



The Presocratics 4: The Atomists

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1. ANAXAGORAS

Anaxagoras was born at Clazomenae, a city of Ionia, about the year 500 B.C. At the age of twenty he removed to Athens, of which city Clazomenae was for some time a dependency. This step on his part may have been connected with the circumstances attending the great invasion of Greece by Xerxes in the year 480. For Xerxes drew a large contingent of his army from the Ionian cities which he had subdued, and many who were unwilling to serve against their mother-country may have taken refuge about that time in Athens. At Athens he resided for nearly fifty years, and during that period became the friend and teacher of many eminent men, among the rest of Pericles, the great Athenian statesman, and of Euripides, the dramatist. Like most of the Ionian philosophers he had a taste for mathematics and astronomy, as well as for certain practical applications of mathematics. Among other books he is said to have written a treatise on the art of scene-designing for the stage, possibly to oblige his friend and pupil Euripides. In his case, as in that of his predecessors, only fragments of his philosophic writings have been preserved, and the connection of certain portions of his teaching as they have come down to us remains somewhat uncertain.

With respect to the constitution of the universe we have the following: "Origination and destruction are phrases which are generally misunderstood among the Greeks. Nothing really is originated or destroyed; the only processes which actually take place are combination and separation of elements already existing. These elements we are to conceive as having been in a state of chaos at first, infinite in number and infinitely small, forming in their immobility a confused and characterless unity. About this chaos was spread the air and aether, infinite also in the multitude of their particles, and infinitely extended. Before separation commenced there was no clear colour or appearance in anything, whether of moist or dry, of hot or cold, of bright or dark, but only an infinite number of the seeds of things, having concealed in them all manner of forms and colours and savours."

There is a curious resemblance in this to the opening verses of Genesis, "The earth was without form and void, and darkness was upon the face of the deep." Nor is the next step in his philosophy without its resemblance to that in the Biblical record. As summarised by Diogenes Laertius it takes this form, "All things were as one: then cometh Mind, and by division brought all things into order." "Conceiving," as Aristotle puts it, "that the original elements of things had no power to generate or develop out of themselves things as they exist, philosophers were forced by the facts themselves to seek the immediate cause of this development. They were unable to believe that fire, or earth, or any such principle was adequate to account for the order and beauty visible in the frame of things; nor did they think it possible to attribute these to mere innate necessity or chance. *One* (Anaxagoras) observing how in living creatures Mind is the ordering force, declared that in nature also this must be the cause of order and beauty, and in

so declaring he seemed, when compared with those before him, as one sober amidst a crowd of babblers.”

Elsewhere, however, Aristotle modifies this commendation. “Anaxagoras,” he says, “uses Mind only as a kind of last resort, dragging it in when he fails otherwise to account for a phenomenon, but never thinking of it else.” And in the *Phaedo* Plato makes Socrates speak of the high hopes with which he had taken to the works of Anaxagoras, and how grievously he had been disappointed. “As I proceeded,” he says, “I found my philosopher altogether forsaking Mind or any other principle of order, and having {55} recourse to air, and aether, and water, and other eccentricities.”

Anaxagoras, then, at least on this side of his teaching, must be considered rather as the author of a phrase than as the founder of a philosophy. The phrase remained, and had a profound influence on subsequent philosophies, but in his own hands it was little more than a dead letter. His immediate interest was rather in the variety of phenomena than in their conceived principle of unity; he is theoretically, perhaps, ‘on the side of the angels,’ in practice he is a materialist.

Mind he conceived as something apart, sitting throned like Zeus upon the heights, giving doubtless the first impulse to the movement of things, but leaving them for the rest to their own inherent tendencies. As distinguished from them it was, he conceived, the one thing which was absolutely pure and unmixed. All things else had intermixture with every other, the mixtures increasing in complexity towards the centre of things. On the outmost verge were distributed the finest and least complex forms of things—the sun, the moon, the stars; the more dense gathering together, to form as it were in the centre of the vortex, the earth and its manifold existences. By the intermixture of air and earth and water, containing in themselves the infinitely varied seeds of things, plants and animals were developed. The seeds themselves are too minute to be apprehended by the senses, but we can divine their character by the various characters of the visible things themselves, each of these having a necessary correspondence with the nature of the seeds from which they respectively were formed.

