LUCRETIUS AND BACON:

EROS AND THE ATOMS

by

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ABSTRACT

Bacon's atomism is usually seen as a mere repetition of Greek atomism, marking the beginning of the modern scientific age, and as a philosophical position which the founder of the inductive method could hardly avoid taking. Consequently little attention has been paid to the nature itself of Bacon's atomism which, however, on account of the concept of force which it contains, goes beyond Democritean and Epicurean physics. This concept appears in Bacon's De Principiis atque Originibus symbolized by Cupid, and brings Bacon much closer to the atomism of Lucretius than to that of the Greek philosophers. Lucretius' universe, in fact, is more than a mere conglomeration of atoms: it is a domain ruled by the power of Venus and Eros. However, the similarities between the atomic systems of the two philosophers can be made manifest only if Lucretius' Venus is seen in her relation to the atoms.

ABREGE

Souvent on regarde l'atomisme de Bacon comme une répétition de l'atomisme grec qui marque le début de l'âge moderne scientifique, et comme une position philosophique que le fondateur de la méthode inductive ne pouvait pas éviter. Par conséquent, on s'est occupé très peu de la nature même de l'atomisme de Bacon, qui, pourtant, tenant compte de l'idée de force qu'il contient, va plus loin que la physique de Démocrite et d'Epicure. Cette idée est symbolisée par Cupidon dans le De Principiis atque Originibus, et rapproche Bacon à l'atomisme de Lucrèce plus qu'à celui des philosophes grecs. En effet, l'univers de Lucrèce est plus qu'une simple conglomération d'atomes: il est un domaine gouverné par Vénus et Eros. Pourtant, les similarités entre les systèmes atomiques des deux philosophes peuvent se manifester seulement si la Vénus de Lucrèce est reconnue dans sa relation avec les atomes.

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INTRODUCTION

One method of treating Lucretius, both in relation to his debt to earlier philosophies and in terms of his influence on later writers, has been extensively employed; this is to refer to him as to the most "complete" or at least most "legible" embodiment of atomism; "complete" on account of the fragmentary nature of the pre-Socratic atomists and of the works of Epicurus himself, "legible" on account of the stylistic and poetic merits of De Rerum Natura, which, furthermore, being written in Latin, has always been more accessible than its Greek models. However, this privileged position held by Lucretius among scholars of all ages has had some detrimental consequences. The pleasant shortcut to atomism offered by De Rerum Natura has in fact brought most readers to regard it almost solely as a systematic and lyrical exposition of the thought of Leucippus, Democritus and Epicurus, in whose writings atomism suffered from the dryness common to most philosophic treatises, an attitude which has led to a general lack of responsiveness to the originality of Lucretius' thought. In fact, even though many scholars have focused their attention on the stylistic peculiarities and poetic skill of Lucretius, few have concerned themselves with the extent to which his philosophy deviated from its Democritean archetype and from its closer Epicurean model. Pierre Boyancé, the author of Lucrèce et l'épicurisme, best illustrates the former group of scholars. He recognizes that Lucretius has not limited himself to following faithfully the philosophy of Epicurus, rather, "il l'a repensée avec profondeur, en l'ordonnant dans le cadre de

ses chants et il l'a animée, par l'expression, de toute son ardeur de persuasion, de séduction, de conquête spirituelle."[1] However, Boyancé sees in Lucretius only a decorator of the furniture of the Epicurean universe. After saying, "S'il y a une originalité dans la physique de Lucrèce, elle ne consiste pas à introduire des théories nouvelles," he adds, "Il n'y a pas entre Epicure et lui rien qui rappelle l'écart qui sépare Epicure de Démocrite" (p. 3), and that "L'originalité la plus profonde de Lucrèce est . . . d'avoir parlé de l'épicurisme en termes de poésie" (p. 4).

This position, maintained, as I have said, by most Lucretian scholars, finds its roots already among ancient critics and appraisers of Lucretius' work and is best epitomised by Quintilian, who places Lucretius among those writers who "praecepta sapientiae versibus tradiderunt" (Quint. Instit. Orat. I,4,4),[2] and whose merit is mainly that of having made Epicurus' doctrines more acceptable by translating them into verse.[3] Quintilian here quotes part of that famous passage of Lucretius that has probably been the most influential in leading critics to view Lucretius as a mere versifier and sweetener of Epicurean philosophy:

> Sed veluti pueris absinthia taetra medentes
> cum dare conantur, prius oras pocula circum
> contingunt mellis dulci flavoque liquore,
> ut puerorum aetas improvida ludificetur
> labrorum tenus, interea perpotet amarum
> absinthi laticem deceptaque non capiatur,
> sed potius tali pacto recreata valescat,
> sic ego nunc, quoniam haec ratio plerumque videtur
> tristior esse quibus non est tractata, retroque
> volgus abhorret ab hac, volui tibi suaviloquenti
> carmine Pierio rationem exponere nostram
> et quasi musaeo dulci contingere melle,
> si tibi forte animum tali ratione tenere
> versibus in nostris possem, dum perspicis omnem
> naturam rerum qua constet compta figura.
> (Lucretius, De Rerum Natura, I, 936-950)[4]

Perhaps the only scholar who has contributed in any substantial way to an understanding of Lucretius' original thought, is Luciano Perelli, who in his book Lucrezio poeta dell'angoscia, a recently published book, succeeds in showing how De Rerum Natura frequently betrays symptoms of a mind working independently of Epicurean influences and reaching conclusions in no way traceable to either Epicurean or atomistic philosophy. (I shall not go into any details about Perelli's work now, since some of his observations will have a chance to appear in the course of my work.) However, due to the fact that his work has been published very recently, his views concerning the originality of Lucretius have not had time to be known and digested outside of the circle of purely Lucretian scholars and, therefore, have not yet met with any consideration and interest on the part of those (still few in number) who concern themselves with the influence of the Latin master on later ages.

We are thus confronted today with a number of works (mainly short articles) on the "fortuna" of Lucretius in the Middle Ages, the Renaissance and later periods, which either stress the posthumous survival of Lucretian imagery and expressions in post-Lucretian literature, or comment on the revival of certain philosophical doctrines, e.g. the atomic theory and the concept of "voluptas". Writers stressing the latter often use the De Rerum Natura as an easy way to refer to pre-Socratic atomic physics and Epicurean ethics. Moreover, it is interesting to note that while those critical writings concerned with Lucretius' poetry concentrate mainly on the period between Lucretius and the end of the Middle

Ages, a period concerned especially with stylistical disquisitions and philological studies, those centered around the ethical and philosophical issues in Lucretius find a more fertile soil in the period immediately following, in the Renaissance, and occasionally in later centuries. This trend reflected in works that compare Lucretius to other authors is easily seen by a perusal of any bibliography of Lucretian studies.[5] But when we come to these latter writings, Lucretius qua Lucretius tends to disappear, to give place to a Lucretian Epicurus combining the atomistic theories of Democritus and Leucippus with the doctrine of "voluptas" proper to Epicurus himself, and with the poetical "suaviloquens carmen" of Lucretius. This presumably involuntary creation of a Lucretian Epicurus prevents a clear understanding of Lucretius and of his influence.

Since it is my intention in the present study to bring together the thought of Lucretius and that of an English thinker of the Renaissance, namely Francis Bacon, it is essential, then, that whatever is strictly Lucretian in De Rerum Natura be isolated from its more generally Epicurean and atomistic context. Consequently, little will be said about the atomism of Bacon in its relation to Democritus' and Epicurus' atomism, but, on the other hand, considerable attention will be paid to certain peculiar aspects of Lucretius' atomic Weltanschauung which find a strikingly similar expression within the pages of Bacon.

Because so much has been written about Bacon's own atomism, I will confine myself to giving as clear a synopsis as possible of the problems presented by it, and a brief summary of the famous

quarrel over the extent of Bacon's acceptance of atomism, as well as a list of basic works on the subject.

The primary aim of this study is, then, to show that the philosophy of Francis Bacon, especially in one particular period of his intellectual development, manifests the presence of influences which are Lucretian rather than Epicurean in nature, and that most of the scholars who have dealt with the atomism of Bacon have been so engrossed in the Epicurean and Democritean contents of De Rerum Natura that they have lost sight not only of those elements in Lucretius which are not Epicurean (a lapsus oculi which, as we have seen, has been rather common among Lucretian scholars) but also of those ideas in Bacon which most clearly witness a deviation from the theories of the original atomists.

Obviously, in order to make the differences between Epicurus and Lucretius clear, it is necessary to review briefly the history of atomism in terms of its genesis and growth. This history will form the first chapter of the present work and will aim at showing what precisely Lucretius contributed to traditional atomism.

CHAPTER I

DEMOCRITUS

We owe the great merit of having destroyed the static Universe of the Parmenidean school to Leucippus and Democritus. With its belief in motionless Being, the Parmenidean school had denied plurality and any creative process of coming-into-being, and consequently, had taken a position which was hardly compatible with any empirical and realistic view of the universe. The impasse that resulted from the Parmenidean philosophy and from the mathematical and logical abstractions of Pythagoras and Zeno necessitated a total reorganization of the Universe in terms of principles which, even if not perceivable in themselves, could find proof for their existence in the observation of Nature herself and no longer in vague abstractions and logical formulations. Leucippus and Democritus brought about this reorganization.

Little is known about Leucippus, but since the little we know of his philosophy is repeated and developed by Democritus, we may safely refer to the early atomism simply in terms of Democritean philosophy.

Democritus' theory consisted in the vision of a Universe whose elemental particles and basic substance were atoms, imperceptibly small bodies (Kirk and Raven, fr. 555),[1] compact and full (Kirk and Raven, fr. 546), moving in space. In order to account for the motion of these small particles of matter, Democritus postulated the existence of void, which, by allowing

the atoms to come together, permitted the creation of more or less complex atomic combinations, so that "by their coming together they effect coming-into-being, by their separation perishing" (Kirk and Raven, fr. 552).

This subdivision of the Universe in terms of atoms and void, matter and space, can be seen as a development of the Parmenidean distinction between Being and Not Being; however, it is perhaps more realistic to see atomism and its materialism as a rebellion against the Parmenidean flights of imagination, and the void as a necessary consequence of atoms in motion, rather than as a philosophical reformulation of the concept of Not Being.

Democritus mentioned size and shape as the only two properties of the atoms (Kirk and Raven, fr. 574), which therefore, on account of their lack of weight, are left floating in the void with, apparently, no way of coming together. Epicurus later added weight to the properties of the atom, creating, as we shall see, new difficulties; but for the time being, Democritus is left with the problem of accounting for the creation of matter through the coming together of atoms. How do the atoms move, if there is no weight to give them a gravitational vector or some other kind of direction? And how do they come together if they are floating in a space which is infinite? (Kirk and Raven, fr. 562) Democritus says that the atoms move "by mutual collisions and blows" (Kirk and Raven, fr. 579) and, in order to anticipate any objection, such as Aristotle's, to the effect that he "ought to specify what kind of motion . . . is natural to them" (Kirk and Raven, fr. 576),

Democritus states that the first principles of the Universe are brought together in mutual collisions by a force which he calls the "whirl" (δίνη) (Kirk and Raven, fr. 562).

The nature of the "whirl" or vortex is unknown, and it is certainly a rather baffling and unprecedented concept; however, a fragment quoted by Diogenes Laertius attempts to clarify it by stating that "Everything happens according to necessity [κατ' ἀνάγκην]; for the cause of the coming-into-being of all things is the whirl, which he [Democritus] calls necessity" (Kirk and Raven, fr. 565).

But in order that the idea of necessity may clarify what the whirl is, the term ἀνάγκη must be clearly related to the term δίνη. The different interpretations of their relationship make almost impossible any clear understanding of how Democritus conceived it. In the passage just quoted, Diogenes Laertius makes the whirl and necessity synonymous with each other, but Aristotle seems to see Democritus' "necessity" as synonymous with chance or self-imposed movement, not identical with the whirl but rather its direct cause (Kirk and Raven, fr. 567). Simplicius, in agreement with Aristotle but less dogmatic, says that Democritus "seems to generate it [the whirl] by accident or chance" (Kirk and Raven, fr. 570).

Kirk and Raven seem to consider the fragment of Diogenes Laertius as the most reliable, and therefore consider the word "necessity", rather than the word "chance", as the term originally used by Democritus. Consequently, they explain Aristotle's replacement of the word "necessity" by the word "chance" (τὸ

αὐτόματον) by saying that "In Aristotelian terms, combinations can be said to take place by chance. . . . For Aristotle they are chance events because they do not fulfil any final cause; but the atomists emphasized the other aspect of non-planned mechanical sequence, i.e. as necessity" (Kirk and Raven, p. 413).

Taking "chance" as the Aristotelian equivalent of Democritus' "necessity" does not, however, clarify the relationship existing between this force called "necessity" and that designated as "the whirl". Is the former synonymous with the latter, as Diogenes Laertius' fragment implies, or is one the cause of, the motive power behind the other, as Aristotle and Simplicius claim? The problem has not yet been solved, but whatever the function of necessity may be, it helps explain the idea of the whirl--if not by giving it the consistency of a physical phenomenon, at least by placing it within an historical context. For if the idea of the whirl is new, that of necessity is not, and can be traced back not only to its more mythological formulators, such as Homer and Hesiod, but also to Ionian science, more specifically to Anaximander who, at the end of his famous passage on the "Indefinite" (τὸ ἄπειρον) says that "the source of coming-to-be for existing things is that into which destruction, too, happens according to necessity [κατὰ τὸ χρεών]" (Kirk and Raven, fr. 103). In the light of this ancestor of Democritus' "necessity", we can perhaps see the atomist's "whirl" as an attempt to materialize the already existing idea of ἀνάγκη by giving it a more definite, visual motion, a vector as it were. Thus, Diogenes Laertius' fragment concerning the identification of the whirl with necessity becomes indeed more

reliable and clearer than Aristotle's or Simplicius' interpretation in that it makes the whirl into the "field" of the force of Necessity and therefore comes very close to an extremely modern conception of force.

Thus we have in Democritean physics a universe made up of atoms and void, a void which, however, cannot be completely empty, since it is the sphere of action of the whirl and/or necessity, a force (or forces) which cannot reside in the atoms which are, by definition, "indivisible . . . and impassible owing to their compactness, and without any void in them" (Kirk and Raven, fr. 556).

* * *

EPICURUS

It is obvious that with Epicurus, philosophy has dealt a violent blow to Platonism. Epicurus' return to nature and empirical observation was a clear refutation of Plato's world of Ideas and of his apotheosis of Reason. However, Epicurus' opposition to Plato confined itself to a reformulation of Ionian science, and did not manifest itself too conspicuously in his general thought.

N. W. DeWitt says of Epicurus that Platonism was "among his chief abominations" (Epicurus and His Philosophy, p.6),[2] yet it is necessary to recognize in Epicureanism a philosophy that, though not consciously indebted to Plato, could not have existed without the intellectual revolution he brought about. This revolution had made man less aware of the Universe that surrounded him and more concerned with the position he held in it, and Plato's appearance probably has been as important and

influential for the study of the ζῷον πολιτικόν as was Auguste Comte's in the nineteenth century.

