will" (J. L. Austin, 'Ifs and Cans', reprinted in *Philosophical Papers*, second edition [London, 1970], p. 207). Austin criticizes this suggestion at length in 'Ifs and Cans',

[50] *SVF* 2.916.

[51] The degrees to which Chrysippus himself was willing to conflate necessity and fate and the possibility of this conflation's being due to his critics, who viewed Chrysippus' attempt to *separate* the concepts as unsatisfactory, are vexed question. Cf. J. Rist, *Stoic Philosophy* (Cambridge, 1969); M. E. Reesor, 'Fate and Possibility in Early Stoic Philosophy', in *The Stoics,* ed. Rist, pp. 187–202; R. W. Sharples, 'Necessity in the Stoic Doctrine of Fate', *Symbolae Osloenses* **56** (1981), pp. 81–97; Sorabji, *NC&B*, pp. 64–67, 70–71, 86. Of course, this issue will be complicated if (as this chapter rather tentatively suggests) our evidence represents an amalgam of various positions, perhaps not very carefully distinguished, adopted by Chrysippus at different places in his voluminous writings.

[52] Some have interpreted Chrysippus as confining the action of fate to the realm of antecedent, "assisting and proximate" causes. Cicero evidently holds such a view; but the position he attributes to Chrysippus at *De fato* 19 is most unclearly described and, it seems, the text corrupt. Proposed emendations do not seem to me to be successful in resolving all the conceptual difficulties with the chapter.

[53] Cicero, *De fato* 18.42.

[54] For example, at *De fato* 19.44 (with text emended by Turnebus) Cicero seems to attribute to Chrysippus the view that a prior presentation is not necessary for an act of assent. This

does not seem consistent with the position enunciated at 19.43 ("if anything were effected without an antecedent cause, it would be false that all things would happen by fate") together with the position, apparently adopted by Chrysippus, that all things happen by fate.

[55] This is, in effect, a version of the view of P. L. Donini ('Fato e Volunta umana in Crisippo', *loc. cit.*) and an alternative interpretation of the "sixth attempt" – distinguished by Sorabji *NC&B*, pp. 81, 86 (iii) – of the Stoics to deal with the relation between fate and human responsibility.

[56] *De fato* 12, *SA* **2**/2, 181.5–6.

[57] *De fato* 13, 181.13–14.

[58] *De fato* 14, 183.8–10.

[59] This is, I suppose, the most common contemporary conception of fatalism. There are some ancient analogues of the view, expecially among Middle Platonists such as Albinus. They often interpret the Oedipus story in such a way that is is implied that Laius' "ultimate fate" was determined *irrespective* of what he did to attempt to avoid it. Cf. J. Dillon, *The Middle Platonists* (Ithaca, 1977), pp. 294–298.

[60] *De fato* 12.28.

[61] *Ibid.*, 13.30.

[62] Otherwise, Chrysippus' doctrine of *confatalia* events/states of affairs would not constitute a response to the particular problem raised in the Lazy Argument.

[63] *De fato* 13.30. Although it is certainly not clear from Cicero's text, perhaps this is a conception of fate as "fixing" but not "necessitating" certain events/states of affairs.

[64] An example would be my falling against someone and knocking him over, having been pushed. Nothing about my "humanness" seems to be crucial to the instrumental role I fulfull in this action: any other physical object could have fulfilled the same role. For further discussion of this "proper nature" account of responsibility, see the commentary of Sharples on Alexander's *De fato* 13 (R. W. Sharples, *Alexander of Aprhodesias On Fate: Text, Translation, and Commentary* [London, 1983], pp. 142–143).

[65] At the beginning of *De fato* 14, Alexander argues that this Stoic doctrine does not "preserve the common conceptions of all men with respect to what is up to us" (182.21–22) and goes so far as to accuse the Stoics of "thinking it fit, through deceiving their hearers by the ambiguity [which A. thinks that the "artificial" Stoic account of "*to eph' hēmin*" introduces with respect to that phrase], to try to flee the absurdities that follow for those who say that nothing is up to us" (182.29–31).

[66] This is implied by Alexander at 182.31–183.3.

[67] *De fato* 14, 183.11–15.

[68] See *SVF* 2.74; Cicero, *De fato* 17.40; Verbeke, 'Aristotelisme et Stoicisme', pp. 88ff; also, Sharples, *On Fate*, pp. 139–140; 144–146.

[69] *De fato* 14, 183.22–23.

[70] Hyppolytus Philos. 21 = *SVF* 2.975.

[71] *De fato* 14, 183.24–26.

[72] That this is Alexander's own view is strongly suggested by his comment at 183.27–29: "the voluntary is what comes-to-be from unforced assent; but what is up to us is what comes-to-be with assent in conformity to reason and judgment."

[73] Sharples, *On Fate*, p. 145. Cf. J. M. Rist, 'Prohairesis: Proclus, Plotinus, et alii', *De Jamblique á Proclus* (*Entretieins Hardt*) **21** (Geneva, 1975), p. 107. Cf, also the suggestion

of C. Stough, 'Stoic Determinism and Moral Responsibility', in *The Stoics*, ed. Rist, p. 129, Note 21: "The concept of that which is *attributable to something* applies more generally in Stoic philosophy to all living things whose behavior is characterized by impulse and assent. But what is *attributable to us* (as human beings) is more narrowly restricted by the addition of intelligence (*logos*) to impulse and assent."

[74] *De fato* 14, 184.11ff, especially 184.25ff. Perhaps Alexander is not considering here an actual group of Stoics that located *to eph' hēmin* in *rational* assent but, rather, considering a counterfactual situation: the objection that the Stoics *would* encounter if they *were* to attempt to limit their account of *to eph' hēmin* to what happens "through" (*dia*) rational or deliberative assent.

[75] Calcidius, *In Timaeum* 220 = *SVF* 2.879.

[76] *De fato* 14, 184.24–26.

[77] Cf. Aristotle, *EN* 3.3, especially 1112b8–9: "deliberation [pertains to] those matters which occur [in one way] for the most part, but with respect to which it is unclear how they will turn out, and in which there is indeterminacy."

[78] This view is implied in Aristotle's discussion of deliberation in *De int.* 9.18b26ff.

[79] *De fato* 14, 185.4–7. The text, particularly at the end of the passage, is not good; Sharples accepts some emendations (of Schwartz and Apelt – see his *On Fate*, p. 248) that yield a slightly different translation (*ibid.*, p. 63).

[80] Cf. Note 49 of this chapter.

[81] "E" is most commonly instantiated by something like "the agent chooses (or desires) to perform the action in question." However, other qualifications might be added: e.g., "the agent's choice is not being forced by some other agent," "the agent's choice (or desire) is not a result of some psychotic malady," etc.

[82] This move will receive further scrutiny in Chapter Seven.

[83] In other words, the sort of responsibility with which they were concerned was (exclusively) what is sometimes termed "moral responsibility," i.e., the sort of responsibility that cannot be attributed to things like automobile tie rods but only to beings recognized as members of some relevant "moral community."

[84] Of course, the account might also be termed "classical incompatibilist" if the "compelled" ("*coacta*") in the following quotation is equated, simply, with "caused," and this seems to be an equation that Spinoza would accept. The "compatibilist" aspect of the account of freedom that I have in mind is to be found in Spinoza's refusal to recognize "self-determination" or "self-necessitation" as limiting freedom.

[85] *Ethic of Benedict de Spinoza*, trans. White and Stirling, Part I, Def. VII, p. 2.

[86] *Ibid.*, Prop. XVII, especially Corol. 2.

[87] *Ibid.*, Prop. XXXIII.

[88] Spinoza customarily (as in Part I, Prop. XXVIII) speaks of an effect as being "determined" (*determinetur*) by its cause; this determination is viewed by him, I think, as a type of necessitation.

[89] *Ibid.*, Part IV, Appendix I and II, pp. 240–241.

[90] *Ibid.*, Prop. IV, especially the Corollary, pp. 183–184. But cf. Part V. Prop. XXXIV: "The mind is subject to affects which are related to passions only so long as the body exists" (p. 275).

[91] This is the general theme of Part V of the *Ethics*; cf., for example, Part V, Prop. III: "An affect which is a passion ceases to be a passion as soon as we form a clear and distinct idea of it" (p. 255).

[92] This view is expressed toward the beginning of the "Preface" to Part V of the *Ethics*.
[93] *Apatheia* is a characteristic virtue of the Stoic sage. However, it does not seem that the Stoics regarded the *apathēs* person as a person "immune," so to speak, from causal influences; rather irrational emotions do not influence his giving or withholding assent and the consequent action. See Cicero, *De finibus bonorum et malorum* 3.10.35; J. M. Rist, 'The Stoic Concept of Detachment', in *The Stoics*, ed, Rist, pp. 259–272; I. G. Kidd, 'Posidonius on Emotions', in *Problems in Stoicism*, ed. A. A. Long (London, 1971), pp. 200–215.
[94] I believe that both Chrysippus and Spinoza would hold that human "assent" and action usually or always is some sort of response to "external stimulus," but that this fact is not imcompatible with the assent's (or action's) being "rational." An "emotional" response not rationally grounded – whatever that might amount to – is what defeats freedom with respect to an assent/action.
[95] Spinoza, *Ethics*, Part I, Def. VII.

CHAPTER FIVE

PERIPATETIC POLEMICS

In this chapter we shall examine further the criticism of Stoic cosmology – in particular, the criticism of the Stoic conception of fate – by Alexander of Aphrodisias. We shall also consider what Alexander claims to be "the opinion of the Peripatetic school" concerning fate, as well as several peculiar modal principles evidently accepted by Alexander. I shall suggest that underlying the complex and often obscure disagreement concerning fate between Alexander and the Stoics are two very different conceptions of causal/temporal sequences. While the Stoics developed a conception of causal sequences in which temporally antecedent causes necessitate temporally posterior effect, a conception which is in many ways strikingly "modern," such a temporal/causal sequence is not the paradigm of a causal sequence for the Peripatetics. Peripatetics such as Alexander ascribe characteristics to such sequences that complicate their anti-Stoic polemics concerning the nature and extent of fate. Nonetheless, I shall suggest, Alexander does have a sort of "empiricist" rejoinder to the Stoic postulation of universal causal necessitation. The Stoic doctrines of "obscure" (*adēla*) causal factors and of eternal recurrence can be thought of as "metaphysical" responses to such "empiricist" worries about the justifiability of a principle of universal causal necessitation.

A. STOIC AND PERIPATETIC CONCEPTIONS OF *HEIMARMENĒ*

The Stoic conception of fate, as we have seen, is the conception of universal causal determinism. To quote A. A. Long, "it is, in brief, the law of cause and effect, the law that every event is completely determined by antecedent causes and will, itself, help to determine subsequent events."[1] Cicero, in a passage from *De divinatione* cited by Long, emphasizes that fate is "physically" (and not "superstitiously") said to be the

> eternal cause of things: why those things which were the case happened, why those things that are now the case are happening, and why those things that will be the case will ensue.[2]

The doctrine has two components particularly significant for the con-

siderations of this chapter: (i) every event/state of affairs has a (complex of) cause(s) such that the "instantiation" of these causes *necessitate* the "instantiation" of the event/state of affairs in question (i.e., the occurrence of the event/state of affairs which is the effect is *necessary relative to* the occurrence of the cause(s)); (ii) the necessitating complex of causes is a constituent of a "cosmic state" *temporally antecedent* to the cosmic state of which the event/state of affairs in question (the "effect") is a constituent.

In *De fato* 8 Alexander makes it clear he understands that the Stoic conception of fate (which he is criticizing) possesses these two components: according to the Stoic doctrine he eschews,

> All things have certain antecedent (*proēgēsamenois*) causes preceding of necessity; and things that are and things that come-to-be arise each of them having some cause previously established (*prokatabeblēmenon*). When this cause either is or has come to be, it is necessary that such an effect either be or come-to-be.[3]

The Peripatetic conception of fate that Alexander adduces in opposition to the Stoic concept is succinctly presented. To begin with, usage dictates that "it is necessary to place fate among those things that happen for the sake of (*heneka*) something."[4] However, since (according to the Peripatetic view) "what is up to us" (*to eph' hēmin*) is that which it is both possible for us to do and possible for us to refrain from doing, fate cannot be located among the things that are up to us:

> if those things are up to us of which "the being effected" and "the not being effected" seem to be under our control, it is not right to say that fate is the cause of these things nor that there are certain principles and external causes – previously established – of the inviolable coming-to-be or not coming-to-be of any of these things. (For one of these things would no longer be up to us, if it should come-to-be in this manner).[5]

"It remains to state," Alexander continues, "that fate exists in those things that come-to-be according to nature; so that, consequently, fate and nature are the same thing."[6] Generation and destruction "according to nature" involve the influence of celestial movement on the kinds of things constituting the sublunary realm: "the first principle of all generation is some sort of relation of the heavenly bodies – with respect to their motion – to things here below."[7] However,

> the things that come-to-be through nature do not come-to-be of necessity; it is possible for the generation of things that come-to-be to be impeded. For this reason, then, the things that come-to-be through nature come-to-be for the most part, but not of necessity. That which comes-to-be contrary to nature also has a place among these things, nature being impeded in its work by some external cause.[8]

This passage is typically Peripatetic, both in its argumentation and its ambiguities. What comes-to-be through fate, which is to be equated with what comes-to-be through nature, does not come-to-be of necessity. Why not? The suppressed premise is that what comes-to-be of necessity is the same thing as what *always* comes-to-be. Since what comes-to-be through nature generally does not always come-to-be in the same way, but only "for the most part," what comes to be through fate does not always come-to-be in the same way and, hence, does not come-to-be of necessity. In order to explain why what comes-to-be through nature (fate) does not always come-to-be in the same way, i.e., why natural processes are *not* characterized by invariable regularity, Alexander (like Aristotle) has recourse to "external causal factors" which occasionally "impede" the natural development of the process in question toward its "natural end." The ambiguity of the passage centers on the question of whether it is in *real* disagreement with the Stoic dictum, several times referred to by Alexander himself:

> they say that it is impossible, when all the surrounding circumstances – relative to the cause and what it is a cause of – are the same, that the matter should *not* turn out in such-and-such a way at one time and *should* turn out in that way at another time.[9]

The question, of course, is whether, if the "surrounding circumstances" are "finely" enough described (so that the presence or absence of various kinds of "impeding" factors would be included in this description), there would not be unexceptionable regularity in all natural processes thus described.

This issue was discussed, in the case of Aristotle, in Chapter Two.[10] The same difficulties we encountered in coming up with a definite answer in Aristotle's case obtain, I believe, for Alexander. The rather tentative answer I reached in Aristotle's case – "no," an answer which leads to a sort of indeterminism – also seems probably to be the correct answer for Alexander. However, it certainly is not an answer that is always readily apparent in Alexander's discussion of the determinism and "responsibility" issue. I hope that the next section may partly explain what may strike the contemporary reader as Alexander's "fuzzy-mindedness" concerning this issue.

B. CAUSAL/TEMPORAL SEQUENCES: STOIC AND PERIPATETIC CONCEPTIONS

The dictum that a cause temporally precedes its effects has become the legacy bequeathed by Newtonian mechanics to contemporary thought.[11] However, there are metaphysical subtleties involved in this dictum perspicuously set forth by M. A. E. Dummett in a paper entitled "Can an Effect Precede its Cause?":

> . . . we have to look more closely at what is meant by saying that causes precede effects. There is a well-known crux about this point. If causes precede effects, it seems that there can never be any certainty that a cause will bring about its effect; since, during the interval, something might always intervene to hinder the operation of the cause. Moreover, the supposition that there is a lapse of time between the occurrence of the cause and its fruition in its effect appears irrational; for if the effect does not take place immediately, what makes it come about when, eventually, it does? On the other hand, if causes are contemporaneous with their effects, we are faced with the dilemma that Hume posed: for the cause of the cause will in its turn be simultaneous with the effect, and we shall be unable to trace the causal ancestry of an event back a single instant in time.
>
> The dilemma is resolved when we consider how the picture which we have of causation is to be interpreted. A cause operates upon a thing, and once it stops operating, the thing then (i.e., subsequently) goes on in the same way until some further cause operates upon it. . . . What we here regard as 'going on as before' need not itself be an unchanging state, but may also be a process. Thus, although causes operate to bring about their immediate effects without any lapse of time, we are able to trace the causal ancestry of an event back in time without an arbitrary lacuna in our chain of explanations; for a cause may initiate a process, which will be terminated when it reaches an assignable point, and will then in its turn have some further effect. The temporal direction of causation, from earlier to later, comes in because we regard a cause as *starting off* a process: that is to say, the fact that at any one moment the process is going on is sufficiently explained if we can explain what began it. Causes are simultaneous with their immediate effects, but precede their remote effects.[12]

One might paraphrase Dummett's point by saying that what is wanted to resolve the dilemma of temporally precedent causation is some conception of "*causal inertia*" or, to use his phrase, the notion of processes "whose continuance is not regarded as requiring explanation"[13] once the *initiation* of the process has been explained.

The Peripatetic tradition seems generally to have lacked such a conception of "causal inertia" with respect to causal series "ordered *per se*," to use the later scholastic phrase. Causal series ordered *per se* are contrasted with causal series ordered *per accidens* in the following passage from Duns Scotus:

> *Per se* or essentially ordered causes differ from accidentally ordered causes. . . . In essentially ordered causes, the second depends upon the first precisely in its act of causation. In

accidentally ordered causes this is not the case, although the second may depend upon the first for its existence, or in some other way. Thus a son depends upon his father for existence but is not dependent upon him in exercising his own causality [that is, in himself begetting a son], since he can act just as well whether his father be living or dead.[14]

Essentially ordered cause-effect relations are not characterized by causal inertia: when the effect is present the cause must be operative. One obvious corollary drawn by Scotus is that a series of causes ordered *per se* cannot be such that any cause temporally precedes its effect.[15] It is also, of course, the conception of a series of causes ordered *per se* that gives rise to the "typical" Aristotelian arguments against an infinite regress of causes and, consequently, to arguments for a first mover, arguments that begin with Aristotle himself and continue through St. Thomas' *quinque viae* and beyond.[16]

For Aristotle, as we saw in Chapter Two, an important paradigm of a "necessitating cause" is obtained from the sort of "syllogistic derivability" involved in his very stringent notion of a "science" or *epistēmē*: typically, he holds the (immediate) cause of an event/state of affairs (e.g., that connoted by "Every vine is deciduous" or "The moon is eclipsed") to be the "middle" as attributed to the subject (e.g., the fact that every vine possesses broad leaves or the event of the earth's interposition between the moon and sun) in a valid syllogism yielding the "wherefore" or "reasoned fact" (*to dia ti*) [as opposed to yielding merely the "what" or "bare fact" (*to hoti*)]. This logical/conceptual notion of cause as middle term in a scientific syllogism yielding "reasoned fact" undoubtedly is a crucial factor in the development of the Peripatetic paradigm of a series of necessitating causes as a series of causes ordered *per se*. For, in the sort of cases typically considered by Aristotle, a series of "explaining facts" possesses the transitivity and simultaneity characteristic of a series of essentially ordered causes.[17]

Aristotle in fact suggests that when the effect obtains (*hyparchei*), the cause-explanation must simultaneously obtain: "if the cause does not obtain," he says, "there will be some *other* cause of these events in question."[18] In *Posterior Analytics* 2.12 Aristotle asserts the temporal/aspectual homogeneity of cause and effect with particular clarity:

With respect to things that are coming-to-be, things that have come-to-be, and things that will be as well as things that are, the cause is the same. For the middle (*to meson*) is the cause; but – what is [is the cause of] things that are, what is coming-to-be of things that are coming-to-be, what has come-to-be of things that have come-to-be, what will be of things that will be. For example, on account of what *has* the eclipse *happened*? Because the earth

has come in between [the earth and the sun]. It [the eclipse] is *happening* because the earth *is* [*coming* between]; it *will happen* because [the earth] *will* come between.[19]

When Aristotle considers causation *in rebus*, so to speak, he adopts this same conception of an essentially ordered causal series as a paradigm of causal necessitation:

since, then, it was supposed that the mover (*to kinoun*), being moved, effects motion, it is necessary that the motion of the moved and that of the mover come-to-be at the same time (*hama*) (for the mover moves and the moved is moved at the same time). It is then clear that the motion of A and of B and of C, and of each of the things that are both moved and movers, will be simultaneous.[20]

The conception of a series of causes ordered *per se* raises a notorious problem for Aristotelian physics' account of locomotion, a problem Aristotle himself addresses in *Physics* 8.10:

If everything that is moved is moved by something – however many things, that is, that do not move themselves – how is it that some things continue in motion when what moved them is not in contact with them, as for example, things that are thrown?[21]

Aristotle's answer is forthcoming:

It is necessary to say this: that the source of motion makes the air or the water or something else of this sort, which is by nature capable of moving and being moved, able to effect motion. But what is moved does not cease to cause motion simultaneously with the cessation of its being moved; its being moved will cease at the same time that what moved it ceases to move it, but it will be able to effect motion.[22]

The doctrine that is here being expressed evidently is that things in the series retain the *dynamis* to move after having ceased to be moved themselves. Aristotle regards the motive *dynamis* in such a series as constantly diminishing to the point where a member of the series no longer imparts the motive *dynamis* but only motion; i.e., there is a point at which a "link" causes its successor to be moved but does not transmit the power to *effect* motion. Here the series must end.[23] Although it is not clear to what extent this explanation of a "special kind" of locomotion is compatible with other aspects of the Aristotelian treatment of change,[24] it seems that this sort of causal series would, in the scholastic terminology, have to be accounted a series of causes ordered *per accidens* rather than *per se*: the "motive action" of a member of the series is not to be precisely identified with its "mobile passion."

The Aristotelian/Peripatetic temporal-frequency conception of necessitation or conditional necessity interacts with the preceding conception of causal chains (i.e., those whose members are ordered *per se* and those

whose members are ordered *per accidens*) to yield some peculiar consequences concerning "necessitating causes," that is, causes such that it is conditionally necessary, given the instantiation of the cause, that the effect also be instantiated. These peculiar consequences find explicit statement in Alexander of Aphrodisias' writings but have their foundation, I believe, in the Aristotelian *corpus*.

Recall that, according to the temporal-frequency account of conditional necessity, B is conditionally necessary, given A, just in case it is *always* the case that when A is temporally instantiated, B is also instantiated (or, equivalently, it is *never* the case both that A is temporally instantiated but B fails to be temporally instantiated). This account of the necessitation of B by A or the conditional necessity of B, given A, nicely fits a causal series ordered *per se*. It certainly is the case that if, in such a series, A causes B, B occurs (is occurring) at all the same times that A occurs (is occurring). Hence, according to the temporal-frequency model of necessitation or relative necessity, A necessitates B.

However, problems arise when we consider causal series in which the cause is temporally antecedent to the effect – causal series which, in other words, must be ordered *per accidens*. Aristotle addresses problems caused by such temporal/causal series in *Posterior Analytics* 2.12. He makes two claims concerning such temporal/causal sequences which are, relative to the topic of this chapter, particularly significant. One claim is that "syllogistic reasoning is possible from what has come to be later;"[25] the other is that such reasoning "is not possible from what is earlier."[26]

C. *A FRONTE* CONDITIONAL NECESSITY

Aristotle clearly maintains that the sort of cause-effect relation represented by a "scientific," demonstrative syllogism is a relation in which the effect is conditionally necessary, given the cause.[27] His reason for claiming that there cannot be scientific inference from a temporally anterior cause depends, it seems, on an argument that such a cause cannot necessitate its effect, an argument cast in terms of the temporal-frequency conception of necessitation. The argument goes as follows: Suppose that an event/state of affairs A occurs prior to an event/state of affairs B. Due to the nature of time, Aristotle argues, A and B cannot be contiguous.[28] Now, suppose that A *has* occurred (PA, in tense-logic notation). Aristotle points out that we are not entitled to infer that B *has* occurred (PB), because "in the time between [the supposed temporal

instantiation of A and the instantiation of B] it will be false to say this: that the latter *has* happened."[29] In other words, the fact that A has occurred cannot necessitate the fact that B *has* occurred because there will be a time when the conditional PA ⊃ PB is false; thus, this conditional cannot be a *necessary* conditional in view of the equation of "necessarily" with "always."

Similarly, Aristotle says, we are not entitled to infer from the fact A *has* occurred that B will occur (FB). Although Aristotle does not spell out his reasoning so precisely in this case, there are two possible arguments that he might give. He *might* argue that "before the event" FB is not determinately true or determinately false at least in the case of some A's and B's. Thus, the conditional PA ⊃ FB would not be true at *all* times because it would not be determinately true in the interval separating A and B. There is another argument he may have in mind, however, one that involves fewer assumptions concerning time and truth values. Apparently, after the occurrence of B, PA will still be true but FB ("it *will* be the case that B") is false, thus rendering the conditional PA ⊃ FB *not always* true. A similar argument, of course, can be developed for the conditional PA ⊃ B.

Aristotle appears to conclude that, when A and B are not temporally concurrent, there can be a necessary causal relation such that B is necessary, relative to A, *only* in cases in which B is temporally prior to A. In such a case, the conditional PA ⊃ PB has the following property: *ex hypothesi*, B "becomes true" before A does; so *whenever* PA is true PB is true as well (i.e., the conditional PA ⊃ PB is always true). By the temporal-frequency account of necessity, then, PA ⊃ PB is necessary.

Aristotle's most frequent examples of this relation of *a fronte* conditional necessity[30] involve temporally precedent necessary conditions: for example, it is necessary that a foundation has come about (*gegonenai*) if a house has come about (*gegonen*), and if a foundation, it is necessary that there have first been stones; or, with respect to the future,

> if there will be (*estai*) a house, in a like fashion, there will first be stones (it is demonstrated similarly through the middle, for there will first be a foundation).[31]

However, conditionals of the form PA ⊃ PB which are "*a fronte*" – i.e., conditionals of this form in which event/state of affairs B is temporally prior to event/state of affairs A – can be "necessary" in the sense of "always true" simply because of the fact that B temporally precedes A. There need not be any obvious "entailment" or logical/conceptual rela-

tion between A and B. In fact, it is not even necessary that "B-like" events always are preceded by "A-like" events; a singular event/state of affairs B preceding a singular A can be sufficient to render the conditional PA ⊃ PB always true.

In Chapter Two, I suggested that this interaction between tensed-propositions (represented here and in Chapter Two by the tense operators)[32] may have been connected with Aristotle's doctrine of the necessity of the "past" of any time, relative to "what is the case" at that time. It *may* be that something like this interaction led Aristotle to regard *all* the past of the "state of the *cosmos*" at a given time t as a "necessary condition" of the cosmos' being the way that it is at time t.

One might regard this doctrine of the relative necessity of the past as simply an unfortunate consequence of the temporal-frequency account of the alethic modalities together with the idea that the past, relative to any time, is entirely determinate or "fixed" (in a way in which the future, relative to that time, may not be). For if the past of a given individual event or state of affairs A is entirely determinate after the "occurrence" or "instantiation" of the event/state of affairs and event/state of affairs B is a constituent of that past, it is always the case – or, at least, always the case *after* the instantiation of A – that B has been instantiated as well.

However, there are other conceptual routes that lead to the unlikely Peripatetic doctrine of the necessity of all *a fronte* conditionals. Perhaps it is somewhat surprising to find one such route followed in an influential contemporary discussion of causation, J. L. Mackie's *Cement of the Universe*. The starting point is the following line of reasoning: suppose that this individual event/state of affairs Y has as its cause the individual (although perhaps "complex" individual) event/state of affairs X. What does this supposition entail? According to Mackie's intuitions, it entails, along with several other things, that "*X* occurred and *Y* occurred and in the circumstances, *Y* would not have occurred if *X* had not."[33] In other words, a cause is necessary, in some appropriate sense of "necessity," relative to its effect. There is a question concerning this claim which is, I think, quite obvious: even if we grant that X caused Y, might not Y have had some other cause? To invoke Mackie's example,

> might we not say that the striking of the match caused the appearance of the flame and yet admit that even if the match had not been struck the flame would have appeared if, say, this match had been touched by a red-hot poker?[34]

Mackie's response is to answer this question affirmatively but to assert that

the qualifying phrase "in the circumstances" rules out such alternative causes.[35]

This response is problematic, however. Mackie seems to believe that we can evaluate the truth of a counterfactual such as "in the circumstances, Y would not have occurred if X had not" by simply considering what happens in circumstances "like the ones that actually obtain minus X," or, as he would put it, what happens in a possible world like the actual one up to where (an event prior to Y and necessary for) X occurs but in which (this event prior to) X is "excised" and the world is permitted to "run on," in accord with the same principles of operation as the ones that actually obtain.[36] The problem is that *something* has to "fill in" in a possible world for the "excised X" (since possible worlds are *maximal* consistent ordered sets of circumstances), and there seems to be no non-question-begging reason for excluding "alternative causes" from the list of candidates for the replacement of the excised X. It may be that any possible world "minus X" but otherwise as similar as possible to "the world that actually obtains" includes an alternative cause for X.[37]

For example, suppose that my desiring a yellow shirt – or my being characterized by a corresponding physical state – was the "stative event-analogue" causing the event of my driving to Diamond's department store. Now, the following does not seem to be an *a priori* impossible situation: a possible world that does *not* contain the causal state of affairs of my desiring a yellow shirt (or its physical analogue or "instantiation"), but is otherwise as similar as possible to the actual world, is a world in which (1) I desire a white shirt – or am characterized by the corresponding physical state – and (2) I otherwise act as I do in the actual world. In such a situation, it would turn out *not to be true* that "in the circumstances, if I had not desired a yellow shirt, I would not have driven to Diamond's."[38]

Mackie *wants* to affirm that, with respect to the "basic" form of causation that obtains among concrete events/state of affairs, the necessity of the cause, relative to the effect, allows that the cause "could have been a bit different without altering the result."[39] However, he additionally wishes (A) to analyze his doctrine of the necessity of the cause, relative to the effect in terms of a counterfactual conditional such as "in the circumstances, if the cause should have been absent, so would have the effect" and (B) to give some sort of possible-worlds semantic account of the counterfactual. It is far from obvious that a reasonable possible-worlds semantic account of counterfactuals can be counted on to validate each instance of the counterfactual conditional enshrining the

principle of the necessity of the cause, relative to the effect.

The most "straightforward" account of the necessity of the cause, relative to the effect – together with the perhaps plausible supposition that every past event/state of affairs stands in the cause-effect relation to some present even/state of affairs – leads to the claim that, relative to what is now the case, each "component" of the past is necessary. In other words, the Peripatetic doctrine of the relative necessity of the past follows from the doctrine that a cause is necessary relative to its effect plus the assumption that each component of the past has some present effect. Mackie's doctrine that the occurrence/"instantiation" of the cause is a necessary condition of the occurrence/instantiation of the effect is, I believe, a contemporary counterpart of a doctrine found in Alexander of Aphrodisias, which has recently been cited by R. W. Sharples.[40] The doctrine, which Alexander seems both to attribute to Aristotle and to accept himself, is that of the necessity of all *a fronte* conditionals. In Alexander's words,

> the principle that "if the later, then it is necesssary that the first" [is] true with respect to all things that come to be.[41]

It is surprising, then, to find Alexander developing the sort of criticism of the Stoic doctrine of what is "up to us" found in *De fato* 14, a criticism that was discussed in the last chapter. Recall that a key component of the Stoic (Chrysippean) account of an act X's "being up to" an agent A was that the coming-about of X necessarily involve the actualization of some potentiality connected with the "proper nature" of the agnt.[42] According to Alexander's account of the Stoic doctrine, an act which can properly be said to be up to an agent "cannot come about through anything other than through this [agent], nor in any other way than thusly [i.e., the way it does come about] through the agent.[43] In other words, this *Stoic* doctrine also seems to exemplify a version of Mackie's principle that a cause (in this case, cause *qua* "responsible agent") constitutes a necessary condition, "in the circumstances," of the effect. Alexander spells out one line of criticism of this doctrine toward the end of *De fato* 14:

> if [they locate] "what is up to us" in deliberation, it no longer follows for them that the things that come about through human instrumentality cannot come about in any other way because of the fact that a human being, although capable of deliberation, does not effect through his deliberation all things that come about [through his instrumentality]. For we do not bring about all the things that we bring about after having deliberated. . . . If some things come about when we have deliberated but other things come about when we have not, then there is no longer any ground for saying that the things that come about through

deliberation are "up to the human being" because of the fact that [what results from such deliberation] cannot come about in any other way.[44]

The gist of Alexander's argument seems to be the following. The Stoics claim that an act X is "up to" a rational agent A because a necessary condition of the occurrence of X is the actualization of the "deliberative faculty" which constitutes (at least, partly constitutes) the "proper nature" of A. However, Alexander appears to reply, the fact that some acts that we want to attribute to the agent A do *not* involve deliberation shows that the actualization of A's deliberative faculty is *not* a necessary condition of the occurrence of act X. Hence, *according to their own account,* the Stoics cannot claim that X is up to A. They cannot make this claim because the occurrence of X does not necessarily involve (i.e., have as a necessary condition) the actualization of the "proper nature" of A.

This response is in one way quite natural, but in another peculiar. It is natural in terms of the temporal-frequency model of conditional necessity. How does one determine whether the instantiation of an individual event/state of affairs Y is a necessary condition of the instantiation of an individual event/state of affairs X? Consider whether "X-type" events (i.e., other events "relatively similar" to X) are *always* preceded (accompanied, etc.) by "Y-type" events. The response is peculiar because it seems to be at odds with Alexander's doctrine of the necessity of all *a fronte* conditionals. And the sort of case Alexander is discussing seems to involve an *a fronte* conditional: "if the later (action X), then the prior (A's deliberative process culminating in a decision)."

As was noted in Chapter Two, a "straightforward" employment of the temporal-frequency model of conditional necessity *generally* seems to be avoided by Peripatetics such as Alexander with respect to the assessment of *a fronte* conditionals.[45] In other words, the doctrine of universal *a fronte* conditional necessity, would not be terribly plausible if one were to assess the truth of "Necessarily, if the temporally posterior X, then the temporally prior Y" by considering whether "effects" similar to X (X-type events/states of affairs) are *always* temporally preceded by "causes" similar to Y (Y-type events/states of affairs). In general, an event/state of affairs of a given "type" (event when the type is a rather "detailed," specific type) can come about in more than one kind of context.

Alexander *does,* however, seem to employ this argument-schema in *De fato* 14: since "X-type" events/states of affairs are not *always* temporally preceded by "Y-type" events/states of affairs, *this particular* event/state of affairs Y (agent A's deliberating and reaching a decision) is not

conditionally necessary relative to *this particular* event/state of affairs X (A's performing some action "up to A"). I suspect, however, that the employment of the temporal-frequency model of conditional necessity represented by this argument is not one that Alexander would, in general, want to be committed to with respect to *a fronte* conditionals. Rather, Alexander's method of argumentation seems fundamentally at odds with his doctrine of universal *a fronte* conditional necessity and perhaps represents an *ad hominem* response to the Stoic analysis of "what is up to us."

The use of the temporal-frequency account of conditional necessity which *supports* the doctrine of universal *a fronte* conditional necessity involves the assumption that the temporally prior Y and temporally posterior X are *individual,* concrete events/states of affairs. Once the temporally posterior X has occurred, the relation between X and the earlier Y is *ever thereafter* "fixed," a circumstance that grounds the eternal truth of the tense logical conditional PX $\supset$ PY, and hence, according to the temporal-frequency account of necessity, its necessity. In Chapter Two, I suggested that Aristotle's conception of time might justify what seems to be the "differential" use of the temporal-frequency model of conditional necessity: with respect to *a fronte* conditionals, "if the later X, then the earlier Y," one considers only the "eternally fixed" relation between the individual events/states of affairs; but, with respect to *a tergo* conditionals, "if the earlier X, then the later Y," one may consider other similar circumstances in which X-type events/states of affairs occur and see whether Y-type events/states of affairs are *always* forthcoming. Since, there seem to be cases where, in the "relevantly similar circumstances," the same sort of event/state of affairs does *not* ensue, universal *a tergo* conditional necessity can be denied.

This apparently differential use of the temporal-frequency model may be related, I suggested, to the Aristotelian conception of time, which is "dynamic." That is, while the present-and-past, relative to a given time, is regarded as a fixed linear series of events, processes and states, the future is not regarded as an analogous determinate linear series. Consequently, if one "assumes the temporal perspective" of the antecedent or protasis X, one is looking temporally ("backwards") towards a "concrete individual" Y in the case of an *a fronte* conditional, "if the later X, then the earlier Y." But, according to the Aristotelian conception of time, one can, at most, look forward to the instantiation of "Y-*type*" event/state of affairs in the case of an *a tergo* conditional, "if the earlier X, then the later

Y." From the temporal perspective of X, there is not *yet* any "concrete individual" Y to which to refer.

Such a temporal consideration supplies, I believe, a clue to the source and nature of a most peculiar modal principle concerning *a tergo* conditionals. Before turning to a consideration of that principle, I should like to point out that a distinction analogous to the "general" and "concrete, individual" uses of the temporal-frequency model of conditional necessity is to be found in Mackie's discussion of his claim that "X caused Y" entails "X was necessary in the circumstances for Y." Mackie readily admits that we can grant that X caused Y and, consistently maintain that Y, considered *in abstracto,* could have causes other than X.[46] The appearance of a flame, although actually caused by the striking of a match, *could,* considered *in abstracto,* be caused by touching the match with a red-hot poker. What this seems to amount to is the consideration of what does or would happen in circumstances which incorporate events/states of affairs "of the same kind" as our effect of the appearance of flame at the end of the match. And it is patently true that in some instances of this kind, the cause is *not* the striking of the match. This line of reasoning corresponds to the "general" use of the temporal-frequency model of conditional necessity which Alexander employs – perhaps, in an *ad hominem* fashion – against the Stoics.

However, Mackie wants to maintain that if X caused Y, then X was necessary *in the circumstances* for Y. I argued that it is not at all certain that an analysis of "necessary in the circumstances" in terms of a counterfactual conditional and the analysis of the latter in terms of possible worlds guarantee this entailment. One could, of course, simply *stipulate* a sense for the claim "X is necessary in the circumstances for Y" such that "in the circumstances" is understood as *excluding* any alternative cause for Y. At places, Mackie seems to do just this.[47] Then, on the assumption that every event/state of affairs must have some cause, the counterfactual "in the circumstances, Y would not have occurred if X had not" (reading "in the circumstances" in the same way) will obviously be true if "X caused Y" is true. According to this interpretation of the claim that "X caused Y" entails "in the circumstances, Y would not have occurred if X had not," the claim of entailment really is, simply, the claim that every event/state of affairs *must* have had the cause it did (if it had a cause).[48] Perhaps this interpretation best captures Mackie's intentions.