Thus for a true apprehension of things sensation and reason are both necessary—sensation to certify to the apparent characters of objects, reason to pass from these to the nature of the invisible seeds or atoms which cause those characters. Taken by themselves our sensations are false, inasmuch as they give us only combined impressions, yet they are a necessary stage towards the truth, as providing the materials which reason must separate into their real elements.

From this brief summary we may gather that Mind was conceived, so to speak, as placed at the *beginning* of existence, inasmuch as it is the first originator of the vortex motions of the atoms or seeds of things; it was conceived also at the *end* of existence as the power which by analysis of the data of sensation goes back through the complexity of actual being to the original unmingled or undeveloped nature of things. But the whole process of nature itself between these limits Anaxagoras conceived as a purely mechanical or at least physical development, the uncertainty of his view as between these two alternative ways of considering it being typified in his use of the two expressions *atoms* and *seeds*. The analogies of this view with those of modern materialism, which finds in the ultimate molecules of matter “the promise and the potency of all life and all existence,” need not be here enlarged upon.

After nearly half a century’s teaching at Athens Anaxagoras was indicted on a charge of inculcating doctrines subversive of religion. It is obvious enough that his theories left no room for the popular mythology, but the Athenians were not usually very sensitive as to the bearing of mere theories upon their public institutions. It seems probable that the accusation was merely a cloak for political hostility. Anaxagoras was the friend and intimate of Pericles, leader of the democratic party in the state, and the attack upon Anaxagoras was really a political move intended to damage Pericles. As such Pericles himself accepted it, and the trial became

a contest of strength, which resulted in a partial success and a partial defeat for both sides. Pericles succeeded in saving his friend's life, but the opposite party obtained a sentence of fine and banishment against him. Anaxagoras retired to Lampsacus, a city on the Hellespont, and there, after some five years, he died.

2. EMPEDOCLES

Empedocles was a native of Agrigentum, a Greek colony in Sicily. At the time when he flourished in his native city (circa 440 B.C.) it was one of the wealthiest and most powerful communities in that wealthy and powerful island. It had, however, been infested, like its neighbours, by the designs of tyrants and the dissensions of rival factions. Empedocles was a man of high family, and he exercised the influence which his position and his abilities secured him in promoting and maintaining the liberty of his fellow-countrymen. Partly on this account, partly from a reputation which with or without his own will he acquired for an almost miraculous skill in healing and necromantic arts, Empedocles attained to a position of singular personal power over his contemporaries, and was indeed regarded as semi-divine. His death was hedged about with mystery. According to one story he gave a great feast to his friends and offered a sacrifice; then when his friends went to rest he disappeared, and was no more seen. According to a story less dignified and better known—

*Deus immortalis haberi
Dum cupit Empedocles, ardentem frigidus Aetnam*

“Eager to be deemed a god,
Empedocles coldly threw himself in burning Etna.”

The fraud, it was said, was detected by one of his shoes being cast up from the crater. Whatever the manner of his end, the Etna story may probably be taken as an ill-natured joke of some sceptic wit; and it is certain that no such story was believed by his fellow-citizens, who rendered in after years divine honours to his name.

Like Xenophanes, Parmenides, and other Graeco-Italian philosophers, he expounded his views in verse; but he reached a poetic excellence unattained by any predecessor. Aristotle characterises his gift as Homeric, and himself as a master of style, employing freely metaphors and other poetic forms. Lucretius also speaks of him in terms of high admiration (*De Nat. Res. i. 716 sqq.*): “Foremost among them is Empedocles of Agrigentum, child of the island with the triple capes, a land wondrous deemed in many wise, and worthy to be viewed of all men. Rich it is in all manner of good things, and strong in the might of its men, yet naught within its borders men deem more divine or more wondrous or more dear than her illustrious son. Nay, the songs which issued from his godlike breast are eloquent yet, and expound his findings wondrous well, so that hardly is he thought to have been of mortal clay.”