Epicurus, in fact, was no longer concerned with studying nature for its own sake in the fashion of the Pre-Socratics, but only in so far as it might bring happiness to human beings. Knowledge and science had ἀταραξία, peace of mind, as their main aim (Diogenes Laertius, Lives of Eminent Philosophers, X, 85c),[3] and they have to be pursued only "ὅση πρὸς τὸ ἀτάραχον καὶ μακάριον ἡμῶν συντείνει" (Diog. Laert., X, 80a).[4]

Thus, where in Leucippus and Democritus the atom accounted for first causes, in Epicurus it became a tool of ethics, the basis for categorical imperatives, the justification for a teleological philosophy, and consequently an aid to the investigation of final causes. Moreover, this ideological difference between Democritean and Epicurean physics, manifested by the presence in Epicurus' work of ethical preoccupations which are absent in that of Democritus, extends to the properties and qualifications of the atom itself.

In his doctoral dissertation on the differences between the Democritean and Epicurean philosophies of nature, Karl Marx complains of the fact that "modern writers by and large make Epicurus a mere plagiarist of Democritus in regard to the philosophy of nature." Leibniz, Marx says, had expressed a similar opinion by stating that "of this great man (Democritus) we scarcely know what Epicurus has borrowed from him, who was not capable of always taking the best" (The Difference Between the Democritean and Epicurean Philosophy of Nature, p. 66-7).[5]

However, although Marx, too, aims at proving the essential

difference between the two forms of atomism, he does not seem to see that the difference can be noticed already in the constitution of their principle elements, which he erroneously considers "undeniably the same" (Marx, p. 67). But what does Marx mean when he says that they are "undeniably the same"? His comment could mean either of two things: that both Democritus and Epicurus agreed on having their universe formed by two main principles, atoms and void, or -- taking this interpretation for granted -- that both Epicurus' and Democritus' two principles have the same attributes and functions. In either case, Marx's statement is inaccurate. If we accept the first interpretation, Marx's statement can be partially refuted by the fact that Democritus never says that the universe is made up only of atoms and void -- he thus allows for the existence of his "whirl"; while Epicurus, in contrast, dogmatically states: "τὸ πᾶν ἐστι σώματα καὶ κενόν" (Diog. Laert., X, 39b),[6] and deprives the universe of any force or motive energy. In order to assess the validity of the second interpretation, however, we must look further and determine whether the atom and the void of Democritus are really the same as those of Epicurus, and if they are not, what the differences between the two conceptions imply.

Both Democritus and Epicurus believed in the existence of two basic principles, the one solid and full, the other rare and empty. Moreover, they both believed in the indivisibility of the atom, even if the former considers smallness and the latter hardness the cause of this indivisibility (Kirk and Raven, fr. 557). But at this point the similarities between the two philosophers end, and

their views of the atom become irreconcilable; for while Democritus, on one hand, names only two properties of the atom -- size and shape (Kirk and Raven, fr. 574) -- Epicurus adds weight, or mass (βάρος) (Kirk and Raven, fr. 574; Diog. Laert., X, 54a).

Epicurus' introduction of weight is of fundamental importance; the concept of weight leads us to an understanding of the basic difference between Democritus and Epicurus, namely, the latter's omission of any concept of force such as we have discovered in the philosophy of Democritus. But in order that we may account for this third property attributed to the atom, a few words must be said on Epicurus' opinions concerning Necessity and the gods.

Atomism is used by Epicurus to prove the absurdity of a belief in immortality and in anything divine. Everything is made up of atoms; every form of matter thus constituted is mortal except the atom itself, which lasts forever and seeks new combinations out of the old ones. The atom is in no way subject to any divine power. The gods do exist, Epicurus allows, but they have nothing to do with the structure and motions of the universe (Diog. Laert., X, 97a). They have no duties, nothing moves them and nothing is moved by them (Diog. Laert., X, 97a, 139). It is obvious, then, that Epicurus' gods, by virtue of their powerlessness, do not really exist, since the concept of God has a meaning only if power is attributed to it.

But Epicurus is not satisfied with having crippled the existing theogony; he knows that the gods are only puppets or at best symbols of a force, since time immemorial recognized by man as arbiter of human life and of universal phenomena.

This force is Necessity. It is probably for this reason that Epicurus deems it unnecessary to deny completely the existence of the gods (a denial that, furthermore, might have compromised his position in the state, and made his philosophy even harder for people to accept) and instead sets about showing that "Necessity" is a pious fiction.

In the Odyssey, Athena says that not even the gods can save man from his fate (Moira) (3. 228). In the Iliad, the gods themselves admit that their powers are limited compared to those of Necessity (15. 117). In Hesiod's Theogony we hear that the Moirai and the avenging Fates bring punishment to both men and gods for their trangressions (220), while Aeschylus' Prometheus declares that Zeus himself is subject to the decrees of Necessity (Prometheus Bound, v. 520 ff.).

Epicurus probably would not have taken arms against the idea of Necessity if it had been only the product of a mythical mind; he realized, however, that the idea had played an important role not only in the scientific philosophy of Anaximander but, as we have already seen, had also become the first mover of the Democritean atomic universe. Consequently, understanding that the existence of atoms did not necessarily eliminate the possibility of a divine or metaphysical agent, he formulated his famous attack on Necessity in his letter to Menoeceus. "Destiny," he says, "which some introduce as sovereign over all things, he [the wise man] laughs to scorn, affirming that some things happen by necessity, others by chance, others through our own agency. For he sees that necessity destroys responsibility and that chance or fortune is

constant; whereas our own actions are free, and it is to them that praise and blame naturally attach. It were better, indeed, to accept the legends of the gods than to bow beneath that yoke of destiny which the natural philosophers have imposed" (Diog.Laert., X, 133b).[7] In this passage, by doing away with Necessity, Epicurus unfortunately shows an eagerness that can hardly be called philosophical. At this point he has ceased to be a serious thinker in search of natural causes, and has become a wishful thinker, whose aim is to refute the "natural philosophers"' belief in Necessity (among whom we recognize Anaximander and Democritus) and to give man freedom and independence from the divine will. He does not explain on what grounds he demolishes Necessity: we may consider his "swerving" atom, endowed with free-will, the cause of this liberum arbitrium in man. But, as we shall see later, the anomalous behaviour of the atom is not really the cause of human freedom but rather the necessary consequence of having deprived the universe of a moving force. However, Epicurus had to pay for his almost religious zeal. If Necessity does not exist and if no other force is found, how are we to account for the motion of the atoms? Why do they move? Who or what moves them? We may excuse him for not knowing how the atoms and void were created, although he attempts to give an explanation when he unsatisfactorily says that atoms and void always existed (Diog. Laert., X, 44c). Yet to dismiss the issue concerning their movement by a similar explanation would mean giving a very weak basis to his refutation of Democritus' theory. Consequently, Epicurus explains that the motion of the atoms is vertical and perpendicular (Diog. Laert., X, 43a) and that

weight carries them down through infinite space (Diog. Laert., X, 54a). Weight is introduced as a partial substitute for Necessity.

Karl Marx, in his doctoral dissertation, seems to believe that all that Epicurus added to Democritean atoms, in terms of their motion, is the idea of "swerve". He says that "Epicurus assumes a threefold motion of the atoms in the void. One motion is that of a fall in a straight line, the second comes from the atom deviating from a straight line, and the third is established through the repulsion of the many atoms. The assumption of the first and last Democritus has in common with Epicurus; the declination of the atom from the straight line differentiates them" (Marx, p. 77). However, here Marx has made a serious mistake, for not only is there no mention in Leucippus and Democritus of the perpendicular downward fall of the atoms, which according to them move "ἀλληλοτυποῦσας καὶ κρουομένας πρὸς ἀλλήλας" (Kirk and Raven, fr. 579),[8] but Cicero too, in his De Finibus Bonorum et Malorum, often quoted by Marx himself, says that both the perpendicular downward fall of the atoms and their weight are innovations peculiar to Epicurus (I, vi, 18). Then, too, Democritus' whirl does not require a concept of weight and of fall through space to account for the movements of the atoms; furthermore, the motion of the whirl is hardly reconcilable with downward motion.

Marx's incorrect statement, however, has given us a means of realizing the extent of the revolution brought about by Epicurus to the atomic theory, a revolution which is not simply limited to the appearance of the swerve, but is based on a whole

philosophical machination which begins with the addition of weight as property of the atom, develops inevitably into the concept of downward motion and, as we shall see now, ends with the invention of the atomic declination.

Weight, as we have seen, was introduced by Epicurus in order to account for the motion of the atom once it had been released from the bonds of Democritean Necessity, but Epicurus himself realizes that he is far from having solved the problem of its motion. If the atoms only move in straight vertical lines and if they possess equal velocity, as he clearly states in his letter to Herodotus (Diog. Laert., X, 61a), how will they ever meet and bring about those collisions required for the creation of matter? (Cicero, De Finibus, I,vi,19) [9] Epicurus hints at the possibility of a swerve taking place during the downward fall of the atom. He says that some of the atoms "αὐτοῦ τὸν παλμὸν ἰσχουσιν" (Diog. Laert., X, 43c).[10] The mention of an anomalous behaviour on the part of the atom occurs only once among the works of Epicurus that have come down to us, and no explanation is given of it anywhere in his works. We may call the "παλμός" "oscillation", "quivering", or "swerve"; but whichever word we may use to translate the Greek term, it remains clear that according to Epicurus, at a certain point of its downward course, the atom stops -- as the word "ἰσχουσιν" seems to imply -- and begins to quiver, both forms of behaviour being in complete contradiction with the account of the atomic motion given by Epicurus in his letter to Herodotus, where he says that any motion other than perpendicular is due either to collision with

other atoms or to the reaction produced by the weight of the atom counteracting the force of the collision (Diog. Laert., X, 61c).

However, a complete account of the swerve is found in Lucretius, who either develops the short and vague statement of Epicurus with his own understanding of it or bases his description of the phenomenon on some longer passage of Epicurus which has not come down to us. Lucretius says that,

> corpora cum deorsum rectum per inane feruntur
> ponderibus propriis, incerto tempore ferme
> incertisque locis spatio se pellere paulum
> tantum quod momen mutatum dicere possis.
> quod nisi declinare solerent, omnia deorsum,
> imbris uti guttae, caderent per inane profundum,
> nec foret offensus natus nec plaga creata
> principiis: ita nil umquam natura creasset.
> (De Rer. Nat., II, 216-224)[11]

Cicero, probably basing himself on Lucretius' account rather than on Epicurus', justly realizes the artificiality of this non-Democritean theory, which he calls "res ficta pueriliter" and "ad libidinem", that is, an infantile arbitrary invention, since Epicurus himself "ait enim declinare atomum sine causa, quo nihil turpius physico quam fieri quidquam sine causa dicere" (De Finibus, I,vi,19),[12] this being especially true of Epicurus, whose philosophical axiom was "οὐδὲν γίνεται ἐκ τοῦ μὴ ὄντος" (Diog. Laert., X, 38c).[13]

Cicero's criticism of Epicurus' atomic theory is instrumental in destroying the conception of Epicurus as "mere plagiarist of Democritus"; nevertheless, unfortunately, Cicero does not see that the contrast between the two philosophers does not consist simply in a technical question involving a more or less adequate explanation of the behaviour of the atom but in an altogether different approach

to natural philosophy. Both Democritus and Epicurus, according to Cicero, discuss the structure of the universe only in terms of its material components, omitting to consider "vim et causam efficiendi", the question of force and of efficient cause (I,vi,18).

It is certainly true that neither of the two atomists is as conscious of force as he is of matter, but we must, nevertheless, recognize that Democritus' "whirl" and his "Necessity" are by no means superficial or omissible contributions to kinetic physics and that nothing in any way similar is to be found in Epicurus. The latter's theory of atomic declination can in no way account for the presence of force, but, as we have seen, only for an ethical or existential belief in freedom and atheism. With Epicurus, for the first time probably in the history of Greek natural philosophy, we have a vision of the universe which does not include an even simplistic notion of moving force. Socrates and Plato and the influence of their ethical philosophy are probably to be blamed for this serious lacuna in Epicurus' thought. It will be Lucretius, two centuries later, who will fill it, if not through sheer power of analysis and observation, certainly by means of a highly fertile imagination. The next chapter will try to show its fruits.

CHAPTER II

In The Philosophy of Poetry, a short work on the relationship between form and content in Lucretius' poem, Henri Bergson touches on what is probably the most striking difference between Epicurus and Lucretius. He says:

> Lucretius was struck by the part of Democritus' theory treated lightly by Epicurus: the absolute rigidity of the laws of nature. Everything consists and has always consisted solely of atoms, masses of atoms, and changes in the arrangement of atoms; atoms move on, eternally and inexorably; definite, changeless laws must govern the birth, growth and decay of things caught up and squeezed from every direction by the tight bond of necessity. And inspired by what he assumes to be the basic idea of Epicureanism, Lucretius discovers that while natural phenomena appear to follow no set plan, their infinite variety actually masks the movement of atoms in predetermined directions and the uniform force of immutable laws (P. 79).[1]

Epicurus, as we have seen, considered the study of natural philosophy only a means to achieve happiness and tranquillity. His physics was crude and fell short of explaining adequately the mechanism of the universe. Lucretius, too, we may say, expounded ethical doctrines clearly formed upon the Epicurean model. However, De Rerum Natura represents a violent departure from Epicurean philosophy in that its physics shows a wholly unepicurean preoccupation with the concept of force, determinism and Necessity, which Epicurus had so eagerly rejected; and its ethics witnesses the transformation brought about by Lucretius to the Epicurean idea of pleasure, by giving it more than simply ethical connotations, correlating it with the physical universe.

The atoms of Lucretius show the same characteristics as

those of Epicurus. They need void (inane) to move (De Rerum Natura, I, 330). They are solid and indestructible (I, 485-6). Their motion is everlasting (II, 80 ff.) and manifests three different types of behaviour: one is the vertical motion produced by their weight (II, 84, 217-8), another is the leaping movements caused by collisions (II, 85 ff.) and the third is the swerving motion (clinamen) (II, 216-93). It would be a mistake, however, to think that Lucretius has limited himself to translating Epicurus' atomic doctrines into Latin. The Latin poet's exposition of the atomic theory is full of explanations and illustrations that are not found in Epicurus. But if someone should say that what we call Lucretius' own contributions are in reality also mere translations of some lost Epicurean text, instances may be found in De Rerum Natura which prove the Roman origin of many of Lucretius' statements illustrating "the nature of things".[2] Furthermore, does not Lucretius himself say that his aim is to "inlustrare Latinis versibus" "Graiorum obscura reperta" (I, 136-7) wishing therefore to elucidate, by his Latin poetry, what Democritus and Epicurus had left unexplained? This statement, in fact, seems to show that the Epicurean and Democritean material available to Lucretius could not have been much more extensive than that available to us.

However, if Lucretius' account of the atoms and their behaviour is much more articulate and thorough than that of its Greek models, no evidence can be found in De Rerum Natura of non-Epicurean atomism.

It is a common opinion that all that Lucretius added to Epicurean philosophy was his poetry and his mood; Pierre Boyancé

and Luciano Perelli, as we have seen in the introduction, are mainly responsible for these views, but the former scholar especially omits to say that both a particular style and a particular mood may be symptomatic of a particular philosophical view, not only regarding ethics, which would be all too banal, but regarding the very physical structure of the universe. In other words, a certain style not only can reflect an optimistic or pessimistic mood and consequently marked ethical or existential preoccupations, but it can also betray the acquisition on the part of the writer of certain fundamental truths regarding the nature of the universe. Such is the case of Lucretius.