It also has some plausibility as an interpretation of the fundamental import of the Peripatetic doctrine of universal *a fronte* conditional

necessity. In *De fato* 24 Alexander, in fact, connects the doctrine of *a fronte* conditional necessity with the preservation of a doctrine that the Peripatetics generally seem to have desired to preserve:

> Is it not possible to preserve [the doctrine] that nothing of the things that happen happens without a cause, even though matters are the way we say they are, [i.e., even though not all causes are necessitating causes]?[49]

Alexander proceeds to argue that the doctrine is preserved by drawing a distinction:

> so, among things that come about according to nature, one must understand that the causes are "of necessity" in this way: not that the existence of things follows of necessity from causes that are prior, but that there is some cause prior to them follows from the later coming-to-be of such things.[50]

It is interesting to note that Alexander uses two examples: (A) while the existence of Sophroniscus does not imply "that he is a father or the cause of anything of the things coming-to-be after him," if we assume the existence of Socrates, "Sophroniscus was, of necessity, the cause of his [i.e., Socrates'] coming-to-be;" (B) "if there is a foundation, it is not necessary that a house come-to-be, but if there is a house, a foundation must first have been laid."[51]

In the case of (B), it seems that the coming-to-be of a foundation can plausibly be regarded as a necessary condition of the coming-to-be of a house *in abstracto*. That is, the coming-to-be of *any* house in *any* circumstance seems to require the prior coming-to-be of a foundation. (A) is a quite different sort of case. Here we apparently are concerned exclusively with a concrete, *individual* process, the genesis of Socrates. *Other* cases of human genesis are not obviously relevant to answering the question of whether Sophroniscus, who is assumed to be the (proximate efficient) cause of Socrates' coming-to-be, is a necessary condition of Socrates' coming-to-be. How, then, is one to decide the issue of whether Sophroniscus is a *necessary* condition of Socrates' genesis?

Mackie's decision that he is a necessary condition is a consequence, I should guess, of his feeling that there should be *some* necessary connection between the cause and effect. But he holds, like the Peripatetics, that our conception of the cause-effect relation does not entail that a cause need necessitate its effect; so the effect cannot be necessary relative to the cause "in general."[52] He then develops an account of what it means for X to be necessary "in the circumstances" for Y, where X and Y are understood to be "concrete, individual" events/states of affairs,

and in which the phrase "in the circumstances" is understood (or assumed) to rule out "alternative" causes for Y. The upshot of the claim that X was in the circumstances necessary for Y, where X and Y are understood as concrete individuals seems to be, simply, "Y had to have *some* cause; and since, in the entirely determinate context in which it occurred, there were no alternative causes for it, then Y's cause, relative to that context, had to be X."

Perhaps some such intuitions lie behind the Peripatetic doctrine of universal *a fronte* conditional necessity and specific instances of this doctrine, such as Alexander's claim that although it is not necessary, relative to the existence of Sophroniscus, that he generate Socrates, it *is* necessary, relative to the existence of Socrates, that he have been generated by Sophroniscus. Any such intuition would have been abetted, in the case of the Peripatetics, by the temporal-frequency conception of the modalities and the Aristotelian conception of time as present-and-past determinate or "linear" but future indeterminate or "branching."[53] From a temporal perspective at which Socrates has "already" been generated, there is henceforth an *eternally fixed* relation between Socrates' generation and Sophroniscus' begetting, exemplified by the fact that the conditional "If Socrates has been generated, then Sophroniscus begat him" is *always* true after the time at which Socrates' generation is effected. However, it is not the case that from the perspective of some time prior to Socrates' generation at which Sophroniscus exists there is a similarly fixed relation between Sophroniscus' begetting and Socrates' generation. From the Aristotelian – and, I think, general Peripatetic – viewpoint, McTaggart's B-series relations of temporal priority and posteriority are not eternal or atemporal relations that obtain between events/states of affairs: in some cases, the question of whether such a relation obtains is *itself* a temporally relative matter, depending upon the temporal perspective from which one is making the judgment.[54]

D. *A TERGO* CONDITIONAL NECESSITY

The temporal-frequency model of conditional necessity also plays a fundamental role, I believe, in what must strike the contemporary philosopher as Alexander's very peculiar conception of *a tergo* conditionals. As Sharples points out, Alexander both attributes his conception of *a tergo* conditionals to Aristotle and invokes it himself in his polemic against Stoic determinism, which is "built upon precisely the type of *a tergo*

conditional conception" that Alexander's analysis tends to "downgrade."[55] Stoic determinism, in other words, invokes the picture of a necessitating relation between temporally prior "cosmic states" and temporally posterior ones: so according to at least one Stoic conception, it is conditionally necessary, relative to a given cosmic state, that this state be temporally succeeded by just those states that do, in fact, succeed it.[56] This Stoic picture comes closer than any other ancient conception of causation to what has come to be the canonical modern framework for discussions of causation and determinism. The picture of temporally prior "cosmic time slices" standing in some sort of necessitating relation to temporally posterior ones, a picture which obviously owes a great deal to Newtonian mechanics and its interpreters – especially, it seems, Laplace – still, largely, holds sway in discussions of "determinism and freedom," even in an age when physics has largely abandoned the Newtonian world-view.

The Stoic picture was not one, however, that Peripatetics such as Alexander were prepared to accept. Alexander is led to view *a tergo* conditional necessity as a phenomenon that is very rare (and perhaps really nonexistent) in nature. His attitude certainly derives, in part, from the temporal-frequency model of conditional necessity, a connection to which I shall turn first. However, I shall suggest that there is also a "deeper" metaphysical rationale for the suspicion with which Alexander regards claims concerning the necessity of *a tergo* conditional relations.

Sharples, again, has called attention to the fact that Alexander attributes to Aristotle – and seems to accept himself – a very peculiar modal principle pertaining to *a tergo* conditional relations, i.e., relations of the form "if the former [temporally prior], then the latter." The principle, denominated "T" by Sharples, is set forth by him as follows:

> *A tergo* conditional necessity – that is, "necessarily, if p then q, where q is later than p" – *never* applies except in cases where q is necessary independent of p in any case.[57]

In contemporary notation, this amounts to

> L(p ⊃ q) where p is temporally prior to q, entails Lq.

Although Sharples establishes that both Alexander and the later commentator Philoponus attribute T to Aristotle – and, in fact, Alexander seems to accept it himself, although Philoponus does not[58] –he does not address the issue of why a philosopher as sophisticated as Alexander might have accepted T, a principle that would strike virtually

any contemporary philosopher or modal logician as, on the face of it, mad.

We need not, I think, decide that Alexander (or Aristotle) was mad. Part of the explanation for T can be found in the temporal-frequency model of conditional necessity. Let us consider a schematic example of *a tergo* conditional necessity, "necessarily, if the earlier X, then the later Y." If we represent the relation of temporal priority/posteriority between the X and the Y in terms of tense-markers, we might obtain something like PX ⊃ FY, "if it was the case that X, then it will be the case that Y." Under what conditions would such a conditional be necessary? After the time at which X is instantiated, PX will *always* be true. But, in order for the consequent FY *always* thereafter to be true, some very extraordinary conditions must be satisfied; the instantiation of Y just once after the instantiation of X is not sufficient. Perhaps the most obvious condition that would make FY forever true after the instantiation of X is the cyclical coming-to-be true of Y ever thereafter.[59]

So, Y would be necessary in the sense of its now-and always-henceforth coming about in a cyclical fashion. However, Aristotle in *De caelo* 1.12 argues that the notion of something's "*beginning* to eternally exist" (or, it seems, "beginning to eternally recurrently come-to-be") does not make sense. One such argument begins a series of considerations the point of which is to show the equivalence of what is (can be) generated with what is (can be) destroyed.

> All things are capable of acting or undergoing, being or not being, either for an infinite time or for a time of some definite extent – and for an infinite time only insofar as "infinite time" is defined in a certain way: "that than which there is no greater time." The infinite in one direction is neither infinite nor of definite extent.[60]

What Aristotle has in mind, here, can be illustrated using the normal linear ordering of real numbers to represent time. Consider a ray, the origin of which is 1, pointing to the "right", an apparent example of "the infinite in one direction." It does not represent a "definite interval of time" (*posos tis hōrismenso chronos*) insofar as it is not bounded (*hōrismenos*) on the right. However, our untutored intuitions tell us that the ray pointing in the same direction with origin O is longer; so the original ray does not represent an infinite interval of time, according to Aristotle's conception ("that than which there is no greater time"), either. The argument will not convince the contemporary reader; but the mechanism for dealing with the concept of infinity which the contem-

porary reader possesses, a mechanism that allows him to argue that the one ray is "really no longer" than the other, is much more sophisticated than that at the disposal of Aristotle.[61]

Whether justified or not – and it seems that he was not – Aristotle would not have regarded a situation in which Y initially becomes true and cyclically becomes true eternally thereafter as possible. But in order for the *a tergo* conditional $PX \supset FY$ to be necessary, assuming the truth of its antecedent, Y would have to be cyclically (or continuously) true after the time at which X becomes true. If Y cannot *begin* to be eternally cyclically (or continuously) true, it must *always* be cyclically (or continuously) true. But, according to the temporal-frequency account of necessary coming-to-be, this amounts to the claim that Y is necessary. We have, in effect, produced an argument for the outrageous principle T: the temporal-frequency account of necessity and Aristotle's *De caelo* claim concerning the equivalence of what is (can be) generated and what is (can be) destroyed yield the entailment.

$$T': L(PX \supset FY) \models LFY.$$

That the temporal-frequency model of necessity does, in fact, figure in principle T is indirectly indicated by a corollary to the principle enunciated by Alexander in *Quaestio* 3.5. He argues, in effect, that propositions expressing the existence of individual things (and, by extension, propositions pertaining to any individual event/state of affairs) cannot stand as consequents of necessary *a tergo* conditionals:

> For the things that come to be are the individuals, Socrates, Plato, this horse; and it is not possible for any of them to return and come to be again. For if any of them did come to be of necessity, "if what is first, [then] what is later," too, [would be] true of them; but as it is it is not so.[62]

The implicit equation of coming-to-be of necessity and (eternally) coming-to-be again and its connection with the schema for *a tergo* conditionals "if what is first, [then] what is later," is, I believe, significant. It suggests that our temporal account of the derivation of principle T itself is, at least, plausible.

It might thus be supposed that T is an aberration to be explained solely in terms of the Peripatetic temporal-frequency conception of the alethic modalities. I believe, however, that there is a "deeper" significance to principle T, a significance that derives from something like Dummett's "paradox of the temporally precedent cause," discussed earlier in this

chapter. One might assume that in the case of an *a tergo* causal relation, in which a temporally prior X is the cause of a temporally posterior Y, it is the state of affairs of "X's *having* occurred" that is the cause of the state of affairs of "Y's going to occur."[63] But, then, if "X's having occurred" is a *necessitating* cause, i.e., if it is sufficient for its effect, a problem arises. After the occurrence of Y, it still remains true that X has occurred. In other words, the state of affairs of "X's having occurred" remains "instantiated." So, if "X's having occurred" is a necessitating cause, it will *always* have to remain true, after the occurrence of X, the Y is *going* to occur. One way for the state of affairs of "Y's going to occur" always to remain true is for Y eternally to recur "in a cycle". We arrive at a conclusion, in other words, similar to the Peripatetic principle T.

Our natural reaction to this consequence is, I think, to conclude that the temporal priority of cause and temporal posteriority of effect in an *a tergo* causal relation cannot correctly be represented as a necessitating relation between the "tensed" state of affairs of "X's having occurred" and "Y's going to occur." But how, then, is one to represent this relation? I suspect that something like Dummett's notion of "causal inertia" is needed:

> A cause operates upon a thing, and once it stops operating, the thing then (i.e., subsequently) goes on in the same way until some further cause operates upon it . . . What we here regard as 'going on as before' need not itself be an unchanging state, but may also be a process . . . For a cause may initiate a process, which will be terminated when it reaches an assignable point.[64]

It is not clear to what extent the Peripatetic tradition possesses such a conception of causal inertia. The tradition certainly *does* possess the conception of things with a complex of "natural powers" and attendant natural processes or *kinēseis* which proceed to a *telos* natural to that (kind of) thing. But here the final/formal *aition* seems, in some sense, to be "present" throughout the process.[65] What the tradition seems, generally, to *lack* is the idea that such a process can be "started off" by some temporally prior, external factor and then be left to "run its natural course" on its own, the running of its natural course being adequately explained by the "initial impetus."

Although Peripatetics such as Alexander may not be willing to explicitly affirm that all temporally prior causes are causes that "prevent" or "interfere" with a natural process, the paradigm of such an "interfering" cause seems to lie behind their treatment of the *a tergo* causal relation. In particular, such a cause is not thought of as invariably

initiating some natural process, which "naturally progresses" until it is "terminated at an assignable point." Rather, an "*a tergo* cause" usually stands in a transient relation to a temporally posterior event/state of affairs/process "in the particular set of circumstances." It is assumed that the relation between such a "cause" and "effect" is peculiar to those circumstances; thus, there is no question of the cause *invariably* (i.e., "necessarily") procuring the effect.

In sum, for a variety of complexly interrelated reasons – e.g., the tendency to transpose a syllogistic-derivability notion of necessitation *in res*, the apparent lack of a requisite concept of causal inertia, the influence of the temporal-frequency conception of the modalities – the Paripatetic *paradigm* of causal necessitation tends to be "vertical" (cause and necessitated effect are temporally simultaneous) rather than "horizonal" (necessitated effect typically temporally follows cause). The Stoic paradigm, however, seems generally to be *a tergo* or "horizontal."

This difference of perspective yields an anti-determinist (i.e., anti-*Stoic* determinist) polemic, by Alexander, that sometimes seems to miss its mark. For example, as R. W. Sharples argues, Alexander at places seems to argue against determinism by arguing that there is "irregularity" or "variation" in the *cosmos*. But, Sharples adds, "Alexander's assertion of *variation* is irrelevant as a criticism of the determinist position as he himself states it elsewhere."[66] The "determinist position" which Sharples has in mind is that stated by Alexander in *De fato* 22:

> They say that it is impossible that, when all the circumstances surrounding the cause and that of which it is the cause are the same, the matter should sometimes turn out *not* this way, sometimes in this way.[67]

This form of determinism seems, in essence, to amount to an assertion of universal *a tergo conditional* necessity. As Sharples notes,

> Necessity conceived in terms of 'always being so' will cover the necessity of mechanistic, *a tergo* cause and effect, if it is applied to the relationship between cause and effect considered as a whole; 'always (if p, then q)'. But in so far as it is applied to events considered in themselves, . . . there may be cases of what is in fact necessary *a tergo* causation to which the term 'necessary' will not readily be applied, because the outcome is not a permanent and invariable feature of the thing to which it happens itself, even if it is the case that, given the particular circumstances, the result is inevitable and will always occur.[68]

Sharples is, in effect, arguing that just because Alexander finds some aspects of the *cosmos* that are not *absolutely* or *unconditionally* necessary, in terms of the temporal-frequency model of necessity (i.e., are not

"always the case" or "eternally recurrent"), this is not a sufficient reason to reject universal *a tergo conditional* necessity, interpreted in terms of the same temporal-frequency model.

However, the "peculiar" modal principle T provides a crucial missing premise in Alexander's argument. Suppose that (A) there is *something* in the *cosmos* which is "variant" or "irregular" in the sense of not *always* being the case or eternally recurring. Then, from principle T (the necessity of any *a tergo* conditional relation entails the "absolute" necessity of the "consequent" of the relation), it follows that the "something" of supposition (A) does not have a necessitating *a tergo* cause. *QED*

So according to Alexander's own principles, the anti-determinist stratagem of argumentation from the existence of "variation" in the *cosmos* is perfectly legitimate. Of course, this stratagem does essentially depend upon principle T. I have suggested that although T is "peculiar," it can be understood in terms of other Peripatetic principles, *viz.*, (i) the temporal-frequency model of the alethic modalities, (ii) Aristotle's denial of "one-direction" infinity, and (iii) the interpretation of the p in the *a tergo* conditional "if the earlier p, then the later q" in a "temporally determinate" fashion, i.e., as denoting a unique, individual event/state of affairs. There is, however, another way of interpreting necessary *a tergo* conditionals in terms of the temporal-frequency conception of necessity that does not make the assumption of (iii) and, consequently, does not yield the "peculiar" modal principle T. p is, according to the alternative outlook, treated as "temporally indeterminate" in the consideration of the necessity of an *a tergo* conditional "if the earlier p, then the later q." That is, in order to determine whether the conditional is necessary, one does not ask whether, after this *particular* instantiation of p, q is (continuously or recurrently) *always* thereafter true. Rather, one asks whether there are any *other* "instantiations" of p not "accompanied by" (i.e., temporally succeeded by) an instantiation of q. If there are no such cases,if every instantiation of p is temporally succeeded by an instantiation of q, then the *a tergo* conditional is a necessary one.

Both Aristotle and Alexander sometimes appeal to this temporal-frequency conception of *a tergo* conditional necessity. It is the conception that underlies the stock illustrations of chance and spontaneity employed by both philosophers. Why is there not a *necessary a tergo* relation between a man's desire to plant in his garden (or his digging for that purpose) and his finding buried treasure? Because, according to Aristotle and Alexander, the finding of buried treasure *is not always* consequent

upon desiring to plant in one's garden (or digging for that purpose).[69] To quote Alexander's comment in *De fato* 8,

> chance and spontaneity [pertains to] all those things which *infrequently* (*spaniōs*) occur in connection with those things that have occurred before them.[70]

The obvious question which arises, at this juncture, is one which we previously – in Chapter Two – considered. It is true enough, we might admit, that "digging in order to plant something" *simpliciter* does not always result in the finding of treasure. But, would it not be the case that "digging in order to plant something" *in circumstances "sufficiently similar" to these* (which is a case in which treasure is, in fact, found) *would* always result in the finding of treasure?

Although we now, perhaps, have found a "common ground" on which Peripatetics and Stoics can conduct their debate concerning determinism, it is far from clear that conducting the debate on this common ground brings them any closeer to a resolution of the issue. Suppose that a Peripatetic such as Alexandeer adduces a case of digging in order to plant in which *no* treasure is found and that *this* case is "very similar," in terms of its attendant circumstances, to this case of digging (in which treasure is found). Alexander will likely interpret this state of affairs as falsifying the claim that finding treasure was, in this particular set of circumstances, conditionally necessary in relation to the digging in order to plant something. A Stoic determinist, such as Chrysippus, however, will likely interpret the state of affairs quite differently. He will argue that it was because the "context" or surrounding circumstances in the case where there was digging but no treasure-finding are not sufficiently similar to those that obtain in this case (where there is digging and treasure-finding) that there was no treasure finding in the first case. Hence, *that* case cannot be used to falsify the claim that finding treasure was conditionally necessary, in *these* circumstances, relative to the digging. We have reached a sort of classical crux, recurring throughout the history of the determinist/anti-determinist debates in Western philosophy.

A question of some philosophical interest is whether either Alexander or his Storic opponents have any further contributions to the debate that might be interpreted as advancing the discussion beyond this point of apparent deadlock. The answer is, I believe, affirmative. Alexander appeals to "common sense," the Stoics to a "metaphysical postulate."

We commonly hold that only a "proper part" of the cosmic state or "factual context" in which an event/state of affairs Y is "instantiated" is

causally relevant to its instantiation. There is the suggestion of an argument in Alexander's *De fato* 8 that relies on this common belief and the equally common belief that, at least in some cases, we have a pretty good idea of what, in the factual context in which Y is instantiated, *is* causally relevant to Y's instantiation. To generalize an argument Alexander gives,[71] it seems that there are cases of "chance or spontaneous" occurrences where we can indeed find what he or Aristotle would term "accidental" causes of the chance or spontaneous event in question. These causes apparently do not, however, *necessitate* their effects. That is, it is apparently not *always* the case that the effect succeeds the cause.

In order to maintain their doctrine of universal (*a tergo*) causal necessitation, the Stoics must assume that in such situations there are "hidden" or "obscure" (*adēla*) causal factors, factors the connection of which to the effect is not apparent but the presence or absence of which is crucial in determining whether the effect is instantiated or not. It is plausible, I think, to interpret Alexander, particularly in *De fato* 8-9, as implying that this assumption is not "empirically warranted." We see, he says

> a great variation of outcome, both among things that are and among things that come-to-be; from which it is easy to understand that not everything is bound by causes of this sort [i.e., *a tergo*, necessitating causes].[72]

Like C. S. Peirce, Alexander seems to suggest that "empirical evidence," if "straightforwardly" interpreted, tends to disconfirm the assumption of universal *a tergo* necessitation.[73] In order to maintain such an assumption, experience tends to force upon one something like the Stoic doctrine of *adēla* causes.

And, indeed, we find doctrines not dissimilar to the Stoic postulation of "obscure" causal factors in contemporary deterministic treatments of "random processes." For example, in a recent discussion M. Beliş characterizes a "random causal process" as one in which "the effect is variable, depending on some phenomena which cannot be noticed by a human observer."[74] Why is it, when a coin is repeatedly tossed in circumstances as similar as we can make them (e.g., using a coin-tossing machine, taking precautions against the influence of wind, etc.), that the effect is not *always* the same? Because, says Beliş, coin-tossing is an "unstable" causal process: "the tossing of a coin is a random [process] because the effect strongly depends upon infinitesimal variations of the initial conditions."[75]

> In general, an unstable process involves many issues, mutually exclusive, whose occurrence depends on small, unmeasurable phenomena which mix up with stable and permanent causes. . . .
>
> The particular issue of an unstable process cannot be predicted with certainty by an external observer because: (1) of his inability to measure noise phenomena, and (2) of the great influence of noise phenomena on the issue.[76]

In the "long run," however, the "noise components" tend to cancel each other and "every issue will occur proportionally to the stable causes" operative in the causal process.[77]

This concept of "noise" or "unmeasurable causal factors" is really a sophisticated version of the Stoic doctrine of *adēla* or "obscure" causes. Alexander and Peirce – and others with "indeterminist" inclinations – will question the wisdom of accepting such a doctrine in order to "save" what they regard as the dogma of universal *a tergo* causal necessitation. Stoics – and others with "determinist" inclinations – will regard the "dogma" of universal causal necessitation as so fundamental to our idea of a rational *cosmos* that acceptance of a concept of "obscure" causal factors or "noise" is regarded as far preferable to the interpretation of the "empirical evidence" in such a way as to lead to indeterminism.

Our somewhat imaginative elaboration of the Peripatetic-Stoic debate has, thus far, gone as follows. The Stoics, who assert universal *a tergo* causal necessitation, are (as both they and the Peripatetics agree) committed by this assertion to the doctrine that when the "surrounding circumstances" (i.e., "initial condition" or "complete context") is the same, the same effect will *always* ensue. The Peripatetics respond that "experience" does not confirm this claim: in one situation, effect Y ensues, but in another situation, which is apparently identical in all "relevant" aspects, Y does not ensue. The Stoics respond with the postulation of a doctrine of "obscure" causal factors or "noise," which is responsible for the different outcomes. Thus, despite appearances, the situations are *not* sufficiently "the same" to guarantee identical effects. At this juncture, the Peripatetics might question whether the Stoics can produce a cogent notion of a "sufficiently similar" situation. After all, it is virtually an analytic truth for both the Stoic and Peripatetics, that the passage of time involves *some* change.[78] So there apparently is a sense in which *any* two circumstances, being instantiated at different times, will have *some* different characteristics.[79] And the doctrine of obscure causes really makes it impossible to determine whether any such differences are causally relevant with respect to a given effect.

Although the factual, historical connections are obscure, one can, I think, regard the Stoic "metaphysical postulate" of world-cycles or identical cyclical "recurrence" (*apokatastasis*) as the conceptual response to this problem. The doctrine, the connection of which to universal *a tergo* causal necessitation was alluded to in Chapter Four, represents a sort of metaphysical representation of *a tergo* necessitation. It is in *different* cosmic cycles that we can find circumstances sufficiently similar to those that "now obtain" to "assure" us that when the "initial conditions" are the same, the same effect always ensues. I say "metaphysical" rather than "empirical" representation because, of course, it is not possible for any (human) observer to observe what happens in *different* cosmic cycles. So, the doctrine scarcely provides a convincing answer to any worries the Peripatetics might have had concerning the "empirical justification" of the Stoic doctrine of universal *a tergo* causal necessitation.

This remark does not amount to a declaration that the Peripatetics were the acknowledged winners in the dispute, however. In fact, the doctrine of eternal recurrence proved popular in antiquity and was, at least for a period of time, adopted not only by the Stoics, but by "Academics" who apparently were not determinists. In Chapter Six, we discuss the connection of this doctrine with time and determinism.

E. SUMMARY AND CONCLUSION

The vigilant and conscientious reader may, at this juncture, conclude that I have omitted discussion of a crucial matter in this chapter. It is something of a truism that philosophers since Hume generally have tended to conceive of causes (and their effects) as events or processes. Such a conception of causes is particularly common and seems particularly "natural" in discussion of *a tergo* causal determination or necessitation: some temporally prior "change in the state of the world" causes, necessitates or "brings about" a temporally subsequent event or state of affairs.[80] In this chapter I have usually adopted this way of talking. The reader may object that, at least in the case of my discussion of the Aristotelian conception of causation, this is a mistake. Aristotle, he may claim, conceives of causes as physical *things* (in Aristotle's sense of "physical": capable of undergoing change) or as physical things *cum* their "active powers," rather than as events or processes. Since two of my principal theses in this chapter have been that differences between Peri-

patetic and Stoic conceptions of causation complicate their debate concerning universal causal determinism and differences between ancient and modern conceptions of causation complicate our understanding of this debate, it may be claimed that I ought to have given more prominence to this central fact about the Aristotelian notion of cause.[81]

Although I am in general agreement with my imaginary reader's claim that Aristotle's conception of a cause is not essentially tied to the ontological categories of event or process, my suspicion is that the same is true for modern and contemporary conceptions of causation. The event-talk is usually merely a philosophically or logically convenient *façon de parler*. I believe that this is also the view of M. Frede. In a perspicacious paper, "The Original Notion of a Cause," Frede discusses the Hellenistic modification of the conception of causation. I beg leave to quote at some length from the beginning of his paper.

> Quite generally our use of causal terms seems to be strongly coloured by the notion that in causation there is something which in some sense does something or other so as to produce or bring about an effect. Even if we think of causes as events the paradigms we tend to think of, and certainly the paradigms Hume and Kant thought of, are events in which something does something or other; and we feel that we have to explain that it is only in a very metaphorical sense that an event could be said to produce an effect. Thus, though we may want to get away from such a notion, there is a strong tendency to conceive of causes as somehow active. And it seems our difficulty with the Aristotelian causes is due to the fact that they cannot even be conceived of in this way. A good part of the unfortunate history of the notion of a final cause has its origin in the assumption that the final cause, as a cause, must act and in the vain attempt to explain how it could do so. It is only with Aristotle's moving cause that we think that we readily understand why it should be called a cause. But it would be a mistake to think that Aristotle with his notion of a moving cause tries to capture our notion of cause or at least a notion we would readily recognize as a notion of cause, though it is significant that people have tended to think that among the Aristotelian causes it is only the moving cause which is a cause really. For Aristotle in more theoretical contexts will tell that it is not the sculptor working on his sculpture who is the moving cause but the art of sculpture. And with the art of sculpture we have the same problems as with ends, forms, and matter.[82]

I would certainly agree with all of this. As Frede proceeds to argue, by later antiquity "the notion of a cause had been narrowed down to fit the notion of an active cause,"[83] i.e., had become more akin to the modern and contemporary Western conception of a cause.

The following suggestion is, I believe, consistent with Frede's account. There certainly is an ambiguity, at least from the contemporary perspective, between "cause" (in Frede's "active" sense) on the one hand and "reason" or "explanation" on the other with respect to the Greek

term "*aition*." For Aristotle, the *primary* connotation of the term seems to be "reason" or "explanation." That is, he is willing to countenance talk of "*aitia*" *in rebus* only if such *aitia* fulfill an explanatory function. But it is not a necessary condition of an *aition*'s fulfilling an explanatory function that it be "active" in Frede's sense. By the time we arrive at Frede's notion of an "active cause" in later antiquity, the beginning of the reversal of the relation of primacy between explanation and cause has begun. We find the assumption, which is often quite explicit in contemporary discussions, that in order for an explanation to be "really explanatory" it must be an explanation in terms of causation *in rebus* (again, in Frede's "active" sense of the term "cause").

Perhaps the most plausible explanation for the development of the determinism-responsibility issue during the Hellenistic period is to be found in the development of Frede's "active" conception of a cause. This conception is not easy to characterize succinctly, but it is something like J. H. Randall's mind-independent "inherent, nonrelational, 'power' or 'force' to produce certain effects that are observable."[84] It seems to me to be a reasonable hypothesis – although one that I shall not pursue further in this book – that some such conception of causation is necessary for the formulation of the determinism-responsibility issue in a form recognizable by contemporary philosophers.

As a Peripatetic with a special allegiance to what he takes to be the doctrine of Aristotle – but as a relatively late Peripatetic – Alexander is a figure "with one foot," so to speak, in the "old," Aristotelian way of thinking about *aitia* and one foot in the "new," Hellenistic way of thinking. For example, at the end of *De fato* 3 Alexander shows himself to be sufficiently a child of his times in conceiving of fate as an efficient, "moving," or "active" *aition*:

> Causes, then, being of this number and the difference among them being clear, we should rightly number fate among the productive causes (*en tois poētikois aitiois*), because it stands in an analogous relation, with respect to the things that come-to-be in conformity to it, to the craftsman's making the statue.[85]

Alexander then proceeds, with some apparent difficulty in preserving a consistent, coherent account of fate, to locate it (identified with nature) "among the things that come-to-be for the sake of something."[86]

The fact that Alexander seems to have a somewhat gerrymandered conception of an *aition* is perhaps the most significant "complicating" factor in his debate with the Stoics concerning causal determinism. We

have examined some of these complications in this chapter. The discussion of cosmic cycles and determinism in the following chapter is cast more squarely in terms of the "new" conception of *aitia*. The complexities in that chapter arise principally because of a shift from an "old" conception of time as "flowing" or ontologically dynamic to a "new" conception of time (generated, it seems, in Academic circles) as an omnitemporally "fixed" or ontologically static set of relations.[87]

NOTES

[1] A. A. Long, 'Freedom and Determinism in the Stoic Theory of Human Action', in *Problems in Stoicism* (London, 1971), p. 178.
[2] Cicero, *De divinatione* 1.55.126.
[3] Alexander, *De fato* 8, *SA* 2/2, 173.16–19.
[4] *Ibid.*, 4.169.2–3. Alexander, however, also (as at 3.167.12–16 and 5.168.24–26) seems to regard fate as a species of efficient or "productive" (*poiētikē*) cause, viz., an efficient cause that also has the property of being "for the sake of" something.
[5] *Ibid.*, 5.169.13–18.
[6] *Ibid.*, 6.169.18–19.
[7] *Ibid.*, 169.25–26.
[8] *Ibid.*, 169.28–170.2.
[9] *Ibid.*, 22.192.22–24. Cf. *Ibid.*, 15.185.8–9.
[10] In Section E, 'Aristotle and Determinism'.
[11] The suggestion, which I will not here attempt to support, is that the Newtonian restriction of the notion of a cause to "efficient cause" and the consequent development in the seventeenth and eighteenth centuries of a very narrow (and, in many ways, un-Aristotelian) conception of efficient causation yielded this result as a corollary. Cf. G. E. M. Anscombe, 'Causality and Determination', reprinted in *Causation and Conditionals*, ed. E. Sosa (Oxford, 1975), pp. 63–81.
[12] M. A. E. Dummett, 'Can an Effect Precede its Cause?', reprinted in *Truth and Other Enigmas* (Cambridge, Mass., 1978), pp. 320–322.
[13] *Ibid.*, p. 322.
[14] Duns Scotus, *Opus Oxoniense*, I, Dist. II, Q. 1, in *Duns Scotus: Philosophical Writings*, ed. A. Wolter (Edinburgh, 1962), pp. 40–41.
[15] *Ibid.*
[16] Cf. Patterson Brown, 'Infinite Causal Regression', in *Aquinas: A Collection of Critical Essays*, ed. A. Kenny (Garden City, N.Y., 1969), pp. 214–236.
[17] *Ibid.*, pp. 231–236.
[18] *An. post.* 2.16.98b1–2.
[19] *Ibid.*, 2.12.95a10–15.
[20] *Phys.* 7.1.242a57–62.
[21] *Phys.* 8.10.266b28–30.
[22] *Ibid.*, 267a2–7.
[23] *Ibid.*, 267a9–10: "it comes to an end when the former no longer makes [the latter] to function as a mover (*kinoun*), but only to be moved (*kinoumenon*)."

[24] Why, for example, must the ratio between the "motive action" (*kinoun*) and the "mobile passion" (*kinoumenon*) reach zero in a *finite* number of "links" in such a *per accidens*-ordered causal chain?

[25] *An. post.* 2.12.95a27–28.

[26] *Ibid.*, 95a30–31.

[27] For example, cf. *An. post.* 1.4–8 and 2.16–17.

[28] *Ibid.*, 2.12.95b1–12. Aristotle's argument for this claim (which, I think, will strike the contemporary reader as rather unintuitive) is obscure; it apparently depends on Aristotle's understanding of the Greek system of verb aspect. What came-about (*to genomenon* – aorist aspect) cannot be next to what came-about because *to genomenon* is considered by A. to be a punctual "accomplishment," and two points cannot be contiguous. Nor can what has-come-about (*to gegenēmenon* or *to gegenos* – perfect aspect, "achieved state") be next to what is-coming-about (*to ginomenon* – imperfective, "present" aspect, ongoing process) because the former achieved state supervenes "at a temporal point" but the latter process has no "first" or initiating temporal point (cf. *Phys.* 6.5.236a10ff.) See also the commentary of J. Barnes: *Aristotle's Posterior Analytics*, translated with notes by Jonathan Barnes (Oxford, 1975), pp. 225–227.

[29] *An. post.* 2.12.95a34–35.

[30] By an "*a fronte* conditional," I mean a conditional in which (the event/state of affairs signified by) the antecedent is temporally posterior to (the event/state of affairs signified by) the consequent.

[31] *An. post.* 2.12.95b35–37.

[32] I quite realize, of course, that the relatively crude semantic mechanism of tense logic can scarcely capture all the semantic subtlety of natural language tense and aspect, particularly in the case of a language such as ancient Greek, in which aspect, rather than tense, dominates with respect to the temporal features of verbs. For more on the doctrines of *An. post* 2.12, see my 'Causes as Necessary Conditions: Aristotle, Alexander of Aphrodisias, and J. L. Mackie', *Canadian Journal of Philosophy: Supplementary Volume X* (1984), pp. 157–189.

[33] J. L. Mackie, *The Cement of the Universe: A Study of Causation* (Oxford, 1974), p. 37.

[34] *Ibid.*, p. 31.

[35] *Ibid.*, pp. 37ff.

[36] *Ibid.*, p. 53. Mackie there mentions that it is not necessary to conceive of the "laws of working" as "strictly deterministic ones."

[37] Thus, according to the Stalnaker-Thomason semantic analysis of subjunctive conditionals, the conditional "If X had not occurred, Y would not have occurred" would be false at this ("actual") world (R. Stalnaker and R. Thomason, 'A Semantic Analysis of Conditional Logic', *Theoria* **36** [1970], pp. 23–42). The objection can also be formulated in the alternative semantics for subjunctive conditionals of David Lewis. For more on this type of objection to the analysis of causation in terms of subjunctive or "counterfactual" conditionals, see my "Causes as Necessary Condition," pp. 182ff.

[38] There is an underlying point that is crucial to this argument. It can be put in two, roughly equivalent ways. (1) There does not seem to be any compelling independent reason for defining the "similarity" relation on possible worlds in such a way that it satisfies the following condition: for all worlds W and for all events/states of affairs X and Y, if X causes Y in W, then if there is a world W′ not containing X but containing some alternative cause X′

of Y (and thus containing Y), there is a world W'' more similar to W than is W' that does not contain either X, an alternative cause of Y, or Y. (2) Suppose that in world W, X caused Y; the fact that the most similar world to W not containing X contains some alternative cause of Y does not intuitively seem to constitute a sufficient reason for concluding that the claim that in world W, X caused Y is mistaken, i.e., is not true.

[39] Mackie, p. 265.

[40] R. W. Sharples, ' "If What is Earlier, then of Necessity What is Later?": Some Ancient Discussions of Aristotle *De Generatione et Corruptione* 2.11', *BICS* **26** (1979), pp. 27–44.

[41] Alexander, *Quaestio* 3.5, *SA* 2/2, 88.28–29.

[42] Chapter Four, Section C. Cf. Sorabji, *NC&B*, p. 86.

[43] Alexander, *De fato* 14, *SA* 2/2, 183.9–10.

[44] *Ibid.*, 184.24–185.1.

[45] Chapter Two, Section E, Subsection 3.

[46] Cf., for example, Mackie, p. 31, 265–267.

[47] He seems to have this in mind when he first introduces the qualification at p. 31.

[48] For more on this interpretation and the difficulties with it, see White, 'Causes as Necessary Conditions', pp. 185ff.

[49] *De fato* 24, 193.31–194.2.

[50] *Ibid.*, 194.12–15.

[51] *Ibid.*, 194.8–12.

[52] Mackie, pp. 40ff.

[53] I do not mean to suggest that Aristotle (or later Peripatetics such as Alexander) explicitly conceived of time as backwards-linear and forwards-branching. Rather, such structures serve as the most natural semantic models in tense logic for a conception of time as past-determinate and future-indeterminate. See, for example, Prior, *Past, Present and Future*, Ch. VII, pp. 113–136; Rescher and Urquhart, *Temporal Logic*, Ch. VII, pp. 68–97; Richmond H. Thomason, 'Indeterminist Time and Truth-Value Gaps', *Theoria* **3** (1970), pp. 264–281; M. J. White, 'Necessity and Unactualized Possibilities in Aristotle', *Philosophical Studies* **38** (1980), pp. 287–298.

[54] McTaggart's A-series conception of time is a conception formulated in terms of the "indexical" tense concepts of "present" or "now," "past," and "future"; his B-series conception is formulated in terms of the temporal relations of "at the same time as" or "simultaneous with," "before," and "after." It is usually assumed that propositions formulated in terms of the A-series concepts are not "temporally stable": e.g., it is, at some times, true that the battle of Waterloo *has*, in the past, occurred, but not true at other times ("before the fact"). It is usually assumed, however, that relations derived from the B-series concepts are temporally stable, that is, that if it is ever true that the battle of Waterloo temporally precedes ("is before") the battle of Vicksburg, it is *always* (or, alternatively, *atemporally*) true that this relation obtains. This latter assumption can be consistently denied. Its denial will be further explored in the next chapter, section C.

[55] Sharples, '"If What is Earlier, . . .,"' p. 27.

[56] This is the sort of Stoic view described in section C of the preceding chapter. In general, I subscribe to the view of Sharples, who in discussing J. M. Rist's account of the Stoic conception of *hiemarmenē*, comments as follows: "His claim [*Stoic Philosophy*, pp. 121f.] that fate for the Stoics is to be identified not with what is necessarily going to happen, but only with what will happen, is unacceptable if it is taken as a claim that the Stoics asserted

only the logical truism that what will be will be [i.e. the *necessitas consequentiae* of the conditional "if it will be the case that X, then it will be the case that X"]; for it is clear that the Stoic doctrine of fate did involve the assertion of a deterministic nexus of *physical* causation" (Sharples, 'Necessity in the Stoic Doctrine of Fate', p. 82).

[57] Sharples, '"If What is Earlier, . . .,"' p. 27.

[58] Cf. Alexander, *Quaestiones* 2.22 and 3.5, *SA* **2**/2, 71–72 and 87–89, respectively; Philoponus, *In Aristotelis de generatione et corruptione*, *CIAG* **14**/2, 308.3–25. See the discussion of these passages (and translation of the relevant sections of Alexander's *Quaestiones*) in Sharples, '"If What is Earlier, . . ."'