Like the Eleatics he denies that the senses are an absolute test of truth. “For straitened are the powers that have been shed upon our frames, and many the frets that cross us and defeat our care, and short the span of unsatisfying existence wherein ‘tis given us to see. Shortlived as a wreath of smoke men rise and fleet away, persuaded but of that alone which each has chanced to light upon, driven hither and thither, and vainly do they pray to find *the whole*. For this men may not see or hear or grasp with the hand of thought.” Yet that there is a kind or degree of knowledge possible for man his next words suggest when he continues: “Thou therefore since hither thou hast been borne, hear, and thou shalt learn so much as ‘tis given to mortal thought to

reach.” Then follows an invocation in true Epic style to the “much-wooded white-armed virgin Muse,” wherein he prays that “folly and impurity may be far from the lips of him the teacher, and that sending forth her swift-reined chariot from the shrine of Piety, the Muse may grant him to hear so much as is given to mortal hearing.”

Then follows a warning uttered by the Muse to her would-be disciple: “Thee the flowers of mortal distinctions shall not seduce to utter in daring of heart more than thou mayest, that thereby thou mightest soar to the highest heights of wisdom. And now behold and see, availing thyself of every device whereby the truth may in each matter be revealed, trusting not more to sight for thy learning than to hearing, nor to hearing with its loud echoings more than to the revelations of the tongue, nor to any one of the many ways whereby there is a path to knowledge. Keep a check on the revelation of the hands also, and apprehend each matter in the way whereby it is made plain to thee.”

The correction of the one sense by the others, and of all by reason, this Empedocles deemed the surest road to knowledge. He thus endeavoured to hold a middle place between the purely abstract reasoning of the Eleatic philosophy and the unreasoned first guesses of ordinary observation suggested by this or that sense, and chiefly by the eyes. The senses might supply the raw materials of knowledge, unordered, unrelated, nay even chaotic and mutually destructive; but in their contradictions of each other he hoped to find a starting-point for order amidst the seeming chaos; reason should weigh, reason should reject, but reason also should find a residuum of truth.

In our next fragment we have his enunciation in symbolical language of the *four* elements, by him first formulated: “Hear first of all what are the root principles of all things, being four in number,—Zeus the bright shiner (*i.e.* fire), and Hera (air), and life-bearing Aidoneus (earth), and Nestis (water), who with her teardrops waters the fountain of mortality. Hear also this other that I will tell thee. Nothing of all that perisheth ever is created, nothing ever really findeth an end in death. There is naught but a mingling, and a parting again of that which was mingled, and this is what men call a coming into being. Foolish they, for in them is no far-reaching thought, that they should dream that what was not before can be, or that aught which is can utterly perish and die.” Thus again Empedocles shows himself an Eclectic; in denying that aught can come into being, he holds with the Eleatics (see above, p. 47); in identifying all seeming creation, and ceasing to be with certain mixtures and separations of matter eternally existing, he links himself rather to the doctrine of Anaxagoras..

These four elements constitute the total *corpus* of the universe, eternal, as a whole unmoved and immovable, perfect like a sphere. But within this sphere-like self-centred All there are eternally proceeding separations and new unions of the elements of things; and every one of these is at once a birth and an infinity of dyings, a dying and an infinity of births. Towards this perpetual life in death, and death in life, two forces work inherent in the universe. One of these he names Love, Friendship, Harmony, Aphrodite goddess of Love, Passion, Joy; the other he calls Hate, Discord, Ares god of War, Envy, Strife. Neither of the one nor of the other may man have apprehension by the senses; they are spiritually discerned; yet of the first men have some adumbration in the creative force within their own members, which they name by the names of Love and Nuptial Joy.

Somewhat prosaically summing up the teaching of Empedocles, Aristotle says that he thus posited *six* first principles in nature—four material, two motive or efficient. And he goes on to remark that in the working out of his theory of nature Empedocles, though using his originative principles more consistently than Anaxagoras used his principle of *Nous* or Thought, not infrequently, nevertheless, resorts to some natural force in the elements themselves, or even to chance or necessity. “Nor,” he continues, “has he clearly marked off the functions of his

two efficient forces, nay, he has so confounded them that at times it is Discord that through separation leads to new unions, and Love that through union causes diremption of that which was before.” At times, too, Empedocles seems to have had a vision of these two forces, not as the counteracting yet co-operative *pulsations*, so to speak, of the universal life, but as rival forces having had in time their periods of alternate supremacy and defeat. While all things were in union under the influence of Love, then was there neither Earth nor Water nor Air nor Fire, much less any of the individual things that in eternal interchange are formed of them; but all was in perfect sphere-like balance, enwrapped in the serenity of an eternal silence. Then came the reign of Discord, whereby war arose in heaven as of the fabled giants, and endless change,—endless birth, and endless death.