The most conspicuous feature of his style is the sometimes even monotonous recurrence of certain words, expressions and passages. Luciano Perelli in Lucrezio poeta dell'angoscia, says that "in Lucrezio . . . l'uso di particolari termini conferisce al testo una carica di ossessione depressiva e psicopatica non ravvisabile nelle altre fonti epicuree" (p. 30).[3] He also discovers in Lucretius what he calls "il martellamento ritmico ossessivo e la ripetizione delle parole chiave" (p. 56).[4] But Perelli sees this tendency to repetition only as a symptom of the depressive anxiety afflicting the Latin poet and does not seem to be aware of the fact that it is exactly this morbid state of Lucretius' mind that brings him to the more or less conscious knowledge of what Bergson, centuries later, called "the absolute rigidity of the laws of nature" and of nature's recurring patterns. And it is again by means of Lucretius' rhetoric that we may discover his conception of force.

The structure of Lucretius' poetry continually mirrors the structure of his Weltanschauung. As he himself says,

> quin etiam passim nostris in versibus ipsis
> multa elementa vides multis communia verbis,
> cum tamen inter se versus ac verba necesse est
> confiteare alia ex aliis constare elementis;
> non quo multa parum communis littera currat
> aut nulla inter se duo sint ex omnibus isdem,
> sed quia non volgo paria omnibus omnia constant.
> sic aliis in rebus item communia multa
> multarum rerum cum sint primordia, verum
> dissimili tamen inter se consistere summa
> possunt; ut merito ex aliis constare feratur
> humanum genus et fruges arbustaque laeta.
> (II, 688-699)[5]

The analogy between words in a sentence or letters in a word and atoms in a body of matter is found again in the first book of De Rerum Natura (823-29). It is not surprising, therefore, that the recurrence of certain words in the text should betray not only a preoccupation with the ideas expressed by those words, but with the idea of "recurrence" itself as observed or unconsciously perceived in the universe; for, as Lucretius says, the patterns of language do imitate the patterns of nature. Consequently the repetition of certain words is most conspicuous wherever Lucretius is particularly eager to show the regular and inevitable recurrence of certain natural phenomena. The expression necessest, for example, and its variations (necesse, necesst, necessum, necessumst, necessust), all of them implying inevitability, inexorability and determinism, occur in the text one hundred and eight times and are found in the greatest number in those passages where Lucretius is most impressed by "the absolute rigidity of the laws of nature"; for instance, in the one thousand odd lines (146-1117) of the

first book, concerned exclusively with the basic elements of the universe, atoms and void, atomic combinations and properties, the expression necessest recurs twenty-one times. Twenty-five more instances of this expression are found in the second book, within the nine hundred lines (62-991) describing the movements and shapes of the atoms. The third book, on the mortality of the soul and the irrevocability of death, has seventeen instances of this expression; it appears again nineteen times in the fourth book, which deals with the atoms that produce sensations. However, the fifth book, in spite of its being the longest of the six (1457 lines), being the only one concerned with society, the least natural among universal manifestations, limits the use of the expression necessest to six times, thus drawing our attention to the purely physical nature of Necessity. The sixth book, in fact, which is a discussion of physical phenomena on earth and in the heavens and which contains the famous passage on death, showing the inevitable end reached by all things, employs the expression sixteen times.[6]

At this point, the idea of necessity being much less frequent in a human and social context than in a strictly physical environment, one might assume that Lucretius conceived a view of necessity as of a force, the decrees of which man, unlike the rest of nature, could disobey through the exercise of his own free will. In the light of this observation, Lucretius' insistence on the subject of freedom (II, 251-93) and his lengthy elaboration of the "swerve" theory adumbrated by Epicurus, ceases to be inconsistent with a belief in Necessity, for while it gives man

a chance of escape, within a social structure artificially imposed on nature, it still leaves the entire universe and all its phenomena subject to the unbreakable laws of determinism. It would be a mistake, however, to think that the atoms, producing by their swerve free will in man, are themselves endowed with free will. Lucretius, in fact, like Epicurus, uses the atomic declination only as a stratagem to account for human freedom; unlike Epicurus, however, all through his work Lucretius never ceases to show the role of necessity in natural phenomena. Furthermore, Epicurus dismisses not only the necessity governing human actions but, as we have seen, also the necessity of Democritus, which acts in a purely atomic context, while Lucretius limits the range of freedom to the "mens ipsa", the mind of living creatures (II, 256, 289). Thus the universe, in all its physical or, more precisely, inorganic manifestations, remains bound by the fati foetera, the chains of fate.

Thus necessity reappears in philosophy, after having been exiled by Epicurus; but in De Rerum Natura, the idea of necessity acquires new connotations. The force that Democritus had cursorily brought into relation with the "whirl" becomes with Lucretius something much more definite and comprehensive: in the poem of the Latin philosopher, "ἀνάγκη" becomes Venus.

* * *

Empedocles of Acragas is responsible for having given Aphrodite the status of cosmic force and of main motive power. No one before him had attached so great an importance to the

goddess of love. He, in fact, equated the goddess with "φιλία" (Kirk and Raven, fr. 424), the cosmic force which is responsible for the coming together of all things in the universe. However, her power is counteracted and curtailed by that of "Νεῖκος", Strife, the other motive principle, which brings about the separation of cosmic substances (Kirk and Raven, fr. 426 et al.).

Yet Empedocles was not the first to realize the extent of Aphrodite's powers. Parmenides, in two passages considered by Kirk and Raven irreconcilable with the rest of his doctrines, calls Aphrodite "the goddess who steers all; for she it is that begins all the works of hateful birth and begetting, sending female to mix with male and male in turn with female" (Kirk and Raven, fr. 358)[7] and is "the cause of moving and of coming into being for them all, . . . the holder of the keys, Justice and Necessity" (Kirk and Raven, fr. 359).[8] The juxtaposition of Justice and Necessity is not surprising if we remember that passage of Anaximander where he says that "the source of coming-to-be for existing things is that into which destruction, too, happens 'according to necessity; for they pay penalty and retribution to each other for their injustice according to the assessment of Time'" (Kirk and Raven, fr. 103).[9] To Anaximander, thus, an "injustice" is whatever is done against the laws of Necessity. Thus Parmenides, equating the goddess of love with Necessity, the all-powerful cosmic agent, offers a precedent for Lucretius' Venus. Nevertheless, the appearance of the goddess in the proemium of De Rerum Natura still remains somewhat incongruous. Let us see, then, if we can explain her presence in terms of Lucretius' own thought.

Lucretius, in true Epicurean fashion, uses all his powers of persuasion to ban the gods and mythology from the universe. Early in the first book (62-101) his attack on religion makes its appearance, and the fifth book (146-234) contains a thorough refutation of divinity as commonly imagined by man. Other remarks on the futility and dangers of religion and on the powerlessness of the gods are scattered throughout the work as a whole. How, then, are we to explain the presence of Venus, a goddess who certainly is not described as indifferent to the universe and removed from human affairs, but, on the contrary, as she through whom "genus omne animantum Concipitur" (I, 4-5),[10] and as the only one to govern the nature of things (I, 20)?

In the second book of De Rerum Natura Lucretius himself helps us to understand the figure of Venus; he says,

> . . . siquis mare Neptunum Cereremque vocare
> constituit fruges et Bacchi nomine abuti
> mavolt quam laticis proprium proferre vocamen,
> concedamus ut hic terrarum dictitet orbem
> esse deum matrem, dum vera re tamen ipse
> religione animum turpi contingere parcat.
> (II, 652-7)[11]

It is clear, then, that the value of Venus is no less allegorical than that of Neptune, Ceres or Bacchus: it is a poetical appellation completely bereft of any religious or mythological connotation. But if, then, Venus is a metaphor, what does she stand for?

The position of Venus at the beginning of De Rerum Natura, in the capacity of inspiring muse and as object of the poet's invocation, has led many critics to see the goddess as a mere

poetical device belonging to a rich tradition of poems starting with an invocation to a muse or divinity. The first two words of Lucretius' poem, "Aeneadum genetrix", alluding to her as mother of the Romans, seems to have been an imitation of Ennius' line, "te sane, alta precor Venus, te genetrix patris nostri" (Annales, 52).[12] Again, the "te sociam studeo" of line 24 reminds one of the last line of the famous poem of Sappho, where she begs Aphrodite to join shields with her on the battlefield of love.[13] Moreover, the description of Venus in the proemium is very similar to that of Calliope, the muse of epic poetry, in the sixth book, where Lucretius calls her "Calliope, requies hominum divomque voluptas" (VI, 94).[14] But this critical method or approach based on the identification of Venus with Calliope, unfortunately makes the mistake of considering Venus only as Muse, forgetting the other numerous references to Venus as creative force of nature, and consequently greatly diminishes, in fact largely denies, the impact of the goddess in the poem. E. Bignone, the main supporter of the theory that identifies Venus with Calliope, sees her only as "hominum divomque voluptas" (I, 1) and as herald of "tranquilla pax" (I, 31), thus as almost identical with the Calliope who brings both "requies" and "voluptas" (VI, 94). Hence he draws the conclusion that the "Venus lucretiana" symbolizes the Epicurean principle of "ἡδονὴ καταστηματική", aboulic pleasure.[15] It is tempting, in fact, to see the word "voluptas" as a translation of the Epicurean term "ἡδονή", but, unfortunately, the text of De Rerum Natura does not support this interpretation. Actually, the word "voluptas" appears mostly in association with Venus, erotic

pleasures, and other violent emotions or cravings,[16] except when it becomes an attribute of Calliope or when as a term it is modified by adjectives such as "blanda" (II, 966) or "divina" (III, 28); while the Epicurean "pleasure principle" is best translated by Lucretius with words such as "suave" (II, 1, 5), "dulcis" (II, 7) and "iucundus" (II, 19) which, in fact, appear in the most Epicurean passage of De Rerum Natura, the first sixty lines of the second book. Furthermore, the word "voluptas", rooted in the verb "volo" is much closer to "ἔρως" (a word related to the Greek verb "ἐράω", to desire, to love) than to a word like "ἡδονή", which would be best translated by "suavitas".

The Venus of Lucretius, therefore, seen in the light of these observations, stops being the "ἡδονὴ καταστηματικὴ" of Bignone and becomes "ἡδονὴ κινητικὴ", pleasure as a moving principle and a cosmic force. Antonio Traglia in his work Sulla formazione spirituale di Lucrezio, adopts this view (p. 197 ff.),[17] but fails to consider a point of fundamental importance: the relationship between the "Venus genetrix" of the first book of De Rerum Natura and the "Venus erotica" of the fourth book.

Venus, in the first book, represents the force of sexual desire, but here the stress is placed more on the final product of this force, fertility, creation, than on the force itself. Venus represents birth rather than love and therefore resembles more Juno Natalis than the Venus described by so many Greek myths as the eternal concubine. Erich Neumann, in Amor and Psyche, says that "The end [of Aphrodite's beauty] seems to be desire and sexual intoxication; actually it is fertility" (p. 87).[18] Later he says

that "the myths and mysteries of Aphrodite are not Greek but come from the Near Eastern precinct of the Great Mother, of whom all the Greek goddesses represent partial aspects" (p. 160). It is in the light of this statement, in fact, that Lucretius' description of the Magna Mater (II, 600-643) should be seen: namely, as one aspect of Aphrodite, and, more precisely, that aspect of Venus which is most conspicuous in the proemium of the first book. The identification of this Venus with the Magna Mater, or Mother Earth is, furthermore, stressed by the twice-recurring juxtaposition of Venus and earth. In the first lines of the first book Lucretius says, "tibi [for Venus] suavis daedala tellus Submittit flores" (I, 7-8), and later in the same book,

> unde animale genus generatim in lumina vitae
> redducit Venus, aut redductum daedala tellus
> unde alit atque auget generatim pabula praebens?
> (I, 227-29)

However, this particular facet of Venus does little to support Traglia's Venus "κινητική". Venus, in her role of "genetrix", of mother, is not easily reconcilable with Venus as moving force; therefore, in order to substantiate a theory such as Traglia's which aims at making of Venus a force, an "élan vital", it is necessary to sever the goddess from her maternal role and associate her with a less organic and more kinetic element in De Rerum Natura, namely with a concept of force.

The concept of Venus as force seems to acquire increasing strength in Lucretius' mind as his work develops. While in the first book Venus, as we have seen, is intimately associated with

the earth and its breeding, in the second book we find her allied with "dia voluptas", called by Lucretius "dux vitae", the guide of life (II, 172-3); and while in the first book "voluptas" had appeared as one of the many attributes of Venus (I, 1), in this passage of the second book it seems to have already acquired the status of a complete divinity working in cooperation with Venus. These few lines, in fact, are the preparation for the fourth book, where Venus as "genetrix" will disappear almost completely and make place for another Venus called, this time, "voluptas" or "cupido". We might say that Venus herself has given birth to a being which displays a strong resemblance to its mother but is endowed with a more selfish nature, that is, less interested in pleasure as a means to creation than in pleasure for its own sake. This being is Eros, for whom offspring is a mere accident resulting from its power of attraction. This strange divinity is the result of the love between Venus and Mars. It is thus interesting to note that both Venus and Mars appear in the proemium of De Rerum Natura (I, 31-40) as lovers, almost as if Lucretius, by this description, wanted to prophesy, as it were, not only the birth of Eros from the womb of Venus but also the genesis of a conception of Eros in his own mind. The fourth book, in fact, is no longer the field of action of the Venus we have known in the first book, but rather a battlefield where Eros armed with a bow is war-lord. This does not mean that Venus has disappeared, to be replaced by Eros, but that Venus has undergone a transformation, acquiring the characteristics of her son. In the fourth book she stops being "alma" Venus, and all those attributes, such as "lepor" (I, 15, 28), "cupido" (I, 16, 20), "voluptas" (I, 1), "amor" (I, 19,

34, 36), which in the proemium had been mere tools used by Venus to achieve her end, fertility, become in the fourth book either elements of nature in themselves or individual manifestations of her. Eros, initially under the disguise of an adverb, "cupido" (I, 16, 20), becomes now a noun, "cupido", and a personified noun at that (IV, 1057, 1093, 1115, 1138).

Eros, however, is not merely a new version of the Venus we have known. Not for nothing is he born of the marriage of Venus and Mars. There is more in him than a mere abstraction of the force of attraction employed by Venus for maternal purposes. Eros contains in himself the chromosomes of his father Mars, the god of war, and therefore achieves the union of male and female, not only through fond attraction between the sexes but also through the natural antagonism existing between them. Lucretius describes lovers in the following way:

> . . . etenim potiundi tempore in ipso
> fluctuat incertis erroribus ardor amantum
> nec constat quid primum oculis manibusque fruantur
> quod petiere, premunt arte faciuntque dolorem
> corporis et dentes inlidunt saepe labellis
> osculaque adfligunt, quia non est pura voluptas
> et stimuli subsunt qui instigant laedere id ipsum
> quodcumque est, rabies unde illaec germina surgunt.
> (IV, 1076-83)[19]

Nevertheless, the struggle does not last forever: "leviter poenas frangit Venus inter amorem Blandaque refrenat morsus admixta voluptas" (IV, 1084-85).[20]

It is in this passage (1076-85) that the dual personality of Eros is best shown. His paternal, Martian side is manifested in the power of "amor". "Amor", in Lucretius, is, in fact, always

associated with something negative, painful or degrading. It wounds the mind with "dira lubido", dire craving (IV, 1046-7); it is like a shaft thrown from one body to the other (1053-54); it should be shunned like a pestilence (1063-4); it is the source of pain (1066-7); it is based on illusions (1101); many are its evil consequences (1141-42); it possesses powerful snares (1146); it is often discreditable and humiliating (1158); it is a form of "voluptas" but of a kind which Lucretius calls "non pura voluptas" (1081), that is, pleasure mixed with pain, Venus and Mars.