[59] Another possibility would be Y's continuously-being-true after the instantiation of X. But where "Y" represents a "coming-to-be" rather than a "being" (i.e., an event or developmental process rather than a "static" state of affairs), this does not seem to be a conceptually possible alternative.

[60] Aristotle, *De caelo* 1.12.283a7–11.

[61] I have in mind the various set-theoretic concepts that figure in the contemporary, Cantorian analysis of infinity, e.g., the distinction between being properly contained in or a proper subset of and having a smaller cardinality. This is not to say that Cantor's conception is superior to Aristotle's (as developed, principally, in *Phys.* 3.4–8), however. In fact, Aristotle's conception (in contrast to Cantor's) has recommended itself to a number of contemporary mathematicians, perhaps most notably to "intuitionists" such as L. E. J. Brouwer.

[62] *Quaestio* 3.5, 88.12–15, as translated by Sharples in '"If What is Earlier, . . .,"' p. 30.

[63] In other words, their temporal relation is "built into" the conceptions of the cause and effect.

[64] Dummett, 'Can an Effect Precede its Cause?', p. 320.

[65] For more on this issue, see Ch. VII, Section B. It is, I suspect, a mistake to think of a Peripatetic "final" cause as operating "backwards" in time; it is not clear that temporal relations enter into the Aristotelian notion of final causation in any very significant manner.

[66] Sharples, 'Aristotelian and Stoic Conceptions of Necessity in the *De fato* of Alexander of Aphrodisias', *Phronesis* **20** (1975), p. 252.

[67] Alexander, *De fato* 22, 192.22–24.

[68] Sharples, 'Aristotelian and Stoic Conceptions of Necessity', p. 260.

[69] Aristotle, *Meta.*, 5.30; Alexander, *De fato* 8.

[70] Alexander, *De fato* 8, 173.15–16.

[71] *De fato* 8, 174.2ff.

[72] *Ibid.* 9, 175.13–16.

[73] Cf. C. S. Pierce, 'The Doctrine of Necessity Examined', *The Monist* **2**/3 (1892), pp. 321–337. Reprinted in *Philosophical Writings of Peirce*, ed. J. Buchler (New York 1955), pp. 324–338.

[74] M. Beliş, 'On the Causal Structure of Random Processes', in *Logic, Language, and Probability*, ed. R. J. Bogdan and I. Niiniluoto (Dordrecht, 1973), p. 66.

[75] *Ibid.*, p. 70.

[76] *Ibid.*, pp. 70–71.

[77] *Ibid.*, p. 71. This conclusion depends *at least* on Bernoulli's Theorem (see Ch. One). Some would maintain, however, that Bernoulli's Theorem is a "purely mathematical" theorem not directly applicable to empirical matters. "Von Mises thus concludes that the

arithmetical theorem *has no bearing* on the truth or falsity of Poisson's proposition which he also called the Law of Large Numbers. That is the empirical proposition whose content is roughly that the relative frequencies of certain empirical events tend towards limiting values as the sequence is extended. *This* 'Law of Large Numbers' is not and cannot be proved mathematically. Rather it is the first postulate of von Mises's probability theory" (R. Weatherford, *Philosophical Foundations of Probability Theory* [London, 1982], p. 63).

[78] The schools define time as the "extension" (*diastēma*) and "measure" of process or motion (*kinēsis*), respectively; and *kinēsis* requires some sort of change. For more on this, see the next chapter (Ch. Six).

[79] That is, they will at least differ with respect to the property of occurring at the times at which they, in fact, occur. Whether this need constitute a "real" difference is a complex issue that will be dealt with in greater detail in the next chapter.

[80] This, for example, is the assumption of von Wright, who additionally claims that "the question of whether cause-effect relations hold primarily between events, *i.e.* changes, or between states, must be answered in favor of the first alternative" (G. H. von Wright, *Causality and Determinism* [New York and London, 1974], p. 79).

[81] The Aristotelian view of causation bears *some* resemblance to the contemporary attempt to specify a conception of causation "between" the "Humean" (empirical regularity) account and an account in terms of entailment. According to such a conception, causation is to be analyzed in terms of the actualization of the "powers, capacities, and natures of substances" (E. H. Madden, 'A Third View of Causality', reprinted in *Philosophical Problems of Causation*, ed. T. L. Beauchamp [Encino and Belmont, California, 1974], p. 186). And between the "nature" of a substance and its powers and capacities is a relation of nonlogical, causal, or natural necessity. See also E. H. Madden and J. Humber, "Nonlogical Necessity and C. J. Ducasse," *ibid.*, pp. 163–178; R. Harre, *Principles of Scientific Thinking* (Chicago, 1970); R. Harre and E. H. Madden, *Causal Powers* (Totoaw, N.J., 1975).

[82] M. Frede, 'The Original Notion of Cause', in *Doubt and Dogmatism*: *Studies in Hellenistic Epistemology*, ed. M. Schofield, M. Burnyeat, J. Barnes (Oxford, 1980), pp. 217–218.

[83] *Ibid.*, p. 218.

[84] J. H. Randall, Jr., *The Career of Philosophy*, Vol. 1, p. 607.

[85] Alexander, *De fato* 3, *SA* 2/2, 167.12–16.

[86] *Ibid.*, 5, 169.2–3. The implication of *De fato* 3–5 seems to be that "final" causes – or at least *some* final causes, e.g. fate – are a species of "efficient" (*poiētikon*) cause. Sharples is not particularly concerned by this, commenting that "Alexander's concentration on the efficient cause in what follows seems acceptable, in spite of Pack's complaint (420); that fate is *purposive* is recognized at V 168.27ff., and though Stoic fate is in some ways analogous to the Aristotelian *formal* cause . . . it is as an active, 'efficient' principle that it is so" (R. W. Sharples, *Alexander of Aphrodisias On Fate*, p. 126).

[87] *In general*, I think the *nunc fluens* conception of time is the older view, while the static (or atemporal) relation view is a later development. An exception seems to be the Megarian-Eristic-Dialectical *diadochē* conception of time – perhaps influenced by earlier Eleatic ideas – which seems to be static-relational. See Chapter Two.

CHAPTER SIX

COSMIC CYCLES, TIME, AND DETERMINISM

The doctrine of "cosmic cycles" or a cyclical structure of time plays a rather complex role in the determinism debates of later antiquity. In this chapter, I distinguish what seem to be two distinct historical versions of the doctrine and examine their relevance to the determinism issue. There is, I believe, a Stoic version of eternal recurrence, which tends to be deterministic in intent; but distinguishable from the Stoic is an Academic version, which is susceptible of indeterminist interpretation. I shall suggest that the former fills the role suggested in Chapter Four and in Section D of the preceding chapter: it serves as a sort of metaphysical instantiation of the Stoic principle of universal *a tergo* causal necessitation. Additionally, it supplies a way to apply, non-trivially, the temporal-frequency model of the alethic modalities to *individuals*. The Academic version, however, may serve a rather different function: that of metaphysically grounding a concept of "timeless time" or an eternally (atemporally) determinate and complete linear series of events/states of affairs, which is conceived of as a *temporal* rather than a *causal* series. It is argued, along the way, that both doctrines fill much the sort of function filled by possible worlds in contemporary semantic theory for the alethic modalities. And some of the same metaphysical problems generated by possible worlds – e.g., the question of "identity across worlds" – also arise with respect to cosmic cycles.

A. TWO VERSIONS OF COSMIC CYCLES

In *Contra Celsum* 5.20–21 Origen clearly distinguishes two versions of the doctrine of cosmic cycles. In the former chapter he says

> The Stoics maintain that there is periodically a conflagration of the universe (*ekpyrōsin tou pantos*) and after that a restoration of order (*diakosmēsin*) in which everything is indistinguishable (*aparallakta*) from what happened in the previous restortion of the world. All those who have felt embarrassed by the doctrine have said that there is a slight and very minute difference between one period and the events in the period before it. Now these men say that in the succeeding period it will be the same again: Socrates will again be the son of Sophroniscus and will be an Athenian, and Phaenarete will again marry Sophroniscus and give birth to him.[1]

The Stoic doctrine of cosmic cycles, then, is intimately connected with their doctrine of the periodic conflagration of the *cosmos*, the "mechanics" of which seemed to have involved a transmutation of elements alluded to by Cicero in *De natura deorum* and by Diogenes Laertius.[2] The "orthodox Stoic" doctrine seems to have been that of eternal, *exact* repetition of the cosmic history.

J. Barnes has discussed this orthodox Stoic doctrine of eternal recurrence and two "heterodox" variations of it in some detail.[3] The orthodox doctrine seems to postulate an exact numerical identity among, for example, Socrates in one period and Socrates in other periods. However, such a doctrine raises a problem discussed by Barnes. According to the orthodox doctrine, two "counterpart" events, e.g., "la mort de Chrysippe dans notre kosmos, e_k, et la mort de Chrysippe dans le kosmos prochain, e^*_K," are distinguished by nothing "sinon par leurs positions différentes dans l'histoire de l'univers."[4] But, Barnes argues, it is a consequence of the Stoic doctrine of time that "deux instants seront distincts si et seulement si les événements qui caractérisent l'un se distinguent en quelque manière des événements qui caractérisent l'autre."[5] So, there would seem to be no grounds for saying that the cosmic cycles themselves are "multiple." Barnes concludes:

> En effet, si l'on interprète la these de l'identité dans sa forme orthodoxe, et si l'on y joint des considerations stoïciennes au sujet de la nature du temps, on arrive à une absurdité: les mondes infinis du cycle cosmique se passent tous à la fois; somme toute, il n'y a qu'un monde, il n'y a qu'une histoire mondiale.[6]

Although Barnes seems to me to be correct in his substantive conclusion, it is not, perhaps, so clear that this conclusion amounts to "*une absurdité*." What we have is the difference between a conception of time as *circular* and a conception of time as linear (with no beginning and no ending) but in which a certain sequence of events/states of affairs is exactly and eternally repeated. There seems to be no empirical difference between these conceptions; and, moreover, they are not distinguishable in terms of standard tense logic.[7] The difference between them is metaphysical, in a very "hard-core" sense of the term. Barnes, in effect, argues that the Stoics' metaphysic of time commits them to the circular time conception. This argument seems correct; but it does not appear to be particularly paradoxical – although the Stoics were not, perhaps, always clear about this point and, sometimes at least, tended to think of the doctrine in terms of the eternal repetition of qualitatively identical but numerically distinct cycles.

There is indirect evidence, however, that some Stoics adopted the former "circular-time, one-cosmic-history" viewpoint. The evidence occurs in Origen's *Contra Celsum* 4.68, a chapter in which Origen is discussing one of the "heterodox" conceptions of eternal recurrence distinguished by Barnes. This heterodoxy does not assert that an object (say, Socrates) "recurs" in each cycle or that it is the *same* event of Chrysippus' dying that eternally recurs. Rather objects and events that are "indistinguishable" (*aparallakta*) from each other occur. Origen makes the following remark with respect to this variant of eternal recurrence:

> I do not know how the *cosmos* can always be the same (*ho autos*), and it not merely be the case that one [*cosmos*] is indistinguishable (*aparallaktos*) from another [since] the things in it are not the same, but merely indistinguishable.[8]

The remark suggests, I believe, (i) that there was an orthodox Stoic conception of recurrence according to which there are *not* multiple, temporally ordered indistinguishable *cosmoi* but only one, as in the circular time conception of recurrence, and (ii) that some advocates of the revisionary, many-indistinguishable-Socrateses version of recurrence attempted to retain – or are interpreted by Origen as attempting to retain – the orthodox, single cosmic-history doctrine. As Origen suggests, such a doctrine seems incompatible with the indistinguishable-Socrateses revision. But the single cosmic-history doctrine is just what is demanded – as Barnes notes – by the orthodox conception of the same recurrent-Socrates when combined with the Stoic conception of time.

One heterodox version of the Stoic doctrine of eternal recurrence discussed by Barnes allows a "little variation" (*oligēn . . . parallagēn*) among the cosmic cycles. This version is distinguished from the orthodox "exact recurrence" doctrine by Origen in *Contra Celsum* 5.20. and is alluded to by Alexander of Aprhodisias in his commentary on the *Prior Analytics*.[9] According to Alexander's account, the counterparts of an individual thing *a* in other cycles all possess the essential or "proper" qualities (*ta idiōs poia*) characterizing *a*; but, to quote Barnes, "si *Q* n'est qu'un accident de *a*, rien n'empêche que Q manque à *a* dans d'autres mondes."[10] I agree with Barnes that his heterodoxy amounts to a relaxation of the typical Stoic rigid determinism: the revision amounts to a rejection of the dictum that the same cause *always* yields the same effect if all the surrounding circumstances are the same.

The question of which Stoics might have held such a position is not easy

to answer. In a footnote to *Contra Celsum* 5.20 Chadwick implies that it might have been Panaetius or Boethus.[11] But the evidence suggests that these Stoics rejected the whole Stoic doctrine of *ekpyrōsis* and *diakosmēsis*, not that they held a doctrine of recurrence that allowed some variation from cycle to cycle.[12] It is, I think, at least possible that the adherents of the doctrine of eternal recurrence "with variations" were not strictly Stoics at all, but "Middle Platonists" characterized by "Stoicizing" tendencies, such as those to be discussed later in this chapter.[13] If this particular heterodoxy *did* have Stoic adherents, however, I am inclined to the opinion expressed by Barnes:

> Je dirai de façon dogmatique que je ne connai aucun témoignage qui suggère que le Portigue ancien ait abandonné le déterminisme absolu; et j'en conclus que si la thèse de l'identité a été vraiment modifiée à la manière que suggère Alexandre, ce fut par un personnage de peu d'importance dans l'histoire du Stoïcisme.[14]

The second "heterodox" version of eternal recurrence distinguished by Barnes more closely approximates, I believe, Stoic orthodoxy. The principal reference to this variant seems to occur in *Contra Celsum* 4.68:

> In attempting to remedy the absurdities in some way the Stoics say that in every cycle all men will be in some unknown way indistinguishable from those of former cycles. To avoid supposing that Socrates will live again, they say that it will be someone indistinguishable from Socrates, who will marry someone indistinguishable from Xanthippe, and will be accused by men indistinguishable from Anytus and Meletus.[15]

The doctrine apparently is that of eternal recurrence with each cycle numerically distinct but qualitatively indistinguishable from every other cycle. Consequently, it is not, strictly speaking, the *same* (numerically identical) object *a* (e.g., Socrates) that eternally recurs;[16] each cycle possesses an object not identical to but indistinguishable from "our Socrates." According to Barnes' assessment, "la deuxième hétérodoxie conserve l'absence de difference [among the cycles and their contents] en prétendant sacrifier l'identité."[17] Why the "prétendant"? Because, says Barnes, the concept of non-identical indistinguishable counterparts violates the orthodox Stoic principle of the "identity of indiscernibles."[18]

Perhaps, however, this second heterodox version of eternal recurrence can be interpreted in such a way as to render it somewhat less obviously at odds with orthodox Stoic doctrine. In a passage cited by Barnes,[19] Simplicius notes that those who say "I will be the same in the regeneration [of the *cosmos*]" debate whether

> I am one in number now and then on account of being the same in essence (*dia to tē ousiā*

einai ho autos) or whether I differ because of the ordering of one creation with respect to the *other (tē katataxei eis allēn kai allēn kismopoiian diapheroumai)*.[20]

In his commentary on the *Prior Analytics*, Alexander represents Chrysippus as holding that it is the "proper qualities" (*ta idiōs poia*) which are reinstantiated in each of the successive cosmic cycles.[21] And Diogenes Laertius tells us that the Stoics held that a proper noun or name (*onoma*) signifies an individual or proper property (*idia poiotēs*).[22] So it is open to Chrysippus to maintain that, even though there is a multiplicity of world cycles, Socrates is strictly the same in all cycles because it is strictly the same "proper quality" that is instantiated in each.

Alexander interprets Chrysippus in such a way that what holds for the proper name "Dion" also holds for the demonstrative "*houtos*", when Dion (or a "Dion instantiation") is being demonstrated:

> if this is the case, and Dion should at some time again exist, the proposition "he has died" would then be true with respect to him [because] his soul and body have been separated and then again combined.[23]

However, the Stoics generally treated demonstratives differently from proper names, as we saw in Chapter Four. While proper names signify proper qualities, demonstratives signify the "objects" (*pragmata*). Alexander (*apud* Philoponus) maintains that something is "one and the same in number" only if "it continues, with respect to 'earlier' and 'later', the same thing."[24] On these grounds, objects instantiating the proper quality of "socrateity" in successive cosmic cycles – since there is no temporal continuity between them—would not be the same.

Chrysippus might be prepared to accept this consequence. Although "Socrates" signifies the same "thing" (*viz.*, a particular proper quality) in all cycles, the demonstrative "*houtos*", used to demonstrate the Socrates instantiation in one cycle, does *not* also refer to the Socrates instantiations in other cycles. In fact, some such distinction may be necessary to avoid an argument rehearsed by Alexander in his commentary on the *Prior Analytics*. Recall that Chrysippus denied that only the possible can follow from the possible, adducing the conditional "if Dion is dead (has died), then that [Dion being demonstrated] is dead (has died)" as a counter-example. Chrysippus maintained (i) that the conditional is a valid (*hygies*) one, (ii) that the antecedent is possible, and (iii) that the consequent is impossible. Claim (iii) derives from the Stoic conception of a definite (*hōrismenon*) proposition as one that "contains" its subject. The argument, in brief, for (iii) is that any imaginable circumstance that might make the proposition that is the consequent true is one in which that

proposition is destroyed: hence, there is no imaginable circumstance in which the proposition can be rendered true, and it is thus impossible.[25] One argument against this position set forth by Alexander denies claim (iii). The argument is the following. Suppose I consider Dion in the present world cycle, and the proposition expressed by "if Dion has died, then that (*houtos*) has died," with Dion the *significandum* of the demonstrative. According to Chrysippus' doctrine, Alexander says, Dion will come-to-be again in a (all) future world cycles. If we consider such a cycle and a time in the cycle in which Dion is instantiated, then the proposition expressed by the consequent of the conditional will, at that time, exist (because its subject, the object Dion, will have been "reconstituted"). Moreover, the proposition "*tethnēke Dion*" or Dion has died," will then be true because its subject, demonstrated by the "*houtos*", has undergone death in a previous world cycle. So, from the principle, *ab esse ad posse valet consequentia*, it follows that the consequent of the conditional *is* possible, according to Stoic doctrine: Chrysippus was simply wrong, even from the perspective of his own doctrine, to declare it impossible.[26]

One rejoinder that a Stoic in the Chrysippean tradition might make to this sort of argument rests on the semantic difference between proper nouns and demonstratives postulated by the Stoics. It might be claimed that the use of the demonstrative "*houtos*" in a given use of the sentence "*houtos tethnēke*" rigidly binds the demonstrative to that particular "Socrates instantiation" that is demonstrated. In other words, that particular Socrates instantiation is "included" as subject in the proposition expressed in the use of the sentence "*houtos* [*Sokratēs*] *tethnēke*". The genesis of another Socrates instantiation in a succeeding world cycle (i.e., the reinstantiation of the proper quality signified by the proper name "Socrates") does not, then, result in the reconstitution of the original definite proposition (and, consequently, allow it to become true) because the Soctrates instantiation of that world cycle is a *different* object from the Socrates instantiation of "our" world cycle.

According to the present interpretation of the "second heterodox version" of Stoic eternal recurrence, then, (A) there are multiple cosmic cycles; (B) proper names signify the same thing (i.e., the same proper quality) in the various cycles; (C) demonstratives signify a unique *pragma*, however, which is different from its counterparts in other cycles; (D) the world cycles (and their "contents") are indistinguishable from each other. In effect, a proper name and a demonstrative refer to different "twins" which Plutarch reports that the Stoics "identify" with each

of us:

each of us is a pair of twins and bipartite and double . . . the one being substance (*ousia*), and the other quality (*poiotēs*).[27]

Demonstratives signify the first member of the pair, the "Socrates instantiation," as I have called it; proper names the other member, the individual quality. And these two sorts of things have different identity conditions which allow the identity of Socrates *qua poiotēs* among various cycles but maintain that the Socrates instantiations are not identical from cycle to cycle.

How would the principle of identity of indiscernibles fare within the context of such a doctrine? The answer seems to be that it can be retained for the *significanda* of proper names but must be restricted for the *significanda* of demonstratives. Although it is far from clear exactly what the Stoic concept of a proper or individual quality amounts to,[28] it is perhaps not implausible to conceive of it as something like a Leibnizian "complete individual concept," i.e. a set of "common qualities" that we might think of as completely depicting the entire life history of a thing.[29] The principle of identity of indiscernibles can certainly be retained for such complete individual concepts. In fact, its affirmation for such a class of entities does not seem to be controversial.[30] However, the principle must be restricted for the *significanda* of demonstratives: indistinguishable Socrates instantiations in different cycles are not identical. Whether the principle was maintained by the Stoics for the *pragmata* or instantiations in a single cycle is not clear, but comments by Plutarch and Cicero suggest that it may have been.[31] In sum, the rejection of the principle of identity of indiscernibles "across world cycles," as applied to individual material instantiations, is demanded by the second heterodox Stoic version of eternal recurrence. There is no conclusive evidence whether any of the Stoics advocated this restriction of the principle. However, such a restriction was not unknown in antiquity. Plotinus seems to advocate it – while maintaining the principle with respect to the individual "contents" of a world cycle – in *Ennead* 5.7:

Is it not the case, then, that there is something that is in every way the same in another period, but nothing that is in every way the same in the same period?[32]

In contrast to the Stoic versions of the doctrine of eternal recurrence, Origen distinguishes, in *Contra Celsum* 5.21, what I shall term an "astrological" doctrine of eternal recurrence, a doctrine he attributes to "the Pythagoreans and Platonists."

Furthermore, though the Pythagoreans and the Platonists maintain that the whole is indestructible, yet they fall into similar absurdities. For when in certain fixed cycles the stars adopt the same configurations and the relationships to each other, they say that everything on earth is in the same position as it was at the last time when the relationship of the stars in the universe to one another was the same. According, then, to this doctrine it is inevitable that when after a period the stars come into the same relationship to one another which they had in the time of Socrates, Socrates will again be born of the same parents and suffer the same attacks, and will be accused by Anytus and Meletus, and be condemned by the council of the Areopagus. Moreover, are the learned men among the Egyptians who have similar traditions respected and not laughed at by Celsus and his like?[33]

The doctrine of recurrence to which Origen is here alluding seems to have its source in the astronomical doctrine of the *annus magnus* or *perfectus*, mentioned by Plato at *Timaeus* 39d and Cicero in *De natura deorum* 2.20. Briefly described, the doctrine is that a "great cycle" is defined when the orbits of the sun, moon, and five planets return those heavenly bodies to the same place in the heavens. Plato connects the assignment of orbits to the heavenly bodies with the creation of time,[34] but there is no indication that either he or Cicero conceives of the doctrine of the *annus magnus* as implying recurrence in the sublunary realm. To so understand the doctrine, however, is quite natural for someone who (A) holds an astrological conception of the causal necessitation of some sublunary events by (the configuration of) the heavenly bodies and (B) has a conception of causal necessitation or relative necessity entailing that *whenever* all the same causal factors obtain the same effect ensues. For, then, if a certain configuration of the heavens necessitates an event/state of affairs of type A, the event of type A will recur *whenever* the heavens come into that configuration (i.e., in each great year). Precisely this application of the doctrine of the *annus magnus* is well established in the Middle Platonist tradition at least as early as the second century A.D.[35]

The astrological version of the doctrine of eternal recurrence differs from the Stoic doctrine in several ways. From the Hellenistic viewpoint, perhaps the most significant difference is that the astrological version does not postulate a conflagration separating cycles (or initiating and ending the one cycle). With the notable exception of the Stoics, Hellenistic philosphers regarded the idea of cosmic destruction implied by the doctrine of the conflagration as impious or incoherent (or both).[36] From our viewpoint, however, the astrological version of recurrence is of particular interest because it – unlike the Stoic doctrine – readily admits of an indeterministic development. Only what is subject to stellar causal necessitation need recur in each *annus magnus*.

This seems to be the doctrine developed in the work *De fato* traditionally (but probably inaccurately) attributed to Plutarch:

> for in this time [the *annus magnus*], which is bounded and an object of knowledge, all those things with respect to heaven and earth that are produced of necessity from above will again be restored to the same condition.[37]

Pseudo-Plutarch appears to exclude at least those events/states of affairs that result from human volition from celestial necessitation:

> Let it be clear concerning those things that now pertain to us, that my now writing these things and your doing in a certain manner just those things you happen thus to be doing do not occur through the instrumentality of these heavens as their complete causes.[38]

Although pseudo-Plutarch does not explicitly say so, he implies that there is variation, from cycle to cycle, with respect to those events/states of affairs whose sole cause is not some celestial configuration. Apparently, with respect to such matters, it is *not* the case that, when the complete causal context is the same, the same effect *always* (i.e., in each *annus magnus*) ensues.

We find, then, two doctrines of eternal recurrence in post-Aristotelian ancient cosmology, a Stoic doctrine (or several versions thereof) and an astrological version popular in some Academic circles. The relation of these doctrines to the issue of determinism is, I think, conceptually complex. In the remainder of this chapter we shall further explore some of the connections between the doctrine of recurrence and determinism.

B. COSMIC CYCLES AND THE TEMPORAL-FREQUENCY MODEL OF THE MODALITIES

The doctrine of cosmic cycles can, I think, be regarded as a refinement of the temporal-frequency model of the modalities. At least two problems with such a model of the modalities have previously surfaced. One pertains to its account of conditional necessity: an event/state of affairs type Y is conditionally necessary, relative to an event/state of affairs of type X, just in case *whenever* a type-X event is instantiated, it is accompanied by ("contiguously succeeded by", or whatever) a type-Y event. The problem is that we sometimes want to make judgments pertaining to relative necessity *in the circumstances*. In particular, the reasonable determinist will couch his claim in something like these terms: every event/state of affairs that is instantiated is the effect of a cause that "necessitates it *in the circumstances*." In terms of the temporal-frequency

model of relative necessity or necessitation, this claim becomes: "when the attendant circumstances are similar, a temporal instantiation of the cause invariably or always is accompanied by a temporal instantiation of the effect."

We saw in the preceding chapter that the question can be raised of *how* similar the attendant circumstances must be in order to produce a refutation of a claim of necessitation in the circumstances. It seems that if we consider two events/states of affairs of type X that are instantiated at different times within some linear, non-cyclical time-stretch, there will be *some* differences between the attendent circumstances that obtain at the two times: the later time will have a different past, one that "includes more," than the earlier time. If the earlier instantiation of the X-type event does yield an event of type Y, but the later does not, it is always open to the defender of determinism to explain the difference in terms of this difference of attendent circumstances rather than to give up the relevant special case of the determinism principle: the first X-type event necessitated in the circumstances the succeeding Y-type event.

But, then, can there be a non-trivial temporal-frequency model of "necessitation in the circumstances"? The answer seems to be "only if the circumstances are temporally repeatable." And the doctrine of time as cyclical allows *all* the circumstances "surrounding" the instantiation of any event/state of affairs to be repeated. Not only can cosmic time-slices be repeated – something which is not ruled out by a conception of time as linear and non-cyclical – but the temporal pasts of those instantaneous cosmic states can be rendered indistinguishable by the postulation of cyclical time. So, the postulation of cosmic temporal cycles permits the development of a temporal-frequency model of the claim that an X-type event/state of affairs necessitates in the circumstances a Y-type event/state of affairs, a model with one very special characteristic. In the evaluation of such a claim of necessitation, other temporal instantiations of X-type events will be considered in order to determine whether an instantiation of a Y-type event *always* ensues. What is special about the postulation of cosmic cycles in the context is that the circumstances of the X-type event-instantiations to be considered in the evaluation of the necessitation claim can be made to be identical, or at least indistinguishable, from one another.

The doctrine of cosmic cycles also can be used to extend the temporal-frequency model of the alethic modalities, in a non-trivial way, to *individuals*. We have seen, particularly in Chapter Two, that it is not

obvious how the temporal-frequency model is to be applied to claims about the modal status of individual events/states of affairs, a problem that Hintikka has also pointed out with respect to Aristotle's employment of the model.[39] W. V. O. Quine has also noted this problem with respect to the classical Humean invariable succession conception of causation, a conception akin to the temporal-frequency model of necessitation:

> Hume explained cause as invariable succession, and this makes sense as long as the cause and effect are referred to by genera terms. We can say that fire causes heat, and we can mean thereby, as Hume would have it, that each event classifiable under the head of fire is followed by an event classifiable under the head of heat or heating up. But this account, whatever its virtues for these general causal statements, leaves singular causal statements unexplained.
>
> What does it mean to say that the kicking over of a lamp in Mrs. O'Leary's barn caused the Chicago fire? It cannot mean merely that the event at Mrs. O'Leary's belongs to a set, such that there is invariable succession between the two sets: every member of the one set is followed by a member of the other. This paraphrase is trivially true and too weak.[40]

Quine's point is that if we assume that the temporal instantiation of cause and effect is *unique*, the conception of the relation of effect to cause in terms of invariable temporal succession becomes trivial.

We saw in Chapter Two that similar difficulties arise for the temporal-frequency conception of the modalities when the modalities are applied to individuals. Aristotle wishes to maintain that "it is possible for this cloak to be cut in two and, yet it will not be cut in two but will wear out beforehand."[41] In other words, there apparently are, at least *with respect to individual things*, potentialities that are never actualized. It follows that the plentitude principle and, thus, the temporal-frequency conception of the modalities, cannot be straightforwardly affirmed for possibilities predicated of individuals: it is not the case that some predicate can be problematically affirmed of an individual if and only if that predicate can, at some time, be assertorically affirmed of that individual.[42]

Aristotle has several options available for dealing with this problem. One is to preserve the temporal-frequency conception of the modalities by maintaining that *this* cloak may possibly be cut in two because at some time or times, other similar cloaks are actually cut in two. This is, more or less, the view of Hintikka concerning the import of the temporal-frequency conception of the modalities for Aristotle.[43] However, as Hintikka notes, such a move may be read as implying that the modalities really pertain to *kinds* of things rather than to individuals. Or we may perhaps apply the modal concepts to individuals in a derivative way: to say that it is possible for this cloak to be cut in two is to say that it

exemplifies the kind or sort of thing exemplars of which sometimes *are* cut in two. We do indeed in some contexts conceive of potentialities as "attaching" to kinds: e.g., cloaks can be cut in two, bananas can be preserved by dessication, etc. But we sometimes are concerned about possibilities that pertain to concrete individuals in a concrete set of circumstances: "is it now possible for my grandfather to quit smoking?"

It is not always obvious, I think, how relevant what happens to other individuals of the kind (in similar circumstances, even) is to questions concerning potentialities attaching to concrete individuals in concrete circumstances. In Chapter Two, I suggested a sort of metaphysical conception of such individual-focused possibilities deriving from Aristotle's fundamental principle of possibility: something is possible just in case it can be "hypothesized" as actually obtaining at some time without producing a contradiction. In *De caelo* 1.12 Aristotle asserts that "there is not potentiality (*dynamis*) pertaining to what has come to be, but only to what is or will be."[44] And, I have argued, Aristotle regards the future as *now* (in part) indeterminate. So, hypothesizing the actualization of some potentiality at a future time but finding, later, that this potentiality is not, in fact, then actualized does not lead to a contradiction if it not *now* "already determined" or "fixed" that the potentiality will not then be actualized. Such a view allows for unactualized possibilities with respect to the individuals possessing those potentialities. This metaphysical view of unactualized potentialities inherent in individual subjects is compatible, however, with a temporal-frequency model of the modalities. It is intuitively plausible to hold that the potentialities possessed by an individual in a concrete circumstance are determined by a limited set of general features of the individual and of the circumstance. Since these features are limited and general, it makes sense to suppose that they can be replicated at other times by other individuals. Whether an individual X at a time t characterized by a set of circumstances C has the "two-sided" potentiality of forthwith doing act A (and of refraining from doing A) is determined by whether X's future is now determinate with respect to his doing or refraining from doing A. But, we might assume, there are certain general characteristics of X and general features of C which decide the issue of whether it is now determinately true or determinately false that X will forthwith do A. Here we can reintroduce the temporal-frequency model of the alethic modalities into the picture. Assuming that we have an idea of what the relevant characteristics of X and features of C are, we can consider what happens

in the case of other subjects in other contexts, both exemplifying the relevant characteristics. If in some such cases, the subject forthwith does A and in some cases, he does not do A, one can infer by the temporal-frequency model that it is *now* (before the fact) neither determinately true nor determinately false that our individual agent X will do A – and, hence, that X's doing A is now a contingent matter.

Peripatetics, and other Hellenistic philosophers influenced by Aristotle, generally seem to have assumed some such connection among (I) the doctrine that "genuine" or "two-sided" contingency can pertain only to the future, (II) the derivation of this contingency from the indeterminacy of the future, and (III) the explication of the modal status of an event/state of affairs pertaining to an individual subject, the occurrence of which is held to be an indeterminate/contingent matter, in terms of the frequency with which similar events/states of affairs are instantiated in the case of similar subjects in similar circumstances. The determinate truth (relative necessity) of a predication pertaining to an individual tends to be equated with the temporal universality of the related assertoric predications as applied to "relevantly similar" subjects in relevantly similar circumstances; the determinate falsity (relative impossibility) of such a predication is equated with universal falsity of the related set of assertoric predications; and the indeterminate truth-status (relative two-sided contingency) is equated with a mixture of true and false predications in the related assertoric set. These equations are often implicit. The ease with which the transition between the two perspectives is effected is illustrated in Boethius' commentary (*editio secunda*) on the last part of *De interpretatione* 9:

> Aristotle teaches us above that in those matters which are capable of occurring in either way (*quae utrumlibet sunt*), one part of the contradiction is not definitely true (*definite veram*) nor the other definitely false; now he educes an argument from the more frequent and the less frequent (*a frequentiori et a rariori argumentum trahit*). For he has demonstrated above that there are certain things which indeed happen more frequently, but [of which] it is not prohibited that the opposites sometimes happen . . . Because, then, if in those matters in which [one "part" of a contradictory pair] is for the most part predicated, it is not the case that the one part is definitely true and the other definitely false – and much less is this case in those matters of which the outcome is equally indeterminate (*aequaliter indiscretus eventus est*) – it is clear that in the future contingent propositions it is not the case that one is [determinately?] true, the other false.[45]

The doctrine of cosmic cycles provides an alternative model (alternative, that is, to the foregoing model) for dealing with the alethic modalities as

they pertain to individuals. If individual things, or their counterparts, recur in various cycles, one can give the following semantic account of what it means to say that it is possible for such an individual X to perform act A, to have property P, etc.: such a problematic predication is true just in case X, or one of its counterparts, performs A, has P, etc. in *some* (at least one) cycle. Similarly, it is necessary that X perform A, have P, etc. if and only if X performs A, has P, etc. in *every* cycle. For the concept of necessity (possibility, etc.) in a set of circumstances C, one considers only the set of cycles characterized by C: thus, it is possible, in context C, for individual X to perform act A, have property P, etc. just in case, in some cycle characterized by C, X (or X's counterpart) performs A, has P, etc.

Cosmic cycles are here obviously playing something like the role played by possible worlds in the contemporary semantic interpretation of the alethic modalities. Each cycle, viewed internally, is constituted of a temporal, linear ordering of events/states of affairs. But the "worlds" *themselves* are viewed as being characterized by a linear temporal order. As a consequence of this last fact, we obtain not only what the contemporary philosopher would consider to be an "extreme realism" *vis-à-vis* possible worlds[46] but also what I have elsewhere termed a "harmless" version of the principle of plentitude.[47] I.e., each possible state of affairs is exemplified at some time – in some cosmic cycle *qua* possible world. In fact, due to the temporal ordering of the cosmic cycles or possible worlds, this conception of cosmic cycles can be viewed as a special case of the temporal-frequency model of the alethic modalities: a possible state of affairs is one that is instantiated at some Time with a capital "T", the time not of a single cosmic cylce but of the "union" – really "linearly ordered union" – of *all* cycles. The situation with respect to necessity is more complicated. Concepts of necessity can be specified which range in strength from necessary existence (and the necessary possession of a property P by a necessarily existent subject) – existence (or the possession of P) at all Times with a capital "T" – to the "essential" possession of a property P by an individual X in circumstances C – the possession of P at all times (in all cycles) in which X or a counterpart of X is found in C.

It is to be noted, however, that the cosmic-cycle version of the temporal-frequency model of the modalities represents a considerable departure from the "original Peripatetic" version. The Peripatetic version represents, I think, a conception of the modalities with a sort of empirical epistemological thrust. Conditional necessity, for example, is associated with invariable temporal coincidence (or, perhaps, contiguous

succession). Since, in order for conditional necessity to obtain the temporal coincidence must be without exception, the classical problem of induction arises with respect to the judgments we make concerning conditional necessity and certain other modal concepts, temporally conceived. Nonetheless, I believe that the empirical cast of the model is evident. For example, it is assumed that with respect to a claim such as "It is possible for individual X to perform act A in circumstances C, we can gather evidence with respect to the truth of the claim – by observing what "relevantly similar" individuals do in "relevantly similar circumstances."[48]

The cosmic-cycle version of the temporal-frequency model, however, is quite different in import. We cannot gather evidence concerning a modal predication pertaining to an individual by observing what happens to that individual's counterparts in other cosmic cycles – although perhaps god can.[49] Rather, the cosmic-cycle versions of the temporal-frequency model serve as (humanly unverifiable) semantic models of various cosmological doctrines involving alethic modal concepts.

The Stoic employment of cosmic cycles is perhaps the least problematic example of this sort of version of the temporal-frequency model of the modalities. However, the model is primarily employed by the Stoics to represent the orthodox conception of the "inviolable" *causal* relation: state of affairs X causes state of affairs Y just in case whenever the "surrounding circumstances" (*periestēkota*) are the same and X is instantiated the instantiation of Y forthwith ensues. The postulation of indistinguishable, eternally recurrent cosmic cycles serves to model the Stoic doctrine of universal causal determinism. Each instantaneous cosmic state causally determines the succeeding course of the cosmos. In terms of the modal version of Chrysippean compatibilism reconstructed in Chapter Four, the infinite series of indistinguishable cosmic cycles does *not* model Chrysippus' alethic modal concepts. Let us consider the "Chrysippean" account of necessity: that which does not admit "internally" of falsity *or*, while admitting of falsity, is prevented by external circumstances from being false."[50] Chrysippus' modal compatibilism depends on interpreting "prevented" in the second disjunct as a relation of conceptual/logical incompatibility which is more restrictive that the relation of "being causally precluded": that is, this version of compatibilism depends on there being cases where an event/state of affairs (e.g., this gem's being broken), which is causally precluded by temporally antecedent states of affairs from being instantiated, is not

"prevented" (in the sense of the term used in the account of the alethic modalities) by those states of affairs from being instantiated. The supposition that those antecedent states of affairs are instantiated is not, in other words, logically/conceptually incompatible with the supposition that the later event/state of affairs is instantiated.