These inconsistencies of doctrine, which Aristotle notes as faults in Empedocles, are perhaps rather proofs of the philosophic value of his conceptions. Just as Hegel in modern philosophy could only adequately formulate his conceptions through logical contradictions, so also, perhaps, under the veil of antagonisms of utterance, Empedocles sought to give a fuller vision,—Discord, in his own doctrine, not less than in his conception of nature, being thus the co-worker with Love. The ordinary mind for the ordinary purposes of science seeks exactness of distinction in things, and language, being the creation of ordinary experience, lends itself to such a purpose; the philosophic mind, finding ready to its hand no forms of expression adapted to its conceptions, which have for their final end Union and not Distinction, can only attain its purpose by variety, or even contradictoriness, of representation. Thus to ordinary conception cause must precede effect; to the philosophic mind, dealing as it does with the idea of an organic whole, everything is at once cause and effect, is at once therefore prior to and subsequent to every other, is at once the ruling and the ruled, the conditioning and that which is conditioned.

So, to Empedocles there are four elements, yet in the eternal perfection, the silent reign of Love, there are none of them. There are two forces working upon these and against each other, yet each is like the other either a unifying or a separating force, as one pleases to regard them; and in the eternal silence, the ideal perfectness, there is no warfare at all. There is joy in Love which creates, and in creating destroys; there is joy in the eternal Stillness, nay, this is itself the ultimate joy. There are two forces working, Love and Hate, yet is there but one force, and that force is Necessity. And for final contradiction, the universe is self-balanced, self-conditioned, a perfect sphere; therefore this Necessity is perfect self-realisation, and consequently perfect freedom.

The men who have had the profoundest vision of things—Heraclitus, Empedocles, Socrates, Plato, ay, and Aristotle himself when he was the thinker and not the critic; not to speak of the great moderns, whether preachers or philosophers—have none of them been greatly concerned for consistency of expression, for a mere logical self-identity of doctrine. Life in every form, nay, existence in any form, is a union of contradictories, a complex of antagonisms; and the highest and deepest minds are those that are most adequate to have the vision of these antagonisms in their contrariety, and also in their unity; to see and hear as Empedocles did the eternal war and clamour, but to discern also, as he did in it and through it and behind it and about it, the eternal peace and the eternal silence.

Philosophy, in fact, is a form of poesy; it is, if one pleases so to call it, ‘fiction founded upon fact.’ It is not for that reason the less noble a form of human thought, rather is it the more noble, in the same way as poetry is nobler than mere narrative, and art than representation, and imagination than perception. Philosophy is indeed one of the noblest forms of poetry, because the facts which are its basis are the profoundest, the most eternally interesting, the most universally significant. And not only has it nobility in respect of the greatness of its subject matter, it has also possibilities of an essential truth deeper and more far-reaching and more

fruitful than any demonstrative system of fact can have. A great poem or work of art of any kind is an adumbration of truths which transcend any actual fact, and as such it brings us nearer to the underlying fundamentals of reality which all actual occurrences only by accumulation *tend* to realise. Philosophy, then, in so far as it is great, is, like other great art, prophetic in both interpretations of the word, both as expounding the inner truth that is anterior to actuality, and also as anticipating that final realisation of all things for which ‘the whole creation groaneth.’ It is thus at the basis of religion, of art, of morals; it is the accumulated sense of the highest in man with respect to what is greatest and most mysterious in and about him.