On the other hand, the side of Eros which is inherited from his mother Venus, is like a "gutta dulcedinis" trickling in the heart, which soon becomes "frigida cura" on the arrival of "amor" (1059-60). As we have seen in the above passage, the Venereal aspect of Eros has also the power of soothing the anguish of lovers once the climax of their relationship has been reached (1084-5). Thus, while "amor" is "non pura voluptas", Venus is "pura voluptas" (1075), "blanda voluptas" (1085). Lucretius stresses this difference between "amor" and Venus when he says that it is possible to enjoy the fruits of Venus without being ensnared in the coils of "amor" (1073). Lucretius also identifies "amor" with "cupido". "Cupido" is "dira" (1090) as the "dira lubido" of "amor" (1046-7); it blinds man (1153) and inflames his heart (1090). One, in fact, feels that the terms "amor" and "cupido" or the expressions "in amore" and "cupide" could easily be interchangeable; which is not surprising when we think that both Amor and Cupid were the names given by the Romans to the Greek god Eros.

The theory that the description of Eros in Lucretius contains many allusions to the god's Martian origins is substantiated by the frequent recurrence in the text of images of blood and wounding, illustrated by words like "saucia", wounded (1047), "vulnus", wound (1049), "sanguis", blood, and "ictu", blow (1050), by "ruber umor", red liquid (1051), "volnera plagis", wounds through blows (1070), and "pereunt", die (1121). Furthermore, what can better illustrate the juxtaposition of Love and Death in Lucretius' work than the fact that his poem starts with an invocation to Venus and ends with a description of Death? And is it not remarkable that the symptoms of death by plague (VI, 1185-92) should remind us of those same symptoms which Sappho describes as proper to love-sickness?[21]

Today this view of love has become rather common; Tristan and Isolde, Romeo and Juliet, the "Eros-Thanatos" of Freud and Marcuse and the Duino Elegies of Rainer Maria Rilke (the first one in particular) have explained and popularized the communion of such antithetical concepts as Love and Death, and Love and War. Similarly, Henry de Montherlant, in Un incompris, described lovers in the following way: "les amants se heurtent et se soulèvent comme deux vagues qui s'affrontent, mais ensuite, comme elles, ils retombent en se mêlant" (Act I, Scene 5).

Thus we have seen not only that Venus is the form that cosmic force takes in the universe of De Rerum Natura, but also that this Venus is of a particular kind, either working with or transforming herself into Eros. The result of this collaboration or metamorphosis is a force which is very similar to the Empedoclean

combination of φιλία and Νεῖκος; but while Empedocles envisaged the existence of two distinct forces, Lucretius, by seeing the former as Aphrodite and the latter as Ares, combined the two into one single force, Eros, both the fruit and the combination of the parental couple. Furthermore, while Empedocles had regarded Strife mainly as an agent of separation, Lucretius realized that the separation brought about by Strife and War was only a consequence of the coming together of antagonistic bodies; consequently, he viewed Strife as a form of attraction rather than as a form of repulsion. Thus, the attraction of Love was made to differ from the attraction of Strife only in terms of the former's being pleasant and the latter's being painful.

The concept of Eros, consequently, is most probably to be traced back to Empedocles and to be seen as a development of the latter's idea. Epicurus, unfortunately, had nothing to do with the formulation of this idea, not only because he had not included any force in his universe but because he had assigned no role to love except that of dangerous and harmful emotion (Vatican Sayings, LI).[21a]

It is not surprising to discover that Lucretius' concept of force owes a great debt to Empedocles' theories; we know, in fact, that of all the philosophers known by Lucretius, with the exception of Epicurus, Empedocles was held in the highest esteem by the Latin poet, who calls the Greek poet-philosopher a most illustrious man (I, 729) endowed with a divine mind (I, 731) and "vix humana . . . stirpe creatus", of almost divine stock (I, 733), all these being attributes which Lucretius had applied to Epicurus himself.

However, keeping in mind the admiration the Latin philosopher had for Empedocles, it is surprising to notice that Lucretius mentions him only in order to refute his theory of the four basic elements (I, 712-16) which, with the Love-Strife theory, forms the whole of Empedoclean philosophy. This curious behaviour on the part of Lucretius seems to imply that the part of the Empedoclean thought which attracted Lucretius most and justified his flattering remarks was that part of the Greek's philosophy which concerned force, which part, however, for reasons I cannot fathom, he does not mention. Nevertheless, the appearance of Eros and Venus in De Rerum Natura sufficiently proves the presence of Empedoclean elements, even if we cannot speak of a wholly conscious assimilation of these on the part of Lucretius.

These elements, as Empedocles' work amply shows, affect both the animal/human world and the inanimate or inorganic universe. Similarly there are reasons to believe that Lucretius' principle, Eros, governs not only human or animal intercourse but also the behaviour of the atoms themselves. Moreover, it is important to stress, in the context of atomic behaviour, the hegemony of Eros, rather than that of Venus. Let us see, now, why.

We have seen already where the main differences between Venus and Eros lie. Venus is seen by Lucretius as a force that has an aim to reach, a task to fulfill, namely the continuation of the species and the constant renewal of life. This work of fertilization is brought about through the help of forces called "voluptas", "cupido", "amor". Eros, on the other hand, being the very essence of these three instrumental forces, though working at the service

of Venus, is in itself blind, aimless. We might say, in modern terms, that while Venus is a force, that is, endowed with a vector, a direction, Eros is simply pure energy. This interpretation of Eros' aimlessness finds further confirmation in the fact that for Lucretius, Eros does not operate merely in terms of sexual attraction but also in terms of sexual antagonism, where it becomes a Martian principle eager to hurt and destroy, as we have seen in the description of the lovers in the fourth book. Thus, Eros is characterized by two fundamental attributes, its blindness and its power of attraction, be it productive (Venus) or destructive (Mars).

The first attribute, blindness, as we have seen, characterizes all erotic behaviour. The frenzy of love is called by Lucretius "vulnus caecum" (IV, 1120), and the behaviour of man under the effect of sexual stimuli is also called blind. Men, when "cupidine caeci" --blinded by desire (IV, 1153)--are unable to see and think objectively, and ascribe to the person they love attributes that these do not possess (IV, 1153-76). This blindness belongs to all forms of violent craving, not only sexual desire; for instance, "cupido honorum", lust of honours, is also called "caeca" by Lucretius (III, 59). But what is more important, this same characteristic is frequently attached to the atoms themselves and to their motions. In the first book the atoms are said to be "caeca" (I, 1110). One should note at this point, however, that the adjective "caecus" in Lucretius often means "hidden" and not "blind"; the "caeca" in line 1110 of the first book seems to mean "blind", but in other places (I, 277, 295; II, 328, 714) the word "caecus" has to be translated as "unseen". However, the important

thing is that the epithet "blind" is applied to the atoms' motion rather than to their bodies. In fact, Lucretius, in a passage in the second book, repeats three times that the atoms clash together by blind blows and motions, using expressions such as "caecos motus" (127-8), "caecis plagis" (129), and "ictibus caecis" (136). When discussing the power of the Magnesian stone, or magnet, Lucretius speaks of "caecis compagibus", blind attachments between the magnet and iron (VI, 1016); we shall see, later, how even in the field of magnetism, Eros plays an important role. Natural forces, such as that of the wind, are called "blind"; Lucretius speaks, in fact, of "venti caeca potestas" (III, 247, 269).

At this point it might be of some interest to observe that Lucretius seems to identify his motive principle "voluptas" with that of "voluntas" and therefore his concept of Eros with that of will. Even without any support from the text, this inference should not surprise us, once we realize that "Eros", "cupido", "voluptas" and "voluntas" are all etymologically rooted in verbs implying various degrees of desire ("ἐράω", "cupio", "volo"). In the passage on the "clinamen" in the second book, Lucretius asks:

> unde est haec, inquam, fatis avolsa voluntas
> per quam progredimur quo ducit quemque voluptas.
> (II, 257-8)[22]

It is clear, from these lines, that "voluntas" and "voluptas" are, in reality, one and the same principle; moreover, their position at the end of the line seems to be due more to a desire to juxtapose the two terms than to metrical requirements. The identification of the two terms is again stressed in the fourth

book, where Lucretius, speaking of the swelling of stimulated genitals and of the resulting ejection of seed says:

> inritata tument loca semine fitque voluntas
> eicere id quo se contendit dira lubido.
> (IV, 1045-6)[23]

"Lubido", here, replaces "voluptas" but, as we have seen earlier, the terms are almost synonymous. The two two-line passages thus show marked similarities. The term "voluntas" of the first line seems to be in direct apposition to the "voluptas" of the first passage and to the "lubido" of the second passage, this apposition receiving further stress in both cases from the position of all these terms at the end of the line. Therefore it would not be too arbitrary to suggest that Lucretius envisaged the possibility of relating the principle of Eros to an even wider and more encompassing one, that of will.

In fact, I tend to see Lucretius as a precursor of Schopenhauer. This is not the place to allow for a comparative study of Lucretius and Schopenhauer (a study which, however, I intend to pursue in the future), but I believe that a few quotations from the German philosopher may help us to understand better some aspects of what we may call the Lucretian metaphysics, especially those concerning the idea of Eros.

Schopenhauer says in his work The World as Will and Representation that "That which makes itself known to the individual consciousness as sexual impulse in general, and without direction to a definite individual of the other sex, is in itself, and apart from the phenomenon, simply will-to-live" (II, p. 535).[24] He explains this

idea in the following passage:

> The sexual impulse is proved to be the decided and strongest affirmation of life by the fact that for man in the natural state, as for the animal, it is his life's final end and highest goal. Selfpreservation and maintenance are his first aim, and as soon as he has provided for that, he aims only at the propagation of the race; as a merely natural being, he cannot aspire to anything more. Nature too, the inner being of which is the will-to-live itself, with all her force impels both man and the animal to propagate. After this she has attained her end with the individual, and is quite indifferent to its destruction; for, as the will-to-live, she is concerned only with the preservation of the species; the individual is nothing to her.
>
> (I, pp. 329-30)

The idea that Lucretius' Eros might be Schopenhauer's Will in embryo has had very few followers and these limit themselves to vague passing remarks on the subject. V. J. McGill, in his biography Schopenhauer, Pessimist and Pagan, claims that "No philosopher has emphasized the power of love as much as Schopenhauer and since Lucretius, indeed, no one has emphasized it at all" (p. 166).[25] John Masson, in Lucretius, Epicurean and Poet, attempts a closer parallel between the two philosophers and concludes a rather confused chapter by saying that "There are several points of contact, some of them pretty close, between Schopenhauer and Lucretius, but at present we can only remind our readers how Lucretius too intimately associates Will with the origin of Force" (p. 228).[26] The most recent statement on the subject is by Luciano Perelli who, speaking of the proemium of De Rerum Natura in his previously cited work, says that "nell'inno a Venere . . . l'impulso al piacere è un mezzo di cui la natura si vale per la conservazione delle specie. Esiste a mio avviso

una chiara analogia con la cieca volontà di vivere schopenhaueriana, che tutto muove nella natura e che spinge l'uomo all'illusione del piacere, mentre in realtà la natura ci offre soltanto l'alternativa fra il dolore e la noia" (p. 217).[27]

In the light of these passages, then, the lines that Lucretius dedicates to the "swerve" acquire new meanings. One may observe, in fact, that what Lucretius had in mind when writing these lines was a concept of will as universal force rather than one of "liberum arbitrium" as understood by medieval thinkers. It is true that here the Latin poet is describing the phenomenon of free-will, but this phenomenon becomes in his eyes of such cosmic importance (by being made into the determining factor for the creation of the universe) that it can hardly be made to resemble any later conception of free-will. Free-will, in fact, before any modern notion of statistical determinism had come forth, had always been an attribute of man, and its existence had always been a product of theological speculation rather than of empirical observation; by contrast, Lucretius' "freedom" not only affects the whole universe from the atom to man but is the "causa sine qua non" for its existence. Furthermore, we have seen how, in lines 257-8 of the second book the concept of "voluntas", even when meaning "free-will", is equivalent to "voluptas", a concept which is unseparable from that of Eros. The connection between Eros and will, moreover, acquires paramount importance once we realize that the presence of the power of attraction of Eros explains the phenomenon of the "swerve" which would otherwise remain unaccounted for, as in Epicurus' work. In fact, instead

of explaining the anomalous motion of the atom as some chance freak of nature, we can now easily elucidate it in terms of some form of magnetic or, anthropomorphically speaking, erotic attraction between two atoms. Once we accept Eros as the ruler of the Lucretian universe, the enigmatic "clinamen" offers no longer any problem.

Thus, after having accounted for blindness as an attribute of Eros and after having seen how Eros is connected to a notion of will, we may now try to ascertain the extent of his power in an atomic context. It will be necessary at this point to keep in mind the dual Venereal-Martian personality of Eros.

Once the will of Eros has brought about the first collision, the work of creation has begun, and, with it, Venus the matchmaker has joined hands with Mars the warrior. Lucretius illustrates the motion of atoms as they come together to create matter, in the following way:

> contemplator enim, cum solis lumina cumque
> inserti fundunt radii per opaca domorum:
> multa minuta modis multis per inane videbis
> corpora misceri radiorum lumine in ipso
> et velut aeterno certamine proelia pugnas
> edere turmatim certantia nec dare pausam,
> conciliis et discidiis exercita crebris;
> conicere ut possis ex hoc, primordia rerum
> quale sit in magno iactari semper inani.
> (II, 114-122)[28]

The vocabulary in this passage is clearly taken from warfare ("certamine", "proelia", "pugnas", "turmatim", "certantia", "conciliis et discidiis"). Similarly, wherever Lucretius has to describe the motions of the atoms, words like "ictus"

or "plaga" meaning "blows", occur with great frequency ("ictus": I, 528, 1055; II, 85, 99, 136; "plaga": I, 528, 583, 633, 1025, 1042, 1050; II, 129, 141, 223, 227, 285, 288, 531, 715, 726, 956, 1020, 1112, 1140, 1143). It seems as if Lucretius had come to understand the importance of war and that Mars' "fera moenera", savage works (I, 29, 32), are not always destructive, since in the hands of Eros they become an indispensable tool for creation. At this point I will also remind the reader of that passage in the fourth book where the sexual act is described in violently sanguine tones; the section on sex is interspersed not only with images of blood and wounding, as we have observed, but the same terms--"ictus" and "plaga"--which had characterized the motions of the atoms, reappear here in an erotic context ("ictus": IV, 1050, 1052, 1245, 1273, 1284; "plaga": IV, 1070, 1146).