According to this interpretation of the Chrysippean modal concepts, which represents his attempt to "escape necessity be retain fate," *those* modal concepts are not modeled by cosmic cycles. It will evidently be the case, for example, that there are some events/states of affairs which are, relative to a time or the circumstances obtaining at that time, possible but which are not instantiated in those circumstances in any cosmic cycle. However, as we saw in Chapter Four, there is some evidence that Chrysippus (or other Stoics) developed a version of compatibilism in which, to quote Theodoret, "what is necessitated (*to katēnangkasmenon*) does not differ from fate" or the relation between cause and effect. Within this context, we evidently *should* interpret the "prevented" in the Chrysippean account of the alethic modalities in such a way as to encompass cases where the occurrence (or nonoccurrence) of an event/state of affairs is *causally* determined by antecedent events/states of affairs. From the perspective of this conception of the modalities, Stoic cosmic cycles *can* consistently be interpreted as modeling the Chrysippean modal concepts.[51]

The model is not a particularly varied or interesting one, however. For every event/state of affairs will turn out to be necessary, relative to its temporal antecedents, according to this account. Hence, all possible worlds/cosmic cycles will be alike: it is not *possible* according to this interpretation of the Chrysippean account of the modalities, for anything to happen in a given context other than what, in fact, happens. Since there is no contingency (possibility *cum* nonnecessity), such a modal status, which would involved variation among the possible worlds/cosmic cycles, does not get represented in the cosmic-cycle model.

Such contingency seems to have been built into the Middle-Platonist conception of cosmic cycles, however. For example, pseudo-Plutarch argues in the *De fato* that:

> although things that come-to-be are unlimited, extending from infinite to infinite, fate, which has encompassed everything in a cycle, is not unlimited but bounded. For neither law nor natural principle nor anything divine could be unlimited. Further, you would understand what is said if you should apprehend the complete revolution and complete time . . . For in this time, which is definite and knowable, everything whatsoever in the heavens and

those things on earth which are established by necessity from above will again be restored to the same state, and again from the beginning the same things will return in the same manner.[52]

As editors have noted, this doctrine is similar to the Stoic doctrine of *apokatastasis*, or cyclical restoration of the *cosmos*.[53] However, there is an important difference: as we saw above, according to the Middle-Platonist version of cyclical restoration, only celestial things and those terrestrial things subject to celestial causal determination are subject to identical cyclical restoration.[54]

The intention of Middle Platonists such as pseudo-Plutarch seems to be to deny universal causal determinism, and this intention is effected by means of the standard Middle-Platonist doctrine of fate as "hypothetical law":

it [fate] has a nature, one might say, like the law of a state, which first promulgates most things, if not all, from hypotheses, and next, insofar as it is in its power, comprehends universally the things pertaining to the state.[55]

Fate or *heimarmenē*, in effect, decrees that certain consequences necessarily follow from certain acts or events as "hypotheses" or antecedents. The "conditionals" so formed are general and pertain to individuals only indirectly, insofar as an individual thing or an individual act satisfies the description contained in the antecedent. Furthermore, the history of a given cosmic cycle is not a unified *causal* nexus or material exemplification of a string of conditionals, each antecedent being a consequent of some conditional with a temporally prior antecedent. Rather, some antecedents, namely those that pertain to "what is up to us" (*to eph' hēmin*), do not have external, antecedent causes. This doctrine is employed in pseudo-Plutarch (and, later, Calcidius) to distinguish what is in fate (*to kath' heimarmenē*) from what is in conformity to fate (*to kath' heimarmenēn*). Everything, all events and states of affairs that are comprehended in any cosmic cycle, are properly said to be "in fate." However, only the consequents that necessarily follow from antecedents which are instantiated are in in conformity to fate.[56]

It seems that this doctrine of relative contingency, that is, the doctrine that there are some events/states of affairs that are not conditionally necessary relative to their temporal antecedents, is modeled by variation in the cosmic cycles. How explicit this modeling was is difficult to ascertain from the extant evidence. In particular, did pseudo-Plutarch, Calcidius, etc. hold that a given event/state of affairs X is possible relative

to a temporally antecedent context or set of circumstances in context C if and only if there is a cosmic cycle in which X is instantiated in context C? While the "right-to-left" conditional constituting such a biconditional has been almost universally accepted in the history of philosophy (*ab esse ad posse valet consequentia*), the left-to-right conditional represents what might be termed a principle of cosmic-cycle plenitude: given a context C and event/state of affairs X, if X is possible relative to C, there is some cosmic cycle in which X occurs in context C.

It is difficult to ascertain whether, in fact, the Middle-Platonist proponents of the doctrine of variable cosmic cycles subscribed to such a principle of cosmic-cycle plenitude. The very fact that contingency in the *cosmos* is apparently modeled by variation among the cycles may suggest that they at least implicitly accepted the plenitude principle. I have elsewhere suggested that pseudo-Plutarch did accept the principle.[57] If this suggestion is correct, cosmic cycles become very much like possible worlds, according to a "realistic" contemporary conception of possible worlds – a conception such as that of David Lewis, for example.[58] The principal difference between such a version of the cosmic-cycle doctrine and a contemporary, realist conception of possible worlds is that, according to the former doctrine, the "worlds" (i.e., cycles) are regarded as being ordered in a way which is, in some sense, temporal. The "cash value" of the claim that the worlds are so ordered does not seem to be great, however. Consequently, the principle of plenitude it implies, *viz.* that any possibility is realized in some cycle, is very weak or harmless, as I have elsewhere characterized it. In fact, it seems scarcely stronger than an analogous "plenitude principle" for a Lewis-type modeling of the modalities in terms of possible worlds: any possibility is realized in some possible world![59] I shall indulge in further philosophical consideration of a modeling of the modalities in terms of temporally ordered possible worlds in the last chapter of this book.

I must confess, however, that I am now far from certain that the Middle-Platonists even implicitly accepted such a model. The problem arises in connection with the principle of cosmic-cycle plenitude, the principle (which is an essential facet of the model) that any possibility is instantiated in some cycle. This principle does not seem capable of harmonious coexistence with the Middle-Platonist conception of providence (*pronoia*). Although pseudo-Plutarch and other Middle Platonists developed a rather complex conception of providence, it, in general, is held by them to order things in the "best and most noble" (*arista te kai kallista*) manner.[60] The problem, then, is that the effective excercise of

providence under such a constraint does not seem to be consistent with the plentitude principle, with, that is, the principle that each possibility is eventually (in some cycle) actualized. The root of the problem is that the interpretation of variant cosmic cycles as possible worlds, temporally ordered, leads to an extremely "egalitarian" conception of actuality. Like certain contemporary theories of possible worlds, it yields a conception of actuality such that each world/cycle is ontologically indistinguishable from every other world, i.e., not actual in any sense that ontologically distinguishes it from other world/cycles.[61] Since providence is assumed to be operative in all cycles, a problem develops as to how this direction of providence could be reconciled with the "actualization" of every possibility, irrespective of the disagreeableness of some such possibilities.

One could, of course, maintain that there is a sense of "real possibility" such that no event/state of affairs not in conformity with providence is, in this sense, possible. This is arguably a rather restricted sense of "possibility." one which might perhaps allow only trivial variations among the cosmic cycles/possible worlds. A cosmic-cycle plenitude principle would then obtain for *this* conception of possibility/necessity: every possibility (which must be in conformity with providence) is in some cycle instantiated. But, then it would seem reasonable to recognize a more inclusive sense (or senses) of possibility for which the plenitude principle does not obtain: there are possibilities, in this more inclusive sense, which are not instantiated in any cosmic cycle, *viz.* those not in conformity with providence. Perhaps this is the characterization of Middle Platonist employment of cosmic cycles which best fits the rather meagre evidence we have. There is, I believe, the implication present in pseudo-Plutarch's discussion of world cycles that there are only minor differences among the cycles.[62] And the hypothesis that the cycles represent a sense of "possibility" qualified by conformity to divine providence constitutes one plausible explanation of this apparent lack of major differences among cycles. One might be tempted to infer that only with respect to relatively "indifferent" matters is there contingency or two-sided possibility of this variety.

In fact, such a consequence seems to follow from pseudo-Plutarch's account of *to eph hēmin*, "what is up to us." In *De int.* 9, Aristotle suggests that with respect to matters that turn out "whichever way chance has it" (*hopoter etuche*) neither the affirmation nor the denial is more (often?) true.[63] Pseudo-Plutarch develops this theme further in his *De fato*. What happens "for the most part" (*to hōs epi polu*) and what happens

infrequently (*to hōs ep' ellaton*) are, he says, "most often up to nature"; however, what happens "whichever way chance has it" (*to hopoteron etuchen*), which he equates with what happens "with equal frequency [as its contradictory]" (*to hōs episēs*), is identified with "what is up to us."[64]

walking and not walking, and whatever are of this sort, of which each contradictory happens with equal frequency, are controlled by human impulse, which is said to be "up to us" and "according to choice" (*kata prohairesin*).[65]

"Matters of (free) choice" or "what is up to us," then, seem to be located in what Leibniz would call "absolute indifference" or "equilibrium of indifference".[66] It seems reasonable to suppose that, with respect to significant matters, a person with a certain nature (intellect and character) would, in a set of surroundings of a given kind, more frequently do act *X* then refrain from doing X, or *vice versa*. But then, such an act would evidently not qualify, according to the account we are considering, as up to the agent. The intention of pseudo-Plutarch was probably to limit actions "up to us" to those matters in which external causal factors do not figure in a significant way.[67] But the requirement that such matters and their contradictories happen with equal frequency seems to rule out *any* significant causal factors for the matter in question. Thus, it becomes difficult to understand in what sense the agent might really be responsible for these indifferent acts; and it also seems clear that we wish to maintain that agents are responsible for acts that are not indifferent in this sense. In brief, pseudo-Plutarch encounters, in a rather extreme form, a problem commonly encountered by libertarians in tying freedom (and, thus, responsibility) to the absence of causal determination.[68]

C. COSMIC CYCLES AND THE ACTUALITY OF THE FUTURE

In *De fato* 9 Cicero asserts that:

those who say that what is going to be is immutable and that it is not possible that a true future [proposition] be changed into a false one are not demonstrating the necessity of fate, but are simply explaining the sense of words; but those who introduce an eternal chain of causes bind the mind of man, robbed of free will, with the necessity of fate.[69]

Cicero is here dismissing as invalid a common ancient variety of fatalist argument from the present truth (falsity) of propositions pertaining to the future to their present necessity (impossibility). There is one such argument schema which is indeed invalid.

Premise: It is true that I shall have eggs for breakfast tomorrow.
Premise: It is necessary that if it is true that I shall have eggs for breakfast tomorrow, then I shall do nothing to make it false that I shall have eggs for breakfast tomorrow.
Conclusion: It is impossible that I shall do anything to make it false that I shall have eggs for breakfast tomorrow.
Premise: It is false that I shall have eggs for breakfast tomorrow.
Premise: It is necessary that if it is false that I shall have eggs for breakfast tomorrow, then I shall do nothing to make it true that I shall have eggs for breakfast tomorrow.
Conclusion: It is impossible that I shall do anything to make it true that I shall have eggs for breakfast tomorrow.

If we assume the principle of bivalence, that it must be either true of false that I shall have eggs for breakfast tomorrow, then the preceding arguments would yield the result that, in the former case, it is impossible for me to refrain from having eggs, in the latter, it is impossible for me to have them.

The problem with the arguments, of course, is that they involve the modal fallacy of the inference of the necessity of the consequent from the necessity of the consequence (Sleigh's fallacy) discussed in Chapert Two. The modal operators of the second premises, which govern the "if . . . then," are transferred to the consequents of those conditionals.[70] Then from the first premises (which are the antecedents of the conditionals, in the "assertoric mode"), we infer by *modus ponens* the duality equivalents of the necessitations of the consequents of the two conditionals.[71]

Although Cicero characterizes both the Stoics and the Epicureans as assuming that an unrestricted principle of bivalence implies some form of determinism, he does not suggest that the basis of their acceptance of such an implication involved anything like the preceding argument. Rather, according to Cicero, Chrysippus argues that

> If there is motion without a cause, not every statement (which the dialecticians call an [*axi*ō*ma*]) will be either true or false; for that will be neither true nor false which does not have efficient causes.[72]

Similarly

> Epicurus fears lest, if he concede this [that everything is either true of false], it must be conceded that whatever happens happens by fate. (For if one of two [contradictories] were true from eternity, it would be certain, and if certain then also necessary; thus, he thinks both necessity and fate would be confirmed)[73]

The argument is slightly elaborated at the end of *De fato* 11:

> why is it that not every proposition is either true or false unless we concede that whatever happens happens by fate? Because, he [Chrysippus?] says, those future matters that do not have causes why they will be in the future cannot be true; therefore, it is necessary that those that are true have causes; so when they have come about they will have come about by fate.[74]

Stoics, Epicureans (and perhaps Peripatetics) seem, in other words, to have accepted something like the following truth condition for temporally prospective propositions:

> a temporally prospective proposition p is true at a time t if and only if there are circumstances occurrent at t sufficient to bring about the (sort of) event or state of affairs designated by p.

The import of the phrase "sufficient to bring about" may be either that of causal *or* logical necessitation. For example, "There will be a sea battle tomorrow" is *now* true, according to the truth condition I have in mind, if and only if there are circumstances now occurrent causally sufficient to produce the occurrence of a sea battle tomorrow. However, if we interpret "sufficient to bring about" in terms of either causal or logical necessitation, we can perhaps maintain that "either there will be a sea battle tomorrow or there will not be a sea battle tomorrow" is now (and always) true because there are now (and always) occurrent logical circumstances sufficient to guarantee the (logically necessary) state of affairs designated by the proposition. The import of the "occurrent at t" in the truth condition is to bar the following sort of application of it: "there will be a sea battle tomorrow" is now true because of the "present circumstance" of there-actually-occurring-tomorrow-a-sea-battle is logically sufficient to guarantee the truth of the proposition. My intent is to rule out such temporally prospective states of affairs as legitimate constituents of the circumstances "occurrent at t."

The foregoing truth condition for temporally prospective propositions is to be contrasted with another, now more common one:

> a temporally prospective proposition p is true at time t if and only if the event or state of affairs designated by p does, in fact, eventually come about.

This condition can be put more completely in the formal mode" as follows:

> a temporally prospective proposition p is true at time t if and

only if its "present-tense analogue" is actually true at some (appropriate) time t′ which is "later" than t.

Unlike Chrysippus and Epicurus, Cicero accepts this second type of truth condition – which, after M.A.E. Dummett, we can refer to as the "truth-value link" version[75] – for temporally prospective propositions.

For just as we say that those past things are true of which there was, in former time, a true "being present" (*instantia*), thus [we say that those future things are true] of which there will be, in succeeding time (*consequenti tempore*), a true "being present."[76]

The truth-value link variety of truth condition is closely connected by Cicero with another principle stated in *De fato* 9.18:

that it was going to happen ought to be understood from the fact that it did happen.[77]

Cicero's more-or-less explicit argument begins with the obviously true claim that, with respect to a temporally determinate prospective proposition, either the state of affairs that it designates will, with the passage of time, be instantiated or it will not. But then, employing the preceding principle, we can conclude from the eventual fact that the state of affairs in question is instantiated, that the temporally prospective proposition claiming that it would be instantiated was, before the fact, always true. And, employing a "substitution instance" of the same principle we can conclude from the eventual fact that the state of affairs in question is *not* instantiated that the contradictory of the temporally prospective proposition claiming that it would be instantiated was, before the fact, always true, and that the proposition itself (by any reasonable account of negation) was, before the fact, always false. Then, by a disjunctive syllogism, we can preserve the principle of bivalence for all temporally prospective propositions. But, Cicero adds, "neither fate nor necessity is for this reason to be feared."[78]

Cicero's key principle here, "that it was going to happen ought to be understood from the fact that it did happen," looks a great deal like the truth-value link truth condition for temporally prospective propositions. However, they should probably be distinguished. Arthur Prior associates the key principle with the tense logical entailment $p \models HFp$ (p entails it has always, in the past, been the case, that it will be the case that p·).[79] And it turns out that consistent formal semantic interpretations can be developed for tense logics that licence this entailment but which do *not* maintain the principle of bivalence for all temporally prospective propositions. In other words, acceptance of the tense-logical entailment

(hereafter referred to as CP – "Cicero's principle") does not commit one to a semantic principle of bivalence with respect to temporally prospective propositions.[80]

I shall try to explain informally this fact. Apart from a specific formal system and semantic interpretation of that system, CP is significantly ambiguous. There is an atemporal (or omnitemporal) interpretation of it, according to which the truth a present-tense proposition p at a time t implies the truth of the future tense Fp at all prior times irrespective of the temporal perspective from which this judgment is made. That is, the proposition "prior to t, Fp is always true" is itself regarded as an atemporally/omnitemporally true proposition (if, in fact, p is true at t). However, according to another possible interpretation – a temporally relative interpretation of CP – while the truth of p at t does indeed entail the truth of HFp ("it has always been going to be the case that p") *at t*, HFp can be true at t without thus implying that *at* (from the temporal perspective of) each earlier time t′, Fp is then true. In other words, according to the temporally relative interpretation of CP, it does not follow from the fact that p is now (at any time t) true and, consequently that one can now (from the temporal perspective of t) truly say that it has always been going to be the case that p (HFp), that from earlier temporal perspectives (i.e., from any t′ such that $t' < t$) one could have *then* truly have said "it is going to be the case that p." According to the temporally relative interpretation of CP, one's correct description of the past from the temporal perspective of the present does not mean that the past, "when it was present," had all the same characteristics that we can correctly ascribe to it *now*. For example, we can consistently maintain that, from the perspective of the present, it is true to say it was always going to be the case that Reagan would win the 1980 presidential election but deny that, from the temporal perspective of 1935, one could then have truly said "Reagan will win the 1980 presidential election." In other words, from the temporal perspective of 1982, "the future of 1935" is determinate or fixed up through 1980 to the present; but from the temporal perspective of 1935, there may not be a determinate future of 1935 up through 1980, but, rather, a number of possible futures.[81]

The temporally relative interpretation of CP, then, shows that the principle does not in itself yield the consequence Cicero seems to think that he can obtain by its use: the preservation of the bivalence principle for future contingent propositions. In order to obtain this consequence Cicero requires an atemporal interpretation of CP. In effect, he requires

a conception of time in which McTaggart's B-series relations of temporal anteriority and posteriority ("before" and "after") are regarded as atemporally or omnitemporally determinate relations. The truth-value link type of truth condition for temporally prospective propositions also seems plausible only if the atemporal/omnitemporal stability of the temporal posteriority-anteriority relation is assumed.

Recall that this type of truth condition, cast in the "formal mode," is the following:

> a temporally prospective proposition p is true at a time t if and only if its "present-tense analogue" is actually true at some (appropriate) time t′ which is later than (temporally posterior to) t.

This type of truth condition was distinguished from the causal/logical sufficiency variety:

> A temporally prospective proposition p is true at a time t if and only if there are circumstances occurrent at t sufficient to bring about the (sort of) event or state of affairs designated by p.

If the former type of truth condition strikes us as more natural than the second, the reason for this reaction, I believe, has something to do with the common contemporary philosophical conception of time. Contemporary philosophers tend to think of what is actually the case or "the actual world" – which is what determines questions of truth and falsity as opposed to questions of necessity and possibility – as having a "complete" and unchanging or temporally fixed structure. In fact, actual time in a fundamental sense of the phrase, is simply the linear ordering of the events/states of affairs that constitute what is actually the case or the actual world. The actual world, with this type of inherent temporal structure, is consequently conceived of in contemporary semantic theory *sub specie aeternitatis*. With such a view of what is actually the case or of the actual world, the truth-value link type of truth condition for temporally prospective propositions is quite compelling. There is no difficulty in conceiving of a contingent p as true prior to the occurrence of the contingent event/state of affairs it signifies, although there may indeed remain problems concerning the possibility of coming to *know* that it is true before the instantiation of the event/state of affairs in question.[82] The reason for this lack of difficulty is that "the actual sequence of events" is thought of as having an atemporally fixed linear ordering; that is, the before-after relation among the events/states of

affairs constituting the actual world is an atemporal or ominitemporally fixed relation. Thus, the before-after relation obtaining between a time t (or the events/states of affairs characterizing it) and a later contingent event *e* is viewed as an atemporal or temporally invariant relation; so the question of whether the temporally prospective proposition p designating *e* is *true-at-t* is a question with a timelessly true answer and, thus, a definitely true or definitely false answer *at t*.

Most ancients, it seems, did not conceive of "the actual sequence of events" as including the future. Most conceived of the actual sequence of events, at most, *sub specie praeteriti* and, perhaps in some cases, only *sub specie praesentis*. Indeed, it seems that a conception of time that does *not* regard it as an atemporal or temporally invariant ordering of events/states of affairs precludes the formation of a concept of the actual sequence of events that is an atemporal or ominitemporal conception – i.e., a conception that includes the past, present, and future, relative to any time, as constituents of the actual world. Without a conception of time that includes "the future" in "the actual" the explanation provided by the truth-link type of truth condition for the *present* truth of a proposition signifying a future contingent event does not seem terribly cogent. Without such a conception of time, what happens or fails to happen *later* seems irrelevant to what is *now* true or false – although it may, of course, be quite relevant to what later becomes true or false.

The philosopher who lacks the requisite conception of time would seem to be more-or-less committed to the causal/logical sufficiency type of truth condition for temporally prospective propositions. This, I believe, is the lot of most ancient philosophers outside the Academic tradition. However, thinkers in this tradition seem to have gradually evolved a conception of time as an atemporal or temporally invariant linear *taxis*.

Paul C. Plass has discussed the development of the conception of time as an atemporal taxis within the Academic tradition.[83] He deals with the conception in Neoplatonism, specifically discussing Plotinus, Proclus, and Damascius, and briefly mentions Iamblichus. It seems likely that Cicero's denial that determinism is entailed by "strict bivalence" – specifically, by the present truth or falsity of every temporally prospective proposition – is derived from the teaching of the Academic Carneades.[84] This attitude toward bivalence and the future supplies the conceptual impetus for the development of a notion of time as a temporally invariant or atemporal linear series of events/states of affairs. Such a view of time appears to be

at least implicitly present in Cicero's *De fato*. He clearly distinguishes between temporally invariant or eternally fixed *temporal* sequences and eternally fixed *causal* sequences:

this [that the consul Marcellus would die at sea] was certainly true from eternity, but it did not have efficient causes.[85]

And,

Thus, "cause" is not to be understood so that what precedes (*antecedat*) something is its cause, but what efficiently precedes it.[86]

We do find, I think, in Cicero's discussion at least intimations of a conception of "timeless time," i.e., time conceived of as an atemporal or temporally invariant linear series of events/states of affairs. Some century-and-a-half later the conception of time as a temporally invariant *taxis* had become more explicit in Middle-Platonist representatives of the Academic tradition, such as Plutarch. Time, he says in the *Platonicae quaestiones*,

is not an effect or an accident which pertains to motion, but rather the cause, power, and principle of the commensurability and order which holds together all things that come-to-be and by virtue of which the nature of the universe, which is animate, is moved. Or rather, motion, being order itself and commensurability, is called time . . . On account of which Plato said that time came-to-be simultaneously with the heavens, but motion prior to the genesis of the heavens. But there was not [then] time. For there was neither order (*diorismos*) but indefinite motion, as it were, the formless and shapeless matter of time. But providence, having taken into tow and constrained matter with shapes and motion with circuits (*periodois*), thus made the *cosmos* simultaneously with time.[87]

The thrust of this quotation evidently is to identify time and, derivatively, the *kinēseis* occurring "within" time, with the fixed order (*taxis*) of events/states of affairs constituting a cosmic cycle. This *temporal* ordering of things is a manifestation of providence (*pronoia*).[88]

In a similar vein, pseudo-Plutarch in the *De fato* ascribes to fate the ordering and enclosing in a cycle of the "indefinite comings-to-be." The "limiting" of time by means of the concept of the *periodos* seems to be an initial step in the process whereby the "sum of temporal relations," i.e., the relations of temporal simultaneity, anteriority, and posteriority, came to be regarded as intrinsically comprehensible. A condition of this comprehensibility, from a common ancient epistemological viewpoint, would be that this sum of temporal relations be itself an unchanging, temporally invariant fact.[89] Pseudo-Plutarch and other Middle Platonists are thus enabled to conceive of time in a temporally invariant fashion, as

the linearly ordered series of world states in a given cosmic cycle. Although this temporal chain of events has causal links, it is not in its entirety a *causal* chain: for some of the events in the chain, principally, those that are up to us, do not have antecedent *causal* links but merely antecedent *temporal* ones. According to pseudo-Plutarch's distinction, everything, all events/states of affairs that are ever instantiated, are properly said to be "in fate" (*en heimarmenē*) because they have a specific, temporally invariant position, relative to other events/states of affairs, in the temporal chain. But, only events/states of affairs that are causally necessitated by antecedent events in the temporal series are, properly speaking, said to be in conformity to fate (*kath' heimarmenēn*).[90]

A conception of the temporal relations of simultaneity, anteriority, and posteriority as being themselves temporally invariant seems to be a piece of conceptual apparatus which is virtually necessary for grounding a cogent rejection of the causal/logical sufficiency type of truth condition for temporally prospective propositions, i.e. a truth condition from which it follows that the truth of a temporally prospective proposition entails that the event/state of affairs it signifies is causally/logically necessitated by some present or past event/state of affairs. The Middle-Platonist conception of a cosmic cycle is such a conception of these temporal relations. Accordingly, a temporally prospective proposition is *now* true if the event/state of affairs it designates is to be found posterior to the point from which we are making the assessment of futurity (the relative "now") in the *taxis* that is the temporally invariant ordering of events/state of affairs constituting the present cosmic cycle. However, the occurrence of the event/state of affairs designated by the proposition need not now be relatively necessary: there need not be an unbroken *causal* chain of necessary conditionals extending from the present world state as "first" antecedent to the event/state of affairs in question as consequent. The atemporal or temporally invariant conception of the relations of simultaneity, "beforeness," and "afterness" within a cosmic cycle allows the future, relative to any "now" in the cycle to be conceived as included in the *actual*, i.e., present history of the cosmos. The fact that the event *e* designated by a temporally prospective proposition p does later come about is relevant to the truth of p now, at the earlier time t, because the before-after relation between t and *e* – or the time t′ at which *e* is instantiated – is an eternally fixed or temporally invariant relation. This appears to have been the view of Carneades and Cicero, a view which facilitates their rejection of the common ancient causal/logical sufficiency

type of truth condition for temporally prospective propositions. And elaborations of conceptions of time supporting the temporally invariant view of simultaneity, beforeness and afterness are to be found, I have suggested, in the later Academic tradition beginning with the development of the Middle-Platonist indeterminist cosmic cycles and culminating in the late Neoplatonic timeless time discussed by Plass.

Within the Academic tradition, then, the acceptance of a full-fledged principle of bivalence for temporally prospective propositions can be distinguished from the issue of the relative (casual or logical) necessitation of the future; the future, in other words, may be incorporated into the actual cosmic history or sequence of events/states of affairs without implying that the future is necessary relative to the present/past. Although this is, from the contemporary perspective, a useful and important distinction, it apparently is a distinction which was difficult or impossible to make within *other* philosophical traditions of later antiquity. Within these traditions, the future, relative to now, is not part of what is *now* the *actual* series of events/state of affairs. Such a view is more-or-less equivalent to the rejection of the atemporal or temporally invariant conception of the temporal ordering relation.

Perhaps this difference between the Academics and the other philosophical traditions of later antiquity has something to do with a further difference, concerning the ontology of time, between the Academics and other ancient traditions. The Epicureans, Stoics, and Peripatetics all held, as Aristotle puts it in *Physics* 8.1, that time is a "sort of affect of motion" (*ho chronos pathos ti kinēsēos*).[91] In order to generate from this conception of time a view of a non-necessitated future as a part of the now-actual sequence of events/state of affairs, it seems that a secondary conception of "cosmic time" as an eternally fixed or temporally invariant sequence of events/states of affairs if required. It seems rather difficult – that least psychologically difficult – to obtain such a conception from the notion of time as an affect of change. In order to do so, one would apparently need to possess a conception of the "sum" of the disparate motions or changes occurring in the history of the cosmos as a temporally invariant linear series of some sort. This conception, in turn, seems to require (a) that one conceive of motions in terms of a sequence of states or non-developmental stages and (b) that one be able to impose a linear ordering on the sum of these states or stages. However, imposing a linear ordering involves grouping states of many disparate motions into "simultaneity classes," classes representing the "total" state of the cosmos at

different times. Then, a linear ordering corresponding to "cosmic time" can be imposed on these classes.

But the very idea that one *could* group states or stages of diverse motions or changes into these simultaneity classes and impose a linear ordering on the result seems natural only if one already possesses an abstract conception of cosmic time as a linear ordering. According to such a conception, the times constituting the ordering represent, in effect, "slots" to be filled by the simultaneity classes of stages of motions or changes. My point is that an abstract conception of time as an affect of motion or change is unlikely, *of itself*, to yield a conception of cosmic time as a linear ordering of the totality of actual events/state of affairs, in which the temporal ordering relation is conceived of as atemporally fixed or invariant.

Rather, the generation of such a conception of cosmic time seems natural only if one presupposes the very thing which is supposed to be generated: a conception of cosmic time as a "framework," a temporally invariant linear *taxis* into which the simultaneity classes of all the stages of disparate motions and changes occurring in the cosmos can be fitted.[92] In his discussion of time in *Physics* 4, Aristotle sees such a framework as being supplied – at least according to some views of time – by the heavenly *periodoi*:

> if, then what is first [within a kind] is the measure of all things of the same kind, cyclical locomotion which is equable is especially the measure, because its number is knowable. While neither alteration nor augmentation nor coming-to-be are equable, locomotion is. For this reason time is accounted the motion of the sphere: other motions are measured by this and time by this motion . . . For time itself is accounted a sort of cycle. This, again, seems so because it is the measure of this sort of [i.e., cyclical] locomotion and is measured by it. So that to say that the genesis of states of affairs (*tōn pragmatōn*) is cyclical is to say of time that it is a sort of circle. And this [is said] because it is measured by cyclical motion.[93]

Aristotle, however, does not seem to have employed the conception of cyclical heavenly motion as the "framework" for a notion of a cosmic temporal sequence in which the ordering relation is a temporally invariant one: for Aristotle, in other words, the future, relative to a time t, is not a part of what is actual at t in the way that the present/past of t are.[94] For Stoics such as Chrysippus, the doctrine of universal (temporally antecedent) causal determination seems to have made it difficult to distinguish between the "chain of causes" of a cosmic cycle and a *temporal* chain of events/states of affairs in which the relations of temporal priority and posteriority are refarded as temporally invariant or eternally fixed.

The Middle Platonists, however – and perhaps some of their predecessors in the Academic tradition – do effect the transition from the concept of the *periodos* or *annus magnus* to the concept of a temporally invariant linear ordering of the "simultaneity classes" of states of affairs or "process stages" which can then be viewed as constituting an immutable history of that cosmic cycle. This temporally invariant ordering of the history of the cosmos, which is essentially a *temporal* rather than a *causal* linear series, is often identified with fate or providence in the Academic tradition. Thus pseudo-Plutarch comments

> for, on the one hand, the determinate [or "definable": *hōrismenon*], which is proper to the divine intelligence, is apprehended in the universal; but, on the other hand, the indeterminate [or "indefinite," "indefinable": *apeiron*] is apprehended in the particular.[95]

And,

> so it is now plain what we meant – that fate is in a way indefinable (*apeiron*) but in a way not. And what was maintained, i.e., that it [fate] is a certain sort of cycle, is now pretty clearly understandable: for as the motion of a cycle and the time which measures that cycle are each of them cycles of a sort, so also the account (*logos*) of things that come-to-be in a cycle should be thought of as a cycle.[96]

The cyclical ordering of the *kinēseis* constituting cosmic history supplies these *kinēseis,* in effect, with a *logos* which renders them "definable" and intelligible. It is, I think, this conception of a cosmic cycle as a static *taxis*, which is "*katholou*" in the sense of being, in principle, repeatable,[97] that grounds the Academic distinction between the present truth of a temporally prospective proposition and the present relative necessity of the event/state of affairs signified by that proposition.

D. SUMMARY AND CONCLUSION

There is a somewhat discordant marriage of Platonist and Peripatetic elements in pseudo-Plutarch's Middle Platonist account of determinism and responsibility. On the one hand, pseudo-Plutarch appeals to a Platonic metaphor: as "political Law" (*ho politikos nomos*), which regulates affairs in a *polis*, is established by the rational ordinance of the ruler, so fate, which regulates affairs in the *cosmos* as a whole, is established by the rational plan of the divine and providential Wisdom.[98] Pseudo-Plutarch maintains that

> while fate [and, indeed, *all* things] certainly is in conformity to providence (*kata pronoian*), providence is in no way in conformity to fate (this comment is to be understood as applying

to the first and highest [providence]). For that which is said to be in conformity to something is posterior to that thing. As, for example, what conforms to law is posterior in nature.[99]

In this vein, pseudo-Plutarch quotes Plato's *Laws* to the effect that

Neither law (*nomos*) nor ordinance (*taxis*) is mightier than understanding (*epistēmēs*). And it is not right that mind be a slave or subject to anything; but indeed, it should be the ruler in all things if it is to be really and truly free in conformity to its nature.[100]

The picture that pseudo-Plutarch seems to have in mind is that rational choices, while they can serve as "antecedents of links" in the causal chain of *heimarmenē*, are themselves not subject to *external* causal determination. Thus, it may be a dictate of fate that if a rational choice X is made, then a state of affairs Y will follow as a consequence of this choice. The consequence is said to be in conformity to fate (*kath' heimarmenēn*); but pseudo-Plutarch denies that the rational choice itself is *kath' heimarmenēn*.[101]

However, it is the Artistotelian conception of choice (*prohairesis*), the issue of "two-sided" practical deliberation, that pseudo-Plutarch has in mind. Two-sided possibility or contingency (*to endechomenon*) "grounds what is up to us as matter" (*hōs hylē tōn eph' hēmin prohypokeisthai*).[102] The Peripatetic hierarchy that is then spelled out by pseudo-Plutarch is the following: the possible (*ta dynata*) is divided into the necessary and the contingent (*ta endechomena*, "which additionally admit of their contrary"); the contingent is divided into that which occurs usually (*to hōs epi to polu*), that which occurs seldom (*to hōs ep' ellaton*), and that which "occurs equally with its contrary and as chance has it" (*to hōs episēs kai hopoteron etuchen*); the latter – what occurs and fails to occur with equal frequency – is "under the control of impulse, [and is] said to be up to us" (*to eph' hēmin*) and "in conformity to choice" (*kata prohairesin*). What is up to us has two species, that which proceeds "from passions, spirit, or appetite" (*ek pathous kai thymous ē epithymias*) and that which proceeds "from reasoning or thought" (*ex epilogismou ē dianoias*). It is the latter that is properly described as being "in conformity to choice."[103]

It is reasonable to suppose, however, that it is precisely with respect to choices or decisions of *practical* reason that there is the greatest dependence on "external" causal factors. The situation or context in which a rational agent possessing a given sort of character finds himself will surely typically have some sort of effect – even if the effect is not a *necessitated* effect – on the decision he takes in that context. The claim of independence from the particular causal context or situation of the agent

could perhaps be more plausibly made with respect to *scientific* reasoning, in the Aristotelian sense (*epistēmē*), than with respect to practical reasoning. In the case of *epistēmē*, what corresponds to the choices of practical deliberation are demonstrated conclusions concerning what is necessary and eternal, i.e., "theorems" of a particular Aristotelian science. And it is arguable that the content of such nonpractical propositions is, in a certain sense, independent from the causal nexus in which a rational being involved in the pursuit of an Aristotelian science might find himself.[104] In Chapter Seven, we shall find Plotinus pursuing this sort of approach to the determinism-responsibility issue.

However, pseudo-Plutarch (along with other Middle Platonists) seems committed to the choices of practical reasoning as paradigms of "what is up to us" or, in other words, what we are primarily responsible for. In order to maintain the independence of such choices from the causal nexus of *heimarmenē*, he appears to embrace the extreme form of indeterminism discussed earlier in this chapter: what is paradigmatically up to us are those choices the occurrence and nonoccurrence of which are equally probably (happen with equal frequency). The unfortunate consequence is the trivialization of the notion of human responsibility. We would seem to be paradigmatically responsible for relatively indifferent matters (e.g., whether we decide, in a particular situation, to sit or to stand), matters that do not seem directly to manifest or "attend upon" our character in any obvious way.[105]

The Middle-Platonist form of indeterminism seems peculiarly radical and, indeed, almost silly from a contemporary perspective. I believe, however, that it points up a problem for contemporary incompatibilism. The paradigmatic incompatibilist maintains that it is not legitimate to hold an agent A responsible for an act X if X is the causally necessary consequence of some state of affairs over which A apparently "has no control," for example, some state of the universe prior to the birth of A. In other words, the incompatibilist maintains that a necessary condition for legitimately holding A responsible for X is that it must be "causally possible," relative to some state of affairs temporally antecedent to A's performing X, for A to act in such a way that he does not end up performing X.[106]

The terms "legitimate" and "legitimately" in the preceding account have something to do, I suspect, with fairness or distributive justice. Let us consider the case of agent A, who performs an act X that we would normally consider vicious, and agent B, who refrains (in apparently

relevantly similar circumstances) from performing X. The paradigmatic causal determinist will hold that A's performing X and B's not performing X are both "causally necessitated" by (features of) world states that obtained long before the birth of either A or B. Our paradigmatic incompatibilist's moral sense is offended by blaming A and praising B for "outcomes" (performing X and refraining from performing X, respectively) that are the causal consequences of states of affairs over which they have no apparent control.

Suppose, now, that we alter this typical scenario slightly. Let us deny causal determinism in the sense that each and every occurrence is *causally necessitated* by (each member of) a causal chain stretching back infinitely into the past. Instead of causal *determinism* we will postulate a doctrine of causal *probabilism*. In the particular case of A and B, let us suppose that instantiation of some states of affairs over which A and B have no apparent control, e.g., things that happened before the birth of either, makes it three times more likely than not that A will perform X in a given set of circumstances and three times more likely than not that B will not perform X in similar circumstances. If considerations of fairness were at the root of the incompatibilist's refusal to attribute responsibility to A and B in the original scenario,[107] should not the same considerations dictate that the incompatibilist attribute *diminished* responsibility in this case: i.e., to ascribe less blame to A for performing X than if the probability of his performing X relative to the state of affairs over which he had no control had been no greater than the chances of his not performing X and to ascribe correspondingly less praise to B? Our altered scenario suggests, I think, that the "modal" element in universal determinism, i.e., interpreting causal determinism as the causal *necessitation* of every event by (each member in) a chain of temporally prior events, may not be of such central significance in the responsibility-determinism issue as contemporary philosophers are wont to suppose.