Lucretius may have had a certain difficulty in visualizing and accounting for Eros, his "primum mobile". The reader may feel its presence all through De Rerum Natura and be more or less convinced of its existence by the recurrent use of certain words and expressions or by the repeated juxtaposition of certain concepts. Lucretius may have never expressly stated that the Universe is ruled by the power of Eros or even by that of Venus, since he limits her sway to the animal and human world. However, the conception of such forces is certainly strongly implied by Lucretius, as I have tried to demonstrate, and it might be referred to as the "aestus", the exhalation, as it were, of De Rerum Natura. Just as Luciano Perelli has felt the need of extracting the emotional and pathological elements from Lucretius' work, I have attempted,

in the present discussion, to abstract whatever metaphysical or mystical beliefs underlie the work of the Latin thinker.

Nevertheless, despite the clandestine nature of Lucretius' "Eros principle", its existence is so often disclosed by the poet's use of language, and by often unconscious juxtapositions of ideas, that it can no longer be denied. In the section on the power of the Magnesian stone (VI, 998-1064), Lucretius gives us the last, and perhaps most forceful and convincing, illustration of the control exerted by Venus and Eros over inorganic matter.

The power of the magnet, as if Lucretius intended it to be another manifestation of Eros' "moenera", is described again in the terminology of love and combat similar to that employed in the description of atomic movements. Words like "conexa", connected (VI, 1010), "compagibus", attachments (1016), and verbs like "pelliciat", entice (1001) and "cohaeret", cling together (1010), all implying communion and attraction, coexist with words like "plagis" (1003, 1020) and verbs like "impellit", drive on (1033), "verberat", beats (1028, 1039) and "offensare", strike against (1053), which create a picture of antagonism and "discordia" (1048).

Madame Mayotte Bollack, in her article entitled "La chaîne aimantine: Lucrèce et ses modèles grecs",[29] justly states that "L'épisode de l'aimant, au sixième livre du De Rerum Natura, est encore plus méconnu qu'incompris" (p. 165). She realizes that the coming together of magnet and iron and their coming apart when separated by bronze (1042-46) are both instances of universal phenomena; the first shows that "Lucrèce réintroduit dans son explication le principe souverain de l'affinité" (p. 181),

the second, "la discorde" (p. 174). The antithetical modes of behaviour shown by magnet and iron are, in fact, instances of the Empedoclean principle of Love and Strife; however, this dual principle appears in Lucretius' account of magnetism as a double manifestation of the same force, that of attraction. Madame Bollack says, in fact, that "les incompatibilités se fondent sur le même principe que l'affinité, ou plutôt la haine et l'amour sont deux manifestations équivalentes quoique opposées de la nature des choses" (p. 176), and concludes her study by bringing the phenomenon of magnetism, as described by Lucretius, "sub specie aeternitatis": "La loi du monde," she says, "sa vie, son aimant (au sens mystique du mot), c'est bien, si l'on veut, l''amour' présent dans l'échange et dans la transformation, mais c'est un amour précaire et menacé, impliqué, compris dans le flux universel, à l'origine duquel il ne participe plus" (p. 185).

In the first book Lucretius says:

> ergo praeter inane et corpora tertia per se
> nulla potest rerum in numero natura relinqui,
> nec quae sub sensus cadat ullo tempore nostros
> nec ratione animi quam quisquam possit apisci.
> (I, 445-48)[30]

We have discovered, nevertheless, that a third nature does exist, and that it manifests itself as a force called Venus or Eros, depending on whether the coming together of organic or inorganic bodies involves pleasure or pain, union or collision. However, this nature, which Lucretius might have called "clandestinam caecamque", secret and unseen (I, 779), can be perceived neither by our senses nor by reason; its existence may be surmised by

sheer speculative intuition. It is thus that we may perhaps interpret the four lines above quoted: if a third nature exists, neither through our senses nor through our reason can we become acquainted with it. It is true that Lucretius repeatedly elevates the senses to the level of supreme judge of reality (I, 422-5; 699-700), and in the fourth book, he voices a strong and lengthy defence of sense perception and of reason as based on it:

> invenies primis ab sensibus esse creatam
> notitiem veri neque sensus posse refelli.
> . . . . . .
> quid maiore fide porro quam sensus haberi
> debet? an ab sensu falso ratio orta valebit
> dicere eos contra, quae tota ab sensibus orta est?
> (IV, 478-9, 482-4) [31]

But Lucretius is hardly aware of the fact that the existence of the atom, the basis of his philosophy, is in no way based on sense perception, since the atoms, as Lucretius himself says, are invisible (I, 268), as well as their motions, which, as we have seen, are frequently called "caeca", here meaning "unseen" and not "blind". The existence of atoms and of their motion is, rather, inferred from that analogy with particles of dust floating in a sunbeam which we have had a chance to analyse (II, 112-22). We could say, therefore, that Lucretius' philosophy is based more on the associative faculty of the mind, in other words on imagination and intuition, than on strictly empirical observation and reasoning; thus, it is not surprising that the former faculty should have been responsible also for a conception of force and for the introduction of the almost mystical notion of Eros. On account of the intuitive nature of Lucretius' thought, we may rightly call De Rerum Natura

the product of his Weltanschauung rather than of his philosophy, defining Weltanschauung in Schleiermacher's words as an "emotional view of the universe".

With Lucretius the void which Epicurus had left so empty and sterile becomes the dwelling of a mysterious energy. What Heisenberg said about nineteenth-century atomism holds true for Lucretius, too: his void was real "inasmuch as it was a transmitter of fields of force".[32] But Lucretius' addition of force to physics should be seen more as the product of his poetical mind than of his rational intellect. More precisely, it should be regarded as a fruit of that lyrical rationalism which Gide admired so greatly in ancient Greeks, a people among whom "la philosophie alimentait la poésie, la poésie exprimant la philosophie".[33]

CHAPTER III

The preceding chapter has allowed us to perceive some of the most serious lacunae in the scholarship on ancient atomism. Similarly, Bacon's atomism has often been misinterpreted and its value seldom recognized. Francis Bacon is usually known as the first thinker in the seventeenth century who postulated the importance of the inductive process in philosophy and science by stressing the need for observation and experimentation. Bacon's fame, in fact, like that of Descartes, rests mainly on his "method," on his approach to the study of nature, rather than on particular insights into the workings of the universe. Critics consequently have focused their attention mainly on Bacon's Novum Organum, his work on the methodology of science, and have overlooked writings such as the De Principiis atque Originibus, which attempt to account for the most obscure manifestations of nature. In fact, if one goes beyond Bacon's purely methodological preoccupations, one finds a man who came very close to formulating a theory of the interchange between matter and energy, thus heralding what is perhaps the most controversial issue in modern physics.

In spite of the frequent mention, in Bacon's works, of ancient Greek atomists, it is intriguing to notice that Lucretius, rather than Democritus and Epicurus, exerted the greatest influence on the natural philosophy of Bacon, although he seldom names the Latin philosopher. The nature and extent of this influence has been completely disregarded, in spite of the considerable evidence supporting it. Some critics of Bacon have gone as far as to deny absolutely his atomism; it is not surprising, then, that once such

heights of absurdity are reached, Lucretius should find no place in studies on the background of Bacon's thought. Yet, it is by a careful reading of Bacon's works on atomism, the De Principiis atque Originibus in particular, that one perceives the impact of De Rerum Natura on Bacon. Bacon's atomic theory, in fact, represents a fundamental departure from traditional Greek atomism and conspicuously betrays a deep understanding of Lucretius and of the modifications brought by him to Democritean and Epicurean physics.

* * *

G. Sortais, Paolo Rossi and J. K. Houck are responsible for the writing of the three most important bibliographies of Bacon. The one compiled by Sortais appeared at the end of his work La philosophie moderne depuis Bacon jusqu'à Leibniz, published in Paris in 1922; however, despite the wealth of the material collected, it seems to be mainly concerned with the influence of Bacon on later ages and, moreover, due to the year of its publication, it is now outdated. Paolo Rossi tried to bring the work of Sortais up to date, that is, to the year 1956, by compiling a short, fourteen page bibliography which can be found in the 1957 issue of the Rivista critica di storia della filosofia under the title "Per una bibliografia degli scritti su Francesco Bacone (1800-1956)." But what is probably the most complete bibliographical work on Bacon is Francis Bacon 1926-66, written by J. Kemp Houck, published in London by the Nether Press in 1968; its seventy pages and its recent publication make it an extremely valuable research tool.

However, none of the bibliographies show any signs of works having been written on the influence of Lucretius on Bacon, except for a two-column article, "Lucretius and Bacon on Death," by D. S. Brewer, which appeared in the 1955 issue of Notes and Queries (p. 509-10) and is listed by Houck. Both Houck and Rossi mention the well-known work on the classical antecedents of Bacon's philosophy, Charles T. Harrison's "Bacon, Hobbes, Boyle and the Ancient Atomists" which appears in the fifteenth volume (1933) of Harvard Studies in Philology and Literature, to which I will refer in the course of this chapter. Another work dealing with Bacon's classical background in general is a series of articles by V. de Magalhaes-Vilhena called "Bacon et l'antiquité" stretching through five years of the Revue philosophique de la France et de l'étranger.[1] Other works of a general nature have been written on the influence of ancient thought on Bacon's philosophy which do not appear in any of the bibliographies; later in this chapter mention will be made of these studies, although they tend to concentrate on Platonic and Aristotelian influences and on the much-discussed atomism of Bacon.

As far as Lucretian scholarship is concerned, three works on Lucretius and his influence stand out: G. D. Hadzits' Lucretius and His Influence published in New York in 1935,[2] Simone Fraisse's L'influence de Lucrèce en France au seizième siècle published in Paris by Nizet in 1962, and W. B. Fleischmann's Lucretius and English Literature 1680-1740 published in Paris in 1964.[3] Starting with these latter studies and going on to the above-mentioned Baconiana, we can determine to what extent either Lucretian or Baconian scholars have discovered analogies between Lucretius' and

Bacon's thought.

Hadzits places Bacon, together with Gassendi, Newton, Leibnitz and Boyle, among those who followed the theories of the ancient atomists (p. 285), but he also adds that Democritus and Epicurus, rather than Lucretius, were responsible for Bacon's atomism (p. 286) and that Lucretius' importance in this age was that of having added "electric vitality" and poetry to the Greek theories so that "The atom, so long despised, came, eventually, to be recognized as the well-nigh most important entity in the physical universe" (p. 287). Hadzits, in fact, sees Bacon as a "disciple of Epicurus and reader of Lucretius" (p. 303), meaning by this that the English philosopher considered Lucretius' merits as being mainly poetical. We shall see later how Bacon's atomism was probably more Lucretian than Epicurean, and how both Lucretius and Epicurus are eclipsed in his work and replaced by Democritus for practical reasons. Hadzits also adds that since "the seventeenth century could not and did not follow Lucretius, the atomist, in his denial of divine creation and of providence . . . Bacon, though perhaps with difficulty, retained his belief in God as a creator" (p. 287). We shall see, however, that Bacon's God acquired Lucretian and pagan hues by becoming associated with Eros. The study by Madame Fraisse concentrates only on Lucretius' fertilizing effect on French soil and consequently never mentions Bacon; the omission of Bacon from her work, however, is hardly excusable when one thinks that Gassendi, the famous French atomist, knew of Bacon's contributions to science. Fleischmann, on the other hand, seems to show a certain interest in the relationship between Lucretius and Bacon; he, in

fact, quotes extensively from and gives a long commentary on Charles T. Harrison's work, "Bacon, Hobbes, Boyle and the Ancient Atomists," probably the only work that deals at some length with the Latin and the English philosopher.

More is to be found, however, among the studies of Baconian scholars. I have already mentioned Harrison and Magalhaes-Vilhena; Mayo's work Epicurus in England, 1650-1725 published in Dallas by the Southwest Press, in 1934,[4] deserves to be added to the list, although his attention is focused mainly on Hobbes. These three studies, among those of a more general nature, remain the best and deserve to be discussed.[5]

Mayo's work has become a standard work on the influence of Epicureanism in England, but unfortunately his interest in the period between 1650 and 1725 shows an unjustified desire to dismiss any appearance of Epicurus before 1650. The arbitrariness of such a limitation in the scope of his thesis is reflected again in its opening pages, where Mayo, obviously compelled to account for the decades immediately preceding the year 1650, briefly disposes of Bacon and his relationship to Epicurus and his school, saying that "in spite of this generous appreciation [of Bacon for the Epicureans], in spite also of the utilitarian strain common, in some degree, to the respective scientific outlooks of Bacon and Epicurus, there could be in fact no essential affinity between the Englishman who preached all his life the necessity of founding knowledge uncompromisingly upon experience, and the Greek who lightheartedly 'made up' a science conducive to the attainment of his ethical aims" (p. 19). Here Mayo, in order to concentrate his

attention on Hobbes with the least possible delay, seems to forget--perhaps consciously--that two philosophies do not necessarily have to display similar ends in order to be similar or related one to the other. If differences in ethical aims or existential attitudes made studies of influences impossible, we would hardly be able to speak of Hume's influence on Kant or of Schopenhauer's influence on Nietzsche.

The rest of Mayo's study mentions Bacon a few more times and never in an Epicurean context (e.g., p. 33, 110, 128, 140, 170). But what is more important for us, it never mentions Lucretius. This curious omission seems to indicate that Mayo, like many other critics, tends to see Lucretius as a mere plagiarist of Epicurus and consequently not worthy of any consideration. The previous chapter of this study has proven, I hope convincingly, how mistaken this view is.

Charles T. Harrison, in "Bacon, Hobbes, Boyle and the Ancient Atomists," tries to remedy the inaccuracies exemplified by Mayo by showing how Bacon was the first in England to appreciate the findings of the Greek atomists. He complains of the fact that "The striking anomaly in the attacks on the influence of the Atomists is that they took no cognizance of Bacon" and that "Bacon has been accorded very modest treatment in histories of atomism"(p. 192). Harrison in fact believes that "It is with Bacon that the influence of the ancient Atomists effectively enters English thought"(p. 192). He finds several instances where the thought of Epicurus is paralleled by that of Bacon, and these instances are not confined to atomism alone. However, the merit of his study is primarily that of having

shown how Bacon echoes Lucretius qua Lucretius, and not Lucretius qua Epicurus.

Nevertheless Harrison adds the comment that "although he [Bacon] understood sufficiently well the relation of Lucretius to Democritus, his personal enthusiasm for Democritus led him sometimes to ascribe to Democritus opinions which he found only in Lucretius"(p. 198). Harrison ascribes Bacon's apparent preference for Democritus to "personal enthusiasm," although, as we shall see later, other more cogent reasons also help to account for it. He adds that "Bacon's reflections on death, superstition, and love are so like in spirit to Lucretius's that one would suspect that Bacon saturated himself with the humane as well as with the naturalistic portions of the poem" (p. 199). Harrison then concludes the section on Bacon by affirming that in the seventeenth century no other Englishman who read Lucretius's poem was "as fully sympathetic as Bacon" (p. 200).