The philosopher with incompatibilist tendencies has several lines of response that he might adopt. (A) He might simply deny the "parity of reasoning" that I claimed to obtain between our original and altered scenarios. That is, it is *not* the case that the same considerations of fairness that lead one to deny the responsibility of A for X where A's performance of X was causally necessitated by things that happened before the birth of A must lead one to ascribe diminished responsibility for performing X to A when things that happened before the birth of A make it three times more likely than not that he will perform X. I do not

think that is a very compelling response. The incompatibilist adopting this line of response would have to have rather elaborate theories of causation and probability in order to begin to make a case why "external" factors that "causally necessitate" an agent's performing an action are relevant to considerations of responsibility but external factors that affect the probability that an agent will perform an action without "causally necessitating" his performance of it are not. I suspect that theories that would support such a distinction, if tenable at all, would prove very controversial. (B) The respondent might admit the validity of the parity of reasoning and proceed to argue as follows. The causal *necessitation* of an action by "external" factors over which the agent has no apparent control is sufficient to eliminate responsibility altogether. What the argument shows, according to this line of response, is that an agent's "being responsible" for an act is not a simple "two-state" matter such that, with respect to the action in question, the agent either is responsible or he is not: rather, responsibility comes in (continuous) degrees. The degree to which an agent's non-causally necessitated actions are "probabilistically affected" by things over which he has no control helps to determine the degree to which the responsibility he bears for those actions is diminished. The theory of pseudo-Plutarch demonstrates a pitfall for this line of response. Actions that are most independent, probabilistically, of external factors would seem to be the actions that we would be *paradigmatically* responsible for; and it seems reasonable to assume that these could turn out to be relatively "trivial" actions. Actions with more moral import, even if not necessitated by such external factors as genetic inheritance, the moral training the agent received and the moral examples to which he was exposed etc., would – common sense tells us – tend to be probabilistically affected by these (and perhaps other) factors. According to this line of response, if such external factors make it, say, three times more likely that I will refuse a bribe in a context of type C rather than accept it, the degree to which I am to be accounted responsible for refusing the bribe and, consequently, the praiseworthiness of my refusal, should be correspondingly diminished.[108] (C) If the respondent were to find unsatisfactory a view of this sort – historically represented by pseudo-Plutarch and other Middle Platonists, I have suggested – he might profitably reexamine his basic incompatibilist assumptions. However, were he unwilling or unable to do this – or if these assumptions survived his critical scrutiny – he might well try to find something nontrivially "truly our own" that is immune to external causal

influence in general, not just to causal necessitation. This description is satisfied, I believe, by the later Neoplatonist Plotinus, to whom we turn in the next chapter.

NOTES

[1] *Origen*: *Contra Celsum* 5.20, translated with an introduction and notes by Henry Chadwick (Cambridge, 1965), pp. 279–280 (translation altered). For the Greek, I have generally used the Migne volume: *Origenis opera omnia*, ed. C. Delarue, Patrologiae Cursus Completus (Series Graeca), ed. J.-P. Migne, Vol. 11 (Paris, 1857). The standard Greek test is the somewhat controversial edition of P. Koetschau for the Berlin Academy, *Die griechischen christlichen Schriftsteller der ersten drei Jarhunderte*, Vols. 2–3 (Leipzig, 1899).

[2] Cicero, *De natura deorum* 2.46.118; D.L., 7.142.

[3] J. Barnes, 'La Doctrine du Retour Éternel', in *Les Stoïciens et Leur Logique*, pp. 3–20.

[4] *Ibid.*, p. 11.

[5] *Ibid.*, p. 12.

[6] *Ibid.*

[7] That is, (a) a semantic model in which time is circular and (b) a semantic model in which time is linear, with no beginning and no end, but in which the sequence of assignments of truth values to propositional variables of the model (a) for circular time is eternally repeated, will validate exactly the same standard tense-logical formulae.

[8] *Contra Celsum*, 4.68 (Migne, p. 1137).

[9] Alexander, *In an. pr.* I 15, *CIAG* **2**/1, 181.25–30. Alexander's example of a *parallagē oligē* is having facial moles in a former *apokatastasis* but not in a later one.

[10] Barnes, 'Retour Éternel', pp. 9–10.

[11] In *Origen*: *Contra Celsum*, p. 279, note 6.

[12] The evidence is, in fact, cited by Chadwick in his note: Cicero, *De natura deorum* 2.46.118; Diogenes Laertius, 7.142; Philo Judaeus, *De aeternitate mundi*, 78ff.

[13] Relevant considerations seem to be the following: Origen does not not explicitly ascribe the doctrine of a "little variation" to the Stoics although he implies that it comes "from (*apo*) the Stoa"; Middle Platonists such as pseudo-Plutarch (as we shall see) seem to accept the doctrine of *apokatastasis* in a form that allows some variation from cycle to cycle, and Origen turns (in 5.21) to a "Platonist and Pythagorean" version of the doctrine directly following this discussion; he also indicates that the doctrine would not be "derided but probably exalted in by Celsus" himself, whom Chadwick considers to be an "eclectic Platonist" with affinities to "Middle Platonists like Albinus" (Chadwick, p. xxvi) despite the fact that Origen sometimes calls him an Epicurean.

[14] Barnes, 'Retour Éternel', p. 10.

[15] *Contra Celsum* 4.68, trans. Chadwick, p. 238.

[16] The doctrine, as well as the "*aparallaktos*" terminology, bears a striking resemblance to the doctrine that denies "strict identity" across possible worlds. Leibniz seems to have held such a view; and its most persuasive contemporary advocate is David Lewis: "Things that do inhabit worlds – people, flames, buildings, puddles, concrete particulars generally – inhabit one world each, no more . . . In general: something has for *counter-parts* at a given world

[other than the one it inhabits] those things existing there that resemble it closely enough in important respects of intrinsic quality and extrinsic relations, and that resemble it no less closely than do other things existing there" (D. Lewis, *Counterfactuals* [Cambridge, Mass., 1973], p. 39).

[17] Barnes, 'Retour Éternel', p. 11.

[18] *Ibid.*, pp. 11–12.

[19] *Ibid.*, p. 18, Note 53.

[20] Simplicius, *In Aristotelis phys.* V 4, *CIAG* **10**, 886.12–16 = *SVF* 2.627.

[21] Alexander, *In an. pr.* I 15, 180.33ff.

[22] D.L., 7.58.

[23] Alexander, *In an. pr.* I 15, 180.36–181.2.

[24] Philoponus, *In Aristotelis de generatione et corruptione* II 11, *CIAG* **14**/2, 314.19–20.

[25] Cf., Alexander, *In an. pr.* I 15, 177.19ff., discussed in Chapter Four, Section A.

[26] *Ibid.*, 180.36ff.

[27] Plutarch, *De comm. not.*, 1083c–d. The import of this passage is a disputed question. My interpretation involves the identification of *ousia* with ("informed" or "qualified") *hylē*.

[28] Cf. M. E. Reesor, 'The Stoic Concept of Quality', *American Journal of Philology* **75** (1954), pp. 40–58; Reesor, 'The Stoic Categories', *ibid.*, 78 (1957), pp. 63–82; J. M. Rist, *Stoic Philosophy*, pp. 160–167.

[29] Leibniz' *notio completa seu perfecta substantiae singularis*. Cf. his 'Remarques sur la lettre de M. Arnaud' in a letter to Hessens-Rheinfels (May, 1686) in *Die philosophischen Schriften von Gottfried Willhelm Leibniz*, ed. C. I. Gerhardt, Vol. 2 (Hildesheim and New York, 1978), pp. 37–47.

[30] According to standard identity conditions for sets, two sets of properties or qualities (complete individual concepts) will be different if and only if they have different members (i.e, the complete individual concepts are constituted of different "common" qualities).

[31] Cf. Cicero, *Academica* 2.26.85; Plutarch, *De comm. not.* 1077c–d. There is no indication in either passage that the principle of identity of indiscernibles was not applied to "existing things" in the world (i.e., in a given world cycle).

[32] Plotinus, *Ennead* 5.7(18).2.21–23, in *Plotini Opera*, ed. P. Henry and H.–R. Schwyzer, Vol. 2 (Oxford, 1977), p. 266.

[33] *Origen: Contra Celsum* 5.21, trans. Chadwick, p. 280.

[34] *Timaeus* 38bff, Plato also mentions (*ibid.*, 39b–c) that one purpose of the sun, with its regular revolutions, is to teach mankind arithmetic.

[35] The doctrine occurs in pseudo-Plutarch, *De fato* 3; I am assuming that its author was roughly contemporaneous with Plutarch, who lived in the second half of the first century and first quarter of the second century A.D. The doctrine is also found in the digression on fate in Calcidius' commentary on Plato's *Timaeus* (*Timaeus a Calcidio translatus commentarioque instructus*, 148, ed. J. H. Waszink [London and Leiden], 1962). There is considerable overlap between these works. Shorter Middle Platonist accounts of fate, providence, free will are found in Albinus' *Epitome* **26**, Apuleius' *De Platone* 1.12, and Nemesius' *De natura hominis* 38. For more on the interrelation of these works see Dillon, *The Middle Platonists*, especially pp. 320–326, 401–408; also J. den Boeft, *Calcidius on Fate: His Doctrine and Sources* (Leiden, 1970).

[36] This is a particular theme of Philo Judaeus' *De aeternitate mundi*. Nemesius describes a version of the doctrine of an eternal cycle of conflagrations and restorations, which he

ascribes to the Stoics, according to which the gods are not subject to the conflagrations.
[37] Pseudo–Plutarch, *De fato* 3.569a–b.
[38] *Ibid.*, 569b–c.
[39] For example, see Hintikka, *T&N*, pp. 171–174.
[40] W. V. Quine, 'Natural Kinds', in *Ontological Relativity and Other Essays* (New York and London, 1969), p. 132.
[41] *De int.* 9.19a12–14.
[42] This may well have been the view of Diodorus, however. I think that some of the criticism of Hintikka's discussion of the "statistical" conception of the modalities in Aristotle has been due to a failure to appreciate that Hintikka is well aware of the fact that this "radical" form of the temporal-frequency or statistical conception of the modalities cannot be attributed to Aristotle.
[43] Hintikka, *T&N*, p. 172: "A mere generalization with respect to time is not enough; Aristotle apparently has to generalize also with respect to individuals." Hintikka does remark, however, that "on this part of our solution I am not at all sure" (*ibid.*).
[44] *De caelo* 1.12.283b13–14.
[45] Boethius, *In librum Arist. PH (editio secunda)*, ed. Meiser, 248–249.
[46] Each world (cosmic cycle) is (a) actual from its own perspective and (b) there is no way of picking out a world (cycle) that is "really actual," "actually actual," or "actual *simpliciter*", and thus no ontological distinction that can be drawn between worlds (cycles) as such. Cf. the sense of the French "*actuel*": present.
[47] White, 'Necessity and Unactualized Possibilities in Aristotle', pp. 294–296.
[48] Although Aristotle and Alexander tend to associate conditional necessity with invariant temporal coincidence, Aristotle, at least, certainly does not identify either of these concepts with the concept of causation, even causation in his strongest sense of the term. This issue will be further discussed in Section A of Chapter Eight.
[49] As I previously mentioned, Nemesius (*Denatura hominis* 38) attributes to some Stoics the doctrine that the gods survive the conflagrations separating cycles. See also Section V ("Divine Knowledge and Time") of my 'Time and Determinism in the Hellenistic Philosophical Schools', pp. 60–62.
[50] Cf. Chapter Four, Section A.
[51] Cf. the discussion of Barnes, 'La Doctrine du Retour Éternel', pp. 6–9.
[52] Pseudo-Plutarch, *De fato* 3.569a–b.
[53] E.g., P. DeLacy and B. Einarson in the Loeb translation of the *De fato*: Plutarch's Moralia, Vol. 7, trans. P. DeLacy and B. Einarson (Cambridge, Mass. and London, 1959), p. 317, Note f.
[54] Cf., *ibid.*, p. 319, Note b.
[55] Pseudo-Plutarch, *De fato* 4.569d.
[56] *Ibid.*, 5.570c–e.
[57] In 'Time and Determinism in the Hellenistic Philosophical Schools', p. 58, Note 53.
[58] See D. Lewis, *Counterfactuals*, pp. 84–91.
[59] For Lewis such a "plenitude principle" would seem to amount to the claim that attributions of possibility (and of necessity) have genuine ontological import (pertain to the realm of possible worlds) rather than linguistic or conceptual import (pertain to the realm of language or of "ideas").
[60] Pseudo-Plutarch, *De fato* 8.572f.
[61] The relation between an indexical *semantic* analysis of actuality (such that for each

possible world W, W is actual at W) and a egalitarian *ontological* conception of possible worlds (such that there is no ontological distinction among possible worlds) is an extremely complicated philosophical and logical issue. My own view is that a semantically adequate indexical analysis of actuality (e.g., something like that suggested in M. J. White, 'Could Rossini Actually Have Written *Don Giovanni*?', *Philosophical Studies* **43** [1983], pp. 337–347) does not entail – nor even suggest – the ontologically egalitarian metaphysical view (sometimes referred to in contemporary literature as "possibilism").

[62] That there are only minor differences among cycles is, I think, strongly suggested by the discussion in *De fato* 3.

[63] *De int.* 9.19a19–20.

[64] *De fato* 6.571c.

[65] *Ibid.*, 6.571d.

[66] Cf. Leibniz, 'Letter to Coste' (December, 1707), in *Die philosophischen Schriften*, ed. Gerhardt, Vol. 3, pp. 400–404. Leibniz is here referring to events that are claimed to have no determining cause or, more particularly, actions for which it is claimed that they have no determining reasons. He holds, of course, that the existence of such reasonless actions would violate the principle of sufficient reason and, thus, is not to be admitted. One suspects that in the present case, pseudo-Plutarch (or his source) is assuming that in the case of a *particular* instance of an action-type that occurs as often as it does not (in relevantly similar circumstances), this equal-frequency of occurrence indicates that there are no causal factors involved beyond the "free choice" (reflecting Leibniz' abhorred equilibrium of indifference) of the agent.

[67] This limitation involves an interpretation of Aristotle's claim that, in order for an action to be up to us, we must be the origin (*archē*) of the action. See Section A of Chapter Seven.

[68] This point will be further elaborated in the final section (D) of this chapter.

[69] Cicero, *De fato* 9.20.

[70] See Chapter Two, Section E.

[71] This sort of logical move, although not always obvious, characterizes a great many fatalist arguments. For example, in a fatalist argument by Richard Taylor discussed at length by S. Cahn, we find the premise "If P′ ('No naval battle occurred yesterday') is true, then it is not within my power to do S (to read a veridical account of the occurrence of a sea battle yesterday in today's newspaper)." What seems to be indubitably true is that "It is not possible both that P′ should be true and that I should do S" or "It is not within my power that (if P′ is true, then I should do S)." However, in Taylor's premise the modal phrase "not within my power" is given scope – illegitimately, I should claim – over the *consequent* of the conditional. If the modal phrase is considered in the "material mode," i.e., as a power or ability of an agent to perform an action, it should apply, I would claim, to the "conditional action" of my doing S if P′ is true. Cf. S. M. Cahn, *Fate, Logic, and Time* (New Haven and London, 1967), pp. 85ff.

[72] *De fato* 10.20.

[73] *Ibid.*, 10.21.

[74] *Ibid.*, 11.26.

[75] M. A. E. Dummett, 'The Reality of the Past', in *Truth and Other Enigmas*, pp. 358–374. Cf. Chapter Three, Note 56.

[76] *De fato* 12.27.

[77] *Ibid.*, 9.18: "futurum autem fuisse ex eo quia factus est intellegi debet."

[78] *Ibid.*, 12.28.

[79] Prior, *Past, Present and Future*, pp. 33–34. Prior actually quotes the principle as set forth in (rhetorical) interrogative form at *De fato* 12.27: "Potest igitur quicquam factum esse quod non verum fuerit futurum esse?"

[80] Cf. R. Thomason, 'Indeterminist Time and Truth Value Gaps', *Theoria* **3** (1970), pp. 264–281; M. J. White, 'Necessity and Unactualized Possibilities in Aristotle'.

[81] It is perhaps worth noting that a central conceptual component of the special theory of relativity is the denial of the phenomenon of an absolute simultaneity (and hence temporal priority-posteriority) relation. Metrical simultaneity is relativized to inertial frame; thus, two inertial frames in relative motion will choose different pairs of events as metrically simultaneous. So, according to the STR, the relation of temporal anteriority-posteriority is not a simple, 'fixed' two-place relation between events. Rather, it may be conceived as a three-place relation among event, event, and inertial frame.

[82] In an interesting article on Aristotle's *De int.* 9, V. R. McKim has advanced an interpretation of Aristotle on future contingents that depends on an ambiguity between " 'S will be P' (said earlier) was true" and " 'S will be P' was rightly said earlier to be true." McKim argues that the latter, but not the former, entails "It [was] necessary that S be P, i.e., impossible that S not be P." This strikes me as the most plausible alternative interpretation of Aristotle to the truth-value gap interpretation discussed in Chapter Two. However, I think that the distinction it depends on is compelling only within an atemporal or temporally fixed conception of the actual world and the events/states of affairs constituting it. See V. R. McKim, 'Fatalism and the Future: Aristotle's Way Out', *Review of Metaphysics* **25**/1 (1971), pp. 80–111.

[83] P. C. Plass, 'Timeless Time in Neoplatonism', *The Modern Schoolman* **55** (1977), pp. 1–19. See also Sorabji's monumental study, *Time, Creation and the Continuum*.

[84] It seems likely that, at Cicero's *De fato* 14.31–32, the claim that someone recasting Carneades' argument against fate as an argument against the present truth of future contingencies "says nothing" represents Carneades' own appraisal.

[85] *De fato* 14.33.

[86] *Ibid.*, 15.34.

[87] Plutarch, *Platonicae quaestiones*, 8.4.1007b–c.

[88] The idea that things could be temporally ordered by divinity without being causally ordered is an idea that gradually became more common in "Platonist" circles.

[89] Cf. Hintikka, *T&N*, pp. 72–76. There is a plausible, but fallacious, argument for the common ancient view – which has its Modern and contemporary counterparts – that "we can have genuine knowledge only of what is eternal or at the very least forever changeless" (*ibid.*, p. 72). Premise 1: For any X, it is necessary that if X knows that it is the case that p, then it is the case that p. Step 2 (from premise 1): For any X, if X knows that it is the case that p, then it necessarily is the case that p. Premise 2: If it necessarily is the case that p, then it eternally is the case that p. Conclusion (from step 2 and premise 2): For any X, if X knows that it is the case that p, then it eternally is the case that p. Premise 1 is, I think, almost certainly true, and premise 2 is not implausible. The problem, of course, is that the move from premise 1 to step 2 is another example of the inference of *necessitas consequentis* from *necessitas consequentiae*.

[90] Pseudo-Plutarch, *De fato* 5.570b–e.

[91] *Phys.* 8.1.251b27–28.

[92] I believe that Waterlow has made a similar point: "Thus coincidence, or *simultaneity*, as

between events not related by any one kinetic order is the basis of *temporal* order or succession, . . . In order for E_1, a member of kinetic series K, to be viewed as marking the terminus of a *quantifiable* interval, E_1 must be seen as indicating a *when*: that is, a point of temporal coincidence with some item in a different series, K′ . . . The result is a universal temporal order: universal, that is, in the sense that there is a place in it for every member of every pair of kinetic series K^x and K^y such that some member of K^x coincides with some member of K^y" (S. Waterlow, 'Aristotle's Now', *The Philosophical Quarterly* [St Andrews] **34**/135 [1984], pp. 110–111). My additional point is that it appears that, in order to obtain the series of "when's" or "now's" in which "there is a place" for each member of every *kinetic* series, something like a conception of cosmic time as a linear ordering must be presupposed. In commenting that "such an analysis may turn out to be circular" (*ibid.*, p. 111), Waterlow is, I take it, alluding to the same issue.

[93] *Phys.* 4.14.223b18–33.

[94] As I have argued in Chapter Two and elsewhere (e.g., 'Time and Determinism in the Hellenistic Philosophical Schools'), I would maintain that, relative to a given now, Aristotle has a very different view of the past and the future: the former constitutes a henceforth (from the now in question) temporally fixed linear series of individual events/states of affairs; but the future, relative to the now in question, is not a similarly determinate linear ordering of individual events/states of affairs. However, at one point in *Phys.* 4.13, it may seem that Aristotle is conceiving the future as a determinate linear series analogous to the past: "Troy was taken at a certain time (*pote*), and there will at a certain time be a flood (*kataklysmos*). It is necessary that they be determined with respect to the now. Therefore, there will be a certain quantity from this time to that [of the flood], and there was [a certain quantity from this time] to the past event" (222a25–28). However, the *kataklysmos* may be an example of an eternally (and necessarily) recurring event, a fact which, according to the interpretation of Alexander discussed in Chs. Two and Five, would give it a special status. According to such an interpretation, the future, from the perspective of a given now, would be "determinate" only with respect to such eternally and necessarily recurrent types of events/states of affairs.

[95] *De fato* 4.570a.

[96] *Ibid.*, 3.569c.

[97] The repeatability yields a sort of generality connoted by "*katholou*."

[98] Cf. *De fato* 4.569d–570e.

[99] *Ibid.*, 9.573b.

[100] *Ibid.*, 9.574a.

[101] *Ibid.*, 6.570e. Cf. Nemesius, *De natura hominis* 38.

[102] *Ibid.*, 6.570f.

[103] *Ibid.*, 6.570f–571e.

[104] This idea will be further explored in Chapter Seven, along with the concept of a distinction between reason and causes that is relevant to the determinism-responsibility issue.

[105] It is not clear, I think, precisely to what extent pseudo-Plutarch and other Middle Platonists recognized this consequence of their theory. I believe that there is some very indirect and circumstantial evidence in the *De fato* that pseudo-Plutarch is aware of it.

[106] This idea, which has roots reaching back to Aristotle's *EN* 3.5 (see Ch. Seven, Section A), is central to various contemporary discussions of the determinism-responsibility issue,

even some "compatibilist" accounts. See, for example, R. Foley, 'Compatibilism', *Mind* **87**/347 (1978), p. 427: "A person does x at t freely just if both (A) and (B) obtain: (A) Although he does x, he is able to do something else y, where he is able to do y just if (i) there is some z such that were he to will z he would do y, and (ii) there is some physically possible situation in which he would know y is the best practical alternative and knowing this would will z; (B) The person was and is able to regulate what he values, where this implies among other things that there was some time prior to t when the person was able to bring about his having at t different values and desires (or his having values and desires of different strengths) such that he would have been rationally induced to will differently at t." This is what I termed in Chapter Four a "modal" variety of compatibilism. Foley, it might be mentioned, is well aware of the importance of the analysis of being "able to regulate what he values" in condition (B): in particular, if the account is to escape circularity, this ability cannot itself be analysed in terms of conditions (A) and (B).

[107] The suggestion that consideration of fairness underly the incompatibilist position is further explored in Ch. Eight, Section B.

[108] It seems that we tend to be more ready to ascribe diminished responsibility for actions considered to be vicious on the basis of "external factors" taken to have some effect on the development of the agent's character "yielding" such vicious actions than we are to ascribe diminished responsibility for actions considered to be virtuous on the same basis. Although this attitude may speak well for human charity, it is difficult to see how it could be justified – as Aristotle in effect notes in *EN* 3.5 – if the ascription of diminished responsibility is made *solely* on the basis of "external" causal influence. I do not think that it is, however. For more on this, see Section B of Chapter Eight.

CHAPTER SEVEN

PLOTINUS AND HUMAN AUTONOMY

The historical part of the present study concludes in this chapter with the third century A.D. Neoplatonist Plotinus. Although there certainly are later figures in antiquity who made contributions to the philosophical discussion of the determinism-responsibility issue (perhaps most notably Proclus), Plotinus seems to me to be a particularly appropriate figure with which to close our discussion of the ancient development of this issue. This is so not merely because he is (probably) the greatest philosopher of late antiquity but also because when Plotinus philosophizes, he is very much aware that he is working against the background of a rich philosophical tradition, a tradition of which he intends to make full creative use. In this respect at least, he resembles contemporary academic or "professional" philosophers. Plotinus weaves together various themes we have already considered in the ancient discussions of responsibility and determinism. With respect to this particular issue, the most important historical influences on Plotinus seem to be Peripatetic – particularly Aristotle's discussion of responsibility in the *Nicomachean Ethics* – and Stoic. He develops his conception of "what is up to us" (*to eph' hēmin*) in explicit opposition to what he takes to be Aristotle's final word on the matter in *EN* 3.5. And his conception of causal determinism is heavily influenced by the Stoic conception of causation.

Since Chapter Two dealt largely with the issue of causal determinism in Aristotle and not with Aristotle's views on responsibility, I shall deal with the latter topic in the first section of this chapter. I shall then return once more to Stoic determinism and what I term "Aristotle's predicament" before I turn to an examination of Plotinus himself. Plotinus may, I think, be regarded as supplying an answer to "Aristotle's predicament" against the background of a conception of causation that is essentially Stoic.

A. BOOK III OF THE *NICOMACHEAN ETHICS* AND ITS AFTERMATH

Aristotle's treatment, in *Nicomachean Ethics* 3 and 7, of responsibility is by no means a simple one. Most of the basic elements of later philosophical discussions of the topic are found, at least in inchoate form, in

these passages. Aristotle *begins*, to my mind, in the right way: it is a fact, perhaps the most important part of the data with which we have to deal, that adult human beings are usually held responsible for their actions. However, in certain circumstances, either a person is *not* held responsible for an action or only a "diminished responsibility" for the action is attributed to the person. In *EN* 3.1 Aristotle approaches the problem negatively, as it were. He inquires into the sorts of conditions that are taken to defeat or diminish responsibility and decides that there are two general kinds of responsibility-defeating/diminishing conditions: "it seems, then, that those things are involuntary (*akousia*) that happen by compulsion (*bia*) or through ignorance (*dia agnoian*)."[1] Of course, Aristotle proceeds to refine these two conditions. His conception of compulsion turns out to be rather stringent: actions are "without qualification" compulsory "when the cause is in external circumstances and the agent contributes nothing" (*hopot' an hē aitia en tois ektos ē kai ho prattōn mēden symballētai*).[2] A criterion of an involuntarily performed act, in Aristotle's strong sense of "involuntary," is that it is an "act performed painfully and with regret."[3] And the sort of ignorance that is responsibility-defeating/diminishing is not ignorance of what is to be chosen nor of "universals" but of "particulars surrounding the action and to which it pertains."[4]

The tendency of most philosophical discussions of responsibility has been to pass rapidly from the negative perspective, that is from a consideration of the kinds of cases where responsibility is, in fact, held to be diminished or not present, to a search for some single responsibility-engendering feature of human action, some property of action or agent in virtue of which human beings can be said, in general, to be responsible for their actions. This is the "metaphysical turn" in discussions of human responsibility and freedom, and we find signs of it in Aristotle:

> Since the involuntary is what is done under compulsion or through ignorance, the voluntary (*to hekousion*) would seem to be that of which the source (or principle: *archē*) is in the agent, who additionally has knowledge of the particular circumstances in which the action occurs.[5]

We have here versions of the two conditions that have figured most prominently in subsequent (Western) philosophical discussions of the determinism-responsibility issue. For an agent to be fully responsible for an action, he himself must be the "cause" or "source" (*aitia, archē*) of the action. In Aristotle – and, I think, in our "common ('everyday': either moral or legal) reflection" on responsibility – this condition begins simply

as the positive statement of the claim that responsibility is diminished or eliminated when the agent has been coerced. But as we have seen, and as we shall soon see more fully, this condition soon takes on a metaphysical life of its own, often rather far removed from its rather humble origins.

The second condition of responsibility can be generally characterized as the requirement that actions for which the agent is responsible be done "knowingly." This condition also seems initially to have been, for Aristotle at least, simply the positive statement of the claim that responsibility is customarily held to be defeated/diminished when the agent is not in his right mind or is ignorant of some crucial matter of fact constituting the context of the action in question ("I didn't know the gun was loaded"). An additional relevant fact recognized by Aristotle is that, at least in some situations, the agent's responsibility for an action is held to be diminished by the hastiness or off-handedness with which it is done; on the other hand, persons are usually held to be *especially* responsible for actions which are carefully planned, duly considered, or done with "malice aforethought."[6]

One reason for our exactitude with respect to this last class of actions may be – and in Aristotle's case, undoubtedly is – that such actions are thought to be especially accurate manifestations of the character of the agent.[7] But why should we be particularly interested in character in determining questions of responsibility? The reason may be that there often is involved, at least implicitly, in the ascription of responsibility to human beings, some judgment concerning the praiseworthiness or blameworthiness of the agent; and, with respect to "practical action," what is especially praiseworthy or blameworthy about the agent is his character.[8] Here, then, is one connection between the two conditions. Possession of knowledge *of a certain sort* (i.e., the absence of certain sorts of ignorance) is a necessary condition of an action's having its source in the agent (i.e., being traceable to the agent's character).

There is, however, another possible connection between the two conditions. As we saw, the condition that the "source" of the actions for which the agent is fully responsible be "internal" to the agent begins as simply the positive statement of the coercion defeasibility condition for responsibility. The term "freedom" and its cognates (or their equivalents) often make their appearance at this juncture. But what is it for something "to be free" or "to act freely"? A classical account is that something is free or acts freely when it is "allowed to act, without external impediment, in accord with its essential nature." If man is essentially a

rational being, human freedom would consist in being allowed to act in conformity with the dictates of reason; and the absence of human freedom would be the result of anything that might prevent one from acting rationally.[9] This conception of freedom is, of course, a familiar one in the history of Western thought. And it plainly is one point of entry for the concept of reason and knowledge into philosophical discussions of determinism and human responsibility. However, it seems likely that a conception of knowledge that enters into such discussions in this way will differ from a conception of knowledge that enters into such discussions in the former manner: the requirement that an agent, in order to be responsible for an action, possess sufficient awareness of the "matters of fact" pertaining to the action that we could reasonably consider the action to be indicative of his character. This distinction is, I think, crucial to Plotinus' very complex attempt in the sixth *Ennead* to grapple with the concept of human freedom.

Of course, by the third century A.D. there had developed variant interpretations of the other metaphysical condition of human responsibility adumbrated by Aristotle: that the "*archē* of the action be in the agent himself." Recall that Aristotle says that an action is compulsory or coerced (and thus, that the agent is not fully or not at all responsible for it) when "its source is 'external', the compelled entity contributing nothing [to the action]" (*hou exōthen hē archē, mēden symballomenou tou biasthentos*).[10] The question that is left open in *EN* 3 is whether the existence of *any* type of "external" causal factors implies that the apparent agent "contributes nothing" to the action. Thinkers with incompatibilist inclinations will, of course, minimize the extent to which a voluntary action of an agent can be the "result" of factors external to the agent; while those of a compatibilist or reconciliationist stripe will allow that an agent can be rightly described as the "*archē*" of an act even if the act is the causal consequence of the "nature" of the agent plus (some of) the surrounding circumstances.

In antiquity, this philosophical dispute often centered on the question of how to interpret the phrase "*to eph' hēmin* ("what is up to us"). As we saw, one of the Stoic moves was to identify *to eph' hēmin* with *to dia hēmōn* ("what occurs through us"); in effect, (some) Stoics argue that when the essential (rational) nature of a person somehow figures as a *necessary condition* of the occurrence of an action, the action "occurs through" and is "up to" that person. Peripatetics, as we also saw, often emphasize the "two-sided possibility" criterion mentioned by Aristotle in

EN 3.5: "in those things in which acting is up to us (*eph' hēmin to prattein*), so is not acting, and *vice versa*."[11] Adherents to the Academic tradition, as well as Peripatetics, tended to equate the satisfaction of this criterion with the absence of a complex of "temporally antecedent, necessitating causes" (*proēgoumena aitia*). Both of the preceding traditions, however, exhibit an abhorrence of the introduction of Epicurean "causeless" (*anaitia*) events, even when such absence of causation is held to be a necessary-but-not-sufficient condition of human responsibility.[12]

On the other hand, even the most thoroughgoing determinists among the Stoics do not seem to be completely willing to deny Aristotle's claim that compulsion or coercion vitiates or diminishes responsibility. As A. Graeser comments,

> The Stoics, although they seem to have been well aware of the fact that any situation in which a decision is taken is, in fact, necessitated by preceding events, which they take to function as auxiliary and proximate causes, do not like to acknowledge the compulsory character of this necessitation to which man is subject. Even after allowance is made for such different suggestions as were proposed by various Stoics either to link or separate propositions about [*pronoia*] and [*heimarmenē*], the fact remains that the latter is always considered some sort of manifestation of the causal aspect of God's will. And man himself, since human soul shares consubstantial identity with the world-soul, accordingly functions as [*heimarmenē*]. At all events, no Stoic could ever think of necessitation as imposition, for it is this necessitation that provides the material, in view of which man can successfully prove that his principles of conduct are in accord with those of universal reason.[13]

This quotation points up what is, from Plotinus' perspective, a central problem with the Stoic doctrine. If my actions are necessitated by antecedent causes, am I an *autonomous* agent or "merely an instrument" of *heimarmenē*, doing *its* bidding and working out *its* plan, even if – like the dog of Chrysippus who, tied to the cart, gets up and walks when the cart moves – I do not "kick against the pricks"? In other words, is not some sort of autonomous metaphysical status – as well as lack of compulsion in Aristotle's minimal sense of "*bia*" – a necessary condition of freedom and, thus, of responsibility in the fullest sense of the term? Perhaps because of his own particular metaphysical principles, Plotinus finds this question a particularly pointed one. Before I turn directly to Plotinus, I shall return once more to the Stoics and Aristotle and the issue of human autonomy.

B. A STOIC METAPHYSICAL MOVE

According to Cicero's account in *De fato* 18, Chrysippus maintains that

if all things happen by fate, it indeed follows that all things happen by antecedent (*antepositis*) causes – not, in truth, principal and perfect but assisting and proximate causes (*verum ne principalis et perfectis sed adiuvantibus et proximis*). And if these latter [assisting and proximate] causes are not in our power (*in nostra postestate*), it does not follow that desire (*appetitus*) is not also in our power. . . . For they think that their claim that assent (*assensiones*) occurs through antecedent causes can be easily explained by them: although it is not possible for there to be assent without an arousing presentation, nonetheless since this presentation is a proximate and not a principal cause, the position which we have just now stated supplies an explanation for this, as Chrysippus would have it, – not indeed that that [assent] could occur without being elicited by any external force (for it is necessary that assent be aroused by an impression). But he returns to his cylinder and top, which cannot begin to move unless they are impelled; but when this has happened, he thinks that it is left to the cylinder to roll and the top to spin by their own nature (*suapte natura*). "So therefore," he says, "just as he who has pushed the cylinder has given it the beginning of motion, he has not given it its capacity for rolling (*volubilitem*), so a sense presentation impresses and, as it were, stamps its own appearance on the mind, but the assent will be in our power. Here, just as we said in the case of the cylinder, although it is impelled from without, it remains moving by its own force and nature. So if something were effected without any antecedent cause, it would be false that all things happen by fate. But if with all things whatsoever that happen, it is likely that a cause precedes, what reason could be adduced why all things do not happen by fate? – but provided that the distinction and dissimilarity that exists among causes is rightly understood.[14]

M. Frede comments – correctly, I think – on this passage as follows:

Chrysippus wants to maintain that everything that happens is fated, is determined by antecedent causes. On the other hand he also wants to maintain that this does not rule out human responsibility, because, though human actions are determined by antecedent causes, it is nevertheless the human beings themselves, rather than the antecedent causes, who are responsible for these actions. Quite generally, though what a thing does is determined by an antecedent cause, it is not the antecedent cause but rather the thing itself or something about that thing which is responsible for what it does, though, of course, not necessarily morally responsible; for only with beings of certain sort and under certain further conditions is responsibility moral responsibility.[15]

As Frede notes, it is significant that Cicero portrays Chrysippus as maintaining that the cylinder in his illustration rolls, after the external impetus is applied, "by its own force" (*suapte vi*):

this implies that there are two forces, two *vires* involved: not just the external *vis* of the antecedent cause, the person who gives a push (cf. 'nulla vi extrinsicus excitata' in 42), but also a *vis* on the inside which keeps the cylinder rolling once it has gotten the initial impulse. This suggests that there is something active, something which exerts a force, on the inside of the cylinder when the cylinder is rolling.[16]

The "*vis* on the inside" to which Frede is here referring is what the Stoics termed a "*synektikon aition*," which I am inclined to translate as "maintaining cause."[17] According to the characterization of Sextus Empiricus, "the effect of synektic causes obtains when they obtain, it is removed when they are removed, and it is diminished when they are diminished."[18] Similarly, Clement of Alexandria comments that

> a synektic cause is that, which being present, the effect remains, and being removed, the effect is removed. The synektic cause is also referred to by the synonymous expression "perfect in itself," since it is of itself sufficient to produce the effect.[19]

These *synektika* or *autotelē* causes (which are also the "*principales et perfectae*" causes of Cicero's *De fato*) seem to have been considered by some Stoics to be a very special kind of cause. For one thing, synektic causes are *contemporaneous* with their effects; and we saw in Chapter Five that if a cause temporally precedes its effect, it has difficulty qualifying as a *necessitating* cause, according to the temporal-frequency conception of relative necessity. That is, if a cause *precedes* its effect, there evidently is a time when the cause obtains but the effect does not. Hence, it is not, according to the temporal-frequency model, necessary that if the cause obtain, then the effect obtains. This problem about temporally prior causes is also noted by Sextus:

> Some, however, say that things present are causes of future things (*paronta mellontōn aitia*), namely "antecedent" (*prokatarktika*) causes, such as intense exposure to the sun [might be thought to be the cause] of fever. But some reject these causes, since a cause, which obtains with respect to something and exists relative to an effect, cannot precede its effect *qua* cause.[20]

Such puzzles about noncontemporaneous causes and effects – which are rooted, I believe, in some assumptions about the nature of causal "efficacy" – have bothered some contemporary philosophers as well as their ancient counterparts. Indeed, conceptual difficulties pertaining to the concept of a cause led Bertrand Russell to recommend the term's "complete extrusion from the philosophical vocabulary . . . . The law of causality, I believe, like much that passes muster among philosophers, is a relic of a byegone age, surviving, like the monarchy, only because it is erroneously supposed to do no harm."[21]

Clement elaborates on the view, mentioned by Sextus, of those ancients who denied that "prokatarktic" or antecedent factors are causes "in the fullest sense of the term":

> If anything is a cause (*aition*) and a thing which effects (*poiētikon*), it is certainly also a thing

through which (*di' ho*). But if something is a thing through which, it is not certain that it is also a cause. For many things cooperate in one effect (*apotelesma*) through which the end (*telos*) comes-to-be, but not all are causes . . . . Therefore, that which does not hinder is inefficacious (*to mē kōluon anenergēton*). Thus, that which does not hinder is not a cause, but that which hinders is. For it is in acting and doing that something is conceived of as a cause. Moreover, what does not hinder is separated (*kechōristai*) from what occurs, but the cause is related to (*pros*) what occurs. So what does not hinder would not be a cause. On account of this, then, [the effect] is brought about because what is able to hinder is not present.[22]

This view (a Stoic "variant"?),[23] which involves an asymmetry between "positive" and "negative" antecedent causal factors, has the greatest intuitive appeal within an Aristotelian metaphysical framework in which a thing has a particularly indwelling *hormē* or *impetus* to the action or behavior characteristic of things of the natural kind to which it belongs. Antecedent circumstances that *facilitate* or *enable* something to fulfill its proper function are, perhaps, necessary conditions of the thing's fulfilling its function; but such a factor is not, to quote Clement, a "cause absolutely" (*haplōs*):

Everything apart from which the effect is not able to come-to-be is of necessity a cause – but not a cause absolutely. For the cause 'without which not' (*hou mē aneu*) is not synektic but cooperative (*synergon*); and everything that acts produces an effect in conjunction with the 'fitness' (*epitēdeiotēs*) of what is acted on. For the cause disposes. Each thing is affected according to what its nature is since its 'fitness' is able to bring about an effect (*praktikon*) and has the logical status (*logon*) of those things 'not without which'. So the cause is impotent (*aprakton*) without [the object's] 'fitness'. Indeed [in a case where there is not a proper 'fitness' supposed], there is not a cause (*aitia*) but a 'coefficient' (*synergos*) since every cause is conceived of as acting.[24]

Thus, conditions that *contribute* to something's "acting in the natural way" are not really causes, in the fullest sense of the term: they do not *necessitate* the thing's acting in the natural way according to either the temporal-frequency model of relative necessity or the metaphysical view that postulates and "indwelling *hormē*" responsible for a thing's characteristic behavior. It is to be emphasized – as Frede indeed does – that this *hormē* or "synektic cause" is viewed as something active.[25] In our post-Newtonian age, we tend to regard the synektic cause of the cylinder's rolling, its "volubility," as a merely passive standing condition. The "real cause" of its rolling is the prokatarktic communication of force to it by the agent's pushing it. Inertia allows the effect of applied force to continue *after* the cause ceases to function as cause. As I suggested in Chapter Five, we often tend, I think, to extend metaphorically the notion of inertia to

the relation between temporally antecedent causes and their effects in general. The cause *initiates* an action or process of a certain sort, which continues according to its own "inertial" developmental or static character *sans* the initiating cause. The difference between many of the ancients and those of us who are "post-Newtonians" is that they see this developmental process or continuing action as the result of an indwelling *active hormē* or synektic cause exerting its causal influence simultaneously with the effect, while we see it as an essentially passive, "inertial" effect, the communicated legacy of a now departed cause.