However, Harrison, in spite of his greater sensitivity to the intellectual and emotional similarities between Lucretius and Bacon, fails to see that Bacon was not a mere admirer of and sympathiser with Lucretius but probably the only thinker in his time who understood the most obscure feature of Lucretius' atomism, namely his notion of force or Eros. Harrison says that Bacon "shows the extent to which atomism had seized upon his imagination when, in the treatise De Principiis atque Originibus, he translates the whole myth of Cupid and Coelum into terms of atoms and void" (p. 196). But he, unfortunately, calls "imagination" what, in reality, is deep understanding. Bacon's allegory in De Principiis marks, in

fact, the first attempt in the history of Lucretian scholarship to come to grips in a scientific way (and not in a poetical way, like Spenser in his Faerie Queene) with the concept of Venus and Eros in De Rerum Natura.

The series of articles by Magalhaes-Vilhena is mainly concerned with Aristotelian and Platonic echoes in the work of Bacon. It also gives the atomism of Bacon large consideration and shows a great partiality to the differences between Democritus' and Epicurus' systems. However, Lucretius here seems to be "persona non grata": Madame Magalhaes-Vilhena's views on the relationship between Lucretius and Bacon are in complete disagreement with those expressed by C. T. Harrison. She says that "Bacon, bien que le mentionnant quelquefois, ne semble pas s'être attaché particulièrement à Lucrèce--cet 'insanus Lucretius' si décrié, après tant d'autres, par Pomponazzi, que Bacon connaissait bien" (Revue philosophique de la France et de l'étranger, 152 (1962), p. 28). She adds that "La raison--si l'on peut parler d'une raison--en est simple: 'Lucrèce--dit Bacon--n'a fait que revêtir du langage poétique le système' de Démocrite"(Ibid.) In quoting this statement of Bacon, she refers the reader to the Riaux translation of the De Principiis atque Originibus (vol. II, p. 454). It is certainly true that whenever he can, Bacon avoids mentioning the name of Lucretius, for reasons which shall be examined later. However, the statement on Lucretius that Madame Magalhaes-Vilhena attributes to Bacon is nowhere to be found in De Principiis, so that her views regarding the relationship between Lucretius and Bacon rest completely unsupported. However, even if Bacon had expressed such an opinion

of Lucretius, the demonstrably great impact of his philosophy on Bacon's thought more than disproves such a theory.

Because of the sporadic appearance of Lucretius in Bacon's work, it is understandable and even, perhaps, excusable that his influence on Bacon should have escaped most critics' notice. It would be absurd, however, for anyone to deny Bacon's atomism, yet such is the case with Robert Leslie Ellis, who with James Spedding and Douglas Denon Heath collected and edited what has long been regarded as the definitive edition of Bacon's works. In fact, in his preface to the Philosophical Works of Bacon Ellis says: "It has sometimes, I believe, been supposed that Bacon had adopted the atomic theory of Democritus. This however is by no means true."[6] A benevolent reader might want to interpret this statement as meaning that the atomism of Bacon was not that of Democritus but rather that of Epicurus or Lucretius, but this generous gesture on the part of the reader would be frustrated by Ellis, who adds that Bacon "did not adopt the peculiar opinions of Democritus and his followers"; in short, that "Bacon was not an atomist" (pp. 96-97). How does Ellis explain, then, the numerous references to Democritus and Bacon's obvious admiration for the Greek philosopher (VIII, 83)? Ellis believes that Bacon "may, perhaps, have been more or less influenced by a wish to find in antiquity something with which the doctrines he condemned [sc. those of the Peripatetics] might be contrasted" (p. 95). He adds to this unconvincing or at least unsubstantiated hypothesis the statement that "to Bacon all sound philosophy seemed to be included in what we now call the natural sciences; and with this view he was naturally led to prefer the

atomic doctrine of Democritus to any metaphysical speculation" (p. 96). Ellis' obviously undocumented conclusions all seem to stem from a passage in the Novum Organum in which Bacon "rejects altogether the notion of a vacuum and that of the unchangeableness of matter" (p. 96). The passage to which Ellis refers is the one where Bacon says, "Nor shall we thus be led to the doctrine of the atoms, which implies the hypothesis of a vacuum and that of the unchangeableness of matter (both false assumptions); we shall be led only to real particles, such as really exist" (VIII, 177). However, from this statement it is evident that what Bacon objected to was not atomism in general but simply the notions of vacuum and of the "unchangeableness of matter." As far as the notion of vacuum is concerned, Bacon makes it very clear in several places not only that his criticism of Democritus is limited to the vacuum theory, but that it was a particular notion of vacuum that Bacon objected to, namely that of an infinite vacuum. He says, in fact, in Descriptio Globi Intellectualis, that "it is one thing to deny a vacuum absolutely, another to deny a collective vacuum. For the reasons which may be advanced in favour of a vacuum interspersed, whereby bodies are relaxed and opened, are far stronger than those on which the assertion of a collective vacuum, that is, a vacuum extending over great spaces, is supported" (X, 426). He also says in defence of Leucippus and Democritus that these "two philosophers, . . . in admitting an interspersed vacuum, do in fact deny a collective one" (X,426).In Cogitationes de Natura Rerum, in order to account for the contraction and condensation of bodies and for their expansion and dilation, he admits the existence of a vacuum.

He in fact comes to the conclusion that contraction must take place "by some natural (whatever that may be) condensation and rarefaction of bodies" (X, 289), "which supposes a vacuum" (X, 290). This vacuum is, however, as he said before, an interspersed one, that is, restricted within bounds and limited by matter, and not a collective one. This development of Bacon's atomism is related to that theory of the dense and the rare, heat and cold, which he adopted late in his life and which appears in Historia Vitae et Mortis (1623) and in Sylva Sylvarum (1627).

As for that part of the passage stating that we should abandon the atoms so that we may "be led only to real particles, such as really exist," it is clear that Bacon had very confused ideas concerning the atomic theory as developed by Democritus. It seems to me, in fact, that here Bacon is quibbling with terms; whether one calls the beginnings of things "atoms" or "particles" makes no real difference in terms of an acceptance of a theoretical philosophy such as Democritus' atomism. Bacon may be unsatisfied with the details of the atomistic theory and with some of the attributes of the atom, but the fact remains that he keeps his partiality to what Ellis calls the "ultimate particles," a term which, by the way, reminds one of Lucretius' term "corpuscula rerum," namely the atoms.

There is, nevertheless, a stage in Bacon's philosophy in which Democritus and Leucippus are partially eclipsed in his mind, not because he has rejected atomism but rather because he found them guilty of a certain narrowness of mind. In the Novum Organum, the very work which Ellis used to deny Bacon's atomism, Bacon says:

> Contemplations of nature and of bodies in their simple

> form break up and distract the understanding, while contemplations of nature and bodies in their composition and configuration overpower and dissolve the understanding: a distinction well seen in the school of Leucippus and Democritus as compared with the other philosophies. For that school is so buried with the particles that it hardly attends to the structure; while the others are so lost in admiration of the structure that they do not penetrate to the simplicity of matter. These kinds of contemplation should therefore be alternated and taken by turns; that so the understanding may be rendered at once penetrating and comprehensive, and the inconveniences above mentioned, with the idols that proceed from them, may be avoided (VIII, 85-6).

Bacon's objections to atomism, then, are mainly directed to the stress placed by the atomists on the concept of the atom, rather than on the atoms themselves. We should keep in mind, furthermore, that the Novum Organum is a work concerned principally with methods of scientific investigation and only to a limited extent with the actual objects of research. It is in the light of this information, then, that Bacon's statements on atomism acquire a more realistic perspective and at the same time familiarize us with the notion of atomic composition and structure, the understanding of which necessitates the presence of a binding force, which we shall meet in the guise of Eros.

Paolo Rossi, by contrast, in Francis Bacon: From Magic to Science,[7] sharply contradicts Ellis' view; in fact, he affirms the atomism of Bacon. Nevertheless he complains that he "cannot ignore the contradiction of Bacon's insistence on the 'inevitability' of accepting atomism in the De Principiis, with his refutation of Democritean atomism in the Novum Organum" (pp. 124-5). He does, however, try to solve the contradiction by claiming that although "Bacon's reappraisal of Democritean philosophy is known and he

accepted most of the atomistic doctrines, . . . his reservations were motivated by his alchemical allegiances" (p. 14). He adds, moreover, that Bacon was of the opinion that "Research should . . . be diverted from the 'queta principia rerum' (passive principles of substances) to their appetites and inclinations" (pp. 14-15).

This leads us to the best statement I have found on the subject of Bacon's atomism and consequently to the issue of Eros and the atoms. Robert Hugh Kargon and Marco Maccio are responsible for having seen Bacon's atomism as a philosophical and scientific theory which developed, throughout his life, in antithetical directions. Unfortunately, both Kargon and Maccio are inclined to understand this antithesis in terms of development rather than in terms of philosophical inconsistency.

In his book Atomism in England from Hariot to Newton, Kargon divides Bacon's intellectual life into three periods: the first ends in the year 1603, the second ranges from 1603 to 1612 and the third from 1612 to 1620. Kargon says that "In the earliest (Elizabethan) period of his career, Bacon showed little interest in the atomism of Democritus, Epicurus, or Lucretius,"[8] but that in the second period "(1603 to 1612 and perhaps later), Bacon showed his greatest sympathy for the atomic doctrine. In the Cogitationes de Rerum Natura (written before 1605), in the De Principiis atque Originibus (written around 1612), and in the new Essaies added in 1612, Bacon made statements most favourable to atomism. They leave no doubt that in this period he was, in some real sense, an adherent of that ancient philosophy" (p. 44). Following this second stage, Bacon seems to have realized that

Democritean and Epicurean atomism did not account for motion and for force as an agent determining motion; therefore, "By the time of the publication of his Novum Organum (1620), he rejected both metaphysical bases of atomism which he had previously accepted: the existence of eternal, immutable atoms and the reality of the void" (p. 47). Kargon adds that "Atomism, basically an a priori construction, and far removed from 'laboratory' practice, as it were, was sacrificed for a new conception, close to that of the chemist, and to Bacon's mind, more closely related to experience" (p. 47). Kargon, however, does not seem to notice that what Bacon rejected was not atomism in its totality, but, as noted above (see p. 57), "the immutable atom and the void" (pp. 47, 49). He stresses the fact that for the Bacon of these later years, "matter is no longer to be thought of in terms of atoms and void but rather in terms of gross matter and a material activating spirit which pervades all space" (p. 49).

Whether Bacon, as Kargon implies, completely rejected atomism, or whether he replaced the term "atoms" with the term "real particles" (Bacon, Works, VIII, 177), is, for our purposes, of secondary importance. The essential point is that the notion of "activating spirit" acquires predominance in Bacon's thought.

Maccio is substantially in agreement with this view of Bacon's atomism. In his article "A proposito dell'atomismo nel Novum Organum di Bacone," he says that Bacon "rifiuta l'ipotesi degli atomi isolati in spazi vuoti per assumere quella della particelle connesse dagli spiriti e mosse da questi. Il rifiuto dell'atomismo tradizionale e l'assunzione dell'attività degli spiriti mi paiono

strettamente connessi con il problema della spiegazione del movimento degli atomi: ad essi è tolto il principio di una tendenza intrinseca al movimento ed esso è attribuito ad una sostanza diversa, gli spiriti."[9] Even so, Maccio seems to be more sensitive than Kargon to Bacon's development, for while Kargon tends to divide Bacon's thought rather sharply into various stages, Maccio realizes that the seeds of the third stage, with its theory of spirits, were already present in the preceding atomistic period. Maccio feels that Bacon "deve aver sentito intensamente in tutto l'arco della sua vita il problema del movimento degli atomi o delle particelle più piccole di corpi; e deve essere stato proprio questo problema a fargli man mano abbandonare l'atomismo per avvicinarlo a concezioni dinamico-vitalistiche" (p. 194).[10]

We can thus observe the following development in Bacon's thought: a first stage in which atomism played no part; a second stage witnessing a complete adoption of Democritean and Epicurean atomism; a third stage showing a partial rejection of traditional atomism and an interest in forces and in the origin of atomic motion; plus a fourth stage where atoms are almost completely abandoned and where the attention is focused mainly on the theory of spirits as causes of motion. A fifth stage is, unfortunately, lacking; and it is in this stage, that, to judge by the manifest tendency of his evolving theories, Bacon would have probably been able to synthesize his thought harmoniously by bringing together atoms (thesis) and spirits (antithesis). A synthesis of this kind would have allowed him to construct a

more complete and satisfying philosophic theory which would have accounted for the two basic constituents of the universe, matter and energy.

Nevertheless, the nature of dialectical processes is usually such that we do not have to wait for the final synthesis in order to have a certain amalgamation of thesis and antithesis. The transition from thesis to antithesis is seldom abrupt, and its gradual development from one to the other at a certain point manifests elements of both, thus preparing the observer for the synthesis to come. Such is the case with Bacon's work. Even if we might feel the need for a subsequent combination of the second (atomistic) stage and the fourth (vitalistic) stage, we can certainly consider the third period as pre-synthetical. It is, in fact, at this point in his life that Bacon sees the world as a whole where atoms and forces are so well integrated that they are almost identified the one with the other. The most significant work of what I call the third stage is De Principiis atque Originibus where in fact, as we shall see, the atom and its motive force, Cupid, are brought together so closely that they are almost identified one with the other. It is in this work that the reader cannot escape the realization that, at this stage of his thought Bacon seems to be anticipating, even if allegorically, what centuries later will become the fundamental tenet of atomic physics, namely the transformation of matter into energy.

In the Cogitationes de Natura Rerum, Bacon already complains of the fact that among ancient philosophers "the moving principles of things are treated for the most part only in passage; so that it

passes all wonder to see how carelessly and loosely the greatest and most useful thing of all is inquired and handled" (X, 294). He also complains that even Democritus, "acute as he is in investigating the principles of bodies, when he comes to examine the principles of motion appears to be unequal to himself, and to be unskilful; which likewise was the common fault of all the philosophers" (X, 292).

In the chapter entitled "Cupid; or the Atom" in his De Sapientia Veterum, Bacon is more lenient towards Democritus and admits that although "the philosophy of the Greeks, . . . in inquiring the principles of motion, . . . is negligent and languid, . . . Democritus considered the matter more deeply; and having first given the atom some dimension and shape, attributed to it a single desire or primary motion simply and absolutely, and a second by comparison" (XIII, 123-4). Ellis, in his preface to De Principiis atque Originibus, infers on the basis of this statement of Bacon, that "The philosophy of Democritus appeared to Bacon to be nearly in accordance with the hidden meaning of these fables [sc. the fables of Cupid and Coelum]," but he adds that "we are not able to judge of his reasons for thinking so, as the only system spoken of in detail is that of Telesius" (V, 271).

The De Principiis, in fact, seems to show a marked partiality to Democritus and Telesius, but since, according to Ellis, "Bacon's own opinions are much more closely connected with those of Democritus than with Telesius's, from whom he derived only isolated doctrines" (V, 288), and since Democritus is here treated by Bacon in a rather vague fashion, one is certainly justified in not being able to

determine the extent of Democritus' influence on the Cupid allegory. However, it is necessary at this point to realize that Bacon was probably much more influenced by Lucretius than by Democritus.

Charles T. Harrison, in the article mentioned above (on p. 53), states that Bacon "uses Lucretius's words in describing Democritus's conception of the nature of the atoms" (p. 198). In the De Principiis atque Originibus, Bacon rightly attributed to Democritus the theory that atoms cannot be perceived by the senses (cf. Kirk and Raven, fr. 555), but he also attributed to the Greek philosopher the statement to the effect that "they resembled neither fire nor anything else that could be felt or touched" (X, 347). This observation is obviously a translation of the following passage in book I of De Rerum Natura:

> . . . neque sunt igni simulata, neque ulli
> praeterea rei quae corpora mittere possit
> sensibus, et nostros adjectu tangere tactus.
> (I, 687-9)

Bacon then adds that according to Democritus, "in the generation of things the first beginnings must needs have a dark and hidden nature, lest something should rise up to resist and oppose them" (X, 347). Again, this statement is the translation of the following passage from Lucretius:

> at primordia gignundis in rebus oportet
> naturam clandestinam caecamque adhibere,
> emineat ne quid, quod contra pugnet et obstet.
> (I, 778-80)

Nevertheless, in these two instances Bacon is guilty only of having expressed Democritus' ideas in Lucretian language. The attribution of one philosopher's words to another becomes much

more serious, however, when Bacon makes Democritus state theories that belonged only to Lucretius. One example is, again, in De Principiis, where Bacon says that Democritus "should have attributed to the atom a heterogeneous motion, as well as a heterogeneous body and a heterogeneous virtue; whereas, out of the motions of the larger bodies, he has selected two motions; namely, the descent of heavy things and the ascent of light (which latter he explained as the effect of force or percussion of the heavier driving the less heavy upwards), and ascribed them as primitive motions to the atom" (X, 348). We have already seen that the downward motion of the atom was an Epicurean and Lucretian innovation, and that the only motive principle mentioned by Democritus is the "δίνη," the "whirl," a principle which, if Bacon had wanted, might have accounted very well for what he calls "heterogeneous motion." It seems as if Bacon wanted consciously to dismiss Democritus and to adopt Lucretius without letting the reader discover his preference. In fact, if it were true that Bacon had a greater admiration for Democritus than for Lucretius, why would he blame Democritus instead of Lucretius for ideas that belonged in reality to Lucretius? In Thoughts on the Nature of Things, Bacon again mixes up Democritus with Lucretius. He says that "It was ridiculous . . . to take those small bodies that appear in the sun's rays for atoms. For these are like dust; whereas an atom, as Democritus himself said, no one ever saw or can see" (X, p. 288). The passage to which he is referring is in the second book of De Rerum Natura (II, 114-122), where Lucretius compares the motion of the atoms to the disordered movement of motes in a sunbeam. It is obvious that here Bacon

has misunderstood Lucretius, not realizing that what the Latin poet had in mind was a mere analogy and in no way a description of the atoms themselves. However, what is even more surprising is that Lucretius is not mentioned, and Democritus is made the scapegoat for the flaws of the atomistic system, when in reality one would expect Bacon to support Democritus, whom he admired, at the expense of Lucretius, whom he, according to Magalhaes-Vilhena, considered a mere plagiarist of the ancient atomists. One is forced, consequently, to draw the conclusion that Bacon considered any approbatory mention of Lucretius detrimental to his career, knowing that his age severely reprimanded Lucretius and the Epicureans in general for their materialism and atheism.[h] A contemporary of Bacon, Giordano Bruno, was burned at the stake for having admired and followed Lucretius' teachings. Atomism per se was no real threat to the established religion, however, since an atomic universe still required the presence of a "primum mobile," or God; Democritus' system, consequently, could be adopted and adapted to the current religious views. Lucretius, on the other hand, was more than a simple atomist; he was an Epicurean, and thus an iconoclast, a pessimist, a pagan. In his essay "Of Atheisme," in fact, Bacon says that "Most of all, that schoole which is most accused of Atheisme doth demonstrate Religion. That is, the Schoole of Leusippus, and Democritus, and Epicurus. For it is a thousand times more credible, that foure mutable Elements, and an immutable fifth essence, duely and eternally placed neede no God: then that an Army of infinite small portions or seeds unplaced, should have produced this order,

and beauty, without a divine Marshall" (XII, 338). Bacon here shows the privileged position held by Democritus and Leucippus and also tries to save Epicurus from the church's indictment. Again, in the same essay, Bacon defends Epicurus' religious position by saying that "his words are noble and divine: 'Nos Deos vulgi negare profanum; sed vulgi opiniones Diis applicare profanum.' . . . And although he had the confidence to deny the administration, he had not the power to deny the nature" (XII, 133). This defence of Epicurus is undoubtedly rather feeble, but it was probably considered sufficient by Bacon, due to the fact that Epicurus had at least done away with the ancient pagan religious beliefs. Being thus deprived of divine agency, Epicurus' universe greatly resembled the universe of Democritus and therefore allowed for the presence of some ruling God. Lucretius, on the other hand, had committed the grave sin of introducing Venus and Eros as prime movers of the Universe. The presence of these most pagan gods thus denied the Christian God his sway and consequently made Christian theologians regard Lucretius as the most heretical of the atomists.

In his Divina Commedia Dante had already made the distinction between Democritus and the Epicureans by placing the former in the Limbo, the next best thing to Paradise (Inf. IV, 136), and consigning Epicurus, with all his followers, to the sixth circle of the Inferno, where the heretics and all those who "l'anima col corpo morta fanno" (make the body die with the soul) stifle in their "avelli." Dante's judgement had not been forgotten in the seventeenth century. As Hadzits says in Lucretius and his

Influence, "a reaction against the tyranny of orthodox beliefs began to set in with the growing spirit of rationalism, and the seventeenth century witnessed some of the results. In spite of this, the seventeenth century bristled with hostilities against Lucretius" (p. 285); and if that century had come to terms with atomism, it certainly "could not and did not follow Lucretius, the atomist, in his denial of divine creation and of providence" (p. 287).

Such was the state of affairs when Bacon wrote, and few works better than De Principiis atque Originibus show the dangerous position in which he found himself. Of all the myths recorded and interpreted by Bacon in De Sapientia Veterum, it was that of Cupid that appealed to him most and which, in his opinion, deserved a place of honour in his De Principiis. However, his Cupid is far from being the principle of a doctrine "not differing in much from the philosophy which Democritus held" (X, 344). Rather he is the very principle that we met in De Rerum Natura in the guise of Eros. Although never before in the history of philosophy--with the exception of Lucretius--have the atoms been seen in relation to Eros, or Venus, and although it would seem obvious that Lucretius' Venus/Eros-atoms combination had strongly influenced Bacon, Lucretius' name never appears either in the Cupid section of De Principiis or in the abridged version of the same section in De Sapientia Veterum. Although Lucretius' presence is felt throughout the two sections, it is never acknowledged.

The Cupid described by Bacon is an amalgamation of several Cupids, as they are represented by different ancient philosophers and poets. His attributes are his everlasting youth, his blindness,

his nakedness, his wings and his arrows (X, 343). In De Principiis Bacon says of Cupid that "his principal and peculiar power is exercised in uniting bodies" (X, 343) and, in De Sapientia, that Eros is "the appetite or instinct of primal matter; or to speak more plainly, the natural motion of the atom, which is indeed the original and unique force that constitutes and fashions all things out of matter" (XIII, 122). Thus Cupid, for Bacon, is either a force that unites bodies, some urge inherent to the bodies themselves, or the motion resulting from either the power of the force or the power of the urge. To make a definition of Eros even more confused, Bacon equates it with the atom itself; the title of the seventeenth chapter in De Sapientia Veterum is, literally, "Cupid; or the Atom." It is safe to conclude, then, that Bacon was not very clear as to the real function and entity of Eros, and that his only purpose in interpreting the allegory of Cupid was to show that among the ancients there existed, even if in an embryonic form, an interest in something which went beyond pure matter, and which accounted for motion and the forces determining it. In both works on Cupid Bacon is voicing his dissatisfaction with the purely atomistic universe of Democritus and seeking for greater insights into the universe by sounding the validity of ancient myths. However, the idea of combining atoms with Love can only have come from Lucretius, whom Bacon, as we have seen, knew all too well. Furthermore, the presence of Lucretius seems to make itself felt even in the description and attributes of Eros himself.

Charles W. Lemmi, in his thesis "The Classic Deities in Bacon",[11] comments on four of the attributes of Bacon's Cupid--

his "individual reality, his age, his blindness, and his nakedness"--and thinks it "probable" that Lucretius suggested them. He explains the similarities between Bacon's Cupid and Lucretius' atom in the following way:

> In attributing to the atom (symbolized by Cupid) individual reality, Bacon is in part expressing his opposition to the conception of potential matter; but he is also reiterating Lucretius's contention that the atom is not an arbitrary portion of matter to be subdivided at pleasure. And Lucretius's atom remains unchanged forever in the eternal minuteness which Bacon symbolizes by Cupid's eternal childhood. As for his comparing the blindness of Cupid to the undiscriminating force of interatomic attraction, it is perhaps significant that Lucretius applies the word blind to the atom, though in the sense of invisible, and that Bacon quotes the passage. Finally there is the interpretation of Cupid's nakedness: the absence of sensible physical qualities in the atom. Lucretius, asserting this same absence of sensible qualities, says that ultimate matter is "nullo velata colore," "Orba colore," "spoliata colore." Now H. S. J. Munro, in his translation of De Rerum Natura, renders these phrases by "clothed with no color," "denuded of color," and "Stripped of color." May not the same expressions have been suggested to Bacon? It will be noticed that he applies the word velum to matter as defined by Ionian physicists (p. 61). 11

Lemmi's observations, especially those concerning Cupid's nakedness, show a certain penetration and a thorough reading of Lucretius; however, the account he gives for the other three properties of Cupid is not as satisfying: the indivisibility of the atom is not a Lucretian invention but an essential characteristic of the original atom of Democritus and Leucippus (Kirk and Raven, fr. 556), so that it is not necessary to bring in Lucretius in order to account for Cupid's "individual reality." The same criticism applies to the parallel between Lucretius' forever unchanging and eternally minute atom and Bacon's eternally

infant Cupid. Democritus, in fact, had already described the atom as infinitely small (Kirk and Raven, fr. 555) and as producing change and coming into being only in its compound forms (Kirk and Raven, fr. 582).

As far as the blindness of Cupid and of the atom is concerned, Lemmi's remark is almost correct. As we have discovered in the previous chapter, Lucretius' atom is often described as "caecus." However, the fact that this adjective in this context, as Lemmi justly observes, means "invisible" and not "blind" weakens his argument, unless we suppose that Bacon himself read Lucretius' "caecus" as meaning "blind." This is possible, but his argument would have been greatly strengthened had he taken note of the fact that while Lucretius often uses the epithet "caecus" as meaning "invisible" when describing the atom itself, on the other hand, he often uses the same adjective as meaning "blind" when describing the atoms' motion (II, 127-8, 129, 136). Lemmi's imprecision is probably due to the fact that he considered Bacon's Cupid as being only a symbol for the atom, as evidenced in the first lines of the passage just quoted. He forgets, however, that for Bacon, Cupid does not only represent the atom, but also "the natural motion of the atom" (XIII, 122). It is thus that the epithet "caecus," in a context of atomic motion, can rightly be translated as "blind." Lemmi's remarks, nevertheless, retain their importance and, qualified by my comments, confirm the presence of strictly Lucretian elements in the atomic theories of Bacon.

I alluded previously to the fact that Bacon's notion of Eros is rather ambiguous, owing to his incapacity to determine whether

Eros is the atom itself, or its moving force. I attributed this ambiguity to confusion and lack of clarity on the part of Bacon. I should point out, though, that fear may well have played a more significant role in Bacon's nebulous account of Cupid. Earlier in this chapter we have tried to explain Bacon's reticent treatment of Lucretius by mentioning the paralysing effects of religion on philosophy in the sixteenth and seventeenth centuries. Now, most likely, we can notice this same negative influence that affects Bacon's clarity of expression and forces him to underplay the importance of Eros. Bacon is tempted into claiming that Eros is the first cause and therefore an abstract principle, a force, but realizing the heretical implications of such a statement, he turns Cupid into a symbol for the atom, for matter, thus allowing for the motive force of God to account for its motion. Bacon in fact states that in ancient fables Cupid " is introduced without a parent, that is to say without a cause," and that " of this primary matter and the proper virtue and action thereof there can be no cause in nature (for we always except God), for nothing was before it" (X, 344). It is clear, however, that when Bacon deprives Cupid of a cause he has stopped thinking of Cupid as atom. He now sees him, to quote Bacon's own words, as "the original and unique force that constitutes and fashions all things out of matter" (XIII, 122). A claim of this nature is the equivalent of saying that the real demiurge, the true fashioner and creator of the universe is Eros, not God, an assertion which easily could have caused Bacon to be rightly accused of atheism, or at least of paganism. With all probability it was the awareness

of his precarious position, therefore, that kept Bacon from defining too clearly the real role of Eros and persuaded him to give Eros sometimes the characteristics of the atom itself and sometimes those of a "primum mobile," of a governing force. His parenthetical statements, "God always excepted" in De Sapientia Veterum (XIII, 122-3) and "for we always except God" in De Principiis atque Originibus (X, 344) can then be seen in their true light. Howard B. White, in Peace Among the Willows, realizes very clearly the danger of Bacon's predicament, and remarks of Bacon's treatment of Eros that "The cautious Bacon, of course, excepted God."[12] Bacon's hesitation regarding the actual essence of Eros is shown again in the ambiguous interpretation of Cupid's nakedness. A discussion of Bacon's interpretation of this "attribute" of Eros is of fundamental importance at this point, since Bacon's preoccupations, here, are not so much with a mere attribute but with the very essence of Eros. By interpreting Eros' nakedness, Bacon, in fact, is trying to decide whether the first principle of the universe is abstract or concrete.

Bacon says that the essence of Cupid is ambivalent; in fact, the ancient myths themselves show Cupid as being a person and, at the same time, as being naked: "that the first matter has some form is demonstrated in the fable by making Cupid a person. . . . But though Cupid is represented in the allegory as a person, he is yet naked. Therefore, next to those who make matter abstract, they are most in error (though on the contrary side) who make it clothed" (X, 353). Consequently, for Bacon, the first principle is neither something completely abstract (naked), like Plato's Ideas, nor something completely concrete (clothed), like Thales'

water, but something half-clothed, or more precisely, to use his own terms, something existing and having a form like a person, but having none of the material attributes or no material consistency, that is, naked.

We can see, then, how Bacon is struggling to determine whether his Eros is a completely abstract and spiritual principle dangerously apt to be seen as displacing the Christian God, or a wholly concrete principle lacking any creative force. Opting for the former definition of Cupid means being guilty of heresy, for, as he says in his Meditationes Sacrae, "whatever does not depend upon God as author and principle, by links and subordinate degrees, the same will be instead of God, and a new principle and kind of usurping God" (XIV, 95). On the other hand, opting for the latter means leaving inert matter and passive atoms dependent for their motion on God, an altogether unempirical, unscientific mover, whom Bacon had all his life tried to dismiss from his natural philosophy. Thus we see how Bacon's desire to account for the motion of the atoms leads him to seek a motive force, which he found in the Venus-Eros of Lucretius, but his desire to keep God in his position of hegemony was just as urgent. Hence the ambiguity of his views in De Principiis atque Originibus. Nevertheless, in spite of Bacon's vague and inconsistent treatment of the subject, his interpretation of the Cupid myth is sufficiently transparent to make the Lucretian elements conspicuous. Bacon's use of Lucretian terminology and expressions, his frequent allusions to Lucretian passages, the forceful reintroduction, in an atomic context, of a concept of force which Democritus had vaguely imagined and Epicurus altogether

dismissed, and the striking similarities between the role of Bacon's Cupid and that of Lucretius' Venus-Eros principle, show how close Bacon was to Lucretius.