Clement suggests, however, that when an external factor hinders the operation of a synektic cause that factor does indeed merit the appellation "cause."[26] Again, the asymmetrical view of antecedent factors is most compelling in the context of something like the Aristotelian metaphysics of "active" formal/final cause. Suppose that something X "effects its natural action or behavior" aided by "cooperating" prokatarktic features of the context of action. The opponent of the asymmetrical view might argue as follows: although such features do not hinder X's doing what it does, is it not the case that they hinder X's doing anything *other* than what it, in fact, does, if the Stoic sort of causal determinism ("same cause with same 'surrounding circumstances' [*periestēkota*] always yield same effect") is assumed? A plausible response is that talk of something's being hindered from acting in a way that is *not* in conformity with its objective nature is inappropriate. Given essentialism, i.e., the existence of an objective natural *hormē* for a thing, we can appropriately speak of "hindrance," "contraint," or "force" with respect to prokatarktic factors only if they oppose the operation of that internal *hormē* or synektic causal force.

The technical metaphysics of causation, then, may have provided at least some Stoics with grounds for maintaining that the *archē* of an action (its synektic cause) lies "within the agent" in cases where the action is an expression of the "objective nature" of the agent. In cases where that nature is foiled by opposing prokatarktic factors, however, these factors constitute an overriding causal constraint on the agent's exercise of its natural *hormē*. Hence, one might proceed to claim, the agent has not acted freely in these cases. Thus, there is in such a case some grounds for attributing to the agent diminished responsibility or for withholding responsibility completely. Frede characterizes the Stoic position in terms of a distinction

between a strict sense of producing or bringing about an effect and a weaker sense . . . . But then our consideration of the cylinder case also has shown that there is a stricter, narrower sense of 'bringing about' in which it is not the person who gives the push, but the perfect cause which brings about the rolling motion of the cylinder 'suapte vi et natura'.[27]

The Stoic metaphysics does indeed give a special status, among the various causal factors contributing to an action, to "what is up to the agent". However, as the cylinder illustration itself shows, the metaphysical view does not distinguish human (or sentient, or "conscious") agents from other "agents." Anything that has an indwelling *hormē* (that is, any natural thing at all, it seems) may "act according to its own force and nature (*suapte vi et natura*)." This "tolerance" built into the Stoic metaphysical conception of *to eph' hēmin* was, as we saw in Chapter Four, an object of criticism for Alexander of Aphrodisias. We shall see that Plotinus raises the same objection: *human* responsibility, he holds, is a special kind of responsibility and thus requires that human beings possess a special kind of autonomy.

C. MORAL RESPONSIBILITY AND ARISTOTLE'S PREDICAMENT

Suppose that, following something like the Stoic route, we hold that "internal nature" of the agent plus attendant circumstances determine the agent's actions. Yet, we maintain that if some actualization of the agent's internal nature is a necessary condition of the action – or, in other, words, if the action is done "through" (*dia*) the nature (which is its synektic cause) – the action can be said to be "up to" the agent and, consequently, the agent is responsible for it. Is it a sensible criticism of this view that, since the agent's having the nature he does is not "up to him," neither are the actions that flow from that nature as their synektic or principal and perfect cause?

I believe that Aristotle does think that the criticism is a sensible one with respect to "practical" action. He holds, however, that the acquisition of at least a good part of our character is up to us:

So, for the unjust and the intemperate man it was in the beginning possible for them not to become the sort of people they are. But for those who have become this way it is no longer possible for them not to *be* as they are. Not only are vices of the soul voluntary but, for some, vices of the body, and we censure them. No one censures those who are ugly by nature but those who are this way through lack of exercise and negligence. And similarly with respect to weakness and disability. No one would reproach the person blind by nature or from a disease or a blow, but rather pity him; but everyone would censure a person who is blind from drunkenness or some other form of intemperance. Of vices of the body, then, those

that are up to us (*eph' hēmin*) are censured, those not up to us not. Since this is the case, with respect to other vices those that are censured must be up to us.[28]

The point I wish to make is that it seems to make most sense to recast the question of responsibility for an action that is taken to be determined by some aspect of one's nature in terms of the question of responsibility for the possession of that nature *if* the "aspect of one's nature" at issue is something *acquired*. In the case of practical action, for Aristotle the relevant aspect of one's nature is preeminently one's character, the virtues and vices which, he says, are "states" (*hexeis*) that exist neither by nature nor contrary to nature but are acquired by habituation.[29] In the case of an aspect of one's nature that is considered to be acquired, it *apparently*, at least, makes sense to ask whether we ourselves are responsible for its acquisition or whether it was "thrust upon us from without."

Aristotle begins with the perfectly legitimate observation that people are sometimes held to be responsible ("blamed") for situations which they cannot *now* change but the development or inception of which *is* considered to have been "up to them." He generalizes this observation so that with respect to the totality of a person's "developed character," although the person cannot *now* change it, he *could* have avoided its development. I doubt that this generalization is legitimate (particularly in the light of Aristotle's own conception of character acquisition as habituation), but I shall not here attempt to deal with this complex issue.[30] However, the feature that I shall term the "transitivity of responsibility," that is, the attempt to ascertain whether an agent is responsible for an action by attempting to ascertain whether the agent is responsible for that aspect of the agent's nature from which the action flows, is a feature that seems most often to arise where the aspect of the agent's nature in question is acquired, as opposed to innate, in the strict sense of this term.[31] And if one further regards the human being before character development as "neutral" or a *tabula rasa* with respect to character, there is, I think, a strong inclination to suppose (*pace* Aristotle) that the *archē* of the character-acquisition is "external" to the agent (e.g., to be found in "moral training," or "environment" more broadly construed). At this point, the transitivity of responsibility comes home to haunt the thinker with compatibilist inclinations.

D. PLOTINUS AND *ENNEAD* 3

Plotinus is generally denominated a determinist, and, indeed, we find him taking what seems to be a determinist stance at the beginning of *Ennead* 3.1(3):

> With respect to things that come-to-be and things that always are, that is, created things not always the same with respect to their actuallization (*energeian*), it must be maintained that all of them arise in conformity to causes; what is uncaused is not to be admitted. Nor is any room to be given to vain "swerves" – either to precipitate motion of bodies, which occurs when nothing had previously determined it (*oudenos proēgēsamenou*), or to impulsive appetition of the soul, when nothing moves it to act in a way in which it previously did not. An even greater necessity would possess [the soul], a being "not its own master", but borne along by these sorts of motions, which are unwilled and uncaused. Something willed – that either external or internal – or something desired moves it. If an object of appetition does not move it, it is not moved at all.[32]

Although this passage is obviously directed against the radical Epicurean form of indeterminism, which seems to have been almost universally rejected outside of Epicurean circles in antiquity, there is no sign that Plotinus is working his way toward a more moderate form of Peripatetic indeterminism (adopted by the Middle Platonists as well), according to which all events/states of affairs have causes, but not all have antecedent "determining" (*proēgēsamena* or *proēgoumena*) causes. D. Amand speaks of Plotinus' "*système franchement déterministe*" and his difficulty of reconciling with that system his belief in "*la liberté de notre vouloir [qui] a ses yeux . . . constitue un fait moral incontestable.*"[33] In fact, Amand sees Plotinus as adopting a virtually Stoic position:

> Par ailleurs, Plotin, qui croit au dogme de la liberté humaine, tient fermement au déterminisme stoïcien. Il se refuse à admettre la moindre contingence véritable. Le fotuit, le hasard, le contingent n'on point de place dans son système, où toutes les actions, tant du monde intelligible que du monde sensible, s'accomplissent en vertu d'une nécessité de nature.[34]

In the third *Ennead*, however, Plotinus rejects several accounts of causation, at least two of which seem to be Stoic in provenance. He considers four accounts. (1) The first is atomism. (2) According to the second, which seems Stoic in character, there is an *aitia* "penetrating all things and this, not only moving (*kinousan*) but also creating (*poiousan*) each thing, they postulate as the same thing as fate and the most dominant cause, being, in fact, all things. Not only all other things, however many come-to-be, but also our thoughts come from the motions of that cause,

just as the parts of an animal are moved not by themselves, but by the controlling principle (*ek hēgemonountos*) of each of the animals."[35] (3) The third account, although it may have appealed to some Stoics as well as to some Platonists, seems to be a position that can be characterized as "general" astrological determinism: "Others, believing that the heavenly circuit (*phoran*) encompasses everything and creates (*poiousan*) all things by the motions, positions, and mutual arrangements of the planets and fixed stars – and believing this on the basis of prediction from these – judge that each thing comes-to-be thence."[36] (4) The fourth account, of which Plotinus distinguishes two variants, is obviously Stoic in provenance.

> The 'interweaving' (*epiplokēn*) of causes with one another and the 'descending chain' (*ton anōthen heirmon*), the later always following the earlier and these [the later] going back to those through which (*di' autōn*) they came-to-be and without which they would not have come-to-be, and the later being subject to (*douleuein*) those before them – all these views, one could say, apparently introduce fate in another way.[37]

Plotinus distinguishes proponents of this account into two groups, those that "make all things dependent on some one principle, and those that do not."[38] He opts, I think, for the second variant of the fourth account,[39] but what his position amounts to is not made very clear in the third *Ennead*. His criticism of the accounts which he rejects, however, is fairly straightforward.

After some standard criticism of atomism (e.g., the random movements of atoms cannot sensibly be invoked as the ultimate *archē* of the order [*taxis*] of the cosmos), he dismisses all accounts which appeal only to bodily causes on the very general grounds that it is not possible that "any of the functions for which soul (*psychē*) is responsible could come from these [material causes]; these functions must proceed from another source [*archē*]."[40] According to the first "Stoic" account (2), "some single soul, penetrating through the universe, effects all things in such a way that each thing is moved as a part to that point where the whole leads."[41] Plotinus' response is that "this excess of necessity and this sort of fate does away with this same fate – the chain and interweaving of causes."[42] His point is that the model of fate as a chain of causes presupposes *at least some* independence or autonomy among the "links." Consequently,

> if, with respect to the universe, everything that acts and that is acted on is one and if, therefore, one "individual" thing does not really come from another in conformity with causes, one thing always leading back to something else, it is not true that all things come-to-be in conformity with causes, but rather all things will be one. So that "we" would

not be "we" and no act would truly be "ours" (*oute ti hēmeteron ergon*). We ourselves would not reason, but our decisions would be the reasonings of another, just as the feet do not kick but we [kick] using them as [our] parts. Rather, each thing must be *each* (*dei kai hekaston hekaston*), and *our* actions and thoughts must exist, and the noble and shameful actions of each thing must be *from* that thing itself (*par' autou hekastou*) . . .[43]

It is obvious that Plotinus does not believe that the form of Stoicism which lays special emphasis on the unity of the whole cosmos (*to pan*) can leave sufficient room for individual human autonomy.

But what of a less radical form of Stoicism, one which does not interpret the unity of the cosmos in such a stringent fashion as to result in there really being only one substance? Before Plotinus turns to a consideration of such an account – (4)(a) above – he dismisses the account of "general astrological determinism" (3) with several arguments that had become standard anti-astrological "tropes" (derived, according to Amand, from Carneades), which it is not pertinent to discuss.[44] When he does take up the consideration of a form of determinism which – through a distinction of types of cause such as that discussed in section B of this chapter – allows an autonomy to "individuals" at least sufficient to distinguish the "links" in the chain of fate, he is scarcely more pleased with it than with the radical unity of account (2). Here, too, Plotinus' principal concern is with *human* autonomy. His principal criticism is the same as that of Alexander of Aphrodisias:[45] the Stoic account of "what is up to us" does not distinguish human agents from other, inanimate "agents." The account, says Plotinus,

involves the complete necessity of all things: since all things are possessed of causes, it is not possible that each thing [that, in fact, comes-to-be] should not come-to-be. Further, there is nothing preventing or nothing making something to turn out otherwise if all things are wrapped up in fate. The things that are set in motion by fate are of such a nature as to leave nothing to us but to be borne where they push us. Impressions (*phantasiai*) will arise from prior necessitating causes (*proēgēsamenois*), and behavior (*hormai*) will be in conformity with those impressions. What is up to us (*to eph' hēmin*) will be only a word. It is not the case that any greater significance will arise from this, that we "behave" (*hormōmen*), since the behavior has come-to-be in conformity with those [fated impressions]. What is in our power (*to hēmeteron*) will be of the same sort as that of other animals, of infants behaving in conformity with blind appetition, and of the insane. For these move. By Zeus, there is even "behavior" belonging to fire and to all the things that, being subject to a "constitution," are borne along in conformity with it. All those who see this do not keep to the argument, but, seeking other causes of this behavior (*hormēs tautēs allas aitias*), do not rest content with this principle (*archēs*) . . . It is necessary to bring in soul (*psychēn*) as another principle, not only the soul of the whole, but the soul of each individual along with this soul; as a principle of not a little importance, it twists together all things since it itself does not come-to-be, as

other things do, from "seeds" [the *logoi spermatikoi*, which can be identified with the temporally antecedent determining causes operative in the "physical world," I think] but is a cause of "first action."[46]

To put the point in a way that is not Plotinian, what Plotinus does is to distinguish two "orders": the order of ("physical") *causes* and the order of *reasons*. All is determined. But "determination by reasons" is a sort of determination different from "determination by causes." It is clear in *Ennead* 3 that Plotinus locates the human autonomy he is seeking in human participation in the order of reasons. But human beings are also corporeal beings and thus participate in the order of causes. Plotinus' conception of the nature of the interaction of the two orders at the locus of the human being remains disturbingly vague. At places in *Ennead* 3, Plotinus seems to suggest that, at least for some people, their rational decisions can, in effect, break the chain of physical causation and serve as "starting points" (without *physical* determinants) of new chains of physical causation.[47] This is a view which is not dissimilar to certain other earlier Platonic (and Peripatetic) forms of indeterminism. However, some have interpreted Plotinus, particularly in *Ennead* 6, as keeping the two orders quite distinct. According to one such interpretation, that of Amand,

> Bref, dans l'action pratique, il n'y a rien qui dépende de nous. La liberté résí de exclusivement dans l'intention honnête, dans la vertu comme disposition intérieure, dans l'intelligence affranchie de l'action. Seules la vertu et l'intelligence sont souveraines. Tout le reste est soumis à la nécessité du processus cosmique, en d'autres mots, à la fatalité. L'être vraiment libre est dépourvu de matière; ce qui dépend véritablement de nous se réduit à une réalité immatérielle. Plotin ne voit donc dans la liberté qu'une forme de la spiritualité de la tendance intellectuelle vers le Bien.[48]

Although I would agree that it is in *Ennead* 6 that Plotinus' position on human autonomy and responsibility gets most fully worked out, his position is, I think, somewhat more complex than Amand suggests.

E. PLOTINUS AND *ENNEAD* 6

A distinction such as the contemporary philosopher might draw between a theoretical proposition and particular "entertainings" or assertions or judgments having that proposition as their "context" or object seems *not* to have been very commonly or clearly drawn in antiquity. The lack of such a clear distinction facilitates the dichotomy between the realm of reasons and the realm of ("physical") causes that Plotinus wishes to

establish. The normal ancient paradigm for the realm of reasons, as I am here using the phrase, is the deductive model: reasons are "chained" together by the relation of entailment or logical consequence (in a very broad use of this term, of course). Now, if we are dealing with the sort of reasons that might be described by the Peripatetic terms "theoretical" or "scientific," these may seem to be quite independent of the realm of "contingent physical causation," since they are eternally true and necessary. The contemporary philosopher who possesses a more-or-less "standard" conception of causation might agree that the *propositions* themselves are, in a way, "independent" of the nexus of events/states of affairs knitted together by the cause-effect relation. But, particularly if he is a determinist, he will probably maintain that the state of affairs of an individual agent's accepting such propositions, or the event of the agent's coming-to-accept them, are very much a part of the nexus of physical causation.

The ancient epistemological and metaphysical traditions, particularly the Platonic and the Peripatetic, do not seem to have maintained the distinctions requisite for such a view, however. In fact, with respect to "pure" or "theoretical" intellection, both these traditions tend explicitly to identify the "activity" (or "state of affairs"?) of knowing and its "object" or "content." The idea of such an identification is, I think, very difficult for most contemporary philosophers to understand. And I do not here have the space – nor, perhaps, the ability – to attempt an elucidation of it. The import of such an identification is great, however, yielding the Aristotelian notion that humans "participate" in immortality through *theōria*, as well what may strike us as the even more *recherche* Peripatetic notions of "thought thinking itself" (not, evidently, a "category mistake" in the Peripatetic view) and the "agent intellect."

Plotinus accepts the identification of intellectual "activity" or "cognitive state" and its "content" with respect "pure intellection" (*nous*) and its proper object. In the fifth *Ennead* he discusses this identification, making – from our point of view, cryptic – statements such as "*nous*, with respect to its 'nousing' (*to noein*), establishes what is (*to on*); and what is, by its being 'noused', gives to *nous* both its 'nousing' and its existence."[49] Fortunately, this Plotinian doctrine does not have to be pellucid in order for us to appreciate its relevance to the issue at hand. The fact that the object or content of theoretical knowledge seem to be independent of the nexus of physical causation, and the identification of "content" with the "activity" or state of affairs of knowing, in the theoretical sense, together

allow us to infer that the activity/state of affairs of knowing is also independent of "physical" causal determinants.

However, in the case of practical deliberation (in the Aristotelian sense of the phrase), its "conclusion" is a judgment pertaining to what do "here and now": that is, the "content" of the judgment *is* the action, or at least, is very intimately related to it.[50] And, of course, what to do here and now depends in a very obvious way on the circumstances in which the agent finds himself. Aristotle himself, in *EN* 10.7, adduces as one reason for the superiority of the life of knowing (*theōria*) to the life of action (*eupraxia*) the relative self-sufficiency (*autarkeia*) of the former: "the just person needs those toward whom and in the company of whom to practice justice, and similarly for the temperate person, and courageous person, and each of the others."[51] Action *manifesting* virtues and vices is at least dependent on the realm of physical causation insofar as it is this realm that supplies the context or occasion for which virtuous action of a certain sort is the appropriate response. In other words, such an "external" context is a *necessary* condition for the virtuous action in question. Of course, this fact does not in itself entail that there is some complex of "external" causal factors causally *sufficient* to produce the virtuous action. But Plotinus regards even this sort of connection of moral action (*praxis*) with the realm of causation as detrimental to the autonomy of such action:

> . . . because there is a battle, we behave courageously. I ask, then, how is that action up to us, since if the battle had not occurred, the action would not have been performed. And similarly in the case of all other deeds in conformity with virtue, with respect to the outcome virtue is always necessitated to perform in this or that way. And if someone were to give to virtue itself the choice: whether it would wish, so that it might act – that there be battles so that it might act courageously, injustice so that it might ordain and establish what is just, poverty so that it might manifest generosity; or whether, when all things are going well, it would take quietude – it would prefer rest from action and that nothing should need any attendance from virtue. Just as a physician such as Hippocrates would choose that no one need his art. If virtue, which comes to actualization in practical actions (*energousa en tais praxesin*), is constrained [by the circumstances] to give assistance, how could what is up to it exist purely and simply (*katharōs*)? Shall we say, then, that while the actions (*praxeis*) are necessary, the reasoning and willing prior to the actions are not necessitated?[52]

Graeser, who finds in Plotinus' thought an anticipation of the Kantian "*guter Wille*," holds that for Plotinus, "what actually is in man's power in the sense that it depends entirely upon him *qua* subject of choice is the quality of his conduct [*to kalōs*]."[53] Interpreted in Aristotelian terms, this statement amounts to the claim that what the agent is really responsible

for are the "major premises" in the "practical syllogism." In other words, responsibility lies in commitment to certain moral standards of action and the resolve to act in conformity with those standards "as the circumstances permit."[54]

I believe, however, that Plotinus finds problems even with this account of what is up to us if the moral standards in question are linked, as both Aristotle and "the many" usually link them, with the traditional moral virtues. According to Aristotle's account – which, I think, represents a sophisticated working out of one "common conception" – the *archē* of the commitment to certain moral standards of action and the resolve to act in conformity with those standards is the *ēthos* or character of the agent. In the good person, the character is a complex of moral virtues (*ēthikai aretai*), each of which is a disposition or ability (*hexis*) "to hit the mean (*mesou . . . stochastikē*) . . . pertaining to passions and actions (*pathē kai praxeis*) for which there is a deficiency and an excess and a mean."[55] One problem for Plotinus is that the view he is considering would locate our "true freedom" (and responsibility) in a disposition or *hexis*, which is a sort of potentiality for acting in a certain way in certain contexts, rather than in the corresponding actualization of this potentiality (the virtuous act, itself). For someone influenced by Aristotelian metaphysics, as Plotinus certainly is, this is a curious and suspect consequence of the Aristotelian conception of *aretē*.[56]

Another problem with the Aristotelian conception of character, more obliquely addressed by Plotinus, pertains to the transitivity of responsibility issue. If our actions, or at least their "moral aspect," are determined by our character plus the attendant circumstances, the part contributed to those actions by our character might be "up to us" even if the attendant circumstances are not. But, according to Aristotle, our character is something we acquire. While Aristotle does not wish to maintain that the moral virtues constituting the character of a good person are irrational or arational, he nonetheless maintains that they are acquired as the consequence of habituation and "moral training," performing the sort of actions in which the virtue in question, once acquired, tends to issue.[57] This process of character acquisition thus might seem to involve the "molding of passions and actions" by physical causes; i.e., a character of a certain sort is not obtained as a consequence of "pure" ratiocination, independent of the realm of physical causation. Therefore, the problem of transitivity of responsibility arises. Since something external to us, e.g. our moral training or, more generally, the moral

environment in which we have been reared, might well seem to be an "external *archē*" of our character, for which we are not responsible, it could be argued that we are not, in general, responsible for the actions produced by that character. Summarizing the Aristotelian account of voluntary action, i.e., "everything is voluntary (*hekousion*) which is done without compulsion and with knowledge (*ho mē bia meta tou eidenai*),"[58] Plotinus comments as follows:

> It is necessary that the knowledge of the person acting voluntarily be not only that pertaining to particulars, but also general (*holōs*). On account of what, then, is someone acting involuntarily if he is ignorant that he is the son, but not acting involuntarily if he is ignorant that [the deed in question, e.g., murder or incest] ought not to be done? If because he ought to have learned this, still his not knowing that he ought to learn and what diverts him from learning are not voluntary.[59]

As a consequence of this apparent lack of autonomy of the moral character of human agents, Plotinus is led to reject the Aristotelian concept of moral *aretē*:

> We say that both virtue (*aretēn*) and reason (*noun*) are in control and that to these it is necessary to refer what is up to us and freedom (*to eleutheron*); and that what is up to us is to be identified with these, which have no master. [And we say that] virtue desires to be autonomous (*to eph' heautous einai*) in exercising authority over the soul, so that it might be good. To this extent (*mechri toutou*) it is free itself and imparts freedom to the soul . . . . One ought to maintain, then, that this virtue is a sort of reason (*noun tina*) – but not the sort reckoning in affects (*pathē*) subject to and measured by reason (*logō*), since these, which are set straight by character and training (*ethesi kai askēsesi*), seem to touch closely on what is bodily.[60]

Freedom (*to eleutheron*), the "metaphysical source" of responsibility, is found only in theoretical reason, since the "realm of reasons" is independent, according to Plotinus' picture, from the realm of physical causation. *Moral* virtue or excellence (*ēthikē aretē*) becomes entirely ancillary to theoretic virtue: it "partakes of freedom" insofar as it leads the agent away from the things of the body to the realm of theoretical knowledge, where the agent's "true self," the real locus of its freedom and self-determination is to be found. The Aristotelian conception – and one prevalent popular conception – of the moral virtues as essentially pertaining to the ordering of the actions and passions of human beings within the context of social intercourse has, in effect, been abandoned. The virtues so conceived – as well as the character they constitute – are too closely tied to the realm of physical causation for Plotinus to locate in them the true source of our nature as responsible beings.

Plotinus' doctrine is presented, of course, in heavily embellished metaphysics. The human soul does not, he maintains, *entirely* "descend into the corporeal." Thus,

> some part of it is always in the intelligible realm (*en tō noētō aei*). But if that part that is in the sensible realm should be in control (*kratoi*) – or rather, if it should *be* controlled and confused – we would not have awareness of those things which the part of the soul above knows.[61]

Reason in the theoretical sense (*nous*), or the noetic part of the human soul is, *qua* noetic, free from the nexus of physical causation. But might we not say the human self, identified in some sense with *nous* or the noetic part of the soul, is "determined" to act rationally? And would not such determination compromise its autonomy? Plotinus addresses just such a concern in *Ennead* 6.8.4.

> A difficulty must be raised with respect to *nous* itself: whether what has a nature and acts in conformity to that nature could be said to have freedom and self-determination (*to ep' autō*) since it is not up to it to *not* do [what it does].[62]

Plotinus proceeds to raise the reasonable question whether "being up to oneself" (*to ep' autois*) could be entirely properly predicated of those things to whom practical action (*praxis*) does not belong." "But," without really answering this question, he continues, "with respect to those things to which practical action [*does* belong], there is necessity from without. For they do not engage in practical action randomly [or without cause: *matēn*]."[63] However, the "activity" of theoretical reason cannot correctly be said to be *externally* determined.[64] Moreover, Plotinus suggests that the notion of something's "being determined to an action by its nature" is not really applicable

> if there [with respect to *nous*] the "being" and its "actualization" are the same thing. If, then, it [the *energeia* of theoretical reason, or "nousing"] is not "through" another and is not "up to" another, how is it not free? If "being up to oneself" (*to ep'autō*) is not appropriate [terminology] and there is here something greater than being up to oneself, the ["activity" of theoretical knowledge] is up to oneself in the following sense: that it is not up to anything else and that there is no other controlling power (*kyrion*) of the activity [or "actualization": *tēs energeias*].[65]

Since the "activity" or state of knowing in the theoretical sense is not really different from its "contents," i.e. from what is known, it is not the case that the rational, "objective" nature of what is known can be rightly said to "determine" the activity/state of knowing. However, it may be the case that the "practical action" X of an agent A at time t is determined by

a combination of the external circumstances obtaining at t (in order to act bravely at t, there must at t be an occasion for brave action) and the moral training and environment to which A has been subjected (in order for A to have the sort of character that disposes him to act bravely in the circumstances obtaining at t, he must have been "brought up rightly").

Plotinus, I believe, sees some peculiarity in applying what had become the canonical phrase for responsibility, "up to one-self" (*to ep' autō*), to the *energeia* of knowing, which seems to be more a "state" than an "activity" in the sense of "doing something."[66] Nonetheless, influenced by an essentially Stoic picture of causal determinism and an essentially Aristotelian picture of practical action, he is sufficiently fearful of the threat to responsibility posed by the transitivity of responsibility issue to refuse to locate "what is up to us" in the realm of practical action, even if that action is "rational" in the sense of involving the faculty of calculation (*logismos*).[67] In his discussion of *akrasia* Aristotle mentions that Socrates had thought – and Aristotle himself appears to agree – that it would be a fearful thing (*deinon*) if, "when knowledge (*epistēmē*) is present, something else were to master it and drag it around like a slave."[68] Plotinus seems to conclude that it is only theoretical knowledge that is safe from this servitude.

There is a sense in which all "practical activity" involves reason's "being dragged around like a slave" for Plotinus. As J. M. Rist notes in an interesting study of the concept of *prohairesis* ([deliberative] "choice") in Neoplatonism,

> There is no rational choice made by the soul when it falls. What it does is allow itself to be seduced by pleasure, or by the wish to be self-supporting. Plotinus does not say that it deliberately chooses pleasure, or that it deliberately chooses a false idea of self-sufficiency. It is seduced into acting without the use of its rational powers and its previous decisions.[69]

And,

> Plotinus' philosophical problem concerns the reason why the soul should act in a non-rational and hence immoral way. His answer is that there is no *reason* why it should; hence it does not *decide* to, but is misled to. Thus the problem is the weakness of the will to good, not the possibility of a decision for evil. The "choice" of evil is deliberate but not deliberated. And the "will" to good is weak because the soul is the third hypostasis, two stages away from the will of the One.[70]

With respect to "practical action" (*praxis*), then, Plotinus holds that our "immoral" actions are not "up to us" in the fullest and most strict sense of this phrase. But neither would he hold, I have suggested, that those

practical actions conventionally termed "moral" or "virtuous" are "up to us," in the most strict sense of the phrase. These too tend to have "causes" rather than (or, perhaps, "as well as") "reasons." Although reason enters into virtuous actions and choices as deliberative calculation (*logismos*) and choice (*prohairesis*), reason in these forms is not self-determining but subject to "external" causal influence in the form of (a) the external circumstances in which the practical agent finds himself and (b) that aspect of character formed by training and "environment."[71] Reason in this "applied" sense *does*, in effect, "get dragged around like a slave": therefore, it does not constitute the true and autonomous "us."

F. THE CONSTATIVE AND THE PERFORMATIVE VIEWS OF RESPONSIBILITY-ATTRIBUTION

There are, I believe, two basic pictures of the activity of responsibility-attribution, which can be set forth in the terminology of contemporary speech act theory. These two pictures would seem to correspond – but perhaps not *exactly* correspond – to compatibilist and incompatibilist positions with respect to responsibility; they may, in fact, be of some help in determining what is "at the heart" of the dispute between the compatibilist and incompatibilist. I shall suggest that Plotinus, despite some superficial appearances to the contrary, belongs in the company of most incompatibilists, who adopt a "constative" picture of responsibility-attribution.

According to what I shall term the "performative" picture,[72] attributing "moral" responsibility to people is a generic action, under which is subsumed a number of "practical" activities, e.g., finding the defendant guilty, not allowing a student to "make up" an examination missed because he was on a skiing trip, criticizing President Reagan for his Latin American policies, etc. What the adherent to the performative picture denies is that attributing moral responsibility to people essentially involves ascertaining that people have a particular ("metaphysical") property, that of "being morally responsible beings," and the consequent attribution of that property to them. Responsibility-attribution, according to the performative view, is basically *doing something* (or, more accurately, comprehends a variety of "doings"), rather than *saying something*, in the sense of predicating a property of a subject.

The performativist maintains that these "doings" need not have as a necessary condition of their appropriate performance the ascertainment

that human beings possess some single property in virtue of which they are morally responsible agents. According to the performative view, the basic necessary condition for appropriate responsibility-attribution is finding (or assuming) an appropriate *causal* connection between the agent who is being "held responsible" and the action for which he is being held responsible. In this regard, an action that might be described as the attribution of moral responsibility does not differ from the attribution of responsibility to inanimate agents – deciding, for example, that a faulty tie rod was responsible for the automobile accident. In the case of so-called "moral responsibility," however, appropriate responsibility-attribution typically involves (a) reference to an action of a human being thought to have some sort of significance with respect to those aspects of human relationships conventionally termed "moral" and (b) ruling out the presence of a number of responsibility-defeating or diminishing factors. It is these additional conditions, according to the performativist, that distinguish moral responsibility from the sort of responsibility we attribute to inanimate agents. The set of defeasibility conditions may be a "vague" one. That is, the list may vary somewhat across cultures and through time – as well as with respect to special conditions characterizing the agent (e.g. the list may be different for children and adults). And one may sometimes be unsure whether a given characteristic is to be counted as responsibility-defeating or -diminishing in a particular case. But that is just the way this complex of activities works.[73]

On the other hand, the constative picture of responsibility-attribution would tend, I suspect, to be congenial to those with incompatibilist inclinations. While the adherent to the constative picture is willing to allow that responsibility-attribution is *connected* with the various "practical activities" on which the performativist focuses, he will maintain that it is an essentially *constative* speech act, the assertion that a certain "fact of the matter" obtains, namely, that an agent or type of agent possesses (with respect to his performance of a given action) the property of "being a morally responsible agent." There is, he claims, some single "metaphysical" responsibility-engendering property (although perhaps a complex property – if properties can be complex) connoted by the verb phrase "is a morally responsible agent." It is in virtue of a human being's possession of this single property that an attribution of moral responsibility to him is true. The possession of such a property by the agent or agents in question is a necessary condition of our properly engaging in most of the various *practical* responsibility-

attributing activities enumerated by the performativist. Thus determining whether human beings ever, in fact, possess this metaphysical property is of great practical import to the constativist: all, or most, of our practical activities of responsibility-attribution might turn out, on the constative view, to be unwarranted, "proven wrong by the metaphysical facts."

Although this property of being a morally responsible agent might be "primitive" and incapable of further analysis, most constativists wish to provide some further elucidation of the property. If the constativist holds that the property either is partially constituted by or entails lack of causal determination of the acts for which the agent is asserted to be morally responsible, the constativist is an incompatibilist.

Plotinus, I believe, is a constativist and an incompatibilist. The responsibility-engendering property is freedom, and this, in turn, is analyzed in terms of an agent's membership in the "intelligible realm," i.e., his capacity for the *energeia* of knowing in the theoretical sense. The "activity" or state of knowing, which Plotinus refuses to distinguish from its "content", he holds to be independent of *causal* determination. And talk of a determination of this activity or state by its "objective content" in a sense that would render the knower's knowing not "up to him" Plotinus rules out because of the metaphysical considerations we have discussed.

G. SUMMARY AND CONCLUSION

Plotinus, like earlier Middle Platonists, is concerned that the location of human action in the causal nexus will entail that such action is not "up to" its (apparent) agent. Plotinus wishes to maintain, as he puts it, that

> there are other causes [than "ourselves"] cf the lack of sound judgment (*tou men mē phronein*). And for those who are of the opinion that fate is an external cause, it is perhaps right to say that these [causes] act in conformity to fate. But the best things are from us (*ta de arista par' hēmōn*); and we have this nature when we are "detached" (*monoi*).[74]

Plotinus' problem is that, accepting an essentially Aristotelian view of practical action, he finds that with respect to practical action we are all too "attached" to the nexus of causation. At the very least, the *execution* of virtuous action depends on certain "external" necessary conditions, the right social circumstances. Furthermore, according to the Aristotelian view, correctness of practical action involves both the possession of the

moral virtues (constituting the character of the *spoudaios*, the "excellent" person) and prudent calculating yielding actions in conformity with this complex of virtues. "Prudent calculation" can be used to achieve evil ends, however. As Aristotle notes, "the incontinent and the bad man will achieve by calculation (*ek tou logismou*) what he has set before himself; so that he will have deliberated (*bebouleusthai*) rightly and thus have obtained a great evil."[75] Significantly, I believe, the term "*logismos*," which is used by Aristotle in a morally neutral sense here, is the term that Plotinus customarily uses when speaking of reason operating at the level of practical action. For Aristotle, "[moral] virtue makes the target right, and practical wisdom (*phronēsis*) makes the means to the target right."[76] In what sense reason enters into the acquisition of the moral virtues for Aristotle is not an easy question to answer. But it does seem that his picture of virtue acquisition through training and habituation might be termed "naturalistic" rather than "intellectual." Plotinus, in accepting this picture, encounters the transitivity of responsibility problem. Suppose that an agent is responsible for an action because of his "rational choosing" to perform that action. But if, in the case of practical action, the action is a consequence of external circumstances, plus agent's "reason," *plus* agent's character, transitivity of responsibility might be invoked in the form of the claim that the agent is responsible for the action only if he is responsible for the character that is one of the causal factors entering into its performance. If the character acquisition is not (completely) voluntary, the act that proceeds as "effect" from character as "cause" will not be (completely) voluntary either, according to the principle of transitivity of responsibility.

Plotinus, it seems, is not really convinced by Aristotle's claim that an agent's acquisition of character is voluntary – and for the very Aristotelian reason that character acquisition is not the "effect of reason alone." As we saw, Plotinus questions the response of Aristotle in *Ennead* 6.8.1:

> On account of what, then, is someone acting involuntarily if he is ignorant that he is the son, but not acting involuntarily if he is ignorant [that the act in question] ought not be done? If because he ought to have learned this, still his not knowing that he ought to have learned and what diverts him from learning are not voluntary.[77]

Plotinus is thus led, almost *malgré lui*, to the conclusion that what is "up to us," in the fullest sense of the phrase, cannot be practical actions themselves or even, it seems, the "rational aspect" of practical actions: our status as fully autonomous agents is to be found in the realm of

theoretical reason where our "activity" of knowing can be altogether isolated from the Stoic causal nexus.

As we saw, the attempt of the Middle Platonists to preserve our responsibility for actions by isolating them from "external" causal influences altogether seems to imply that the actions for which we are most fully responsible may turn out to be "trivial" opnes, ones which we are equally as likely to perform as not to perform relative to any given set of circumstances. In the case of Plotinus, his different type of attempt to preserve our responsibility for actions by isolating them from "external" causal influences altogether seems to imply that the type of "action" for which we are most fully responsible is "knowing," as opposed to any sort of "doing" in which we might engage. Both implications are, I think, counterintuitive, and both are admitted only reluctantly (and perhaps in a somewhat ambivalent way) by the Middle Platonists and Plotinus.

Plotinus' strategy might be summarized by the statement that he attempts to preserve human responsibility by drawing a distinction between reasons and causes and arguing that reasons do not "determine their effects" in the way that causes do. But insofar as the statement applies to Plotinus, the sense of "reasons" seems to be limited to "*theoretical* reasons"; and the sense in which these "have logical consequences" is different from the sense in which "physical" causes have effects. It is perhaps worth noting that the same statement might be used to summarize one of the most interesting contemporary strategies for dealing with the determinism-responsibility issue. A. I. Melden develops this strategy in a subtle but cogent fashion in his monograph *Free Action*.[78] In the case of Melden, however, the term "reasons" has more the sense we would expect: "reasons *for actions*," i.e., reasons in the "practical" sense.