Yet it is not surprising that so little should have been said concerning the presence of Lucretius in De Principiis, especially in the context of a philosophy of force. By now the reason should be obvious: in order to see the atomic Cupid of Bacon as a development or version of the atomic Eros of Lucretius, one must accept the connection between atoms and Eros in Lucretius himself, a connection which has been consistently overlooked by Lucretian scholars. Moreover, the often-mentioned tendency to regard Lucretius as a mere plagiarist of Epicurus and Democritus has blinded critics to the impact of Lucretius' individual and original thought on Bacon's philosophy, just as believing, with Blake, that Bacon is "only Epicurus over again"[13] has led many a critic to see Bacon as a writer of moralistic essays and founder of scientific method, but of little significance for the development of modern atomic theory.

It is for these reasons, therefore, that so much time has been spent in this discussion on Lucretius and his "Eros principle," and on Bacon's critics; this work, in fact, aims not only at an analysis of the relation between Lucretius and Bacon, but also at dispelling certain prejudices which have prevented most critics from seeing, let alone properly acknowledging, Lucretius' real contributions to atomic theory and the nature of the atomism that Bacon developed out of them.

Nevertheless, this work should also be seen as a preliminary

study to the history of the notion of force. A study of this kind has been attempted by Max Jammer in Concepts of Force,[14] where he follows the development of this concept from the Presocratics to modern times. However, Jammer's book, when dealing with Presocratic physics, considers only Heraclitus' and Empedocles' contributions to a theory of dynamics and completely forgets Democritus' "whirl" which, although being a mild attempt at a conceptualization of cosmic energy, acquires a certain importance when seen in its relation to an atomic universe, thus coming, perhaps, closer to the modern theories of physics than the doctrines of Heraclitus and Empedocles. Jammer, moreover, omits all mention of Lucretius and Bacon, thus depriving the history of the concept of force of two highly important contributors and innovators.

Lucretius and Bacon, in fact, were probably the only philosophers who succeeded in discovering and explaining the real nature of energy without relinquishing the belief in a fundamentally material universe. They can neither be accused of excessive idealism like Anaxagoras or Hegel, nor of excessive materialism, like Democritus or Hobbes, but should be numbered among those all-too-rare minds which refuse to be labelled by histories of philosophy as "materialists," "idealists" or any other narrow appellation. They are, in short, the great synthesizers.

NOTES

Introduction

[1] Pierre Boyancé, Lucrèce et l'épicurisme (Paris: Presses Universitaires de France, 1963), p. 2. Hereafter, unless otherwise noted, all references will be to this edition.

[2] Marcus Fabius Quintilianus, Institutiones Oratoriae, I, 4, 4.

[3] Ibid., III, 1, 3.

[4] "but as with children, when physicians try to administer rank wormwood, they first touch the rims about the cups with the sweet yellow fluid of honey, that unthinking childhood be deluded as far as the lips, and meanwhile that they may drink up the bitter juice of wormwood, and though beguiled be not betrayed, but rather by such means be restored and regain health, so now do I: since this doctrine commonly seems somewhat harsh to those who have not used it, and the people shrink back from it, I have chosen to set forth my doctrine to you in sweet-speaking Pierian song, and as it were to touch it with the Muses' delicious honey, if perchance in such a way I might engage your mind in my verses, while you are learning to see in what shape is framed the whole nature of things." Lucretius, De Rerum Natura, transl. W. H. D. Rouse (Cambridge: Harvard Univ. Press, 1966). Hereafter, unless otherwise noted, all references will be to this edition.

[5] For ex., the one by Ettore Paratore, at the end of his

La letteratura latina dell'età imperiale, commendable for its conciseness and comprehensiveness.

Chapter I

[1] G. S. Kirk and J. E. Raven, The Presocratic Philosophers (Cambridge: University Press, 1969). Hereafter, unless otherwise noted, all references will be to this edition.

[2] Norman Wentworth DeWitt, Epicurus and His Philosophy (Minneapolis: University of Minnesota Press, 1954).

[3] Diogenes Laertius, Lives of Eminent Philosophers, transl. R. D. Hicks (Cambridge: Harvard Univ. Press, 1950). Hereafter, unless otherwise noted, all references will be to this edition.

[4] "so far as it is needful to ensure our tranquillity and happiness."

[5] Karl Marx, "The Difference Between the Democritean and Epicurean Philosophy of Nature," in Activity in Marx's Philosophy, ed. by Norman D. Livergood (The Hague: Martinus Nijhoff, 1968). Hereafter, unless otherwise noted, all references will be to this edition.

[6] "the whole of being [the universe] consists of bodies and space."

[7] Trans. by R. D. Hicks.

[8] "by mutual collisions and blows."

[9] Cicero, De Finibus Bonorum et Malorum, transl. H. Rackham (Cambridge: Harvard Univ. Press, 1967). Hereafter, unless otherwise noted, all references will be to this edition.

[10] "keep oscillating in one place."

[11] "that while the first bodies are being carried downwards by their own weight in a straight line through the void, at times quite uncertain and uncertain places, they swerve a little from their course, just so much as you might call a change of motion. For if they were not apt to incline, all would fall downwards like raindrops through the profound void, no collision would take place and no blow would be caused amongst the first-beginnings: thus nature would never have produced anything."

[12] "for Epicurus says the atoms swerve without a cause,-- yet this is the capital offence in a natural philosopher, to speak of something taking place uncaused."

[13] "nothing comes out of that which is not."

Chapter II

[1] Henri Bergson, The Philosophy of Poetry: The Genius of Lucretius, transl. Wade Baskin (New York: Philosophical Library, 1959).

[2] cf. Antonio Traglia, Sulla formazione spirituale di Lucrezio (Roma: Casa Editrice Gismondi, 1948), chap. 1.

[3] "In Lucretius . . . the use of particular terms charges the

work with a depressive and psychopathic obsession non-existent in other Epicurean sources" (my translation). Luciano Perelli, Lucrezio poeta dell'angoscia (Firenze: La Nuova Italia, 1969). Hereafter, unless otherwise noted, all references will be to this edition.

4 "the obsessive rhythmic hammering and repetition of key words" (my translation).

5 "Nay, throughout my own verses also you see many elements common to many words, although you must confess that both verses and words are different and consist of different elements: I do not say that there are very few common letters running through all, or that no two words, if compared, are made up of elements all the same, but that commonly they are not all like all. So in other things also, although many first-beginnings are common to many things, yet taken one with another they can make up a whole quite unlike; so that different elements may rightly be held to compose the human race and corn and luxuriant trees."

6 Louis Roberts, A Concordance of Lucretius (Berkeley: Agon, 1968).

7 δαίμων ἡ πάντα κυβερνᾷ· πάντα γὰρ ⟨ἢ⟩ στυγεροῖο τόκου καὶ μίξις ἄρχει πέμπουσ' ἄρσενι θήλυ μιγῆν τὸ τ' ἐναντίον αὖτις ἄρσεν θηλυτέρῳ.

8 ἁπάσας ⟨ἀρχήν⟩ τε καὶ ⟨αἰτίαν⟩ κινήσεως καὶ γενέσεως ὑπάρχειν.... κληδοῦχον... Δίκην τε καὶ Ἀνάγκην.

9 ἐξ ὧν δὲ ἡ γένεσις ἐστι τοῖς οὖσι καὶ τὴν φθορὰν εἰς ταῦτα γίνεσθαι κατὰ τὸ χρεών· διδόναι γὰρ αὐτὰ δίκην καὶ τίσιν ἀλλήλοις τῆς ἀδικίας κατὰ τὴν τοῦ χρόνου τάξιν.

10 "every generation of living things is conceived."

11 "if anyone decides to call the sea Neptune, and corn Ceres, and to misapply the name of Bacchus rather than to use the title that is proper to that liquor, let us grant him to dub the round world Mother of the Gods, while he forbears in reality himself to infect his mind with base superstition."

12 "I invoke you, lofty Venus, you, the mother of our father" (my translation).

13 J. M. Edmonds, Lyra Graeca (Cambridge: Harvard Univ. Press, 1958), fr. 1.

14 "Calliope, man's repose and god's delight." Compare with De Rer. Nat. I, 1.

15 E. Bignone, Storia della letteratura latina (Firenze, 1945), p. 443.

16 For "voluptas" and Venus see I, 1; II, 172-3; for "voluptas" and erotic pleasures see IV, 1057, 1075, 1081, 1085, 1114, 1201, 1208; for "voluptas" and violent emotions or cravings, see II, 3; II, 258; III, 251; III, 1081; IV, 984.

17 Antonio Traglia, Sulla formazione spirituale di Lucrezio

(Roma: Casa Editrice Gismondi, 1948).

[18] Erich Neumann, Amor and Psyche, the Psychic Development of the Feminine: a Commentary on the Tale of Apuleius (New York: Harper and Row, 1962). Hereafter, unless otherwise noted, all references will be to this edition.

[19] "Indeed, in the very time of possession, lovers' ardour is storm-tossed, uncertain in its course, hesitating what first to enjoy with eye or hand. They press closely the desired object, hurting the body, often they set their teeth in the lips and crush mouth on mouth; because the pleasure is not unmixed and there are secret stings which urge them to hurt that very thing, whatever it may be, from which those germs of frenzy grow."

[20] "Venus gives a light break to the suffering amidst their love, and the soothing pleasure intermingled curbs back the bites."

[21] J. M. Edmonds, op. cit., fr. 2.

[21a] Diogenes Laertius gives a list of several works written by Epicurus among which is a treatise entitled "On Love" (X, 276). However, nothing is known of it and since Diogenes Laertius says that the three letters he has quoted summarize the views expressed by the works in the list, it seems safe to assume that Epicurus' views on love had no bearing on his philosophy, and were of no consequence, especially in terms of his physics.

[22] "whence I say is this will wrested from the fates by which we proceed whither pleasure leads each."

[23] "Those parts thus excited swell with the seed, and there is a desire to emit it towards that whither the dire craving tends."

[24] Arthur Schopenhauer, The World as Will and Representation, transl. E. F. J. Payne (New York: Dover Publications, 1966). Hereafter, unless otherwise noted, all references will be to this edition.

[25] V. J. McGill, Schopenhauer, Pessimist and Pagan (New York: Brentanos, 1931).

[26] John Masson, Lucretius, Epicurean and Poet (London: John Murray, 1907).

[27] "In the hymn to Venus . . . the urge to pleasure is the means by which nature preserves the species. In my opinion, there is a clear analogy between this idea and the blind will-to-live of Schopenhauer, which stirs all nature and which leads man to illusive pleasure, when, in reality, nature only offers us the alternative between pain and boredom" (my translation).

[28] "Do but apply your scrutiny when the sun's light and his rays penetrate and spread through a dark room: you will see many minute specks mingling in many ways throughout the void in the light itself of the rays, and as it were in everlasting conflict struggling, fighting, battling in troops without any pause, driven about with frequent meetings and partings; so that you may conjecture from this what it is for the first-beginnings of things to be ever tossed about in the great void."

[29] Mayotte Bollack, "La chaîne aimantine: Lucrèce et ses modèles grecs," Revue des Etudes Latines, 41 (1963), p. 165-85. Hereafter, unless otherwise noted, all references will be to this edition.

[30] "Therefore besides void and bodies no third nature can be left self-existing in the sum of things; neither one that can ever at any time come within our senses, nor one that any man can grasp by the reasoning of the mind."

[31] "You will find that it is from the senses in the first instance that the concept of truth has come, and that the senses cannot be refuted. . . . What, moreover, must be held to be of greater credit than the senses? Or shall reasoning, derived from false sense, prevail against these senses, being itself wholly derived from the senses?"

[32] Werner Heisenberg, The Physicist's Conception of Nature (London: Hutchinson and Co. Ltd., 1958), p. 13.

[33] André Gide, L'immoraliste (Paris: Gallimard, 1960), p. 105.

Chapter III

[1] 1960, p. 181-4; 1961, p. 25-38; 1962, p. 21-31; 1963, p. 245-54; 1965, p. 465-502. Magalhaes-Vilhena's series of articles is number 727 in Houck's bibliography.

[2] Hereafter, unless otherwise noted, all references will be to this edition.

[3] Hereafter, unless otherwise noted, all references will be to this edition.

[4] Hereafter, unless otherwise noted, all references will be to this edition.

[5] I should add, at this point, that a careful perusal of the Repertoire bibliographique de la philosophie, de Louvain, up to the present date, has not revealed the presence of any other work on the topic of my thesis, except those already mentioned.

[6] Francis Bacon, The Works of Francis Bacon, ed. Ellis, Spedding, Heath (New York: Hurd and Houghton, 1864), I, 95. Hereafter, unless otherwise noted, all references will be to this edition.

[7] Paolo Rossi, Francis Bacon: from Magic to Science, transl. Sacha Rabinovitch (Chicago: Univ. of Chicago Press, 1968). Hereafter, unless otherwise noted, all references will be to this edition.

[8] Robert Hugh Kargon, Atomism in England from Hariot to Newton (Oxford: Clarendon Press, 1966), p. 43. Hereafter, unless otherwise noted, all references will be to this edition.

[9] "refuses the hypothesis of atoms isolated in empty spaces in order to adopt that of small particles connected and moved by spirits. His rejection of the traditional atomism and the adoption of the spirits' activity seem to me to be intimately related to the problem of the explanation of the atoms' motion: the atoms are deprived of an inherent tendency to movement, which movement is

attributed to a different substance, the spirits" (my translation). Março Maccio, "A proposito dell'atomismo nel Novum Organum di Bacone," Rivista critica di storia della filosofia, 17 (1962), p. 191. Hereafter, unless otherwise noted, all references will be to this edition.

[10] "must have deeply felt throughout his whole life the problem of the movement of the atoms or of the smallest particles of the bodies; and exactly this problem must have led Bacon to abandon atomism in order to bring him nearer to dynamic and vitalistic conceptions" (my translation). The italics are mine. I have underlined the conjunction "or" in order to show how Maccio, too, does not see much difference between atoms and what Bacon calls in the Novum Organum, "real particles."

[11] Charles W. Lemmi, "The Classic Deities in Bacon; a Study in Mythological Symbolism," Diss. John Hopkins 1933. Hereafter, unless otherwise noted, all references will be to this edition.

[12] Howard B. White, Peace Among the Willows (The Hague: Martinus Nijhoff, 1968), p. 199. Hereafter, unless otherwise noted, all references will be to this edition.

[13] William Blake, The Poetry and Prose of William Blake, ed. David V. Erdman (New York: Doubleday, 1970), p. 634.

[14] Max Jammer, Concepts of Force: a Study in the Foundations of Dynamics (New York, Harper and Brothers, 1962).

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