The transitivity of responsibility phenomenon is a *bête noire* for both the Middle Platonists and Plotinus. If "what is up to us" fits squarely in the chain of causation, it will not really be up to us: responsibility will be transferred from the "immediate agent" back along the chain either to lodge with a first cause or to be dissipated along an infinite chain with no first link. The Middle Platonist and Plotinian strategy is to isolate what is up to us (at least in the paradigmatic sense) from *any* significant "external" causal influence by arguing that it is only a particular kind of "action" that is (paradigmatically) up to us: an action the performance of which is no more probable than its non-performance, relative to any set of external circumstances, in the case of the Middle Platonist strategy; an

"action" of knowing in the theoretical sense, in the case of the Plotinian strategy. In effect, Melden's strategy also is to isolate human actions from the chain of causation. The strategy does not result in his adopting a revisionist conception of what is (paradigmatically) up to us, however. Rather, he argues that human actions – in the everyday sense of "actions" – do not fit the "causal paradigm" of explanation.

Although I do not have space to do justice to Melden's very sophisticated argumentation, his conclusion, in brief, is that it is a mistake to suppose that various "mentalistic" concepts (e.g., beliefs, intentions, motives, desires) invoked to explain human actions denote events that function as *causes* with respect to those actions and as *effects* with respect to other "external causes." With respect to the traditional determinism-responsibility issue, Melden comments as follows:

> Does the rejection of the causal model [with respect to human actions] imply that actions are uncaused, that freedom is to be purchased at the expense of a capricious indeterminism, or of a libertarianism that misrepresents every responsible action as an heroic effort that somehow thwarts the causal order? Quite the contrary, the argument is designed to show the logical incoherence involved in the supposition that actions, desires, intentions, etc., stand in causal relations, either in the Humean sense or in any sense in which the term 'causal' is employed in the natural sciences. And if the argument is correct, determinism, if it employs this sense of cause, is not false but radically confused. So it is with indeterminism and Libertarianism which grant to determinism the intelligibility of employing the causal model – these seek to avoid the conclusion that each of us is the hapless victim of events, in the former case by viewing actions as causally indeterminate happenings, in the latter by viewing actions for which a person is responsible as events produced by extraordinary and mysterious self-exertions. The trouble in all these cases is that the applicability in principle of the causal model is taken for granted.[79]

Melden reaches this conclusion through a careful examination of the "language of action."[80] A question likely to occur to the reader of this synopsis of his position is whether the "scientific identification" of actions with bodily movements, intentions with neural states, etc. would not reintroduce human actions into the nexus of causation and again raise the problem posed by the transitivity of responsibility phenomenon. Melden thinks that the idea of an identification of human actions with – or "reduction" of human actions to – bodily movements, neural states, etc. is incoherent. Again, his argumentation is largely based on careful analysis of our use of locutions such as "*treating* a case of bodily movement as a case of an action" and "*interpreting* a bodily movement as an action."

For readers less charmed than I with the methodology Melden adopts

here, this will prove to be the weak link in his argument. In my view, however, Melden is correct in questioning the coherence of a "universal" application of the causal model of the sort assumed in "traditional" discussions of the determinism-responsibility issue. Yet his own account is "traditional" in at least one respect. He seems to assume that *if* human actions could coherently be fitted into the causal model, the phenomenon of transitivity of responsibility would then pose a real threat to the everyday assumption that people are generally responsible for what they do. I think that this assumption should also be questioned. I propose to do so in a "philosophical postscript" occurring in the second section of the next and concluding chapter of this book.

NOTES

1 *EN* 3.1.1111a.22.
2 *Ibid.*, 1110b1–3.
3 *Ibid.*, 1110b18–19.
4 *Ibid.*, 1110b33–1111a1.
5 *Ibid.*, 1111a22–24.
6 Cf., for example, Aristotle's discussion of the incontinence (*akrasia*) due to anger, in *EN* 7.6, which he holds to be "less disgraceful" than that due to appetite (1149a24–25). With respect to *akrasia*, something has gone wrong in the process by which our actions should be choices (*prohaireseis*) reflecting our "values." Whereas, with respect to wickedness or vice (*kakia*), the values are wrong: "That *akrasia* is not vice is clear – though perhaps in a certain respect it is. For the former is opposed to choice (*prohairesin*), the latter in conformity to it" (*EN* 7.8.1151a5–7). Aristotle does maintain, however, that not everything that is voluntary is an object of choice (*EN* 3.3.1112a14–15) issuing from previous deliberation.
7 Much of Aristotle's "ethics" is, in contemporary terminology, "action theory": in the case of "practical actions" (*praxeis*) – where *akrasia* has not interfered in the process – the moral virtues constituting character provide, in Aristotle's view, the "starting points" issuing in *prohairesis* and action.
8 Cf. *EN* 1.12.
9 Cf., for example, the account of Plato. According to the view developed in the *Republic*, *thymos* and *epithymia* in a diseased (unjust) soul prevent the soul from acting rationally and thus compromise its freedom (*Rep.* 577dff.).
10 *EN* 3.1.1110b16–17.
11 *Ibid.* 3.5.1113b7–8.
12 Few libertarians wish to maintain that absence of causal necessitation, relative to some temporally antecedent, "external" event/state of affairs, is a *sufficient* condition of the immediate and apparent agent's being "morally responsible" for the action.
13 A. Graeser, *Plotinus and the Stoics: A Preliminary Study* (Leiden, 1972), pp. 113–114.
14 Cicero, *De fato* 18.41–42.
15 M. Frede, 'The Original Notion of Cause', in *Doubt and Dogmatism*, pp. 234–235.
16 *Ibid.*, p. 236.

[17] Galen reports, as Frede notes, that it was the Stoics that introduced the concept and the term '*synektikon*.' Cf. Frede, *ibid.*, p. 243: "Since it is a primary function of the *sunektikon* to hold together the thing it is the form of it seems safe to assume that it is this function to which the *sunektikon* originally owes its name. But it also seems to be this very same *sunektikon* which is not just the cause of the being of something, but also of its behavior."
[18] *PH* 3.15.
[19] Clement of Alexandria, *Stromata* 8.9, ed. D. L. le Nourry, Patrologiae Cursus Completus (Series Graeca), ed. J.-P. Migne, Vol. 9 (Paris, 1857), p. 600.
[20] Sextus Empiricus, *PH* 3.16.
[21] Bertrand Russell, 'On the Notion of A Cause', reprinted in *Mysticism and Logic* (New York, 1957), p. 174. See also Chapter Five, Section A and the discussion in my 'Causes as Necessary Conditions: Aristotle, Alexander of Aphrodisias, and J. L. Mackie'.
[22] Clement, *Strom.* 8.9. (Migne, pp. 593, 596).
[23] Clement's *Strom.* 8.9 seems to represent a not terribly coherent compilation of several different classificatory schemata of causal factors. One result – among others – is ambivalence as to whether non-synektic necessary conditions of an effect should be called "causes" at all. (Cf. Alexander's ambivalence as to whether "accidental causes" are really causes at all.) Since there are obviously Peripatetic as well as Stoic components in Clement's discussion, it is also possible, I think, that the denial of causal status to some *sine qua non* factors represents a (Stoicizing) Peripatetic view.
[24] *Strom.* 8.9 (Migne, p. 596).
[25] Frede, 'The Original Notion of a Cause', p. 236.
[26] *Strom.* 8.9 (Migne, p. 596): "*dio ouk estin aition to mē kōluon, alla to kōluon.*"
[27] Frede, 'The Original Notion of a Cause', pp. 237–238.
[28] *EN.* 3.5.1114a19–31.
[29] *Ibid.*, 2.1.1103a23–26.
[30] A relevant consideration here, perhaps, is that when a person "acts out of character" we often seem to be particularly concerned to try to find a cause/explanation for that behavior – often an explanation in terms of "external pressures" of some sort. For more on the notion of one's developing one's own character, see R. Foley, 'Compatibilism', *Mind* **87**/347 (1978), pp. 421–428.
[31] It is far from obvious that with respect to character acquisition, Aristotle thinks of the infant or child as a *tabula rasa*, however: rather, he says (*EN* 2.1.1103a25), "we are by nature able to receive them [the virtues]" (*pephykosi men hēmin deksasthai autas*).
[32] *Ennead* 3.1(3).1.13–24. For the text of the *Enneads* I have used the edition of Henry and Schwyzer: *Plotini opera*, ed. P. Henry and H.-R. Schwyzer, 3 vols. (Oxford, 1964).
[33] David Amand (Emmanuel Amand de Mendieta), *Fatalisme et Liberté dans L'Antiquité Grecque* (Amsterdam, 1973), pp. 157–158.
[34] *Ibid.*, p. 159.
[35] Plotinus, *Ennead* 3.1.2.19–25.
[36] *Ibid.*, 3.1.2.26–30.
[37] *Ibid.*, 3.1.2.30–36.
[38] *Ibid.*, 3.1.2.36–38.
[39] What this position amounts to, for Plotinus, will be discussed in Sections E and G of this chapter.
[40] *Ennead* 3.1.3.34.

[41] *Ibid.*, 3.1.4.1–3.
[42] *Ibid.*, 3.1.4.9–11.
[43] *Ibid.*, 3.1.4.16–27.
[44] This dismissal occurs in *Ennead* 3.1.5. E.g., many different types of being with many different types of "destiny" are born at the same moment; if their destinies are determined by the configuration of the heavens at that moment, why are they not all alike? Cf. Amand, pp. 49–61.
[45] Cf. Alexander, *De fato* 14 and the discussion in Chapter Four, Section C.
[46] *Ennead* 3.1.7.8–3.1.8.8.
[47] The consequence would be that rational decisions pertaining to "practical action" in the Aristotelian sense would be fully "up to the agent." As I argue in the following section, I do not think that this is Plotinus' considered view, however.
[48] Amand, p. 163.
[49] *Ennead* 5.1(10).4.27–28.
[50] Cf., for example, Aristotle, *EN* 6.10.1143a8–10: "For practical wisdom (*phronēsis*) is able to command; its end is what one ought to do or not to do. But sagacity (*sunesis*) is only able to discern (*kritikē*)."
[51] *Ibid.* 10.7.1177a30–32.
[52] *Ennead.* 6.8(39).5.8–24.
[53] Graeser, *Plotinus and the Stoics*, p. 119.
[54] According to such an interpretation, this commitment is the "aspect of [*praxis*] . . . to which the notion of [*autoexousion*] applies" (*ibid.*).
[55] Aristotle, *EN* 2.6.1106b15–18.
[56] Cf. *Ennead.* 6.8.5.25–28. I understand Plotinus to be questioning the propriety of locating the "reality" of *aretē* in the potentiality rather than its actualization: according to the normal Aristotelian metaphysical understanding of the relation between the two concepts, the actualization should be prior, both epistemologically and metaphysically, to the potentiality.
[57] Cf. *EN* 2.3–4. Note that Aristotle here specifically says of moral virtue that these pertain to pleasures and pains (1104b8–9), which are surely corporeal and thus, in Plotinus' view, to be located in the realm of (physical) causes.
[58] *Ennead* 6.8.1.33–34.
[59] *Ibid.*, 6.8.1.39–44.
[60] *Ibid.*, 6.8.6.4–26.
[61] *Ibid.*, 4.8(6).8.3–6.
[62] *Ibid.*, 6.8.4.4–7.
[63] *Ibid.*, 6.8.4.7–10.
[64] *Ibid.*, 6.8.4.10ff.
[65] *Ibid.*, 6.8.4.27–32.
[66] I have elsewhere argued that it is more appropriate to conceive of Aristotle's *to theōrein* as a "state" than as an "activity," as these terms are employed in contemporary action theory. Cf. my "Aristotle's Concept of *Theōria* and the *Energeia-Kinēsis* Distinction" (*JHP* 18 [1980]).
[67] Plotinus, I think, usually connects *logismos* with the "descent" of the soul into the bodily realm, as at 4.8(6).1.7ff. It seems to be for him primarily reason employed – or "enslaved," as he would put it – in "calculating" with respect to pleasures and pains, gains and losses,

etc. Cf. also 4.4.8.13ff, where Plotinus contrasts the effortless operation of the "world soul" with respect to what is bodily with "our" operation with respect to what is bodily. In our case, but not the world soul's, *logismos* and deliberation are involved. I would agree with the view of J. M. Rist that *logismos* is, for Plotinus, capable of being "'deceived' by pleasure. The upper soul is unaffected by pleasure" (J. M. Rist, 'Prohairesis: Proclus, Plotinus et Alii, in *De Jamblique à Proclus* [Fondation Hardt Entretiens Tome XXI], ed. H. Dorrie [Geneva, 1975], p. 111). But the susceptibility of *logismos* to corruption seems to be due to the fact that it is a rational function which, because of its very nature as a faculty of *calculation*, is essentially concerned with the bodily (e.g. pleasures and pains). For this reason, it seems to me that Rist's conclusion that "neither [*logismos* or *prohairesis*] are involved in the fall of the soul" (*ibid.*, p. 116) follows because these faculties belong to the soul only as a *consequence* its fall or descent "away from" its true nature as a faculty of "pure theoretical knowledge" and its consequent prostitution as a sort of "accountant" with respect to interests that are essentially arational (and bodily). This does not seem to be the view of Rist, however, who speaks of *logismos* as the "faculty *par excellence* of the soul" (*ibid.*). Perhaps he conceives of *logismos* not merely as a faculty of calculation in my rather narrow sense but as a more general faculty of discursive reason. It seems to me, however, that Plotinus tends to use the term in the narrower sense.

[68] Aristotle, *EN* 7.2.1145b23–24.

[69] Rist, 'Prohairesis', p. 111.

[70] *Ibid.*, p. 113.

[71] Cf. Aristotle *EN* 6.2.1139a35–36: "*Dianoia* itself moves nothing." And *EN* 2.1.1103b23–25: "It makes not a little difference whether one is trained (or habituated: *ethizesthai*) thus or so from youth up, but a very great difference – or, rather, all the difference."

[72] The terminology here employed derives, of course, from J. L. Austin. Cf. his 'Performative Utterances', reprinted in his *Philosophical Papers*, pp. 233–252.

[73] A further proposition, not strictly implied but perhaps suggested by the performative view of responsibility-attribution as I conceive it, is that there is no "fact of the matter" concerning human responsibility beyond a description and analysis of the manner and circumstances in which people attribute responsibility. In other words, if there are any "facts" about human responsibility, they are *social* facts. Although I am aware that this view may lead to some form of "cultural relativism" with respect to human responsibility, I nonetheless find it quite plausible.

[74] *Ennead* 3.1.10.7–11.

[75] *EN* 6.9.1142b18–20.

[76] *Ibid.*, 6.12.1144a7–9.

[77] *Ennead* 6.8.1.41–44.

[78] A. I. Melden, *Free Action* (London and New York, 1961).

[79] *Ibid.*, pp. 201–202.

[80] Cf. *ibid.*, pp. 182ff.

CHAPTER EIGHT

PHILOSOPHICAL POSTSCRIPT

In this chapter I return to several philosophical issues that have arisen in the preceding pages. The first issue is that of the viability of what I have referred to as the "temporal-frequency" model – and what Hintikka refers to as the "statistical" model – of the alethic modalities of necessity, possibility, and their contradictories. Under what conditions, if any, would such a model be, by contemporary lights, plausible? This question is addressed in Section A. This discussion will be developed – for reasons that will, I trust, become apparent – in terms of W. Salmon's criteria for assessing interpretations of the concept of probability. The more technical parts of this issue, which pertain to the "admissibility" or mathematical consistency of the temporal-frequency model, I relegate to an appendix. The second philosophical issue I address – which I hope to be of somewhat broader and less technical interest – is that of responsibility and determinism itself. This obviously has become one of the perennial "big issues" in philosophy. Are there any insights or morals to be gleaned from the Hellenistic debates on this topic, discussed in some detail in earlier chapters of this book? Or are these debates primarily of antiquarian interest, having been superannuated by subsequent developments in the philosophical history of the issue? This is the topic of the final Section B of this chapter and of this book.

A. THE TEMPORAL-FREQUENCY MODEL OF THE ALETHIC MODALITIES

We have seen that a recurring theme in ancient cosmology, from at least the time of Aristotle, is what I have termed the temporal-frequency model of the "dual" alethic modalities of necessity and possibility and their contradictories. Characterized in the most general manner, this model equates what is possible with what is *at some time* the case and what is necessary with what is *always* the case. We have examined some of the ancient variants of the model and have already encountered some of the problems with it. We have also seen, in the form of our immortal and hackneyed chimpanzee at its typewriter, that a version of the principle of

plentitude (which is a component of the temporal-frequency model) still holds considerable popular appeal. In this section I turn to an examination of the viability of this model of the modalities.

There are perhaps two especially fundamental aspects of the temporal-frequency model of the modalities. These aspects can be elucidated in terms of probability theory. The first is that necessity is conceived of as the "upper bound" of likelihood or probability, impossibility as the "lower bound." That is, the necessary is "that than which nothing can be more likely or probable," the impossible "that than which nothing can be less likely." So, in terms of contemporary probability theory, according to which the range of probability values is usually taken to be the real closed interval [0, 1], what is necessary is assigned a probability of 1, what is impossible a probability of 0. However, there is a stronger assumption underlying the temporal-frequency model, elucidated in terms of probability theory: *only* what is necessary will be assigned a probability of 1(and, hence, only what is impossible will be assigned a value of 0). A probability function satisfying this condition is said to be *regular.*[1]

The second aspect of the model is that probabilities ae conceived of in terms of something like a contemporary relative frequency theory of probability: that is, the probability of the occurrence of an A-type phenomenon in a B-type context is identified with the (limit of the) relative frequency of occurrence of A-type phenomena in B-type contexts (when an infinite sequence of B-type contexts is considered).[2] Now, since regularity entails that if it is possible that an A-phenomenon occur in a B-context the probability of the occurrence of an A-phenomenon in a B-context is greater than 0, it will follow from the frequency account that the limit of the relative frequency of occurrence of A-phenomena in an infinite sequence of B-contexts is also greater than 0. But if an A-phenomenon *never* occurs in this infinite sequence, the numerator of the fraction representing relative frequency of occurrence of A-phenomena in a series of n B-contexts will be 0, and so will the fraction, for all n. But then the limit of the relative frequency of occurrence of A-phenomena in the infinite sequence of B-contexts cannot be anything other than 0. This is a contradiction. So, by *reductio,* we can conclude that an A-phenomenon must occur in our infinite sequence of B-context "trials."

Our immortal chimpanzee and his sturdy Greek upper-case typewriter of Chapter One constitute a special case of the preceding argument. Bernoulli's Theorem does not entail that the chimp "*must* eventually"

type out the first sentence of Aristotle's *Metaphysics*; it entails that the greater the number of trials (the longer we wait) the higher the probability that at least one of those trials will be successful — that the chimp will type out in Greek "ALL MEN BY NATURE DESIRE TO KNOW." Indeed, if we make a natural assumption about probability functions (that they are "sigma-additive," a concept soon to be explained), it follows that the probability he will do so, in an infinite sequence of trials, is 1. But without the assumption of regularity, it does not follow that he *must* do so (i.e., that it is *necessary* that he do so) in an infinite sequence of trials. With the assumption of regularity, it does follow. In other words, with regularity and sigma-additivity, we can conclude that if an event is possible, it follows that it is somewhere instantiated in an infinite sequence of independent trials. With the additional assumption of an actual infinite sequence of "temporally repeating" (independent)[3] trials, we can infer a version of the plenitude principle: if an event is possible, it is at some time instantiated. And, as we have noted, the plenitude principle is the controversial "heart" of the temporal-frequency model of the modalities.

Unfortunately, as has been pointed out by various authors, the same assumptions that can be used to derive a version of the plenitude principle also allow us to derive absurdities; i.e., these same assumptions create problems of logico-mathematical coherence or, to use W. Salmon's term, admissibility for the temporal-frequency model of the modalities.[4] Sigma-additivity can be informally characterized as follows: if our probability function assigns probability values to a countable (finite or denumerably infinite) number of "events" all "conjunctions" of which are assigned a probability of 0 by our function – that is, the events are not "jointly possible" – the value that it will assign to the "disjunction" of those events is the "sum" of the values assigned to the disjuncts.[5] Of course, when we are dealing with a (denumerably) infinite number of disjuncts, "sum" means "limit of the sequence of partial sums." It is basically a matter of algebra to show that sigma-additivity entails that if we consider a "denumerably infinite conjunction" of events that are independent of each other (that is, for any conjunct events e_i and e_j, the probability of e_j *conditional on or given* e_i is the same as the probability of e_j *simpliciter*), the probability value assigned to that conjunction is equal to the limit of the partial products of the probability values asigned to the conjuncts.

To return to our chimp, we divided time into 3′35″ "trials" and

calculated the probability of the chimp's typing out the first line of the *Metaphysics* in such a trial to be $1/25^{43}$. By hypothesis, these trials are independent of each other: what the chimp types in one does not affect what he types in another. Our prior assumptions, essentially regularity and sigma-additivity, allow us to assign a value of 1 to the "higher-order" probability that, in an "infinite time" (denumerably infinite sequence of 3′35″ trials), the relative frequency of "favourable outcomes" (occurrences of the first line of the *Metaphysics*) equals $1/25^{43}$, and thus to conclude that it is *necessary* that there be at least one favourable outcome in the infinite sequence. However, these assumptions also allow us to infer that the probability of the chimp's typing out *any* determinate, denumerably infinite sequence of upper-case Greek letters and spaces is 0 (which is equal to $\lim_{n \to \infty} \{(1/25^{43})^n\}$) and, hence, that it is impossible for the chimp to type out any such determinate sequence. That is, for any infinite sequence it is impossible that the chimp type it out (i.e., $(\forall s) \sim MP_t s$). Since the sum of these sequences exhausts the chimp's possibilities, it is necessary that he type out at least (and, in fact, at most) one such sequence (i.e., $L(\exists s)P_t s$). It is easy to show, given the appealing modal principle that actuality entails possibility ("*ab esse ad posse valet consequentia*"), that a contradiction follows.[6]

However, if this is not a sufficiently impressive contradiction, one can be obtained with a stronger principle of additivity applying to "disjunctions" with uncountably many disjuncts, which B. Skyrms calls "ultra-additivity,"[7] and some other authors refer to as "perfect additivity," but without the regularity assumption. A Cantorian diagonalization argument shows that there are uncountably many denumerably infinite sequences of Greek upper-case letters and spaces.[8] These represent *all* the possibilities at the disposal of the immortal chimp; so the probability of occurrence of at least one of them (i.e., the probability of the occurrence of the "disjunction" of all of them) is 1. But since (1) these are mutually exclusive possibilities and (2) the probability of occurrence of each individual sequence is 0, the principle of ultra-additivity entails that the probability of the occurrence of their disjunction is the sum of the probabilities of occurrence of the disjuncts, i.e,., 0. So $1 = 0$.

There are, then, problems of logical-mathematical coherence that any temporal-frequency model of the modalities must face. These problems are severe and derive from one of the distinctive features of this model, namely regularity or the assignment of probability 0 *only* to what is "really impossibility" and of probability 1 *only* to what is "really

necessary." Roughly speaking, within a "garden-variety" development of the mathematics of probability theory, the combination of regularity with sigma-additivity is bound to generate problems of admissibility. (In fact, even the combination of regularity and finite-additivity, together with some other intuitive mathematical assumptions, yield contradiction.[9]) But, it would seem that a principle of additivity at least as strong as sigma-additivity is required by the other distinctive feature of the temporal-frequency model, namely, its identification of probability with frequency of occurrence (and, hence, by regularity, of impossibility with non-occurrence, necessity with "invariant occurrence"). For the identification of probability with frequency to be plausible, it must be with "frequency in the long run"; but to make rigorous sense of this phrase, some mechanism (e.g., sigma-additivity) is needed that enables one to calculate, in principle, the frequency of favorable outcomes for an "infinite sequence of trials." Even apart from the frequency analysis of probability, it is arguable – and, in fact, de Finetti has so argued[10] – that regularity itself has some consequences for additivity. It seems that the "disjunction" or union of a collection of impossibilities (whether that collection be of finite, denumerable or nondenumerable cardinality) must be an impossibility. The easiest way to obtain this consequence would be as a special case of a principle of ultra-additivity. However, as we have seen, the result (in "ordinary mathematical contexts") of doing so would be contradiction.

Is there any way for a temporal-frequency model of the modalities to avoid problems of admissibility or "*formal* correctness"? There is, but since the admissibility problems facing the model are serious, the remedy is drastic: abandoning the classical mathematics of the real numbers for "nonstandard measure theory." Intuitively, the problem is that we want to reserve the probability of 0 for "real impossibilities." But the "limit treatment" of infinite sequences, which is based on the real number system, leads us to assign null probability to "infinite conjunctive events" (e.g., out immortal chimp's typing out a particular infinite sequence of Greek letters and spaces) which we are inclined to say are exceedingly improbable (and "equally so") but nonetheless possible. Since the assignment of a positive real number as the probability value to such events leads to contradiction, we would like to have "infinitesimals" at our disposal. But infinitesimals have no place in the mathematics of the real numbers and, for the century and a half prior to the recent past, have been regarded as mathematically disreputable. Recently, however,

infinitesimals have been restored to grace. Discussion of the way in which they can be of help in resolving admissibility problems for the temporal-frequency model of the modalities leads to technicalities that it seems best to omit from the text of this chapter. For those readers who may have more than a passing interest in this issue, further discussion is to be found in the Appendix to this chapter.

Even if, with the aid of fairly drastic measures, the admissibility problems of a temporal-frequency model of the modalities can be resolved, formal correctness does not constitute a vindication of such models. There are still issues of what Salmon terms ascertainability and applicability to be dealt with.[11] Ascertainability, according to Salmon's usage, pertains to the existence of a method by which the values of probabilities – or, in the case of the temporal-frequency model of the modalities, modal "values" *along with* probability values – may, at least in principle, be ascertained. Applicability has to do with the connection between probability (again, in the case of the temporal-frequency model, modality *along with* probability), according to the conception of the theory in question, and what goes on in the physical world. In other words, the question of the applicability of the conception of probability (*cum* modality) under consideration is the question of whether this conception can be applied to the realm of (either "everyday" or "scientific") experience. I hope to show that a temporal-frequency model of the modalities shares many of the same general assets and liabilities of frequency interpretations of probability with respect to ascertainability and applicability.

According to most frequency theories of probability, the concept does not apply *directly* to individual events. Its primary application is to "kinds," that is, classes of "repeatable" events or attributes. In the case of Aristotle's employment of the temporal-frequency model of the modalities a similiar assumption is made concerning the "limit probabilities" of necessity and impossibility and their contradictories. There is thus a sense in which, for Aristotle, the alethic modalities are "empirical": they apply fundamentally to (the relations among) "natural kinds in the world." However, Aristotle and later Peripatetics can be denominated "rationalists" insofar as they assume that the world and our experience of it has a certain immutable conceptual structure – insofar as they assume, to use the phrase of A. P. D. Mourelatos, that the world is "*logos*-textured."[12] As a result, Aristotle customarily assumes a relationship between the temporal-frequency model of necessity and what I have

terms his syllogistic-derivability model. It is *always* (and, hence, necessarily) the case that (a) the diagonal of a right triangle is incommensurable with its sides and (b) that broad-leaved plants are deciduous.[13] And in both cases the necessary propositions figure as theorems of the appropriate "science" or *epistēmē*.

It should be noted that the temporal-frequency model of the modalities supplies Aristotle only with an account of necessitation or conditional necessity: the temporally invariant instantiation of the consequent "along with" the antecedent. The model is not, in itself, also a model for Aristotle's conception of the *causal* relation. A principal theme of Sorabji's *Necessity, Cause and Blame* is that Aristotle does not *identify* necessitation or conditional necessity with causation. I believe that, in fact, Aristotle does not even identify his "strong" or "scientific" conception of *aition* with conditional necessity. He is well aware that to do so would lead to problems of "spurious causal reversal." For example, in *Posterior Analytics* 1.13, Aristotle points out, in effect, that (a) it is conditionally necessary, given the fact that the planets do not twinkle, that they are spatially near the observer and (b) it is also conditionally necessary, given the fact that the planets are spatially near the observer, that they do not twinkle. But it is only the case that the relative nearness of the planets is the *aition* of their not twinkling, and *not* the case that their not twinkling is the *aition* of their relative nearness.[14]

Conditional necessity of effect relative to cause – as analyzed by the temporal-frequency model: the *aition*'s *never* obtaining without the effect's also obtaining – *may* perhaps be a necessary characteristic of Aristotle's strongest, "scientific" conception of an *aition*.[15] One thing is certain, however: the sort of necessity characteristic of the theorems of an Aristotelian science is a *natural* necessity deriving from the "way the world is," most especially, from the fact that the world is arranged in a rational hierarchy of natural kinds. Therefore, one problem of ascertainability with respect to the temporal-frequency model of the modalities is less of a problem, superficially at least, for Aristotle than it would be for a philosopher beginning with a less rationalistic set of assumptions. An ascertainability problem for frequency interpretations of probability much discussed in the contemporary literature is the inference of probability ("long-run" frequency) from any empirical evidence (finite frequency). With the regularity assumption, this becomes for the particular case of probability 1 a version of the "classical problem of induction": the legitimacy of the inference of necessity or "strict

universality" from a limited sample. Here the basic presupposition of Aristotle is that although the necessity of strict universality is "natural," i.e., an objective feature of the world, human beings are creatures naturally fitted for intellectually discerning that necessity.

· The key concept is the process of this discernment is that of *epagogē*, often rendered "induction." However, what is termed by J. Barnes the "orthodox" view of the brief discussion of *epagogē* in *An. post.* 2.19 holds that Aristotle's notion of *epagogē* is not "straightforwardly empiricist": that is, it is not "straight" numerical induction.[16] Most of the connotations of the term "induction" arise from the dualistic epistemological and metaphysical assumptions of classical modern empiricism. The most crucial of these are the following: (1) The only sort of "real" necessity that exists is an "analytic" logical/conceptual necessity deriving from the relations among the "contents" of our ideas or concepts. (2) The experience or intellectual perception that results from induction is not a perception of any analytic relation among ideas – it is "synthetic." (3) Hence, from (1) and (2), it is impossible that induction should result in the intellectual discernment of necessary truths. (4) At most, induction can result in concepts (of swans as white) or propositions (that swans are white) that we may, as a matter of *psychological* fact, be inclined to accept but that are always susceptible to being overturned by future experience.

These assumptions are most plausible, of course, if one regards the "realm of thought" and the "realm of nature or the physical world" as radically distinct – if one assumes that what we as denizens of the former realm have access to is only "our ideas," and that what the relation is between these ideas and the "other realm" is anyone's guess. This obviously is not the perspective of Aristotle, however. And, apart from this perspective, assumptions (1) through (4) above do not all seem so compelling. Aristotle's conception of the world as *logos*-textured and of human beings as creatures fitted for coming to comprehend that structure strongly suggests that there need be no clear dichotomy between the analytic and the synthetic, between what is "merely a relation among ideas" and what is a "matter of fact." Without assumptions (1) through (4), it is not an absurd idea that *epagogē* can give rise to the intellectual comprehension of a concept or proposition under the mode of "strict universality" (that is, necessity, according to the temporal-frequency model) and that such a concept, with its modal feature of strict universality/necessity, *fundamentally* characterizes the natural world rather than the arrangement of our mental furniture. If the suspicion of

absurdity remains – and I suspect it does to some degree for most of us with an "Anglo-American" philosophical training – this may well be due to the philosophical success of classical empiricism. It is only in the twentieth century that two crucial items in its legacy, the rigid dichotomy between the analytic and the synthetic and the (extensional) identification of the necessary with the *a priori* and the contingent with the *a posteriori,* have been seriously questioned.[17] Aristotle, I think, would welcome these particular manifestations of independence from the philosophical orthodoxy of classical empiricism.[18]

We have previously noted the ease with which the adherents of the temporal-frequency model, both Peripatetics and Stoics, move between the necessitation of a B-type event by an A-type event in a C-type context and the *invariant* occurrence of B-type events in conjunction with A-type events in C-type contexts. A source of contention between Peripatetics and Stoics, however, is the manner in which the modalities apply to the single case. This dispute is connected with a special instance of the "problem of the single case" for frequency theories of probability. As Salmon suggests, this seems to be the most serious problem of *applicability* facing the frequency interpretation of probability.[19] Since, according to such theories, probabilities are fundamentally relations (ratios or "limits" of sequences of ratios) between classes of "repeatable" events or attributes, how are we to apply probabilities to *particular* cases, e.g., the probability of *this* particular toss's yielding a head, the probability of a sea battle's occurring *tomorrow,* or the probability of *this* cloak's being torn to pieces rather than wearing out? The answer, "use as the probability of the single event the ratio (or limit of sequences of ratios) between the relevant 'background' or reference class and the relevant 'attribute' class of repeatable events or attributes to which *this* particular set of background conditions and *this* particular event or attribute belong," obviously does not answer the question. It merely restates the problem of just which classes are to be selected as the "relevant" ones. As Salmon puts it,

> The whole trouble is that a given single event belongs to many sequences, and the probabilities associated with the different sequences may differ considerably. The problem is to decide from which sequence to take the probability that is to be attached "fictitiously" to the single event.
>
> According to the frequency interpretation, probability is a relation between two classes. The notation "P(A,B)," reflects this fact by incorporating expressions for two classes, one before the comma and one after it. The class mentioned first is the *reference* class; the other is the *attribute* class. In dealing with the problem of the single case the attribute class gives us

no particular trouble. The terms of the bet determine which attribute we seek: double six, heads, the ace of spades, etc. [or, e.g. the occurrence of a sea battle, the tearing up of a cloak]. The problem of the single case *is* the problem of selecting an appropriate reference class. Consider, for example, how to determine what premium a given individual should be charged for automobile insurance. The insurance company tries to assign him to a category of drivers who are similar to him in relevant respects. It matters, for example, whether the driver is male or female, married or unmarried, an urban or rural dweller, a teenager or not, etc. It does not matter what color the car is or whether it has an odd or even license number. Reichenbach said that one should choose the narrowest reference class for which reliable statistics are available. I would say, instead, that the single case should be referred to the *broadest homogeneous reference class* of which it is a member. In either formulation, the intent is fairly straightforward. A probability is something that has to be established inductively, and in order to ascertain the probability we must have enough instances to be able to make an inductive generalization. Thus, we do not want to try to refer the single cases to classes that that are too narrow, for if we do we will not have enough evidence upon which to base out inference. At the same time, we want our reference class to contain other relevant cases, not irrelevant ones.[20]

With respect to single cases to which a probability value of 1 ("necessitation," with the regularity assumption) may be correctly assigned, the assumption of Aristotle and other Peripatetics seems generally to be that the "reference class" will be something that can figure as a "cause" or explanation (*aition*) and the attribute class something that can figure as an "effect" or *explanandum* in the Aristotelian *epistēmē* or science proper to the type of *explanandum* in question. In an Aristotelian science *aitia* are usually either "formal" or "final" (sometimes "efficient" as well) and contemporaneous with their effects. In other words, Aristotle's conception of the world as *logos*-textured, as arranged in a hierarchy of natural kinds, supplies a sort of answer to the chief applicability problem for the frequency interpretation, the problem of the single case. For purposes of *science,* the relevant "reference' class against which this particular event is to be considered is to be determined by the *epistēmē* into which the event in question can be "fitted," if there is any such *epistēmē*. This *epistēmē,* based as it is on the hierarchy of natural kinds in the world and the place of the event in that hierarchy, will generally select the proper "scientific" causes of the event in question as the relevant reference class. The event in question, then, will *always* happen (= have a probability 1 of happening = necessarily happen) relative to (instances of) the "scientific-cause" reference class; or the event in question will *usually* happen (= have a high probability, although a probability not equal to 1, of happening) relative to (instances of) the "scientific-cause" reference class. In the latter case, the general Peripatetic assumption seems to be

that there are "preventing" or "opposing" (*kōluonta*) factors that sometimes override the scientific cause, i.e., prevent it from giving rise to its normal effect.

These "preventing" factors are often temporally antecedent conditions of some sort. There is another type of temporally antecedent causal factor that sometimes (but not usually or always) given rise to the same "natural kind" of effect always or usually produced by the proper "scientific cause" for that natural kind of event. The usual Peripatetic assumption is that, with respect to such temporally antecedent events/states of affairs and their temporally subsequent "effects", there is not a temporally universal, necessary "law" (or even a law that *usually* holds), e.g., "A-type events *always* (or usually) are succeeded by B-type events." In Peripatetic terminology, the A-type event can be only an "accidental cause" (*aition kata symbebēkos*) of the B-type event. Part of the import of Aristotle's characterization of "accidental" causes as *aorista* ("indefinite," "indeterminate," "infinite") – according to my suggestion in Chapter Two – is that any attempt to transform propositions with antecedents or *explanantia* involving accidental causes into temporally invariant or exceptionless "laws" (or even "laws" that hold for most instances) will be "practically" impossible. But, according to Aristotle's implicit assumption, this practical impossibility – since it entails the impossibility of exhibiting the purported relation between *aition* and effect within the framework of an *epistēmē* – indicates a "real impossibility."

Accidental causes must, according to the Peripatetics, remain accidental. Skyrms' concept of "resilience" is relevant here. Informally, resiliency is a measure of the degree to which a conditional probability value P(B | A) (e.g., the probability of someone's finding treasure [B] conditional on digging a hole in his garden [A]) would be altered by other conditions that might figure in the "context" of a particular instance of the "reference class" (e.g., the garden's being located on what has just been discovered to have been the site of a fifteenth-century pirate settlement [C]) were one to "divide" the reference class using such conditions, that is, were one to consider the probability P(B | A ∩ C). In general, high resilience (resiliency equal to or approaching a value of 1) indicates the statistical "homogeneity" of the original reference class with respect to such partitioning, low resiliency the statistical "heterogeneity" of the reference class.[21] The Peripatetic assumption with respect to temporally antecedent "accidental" *aitia* would, in anachronistic terminology, be

that the resiliency of the probability of the effect conditional relative to a reference class involving "accidental," temporally antecedent *aitia* is low and that the probability itself is not 1. Their further "indeterminist" assumption would, I believe, be that even if it were practical to consider increasingly "fine" partitionings of the reference class yielding a reference class such that the probability of effect conditional on this "finely" specified *aition* has a *resiliency* of 1, we have no reason to believe that the probability of effect conditional upon this *aition* would *itself* have a value of 1 (i.e., be temporally invariant or exceptionless). Their attitude, in other words, would be essentially the same as that of K. Pearson. Should we so finely specify the reference class that our specification includes a description of "all factors" causally (or statistically) relevant to the "effect" or this particular instance of the "attribute class," "all causally (or statistically) relevant factors"

> might mean the whole past history of the universe, and what would happen if the universe started afresh from the same initial conditions, nobody knows, nor will anybody profitable stay to conjecture.[22]

It is here that the Stoics (and, perhaps, some "Middle Platonists") disagree with the Peripatetics. The Stoics, according to Alexander, are motivated by the principle that "if, when the surrounding circumstances (*periestōtōn*) are the same, someone at one time acts one way and at another in a different way, causeless motion (*anaition kinēsin*) is introduced."[23] Such causeless motion would constitute a contradiction of the fundamental Stoic doctrine of the "rational coherence" of the *cosmos* (especially as embodied in the Chrysippean postulate of providential fate or *heimarmenē*). However, as Peripatetics such as Alexander point out, it does not seem *always* to be the case that when the surrounding circumstances are "relevantly similar" an event of the same kind ensues. The Stoics, as we saw, are led to the doctrine of "unnoticed," "obscure," or "hidden" (*adēla*) causal factors to "explain" why we sometimes encounter different outcomes in causal contexts that seem relevantly similar. Consequently, it appears that there is nothing in the temporal history of an event/state of affairs that they can, in principle, rule out as causally (statistically) irrelevant to its occurrence.

As a result of such considerations, it becomes doubtful whether the temporal-frequency model of necessitation can be of much empirical use to the Stoics: they imply that, in order to obtain a temporally invariant

relationship between *aition* and effect (i.e., to obtain a conditional probability of 1) we may be forced to consider a very particular *aition* or, what amounts to the same thing, a very finely specified or narrow "reference class." This is a problem that concerns Russell in his essay "On the Notion of Cause":

> Philosophers, no doubt, think of cause and effect as contiguous in time, but this, for reasons already given, is impossible. Hence, since there are no infinitesimal time-intervals, there must be some finite lapse of time between cause and effect. This, however, at once raises insuperable difficulties. However short we make the interval, something may happen during this interval which prevents the expected result. I put my penny in the slot, but before I can draw out my ticket there is an earthquake which upsets the machine and my calculations. In order to be sure of the expected effect, we must know that there is nothing in the environment to interfere with it. But this means that the supposed cause is not, by itself, adequate to insure the effect. And as soon as we include the environment, the probability of repetition is diminished until at last, when the whole environment is included, the probability of repetition becomes almost *nil*.
>
> . . . I also do not deny that the observation of such regularities, even when they are not without exceptions, is useful in the infancy of a science: the observation that unsupported bodies in air usually fall was a stage on the way to the law of gravitation. What I deny is that science assumes the existence of invariable uniformities of sequence of this kind, or that it aims at discovering them . . ..
>
> The principle, 'same cause, same effect', which philosophers imagine to be vital to science, is therefore utterly otiose. As soon as the antecedents have been given sufficiently fully to enable the conseuqent to be calculated with some exactitude, the antecedents have become so complicated that it is very unlikely that they will ever recur. Hence, if this were the principle involved, science would remain utterly sterile.[24]

The problem, then, for the temporal-frequency model of the modalities (and, more generally, for a frequency model of probability) is that such a model loses its intuitive appeal in cases where we apparently do not have an indefinitely temporally repeatable *aition* or "reference attribute." The Stoic (and, it seems, Middle Platonist) answer to this problem is to postulate infinitely repeating cosmic cycles. The upshot of this move is to insure that, no matter how complicated or extensive the reference attribute (or "full a specification" of causally/statistically relevant factors), the reference class will not be "narrow": that is, the reference attribute or causal context will "recur" in an infinite number of temporally ordered cosmic cycles. The postulation of such cycles represents, I think, a major conceptual alteration in the temporal-frequency model of the modalities (more generally, frequency model of probability), an alteration that begins to erase the distinction between the model and a "possible worlds" model of the modalities (more generally, a "logical" or

"*a priori*" model of probability). To begin with, whatever claim the temporal-frequency model might have had to being "inductive" no longer survives. In applying the modalities to individual cases, we are now told that the objectively "relevant" infinite series is constituted from causal contexts that are "just the same" in different world cycles. But we cannot obtain inductive experience transcending the boundaries of cosmic cycles. And some of the same "metaphysical" problems that arise in contemporary discussions of possible worlds seem to have come up in the ancient discussions of cosmic cycles. For example, does Socrates recur in different cycles, or are there instead "counterparts" (*aparallakta*) of Socrates that occur in differing cycles?

My suggestion is that the cosmic-cycle postulate transforms the temporal-frequency model of the modalities to such an extent that it is no longer clear we are dealing with the same model. Skyrms, in a delightful aphorism, remarks that "There is nothing more probable than that something improbable will happen, but it is impossible that something impossible should happen."[25] The Stoics seem to have begun with a sentiment similar to that expressed in the first clause of this *bon mot* and, interpreting "improbable" as "having a low but non-zero probability," to have concluded that *any* possible state-of-affairs (even very complex and extensive "reference attributes") will be subject to infinite temporal repetition. From this inference, legitimate or not, it is but another small psychological step (although perhaps a major logical jump) to talk of the occurrence in different cycles of indiviudals or their "counterparts," perhaps with some different properties. If, beginning with the temporal-frequency model, we take these steps we shall find that we have arrived at something that resembles, in many respects, a possible-worlds model of the modalities more than it does our original temporal-frequency model.

The strategy of this section has been to interpret the temporal-frequency model of the modalities as a special case of a frequency interpretation of probability and to assess it in terms of Salmon's criteria of admissibility, ascertainability, and applicability. Perhaps the most severe difficulty confronting the temporal-frequency model, so interpreted, is that of admissibility. The very requirements of such a model, *viz.*, regularity (the reservation of the upper bound of probability values for what is necessary, the lower bound for what is impossible) and a type of additivity at least as strong as sigma additivity (in order to be able to talk about frequency of occurrence "in the long run"), would seem to require a departure from the standard mathematical basis of probability

theory. Perhaps the most plausible solution is the move to nonstandard measure theory, which provides nontrivial infinitesimals as possible values for probability functions.

The major ascertainability problem for a frequency interpretation of probability is the justification of the inference of probability ("long run" frequency) from empirical evidence ("sample" frequency). For the temporal-frequency model and the special case of probability 1, this ascertainability problem becomes, as we saw, a version of the classical problem of induction: the legitimacy of the inference of probability 1 (= necessity, = strict universality) from the examinaion of a finite number of cases. I suggested that for Aristotle and later Peripatetics, this problem is less acute than it was to become after the rise of classical modern empiricism because of the Peripatetic lack of an important part the philosophical legacy of classical modern empiricism: a rigid dichotomy between relations among ideas and matters of fact, and the consequent identification of the necessary with the *a priori* and the contingent with the *a posteriori.* Indeed, one fundamental feature of the temporal-frequency model itself, the idea that necessity is the "upper bound" of "degrees of contingency," indicate that the Peripatetics accepted a notion of a continuum "between" contingency and necessity rather than an unbridgeable chasm between two *toto caelo* different territories.

Since a frequency interpretation of probability is formulated as a relation between classes of repeatable events, a crucial applicability problem arises with respect to the application of the concept of probability to individual events/states of affairs. As Salmon notes, this "problem of the single case *is* the problem of selecting an appropriate reference class"[26] for the purpose of assigning a probability value to an individual instantiation of a type of event/state of affairs. In the case of the Peripatetics, Aristotle's assumption that the world is characterized by a hierarchy of natural kinds, which is mirrored in the various sciences or *epistēmai,* provides a basis for an answer. This hierarchy yields a class of final/formal/efficient causes to serve as a "reference" class for the *scientific* consideration of the individual event/state of affairs in question (i.e., its consideration as a member of a particular *natural* kind of event/state of affairs). And Aristotle's assumption seems to be that, relative to such a reference class, the event/state of affairs either necessarily (= always) occurs or the probability of its occurrence is high (it usually occurs). In the latter case, the general assumption seems to be that

various "hindering" factors are operative where the event/state of affairs fails to be instantiated in the presence of a member of the "scientific-cause" reference class. However, what the Peripatetics would, I believe, deny is that, by using such "accidental" factors to more finely partition a "natural kind" causal reference class in order to obtain a more "homogeneous" reference class, we should have any reason to expect that we could in principle obtain a nontrivial reference class for each individual event/state of affairs relative to which the probability of occurrence of that event/state of affairs is 1 (= occurs necessarily, = occurs with strict universality). In other words, they deny the plausibility of an assumption of universal causal determinism.

I have also noted that the Stoic and Middle Platonist approach to the applicability problem of the "single case" for a temporal-frequency model of the modalities is very different. In order to determine whether an occurrence of an event/state of affairs is necessitated, one should, in principle, use as a reference class the *complete* set of background circumstances in which it occurs. But a nontrivial application of this principle would necessitate the postulation of the temporal repeatability of this "complete set of background conditions." I have suggested that this condition would naturally lead to something like the postulation of repeating cosmic cycles, which transforms the temporal-frequency model of the modalities into something more like a possible-worlds model of the modalities.

B. RESPONSIBILITY AND DETERMINISM

As I mentioned in the last chapter, Aristotle seems to me to *begin* his *EN* 3 discussion of responsibility in the right way. Perhaps the most basic datum we have with respect to the issue of determinism and responsibility is that adult humans are usually held responsible for their actions. Any philosophical account of agency and causation that entails that responsibility-attribution is, *per se,* wrong, mistaken, or unwarranted would, I think, be considered by Aristotle to be a theory that does not "save the phenomena" – in particular, the phenomenon of responsibility-attribution.[27] In other words, Aristotle would rule out the possibility of "hard determinism" – the view that everything is necessitated and that, because of this, there is no (moral) responsibility – because it is a theory that could not elucidate the "phenomenon" of responsibility-attribution. I think

Aristotle is right and that the fact, noted by Sorabji, that hard determinism is "the rarest view in antiquity"[28] speaks well for the ancient discussions of the issue. In antiquity the field is then left to the soft determinists and the libertarians. The former make the assumptions (a) that some form of universal causal determination obtains and (b) that this universal determinism is compatible or reconcilable with the attribution (at least in *some* cases) of responsibility "in the richest possible sense of the term" to human beings. The libertarians, on the other hand, (a) deny any principle of universal causation and (b) deny the compatibility of such a principle with *any* attribution of responsibility "in the richest sense of the term" to human beings. In general, the "soft determinists" of antiquity analyze responsibility in terms of "agency" and this concept, in turn, in terms of the combination of the right sort of causal relation between purported "agent" and act (or choice) and the absence of certain responsibility-defeating or - diminishing conditions – usually grouped into the two categories of ignorance of particular matters of fact pertinent to the action and of *force majeure.* Ancient libertarians, on the other hand, tie the responsibility of an agent for an act to the possibility of the agent's "having done otherwise," which they interpret as implying the lack of (antecedent) causal necessitation of the act in question. Here, it might be argued, the dispute has stood throughout the subsequent history of Western philosophy.

A question of some interest, I believe, is "what is the source of the libertarian's commitment to the could-have-done-otherwise condition of responsibility?" I suspect that the answer lies with the transitivity-of-responsibility phenomenon to which brief allusion was made in the preceding chapter. The libertarian interprets the could-have-done-otherwise condition as implying lack of causal determination and, indeed, is satisfied with no account of this condition that would render it compatible with causal determination. And his desire to avoid causal determination, I believe, is grounded in his desire to avoid the transitivity-of-responsibility phenomenon. If causal determinism *does* obtain, is it not the case that responsibility for an action is either "passed back" from the immediate cause of the action to a "first cause" or else dissipated in a infinite string of causes with no first or "uncaused cause"? Hume raises precisely this libertarian worry in a quite typical fashion in the *Enquiry concerning the Human Understanding*:

> For a man, who fired a mine, is answerable for all the consequences whether the train he employed be long or short; so wherever a continued chain of necessary causes is fixed, that

Being, either finite or infinite, who produces the first, is likewise the author of all the rest, and must both bear the blame and acquire the praise which belong to them.[29]

And, concluding Sect. VIII, Part II, he comments that

nor is it possible to explain distinctly, how the Deity can be the mediate cause of all the actions of men, without being the author of sin and moral turpitude.[30]

Hume's examples point the way toward a deeper understanding of the libertarian's problem. If the transitivity-of-responsibility phenomenon is the real basis of the libertarian worry that universal causal determination would eliminate the responsibility of human agents for their actions, the worry is that responsibility will be "transferred" *from* the agent as immediate cause and either lodge with some "first" mediate cause or be dissipated in a infinite series of mediate causes with no initial member. But when we examine concrete cases in which the transitivity-of-responsibility phenomenon occurs, in which, that is, we are inclined to say that responsibility has been either partially or entirely transferred from the person as its "immediate cause" to some mediate cause, such mediate causes usually prove to be animate, that is, either human beings or entities to which we ascribe (either metaphorically or literally) human characteristics such as purpose, desires, and practical intelligence. The person who is the immediate cause becomes a "mere instrument," "has been manipulated," is a "puppet" or even a "victim."[31]

Consideration of such locutions and the concrete cases with respect to which they are employed suggests that the libertarian's quite legitimate concern with the transitivity-of-responsibility phenomenon has been raised within the wrong context, i.e., metaphysics. Its legitimate context is ethics, theology, or social/political philosophy. For it is typically in cases where some more-or-less teleological conception of a mediate cause can be formed that there occurs worry about the transference of responsibility for an action or choice back from its immediate human cause to this mediate cause. "Real cases" of concern about transitivity-of-responsibility, I shall suggest, are typically amenable to analysis of an ethical, social/political, or theological character. But "generalized" concern about the phenomenon must necessarily lead to a "metaphysical turn" that involves (at least if the metaphysical view in question is not animistic, theistic, or deistic) what is arguably an unwarranted extrapolation from concrete cases of concern about transference of responsibility.[32]

If libertarians have perhaps been a bit hasty in making a dubious

metaphysical extrapolation, their soft determinist opponents have perhaps generally paid insufficient attention to the responsibility defeating/diminishing conditions that are invoked in concrete cases. Even if we admit a certain amount of cultural and historical variation in the particular kinds of defeasibility conditions admitted, we may not feel that the simple Aristotelian sorting of these conditions into the "force" and "ignorance-of-relevant-matter-of-fact" categories is the last word, philosophically, to be said on the topic.

To begin with, as J. G. Murphy has pointed out to me, it is doubtful whether the absence of certain epistemological conditions (i.e., Aristotle's knowledge of pertinent matters of fact and the intentions that are relevant to the legal condition of *mens rea*) is properly thought of as a responsibility-defeating or -diminishing condition at all. It is arguably *not* the case that the person who commits manslaughter commits the same (kind of) act as the person who commits murder but bears a comparatively diminished responsibility for the act. Rather, the absence of certain epistemological conditions in the person who commits manslaughter entails that his act is not the same kind of act as that of the murderer.

The presence of *force majeure,* on the other hand, is a genuinely responsibility-defeating condition. But even the most hardened soft determinist is unlikely to think that physical restraint or compulsion is the *only* condition that defeats or diminishes responsibility. Can some general characterization be given of cases in which the transitivity-of-responsibility phenomenon occurs and in which, consequently, the "immediate" human agent of an action is conceived of as absolved of responsibility for that action or as bearing a diminished responsibility for it? Perhaps some of the locutions occurring in transitivity-of-responsibility cases can be of use in developing the beginnings of an affirmative answer to this question. One dictionary definition of "manipulate" is "to manage or control artfully or by shrewd use of influence, especially in an unfair or fraudulent way."[33] My suggestion is that we are most likely to ascribe diminished responsibility for an action to an agent when we judge that the agent has been *manipulated* by another, when, that is, the "other" in question has somehow *unfairly* employed the agent as an instrument in satisfying his own desires or furthering his own aims.

Such a characterization would certainly cover many of the *force majeure* cases of diminished or eliminated responsibility. It would also cover at least some of the other types of case in which we may be inclined to ascribe diminished responsibility. Consider, for example, the case of

psychologist parents who have a psychological theory about the development of the "psychopathic personality" and decide to test it by rearing their offspring in a way that their theory predicts would produce such a personality. Suppose that their child does indeed become a criminal psychopath. This seems to be a case where we might well ascribe a diminished responsibility for his actions to the child, transferring some of that responsibility to his parents. It is also a clear case of the unfair manipulation of the child, an attempt to produce in him a complex of attitudes and desires in no way conceived of as "being for his own good." I believe that our reaction to such a case tends to be different from our reaction to the misdeeds of an individual of criminal character in whose background we can find no obviously "unfair" irregularities. Perhaps we are less likely to ascribe diminished responsibility in the latter, "normal" case because there is no obvious "remote" agent to whom this responsibility can be transferred.

With respect to the preceding suggestion about the nature of paradigmatic cases in which the transitivity-of-responsibility phenomenon is a "genuine worry," two questions immediately come to mind. The first is whether *any* sort of causal influence on the immediate agent of an act by some other conscious agent will involve the transference of some of the responsibility for the act to the remote agent and a corresponding diminishing of responsibility of the immediate agent. The second is whether diminished responsibility of the immediate agent always entails the transference of some responsibility to a more remote *conscious* agent. The answer to both questions is, I believe, negative.

With respect to the first question, it seems relevant to note that not all training or "formation" is unfair to manipulative. We ordinarily do not condemn as manipulation training which we regard as respecting the independent worth of its object, i.e., as respecting whatever we regard as the essential characteristics entitling their bearer to his proper role in the human (or moral, or political) community. Of course, there may be disagreement about what sorts of education or formation are manipulative, and such disagreement, I suspect, is often grounded in differing conceptions of human nature. Conceptions of human nature are at the root of judgments about what constitutes the sort of unfair disregard of a person's place in the moral community that might be termed "manipulation," "indoctrination," or "brain-washing." It is perhaps significant (and historically atypical) that most people in contemporary Western culture would never regard intellectual or "scientific" instruction (e.g.,

the teaching of the most current and widely accepted theory of quantum physics or the canons of propositional validity in argument) as "indoctrination" but that a great many would look with suspicion on religious, political, or even moral formation. What, concretely, is regarded as unfair manipulation may vary from culture to culture and time to time. But, I suspect (1) not *all* conscious attempts to influence the beliefs, attitudes, and desires of human beings will be regarded, at any time in any cultural milieu, as constituting manipulation and (2) (successful) attempts that *are* regarded as (unfairly) manipulative are, *prima facie,* paradigmatic cases where the transference of some responsibility to the manipulator and corresponding ascription of diminished responsibility to the "manipulated" (immediate human agent) are likely to occur.

With respect to the second question, whether the ascription of diminished responsibility occurs only in cases of manipulation of the immediate agent by a conscious remote agent, I am inclined to think that although such cases may be paradigmatic with respect to diminished responsibility, they probably are not exhaustive. It is commonly held that a person's prospects with respect to success and failure in various realms of action – including what might be classified as "moral behaviour" – are at least materially affected, if not entirely determined,[34] by such aspects of the person's "situation" as childhood familial environment, socio-economic class, and even biological heredity. The question that then arises is whether such "significant differences" in situation, in what J. Rawls terms the "natural lottery,"[35] might be invoked in ascribing diminished responsibility to an uncommonly "disadvantaged" agent (and, perhaps, to an uncommonly advantaged one).[36] Here there is no question of diminished responsibility deriving from unfair manipulation of the immediate agent by another conscious agent. But there may be a question of diminished responsibility. Some would hold, for example, that the thug from the ghetto "is not altogether to blame" for his misdeeds: the economic system which gives rise to the unsavory environment that spawned him "must bear part of the blame" – as must, perhaps, the defenders and upholders of that system. And so forth.

There seems to be a degree of plausibility to the suggestion that there is some correlation between regarding differences in the "nautral lottery" that are taken to affect one's prospects of "successful" moral action as unfair – or to use a phrase of Rawls' that in this context seems to amount to much the same thing, "morally arbitrary"[37] – and being willing to ascribe diminished responsibility to the agents thought of as significantly

disadvantaged (or advantaged). In such cases, although there is no unfair treatment at the hands of a literal conscious agent, it is *as though* the Fates had conspired against one individual, placing him in a morally unenviable position, and favoured another, giving him much better "moral prospects." The degree to which such differences are thought of as unfair is perhaps a manifestation of the "liberal" versus "conservative" *Weltanschauungen,* a topic which it is certainly not the business of this chapter (or this book, for that matter) to discuss.[38] Rather, I shall conclude with a summary of my suggestions: (a) there is some connection between willingness to ascribe diminished responsibility for an action to a human agent and the conception of differences in "life situation" taken to be causally relevant to the action in question as "unfair" or "morally arbitrary"; (b) this sort of "agentless" responsibility-diminishing unfairness may represent an extension, metaphorical or otherwise, of the paradigmatic case of responsibility-diminishing manipulation by a conscious agent, e.g., Aristotle's tyrant who coerces a citizen to perform a "base deed" by threats against the lives of his parents and children.[39]

The details of the preceding discussion I regard as tentative and uncertain. What I would emphasize is the methodological assumptions underlying the discussion: (a) the substitution, for a "generalized," metaphysical problem of causal determinism and responsibility, particular (types of) problem*s* of responsibility in particular types of causal context, and (b) the suggestion that philosophical analysis of the particular problem*s* of responsibility is perhaps most fruitfully carried out within an ethical, legal, social/political, or theological framework. A striking implication, to my mind, of our earlier examination of ancient discussions of determinism and responsibility is the limited number of metaphysical and epistemological "tropes" that the Western philosophical tradition has been able to apply to this problem. One might regard what seem to be the inherent limitations of the metaphysical/epistemological approach either as reassuring – as a sign that this is indeed an "enduring question" – or as disquieting – as pointing up the sterility, after over two millenia, of reviving in modern costume time-worn plays. For the philosopher who tends toward the latter opinion, the refocusing of the issue in a moral, legal, theological, or social/political context obviates the temptation to close up the theater.

NOTES

[1] Regularity is a necessary characteristic of probability measures if they are to represent *strictly coherent* systems of belief. Strict coherence rules out as irrational a system of beliefs such that if one were to wager using it, one could not win although one might lose. Cf. A. Shimony, 'Coherence and the Axioms of Confirmation', *Journal of Symbolic Logic* **20** (1955), pp. 1–18.

[2] The weaker notion of "indefinitely extendable" sequence of observations is implicitly used by von Mises: "We will say that a collective is a mass phenomenon or a repetitive event, or, simply, a long sequence of observations for which there are sufficient reasons to believe that the relative frequency of the observed attribute would tend to a limit if the observations were indefinitely continued" (R. von Mises, *Probability, Statistics, and Truth* [London, 1957], p. 15). Von Mises also adds a randomness condition: "Second, these limiting values must remain the same in all partial sequences which may be selected from the original one" (*ibid.*, p. 25). As Weatherford points out, this condition, at most, "only forbids certain types of *infinite* subsequences" (R. Weatherford, *Philosophical Foundations of Probability Theory* [London, 1982], p. 267, Note 50). The randomness condition has usually been rejected by other relative-frequency theorists. Cf. H. Reichenbach, *The Theory of Probability* [Berkeley, 1949], pp. 68ff.

[3] That is, the "absolute" probability of a given outcome in one trial does not differ from the probability of that outcome in that trial *conditional* on the outcome in the preceding (or in any other) trial.

[4] W. C. Salmon, *The Foundations of Scientific Inference* (Pittsburgh, 1967), pp. 63–64.

[5] According to the development of the mathematics of probability theory by most authors, probability functions are characterized by sigma-additivity. A notable exception is B. de Finetti, who opts for *finite* additivity only (B. de Finetti, *Theory of Probability*, Vol. 1, trans. A. Machi and A. Smith [London, 1974], pp. 116–128.).

[6] From the second condition, it follows that $(\exists s)p_t s$, and from this, it follows that $(\exists s)Mp_t s$, which is inconsistent with $(\forall s)\sim Mp_t s$.

[7] Cf. B. Skyrms, 'Zeno's Paradox of Measure', in *Physics, Philosophy and Psychoanalysis: Essays in Honor of Adolf Grünbaum*, ed. R. S. Cohen and L. Laudan (Dordrecht, 1983), p. 227.

[8] Suppose that there is an enumeration N of infinite sequences of Greek upper-case letters and spaces. Then construct an infinite sequence such that it is different from N_1 in the first place, N_2 in the second place, etc. It obviously cannot be a member of the enumeration, i.e., equal to N_i for any *i*.

[9] There is no measure function such that it is regular, finitely additive, translation-invariant, real-valued, and defined on all subsets of the unit interval. See, for example, Skyrms, *Causal Necessity: A Pragmatic Investigation of the Necessity of Laws* (London and New Haven, 1980), p. 187.

[10] De Finetti, *Theory of Probability*, Vol. 1, p. 121.

[11] Salmon, *The Foundations of Scientific Inference*, pp. 63–65.

[12] A. P. D. Mourelatos, 'Heraclitus, Parmenides, and the Naive Metaphysics of Things', in *Exegesis and Argument*, pp. 16ff.

[13] Cf. Aristotle, *Meta.* 9.4 and *An. post.* 2.16, respectively.

[14] *An. post.* 1.13.78a29–b3.

[15] In places (e.g., *EN* 6.3 and *An. post.* 1.6) Aristotle affirms that there can be scientific

knowledge only of what is necessarily (= always) such-and-such; but in other places he suggests that it is possible to have scientific knowledge of either what is necesssarily (= always) such-and-such or what is *usually* such-and-such.

[16] *Aristotle's Posterior Analytics,* translated with notes by J. Barnes (Oxford, 1975), pp. 256ff. Barnes argues that there are two questions posed and answered in *An. post.* 2.19: the first question pertains to *how* we acquire the first principles of a science, the second pertains to what "state" (*hexis*) apprehends them. Barnes claims that "*nous*" is Aristotle's answer to the *second* question, and that his answer to the first is "whole-heartedly empiricist" (*ibid.*, p. 259) – i.e., *epagogē*. "*Nous* is an answer to the second question, not a rival, rationalistic, answer to the first: 'intuition' as a mode of discovery is absent from *APst*" (*ibid.*). It is, I think, possible to agree with Barnes (i) that there are two questions posed in B 19, (ii) that "*nous*" seems to be A.'s answer to the second, not the first question, and (iii) that " 'intuition' as a mode of discovery is absent" from the chapter *if* "intuition" bears the connotation that it acquired in the seventeenth century "Way of Ideas" tradition: immediate perception of similarities or differences between the contents of two "ideas." However, it is also possible – as I hope I am able to indicate in the text – to disagree that A.'s conception of *epagogē* is "whole-heartedly empiricist" induction by enumeration *if* this phrase bears the connotations of classical modern empiricism.

[17] I am thinking here particularly of W. V. O. Quine's treatment of the analytic-synthetic dichotomy (cf. his famous 'Two Dogmas of Empiricism', reprinted in *From a Logical Point of View: Logico-Philosophical Essays,* second edition [Cambridge, Mass., 1961], pp. 20–46) and S. Kripke's espousal of a doctrine of necessary *a posteriori* propositions (cf. his *Naming and Necessity* [Cambridge, Mass., 1980]).

[18] I suspect that Aristotle would feel more comfortable with Kripke than with Quine here. Cf. Kripke, *Naming and Necessity,* p. 128: "Whether science can discover empirically that certain properties are *necessary* of cows, or of tigers, is another question, which I answer affirmatively."

[19] Salmon, *Foundations of Scientific Inference,* p. 90.

[20] *Ibid.*, pp. 90–91.

[21] Skyrms, *Causal Necessity,* pp., 11ff. There seem to be some technical problems with Skyrms' development of his conception, however. As R. Otte has pointed out, the invariance and resiliency of a proposition depend in certain circumstances on whether the probability of the proposition is large or small; this seems to be an unfortunate (but remediable) consequence of Skyrms' definitions of these concepts. See R. Otte, 'Critical Review: Brian Skyrms, *Causal Necessity*', *Philosophical Studies* **44**/3 (1984), pp. 425–433.

[22] K. Pearson, *The Grammar of Science* (New York, 1957), Ch. 5, Sec. 7, quoted in Skyrms, *Causal Necessity,* p. 25.

[23] Alexander, *De fato* 15, *SA* **2**/2, 185.8–9.

[24] Bertrand Russell, 'On the Notion of Cause', reprinted in *Mysticism and Logic* (New York, 1957), pp. 181–182.

[25] Skyrms, *Causal Necessity,* p. 30.

[26] Salmon, p. 91.

[27] The assumption here is that responsibility-attribution is a "fact" – although, indeed, a social/cultural fact – and that any treatment of the determinism-responsibility issue that simply dismisses this datum is embarking upon the path of revisionary, as opposed to descriptive, metaphysics. Aristotle advocates the way of descriptive metaphysics. See P. F. Strawson, *Individuals: An Essay in Descriptive Metaphysics* (London, 1959), pp. xiii–xvi.

[28] Sorabji, NC&B, p. 87.

[29] David Hume, *Enquiries concerning Human Understanding and concerning the Principles of Morals,* ed. P. H. Nidditch, third edition (Oxford, 1975). p. 100.

[30] *Ibid.*, p. 103.

[31] Examples used in introductory philosophy courses in discussions of the freedom-determinism issue typically introduce such a manipulator: e.g., "Consider the case of the mad genius who develops the means of stimulating the brain in such a way that he can control all the thoughts, motives, and desires of the subject. Etc. Would we judge that the subject in such a situation is to be held responsible for his actions?" "Certainly not," the students will respond. But this response surely is not merely due to the fact that the subject's thoughts, motives and desires are causally determined or necessitated.

[32] I should, I think, be inclined to subscribe to a view concerning determinism and responsibility that is implicit in this paragraph and, indeed, this whole section: with respect to particular actions – or with respect to certain *types* of actions in certain *types* of contexts – it "makes sense" to ask whether and to what degree the agent was responsible for the action; but it does not "make sense" to ask whether people are *ever,* in *any* circumstances, responsible for their actions.

[33] *Webster's New World Dictionary of the American Language,* college edition (Cleveland and New York, 1957), p. 893.

[34] Cf. the reformulation of the determinism-responsibility issue in terms of "causal probabilism" rather than causal determinism (necessitation) in Ch. Six, Section D.

[35] See the references under 'Distribution of natural assets' in the index of J. Rawls, *A Theory of Justice* (Cambridge, Mass., 1971), p. 592.

[36] See Ch. Six, Note 108.

[37] Rawls, p. 102: "The two principles [i.e., Rawls' two principles of justice] are a fair way of meeting the arbitrariness of fortune; and while no doubt imperfect in other ways, the institutions which satisfy these principle are just." Although Rawls maintains that "the natural distribution is neither just nor unjust," its "morally arbitrary" nature entails, according to Rawls, that social/political institutions in which there are no provisions for counteracting the effects of the natural lottery would be unjust.

[38] See Nozick's discussion of 'Natural Assets and Arbitrariness', in R. Nozick, *Anarchy, State, and Utopia* (New York, 1974), pp. 213–231.

[39] *EN* 3.1.1110a5–7. Aristotle decides, however that "actions of this sort are 'mixed' but seem more like voluntary (*hekousiois*) actions" (1110a11–12); and "actions of this sort are voluntary, but perhaps involuntary (*akousia*) absolutely speaking (*haplōs*), for no one would choose anything of this sort for its own sake (*kath' hauto*)" (1110a18–19).

APPENDIX

This appendix is devoted to further consideration of the logical-mathematical coherence or admissibility of the temporal-frequency model of the modalities. I shall, in particular, be concerned with the application of nonstandard measure theory to the resolution of admissibility problems with the model. Some of the same intuitions that underlie this model of the modalities are succinctly summed up by A. Bernstein and F. Wattenberg in their introduction to what is becoming a classic paper, 'Non-standard Measure Theory':

> Suppose that a dart is thrown, using the unit interval as a target; then what is the probability of hitting a given point? Clearly this probability cannot be a positive real number, yet to say that it is zero violates the intuitive feeling that, after all, there is some possibility of hitting the point. With the development by A. Robinson of nonstandard analysis, a rigorous theory of infinitesimals, another alternative presents itself: the probability of hitting a point should be a positive infinitesimal, that is a number bigger than zero but less than any positive real number.[1]

While it is beyond the scope of this appendix to provide a summary of the methods and principles of Robinson's development of nonstandard analysis – and, in fact, excellent summaries already exist[2] – some discussion of this development is necessary in order to suggest the manner in which nonstandard measure theory resolves the conflict between regularity and a "strong" additivity principle.

Robinson's development of nonstandard analysis employs the methods of model theory, that branch of mathematics that deals with the properties of "semantic structures" used to interpret formal languages. Intuitively, we think of the propositions of real analysis as being "about" the real numbers. In logistic jargon, this amounts to interpreting these propositions in an "intended model" which has as its basic or *urelements* the real numbers. Then, (first-order) properties of the reals can be thought of as sets of these *urelements*, (first-order) two-place relations on the reals as sets of ordered pairs of these elements, etc. We can define a structure $\mathfrak{R}$ which is the "complete structure" of the reals," that includes all sets and relations of reals, all sets of such sets and relations, etc, *ad infinitum*. A higher-order formal language[3] L suitable for

formulating the propositions of real analysis is assumed. Fundamental and well-known results in the metatheory of logic entail that there exists another "nonstandard" structure* $\mathfrak{R}$, which (a) includes the *urelements* of $\mathfrak{R}$ but other elements as well and (b), under an appropriate assignment of the constants of L to its elements, makes true all the sentences of L that are made true by $\mathfrak{R}$, the "intended model" of the reals. Properties of the reals will have "analogous properties" (customarily identified by the property name preceded by an asterisk) defined in terms of the nonstandard model* $\mathfrak{R}$. (A "wrinkle" here is that higher-order quantifiers of L do not range over *all* the sets and relations of the appropriate type in * $\mathfrak{R}$, but only over the subsets of these sets and relations which are termed "internal." As a result, for a property or relation Q that is "higher-order," i.e., a property or relation the specification of which in L involves higher-order quantification, there generally will be less of an intuitive resemblance between Q and its nonstandard analogue* Q.)

The nonstandard models that have been of particular interest in nonstandard analysis assign to the set (of*reals) that represents the property of being a *positive integer (* $\mathfrak{N}$) *urelements* of * $\mathfrak{R}$ larger than any *standard* positive integer (for which there are corresponding *urelements* in * $\mathfrak{N}$). The result, by the multiplicative identity property of ordered fields (of which the structure of reals is an example), is the existence of infinitesimals, for example, an infinitesimal $1/n$ that is the multiplicative inverse of each infinite *postive integer n. The existence of notrivial infinitesimals, that is, positive numbers smaller than any standard real but larger than zero, provides a mechanism for distinguishing between "negligibly small" probability and impossibility, a distinction that seems to be needed in order to preserve regularity: the equation of 0 probability with impossibility.[4]

Bernstein and Wattenburg's work on nonstandard measure theory shows how another problem of admissibility for a regular probability function can be addressed (since what is known as "measure theory" forms the basis of the modern mathematical treatment of probability).[5] The problem concerns the conflict, previously discussed, between regularity and "strong" additivity properties. The nonstandard measure functions which they discuss are regular and have the following additivity property:

Where m is the measure function in question, S is the collection of sets that is its domain, and * $\mathfrak{N}$ is the non-standard set of *positive integers, if $\{A_{i,i \in}$ * $\mathfrak{N}$ $\}$ is any sequence of disjoint

subsets of S, then there is a $N \in {}^*\mathfrak{N}$ such that if $i > N$, then (a) $m(A_i) = 0$ and (b) $m(\cup_{i \in {}^*\mathfrak{N}} A_i) = \Sigma_{i=1}^{N} m(A_i)$.[6]

Since all the standard positive integers are "embedded" in ${}^*\mathfrak{N}$, the finite (without an asterisk) additivity of the measure function is an immediate consequence of the preceding. However, since ${}^*\mathfrak{N}$ contains infinite positive integers (that is, the property of having *finite cardinality is applicable to sets that are infinite-without-the-asterisk), the additive property holds also for infinite partitions of the domain of the non-standard measure function. The result is that we can define a notion of *perfect or *ultra-additivity satisfied by Bernstein and Wattenberg's nonstandard measure functions. As B. de Finetti notes, the imposition of a property of perfect additivity entails[7] the condition that

> in any partition there is a finite, or countable, number of events with positive probabilities, summing to one: the others have zero probability both individually and collectively.[8]

De Finetti points out that the foregoing condition, in combination with regularity, is "logically absurd unless one excludes the possibility of an uncountable infinity of possible cases." When "*finite" is substituted for "finite, or countable" in de Finetti's condition, the result is entailed by Bernstein and Wattenberg's additivity condition. We might say that their non-standard measure functions are *perfectly additive. *Perfect additivity does not, apparently, limit the possible sorts of partition of a set in the way deprecated by de Finetti.[9]

A historical question pertaining to the admissibility issue is the extent to which the nonstandard analysis resolution of admissibility problems might have been congenial to the ancient advocates of a temporal-frequency model of the modalities. Of course, the level of mathematical sophistication of Robinson's construction of fields of "hyperreal" numbers places severe restrictions on the very meaningfulness of this question. Aristotle, for example, does not seem to have any sophisticated *mathematical* concepts underlying his discussions of infinity. However, Aristotle's generally "anti-realist" – or perhaps, better: "constructivist" – attitude toward infinity[10] suggests that he might have been suspicious of any sort of postulation of infinitesimals or infinitely large numbers. Since Aristotle may also have been the originator of the temporal-frequency model of the modalities, we have here one of those ironies with which the history of philosophy abounds.

The Stoa is perhaps the most likely place in antiquity to look for a sympathetic attitude toward infinitesimals. But attribution of the concept

of an infinitesimal even to the Stoics is controversial. A major step in formulating a mathematically coherent doctrine of infinitesimals is the denial of the absolute validity of what is called the axiom (or postulate) of Archimedes (or, alternatively, of Eudoxus): for any a, b, if $0 < a \leq b$, then there is a positive interger n, such that a added to itself n times is greater than b. If a is an infinitesimal, b a standard real number, and the range of "n" is the standard (non-asterisk) positive integers, the conditional does not obtain. I have suggested that there is at least some evidence that Chrysippus did deny the universal validity of this axiom.[11] However, the evidence is far from conclusive. And even if he did, such a denial would not entail that had worked out anything approaching a coherent mathematical theory providing for the existence of infinitesimals.

NOTES

[1] A. R. Bernstein and F. Wattenberg, 'Nonstandard Measure Theory', in *Applications of Model Theory to Algebra, Analysis, and Probability*, ed. W. A. J. Luxemburg (New York, 1969), p. 171.

[2] For a rigorous but relatively informal account, see 'Appendix 4: Nonstandard Analysis and Infinitesimal Probabilities' in Skyrms, *Causal Necessity*, pp. 177–187.

[3] That is, there will be variables having as their domain the set of *urelements*, variables having as their domain the set of sets of *urelements*, etc.

[4] A. Robinson is responsible for the development of nonstandard analysis. His principal comprehensive work is *Non-standard Analysis* (Amsterdam, 1966).

[5] A standard work on measure theory is P. Halmos, *Measure Theory* (Princeton, 1950).

[6] See Bernstein and Wattenberg, *Theorem* 2/2, p. 176.

[7] Suppose that perfect additivity holds and that there is a partition summing to one into a nondenumerable number of "events." Perfect additivity entails countable additivity (sigma additivity). Consider the number of events with probability greater than or equal to 1/2 and less than or equal to 1. By countable additivity, there must be no greater than a countable number of events in the nondenumerable partition having greater-than-zero probability in this class. The same argument applies for each class of events in the partition having a probability greater than or equal to $1/n$ and less than or equal to $1/(n\text{-}1.)$ There are, then, at most a countable number of classes of events, each containing a countable number of events, having a greater-than-zero probability if we consider the union of these classes. Since the union of a countable number of sets, each having a countable number of members, is a set with a countable number of members, there is a countable number of events having a greater-than-zero probability in the union of these classes. But every event in our original nondenumerable partition falls in (at least) one of these classes. Therefore, there is at most a countable number of events in the original partition having a greater-than-zero probability. By perfect additivity, the probabilities of the remainder of events in the partition must have ("individually and collectively") zero probability.

[8] De Finetti, *Theory of Probability*, vol. 1, p. 118.
[9] *Ibid.*, p. 120.
[10] See Aristotle, *Phys.* 3.4–8.
[11] M. J. White, 'Zeno's Arrow, Divisible Infinitesimals, and Chrysippus', *Phronesis* **27**/3 (1982), pp. 239–254.

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D/K = *Die Fragmente der Vorsokratiker* (ed. H. Diels, W. Kranz)
SVF = *Stoicorum Veterum Fragmenta* (ed. J. von Arnim)

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