The facts, indeed, with which philosophy attempts to deal are so vital and so vast that even the greatest intellects may well stagger occasionally under the burden of their own conceptions of them. To rise to the height of such an argument demands a more than Miltonic imagination; and criticisms directed only at this or that fragment of the whole are as irrelevant, if not as inept, as the criticism of the mathematician directed against *Paradise Lost*, that it ‘proved nothing.’ The mystery of being and of life, the true purport and reality of this world of which we seem to be a part, and yet of which we seem to have some apprehension as though we were other than a part; the strange problems of creation and change and birth and death, of love and sin and purification; of a heaven dreamt of or believed in, or somehow actually apprehended; of life here, and of an immortality yearned after and hoped for—these problems, these mysteries, no philosophy ever did or ever can empty of their strangeness, or bring down to the level of the commonplace ‘certainties’ of daily life or of science, which are no more than shadows after all, that seem certainties because of the background of mystery on which they are cast.

But just as an individual is a higher being, a fuller, more truly human creature, when he has got so far removed from the merely animal existence as to realise that there are such problems and mysteries, so also the humanisation of the race, the development of its noblest peoples and its noblest literatures, have been conditioned by the successive visions of these mysteries in more and more complex organisation by the great philosophers and poets and preachers. The systems of such men may die, but such deaths mean, as Empedocles said of the ordinary deaths of things, only an infinity of new births. Being dead, their systems yet speak in the inherited language and ideas and aspirations and beliefs that form the never-ending, still-renewing material for new philosophies and new faiths. In Thales, Heraclitus, Pythagoras, Parmenides, Empedocles we have been touching hands with an apostolic succession of great men and great thinkers and great poets—men of noble life and lofty thoughts, true prophets and revealers. And the apostolic succession even within the Greek world does not fail for centuries yet.

Passing from the general conceptions of Empedocles to those more particular rationalisations of particular problems which very largely provided the motive of early philosophies, while scientific methods were in an undeveloped and uncritical condition, we may notice such interesting statements as the following: “The earth, which is at the centre of the sphere of the universe, remains firm, because the spin of the universe as a whole keeps it in its place like the water in a spinning cup.” He has the same conception of the early condition of the earth as in other cosmogonies. At first it was a chaos of watery slough, which slowly, under the influence of sky and sun, parted off into earth and sea. The sea was the ‘sweat’ of the earth, and by analogy with the sweat it was salt. The heavens, on the other hand, were formed of air and fire, and the sun was, as it were, a speculum at which the effulgence and the heat of the whole heavens concentrated. But that the aether and the fire had not been fully separated from earth and water he held to be proved by the hot fountains and fiery phenomena which must have been so familiar to a native of Sicily. Curiously enough he imagined fire to possess a solidifying power, and therefore attributed to it the solidity of the earth and the hardness of the rocks. No doubt he had observed some effects of fire in ‘metamorphic’ formations in his own vicinity.

He had also a conception of the gradual development on the earth of higher and higher forms of life, the first being rude and imperfect, and a 'struggle for existence' ensuing in which the monstrous and the deficient gradually were eliminated—the "two-faced, the double-breasted, the oxen-shaped with human prows, or human-shaped with head of ox, or hemaphrodite," and so forth. Love and Strife worked out their ends upon these varied forms; some procreated and reproduced after their image, others were incapable of reproduction from mere monstrosity or weakness, and disappeared. Something other than mere chance thus governed the development of things; there was a law, a reason, a *Logos* governing the process. This law or reason he perhaps fancifully illustrated by attributing the different characters of flesh and sinew and bone to the different numerical proportions, in which they severally contain the different elements.

On this Aristotle, keen-scented critic as he was, has a question, or series of questions, to ask as to the relation between this *Logos*, or principle of orderly combination, and Love as the ruling force in all unions of things. "Is Love," he asks, "a cause of mixtures of any sort, or only of such sorts as *Logos* dictates? And whether then is Love identical with this *Logos*, or are they separate and distinct; and if so, what settles their separate functions?" Questions which Empedocles did not answer, and perhaps would not have tried to answer had he heard them.

The soul or life-principle in man Empedocles regarded as an ordered composite of all the elements or principles of the life in nature, and in this kinship of the elements in man and the elements in nature he found a rationale of our powers of perception. "By the earth," said he, "we have perception of earth; by water we have perception of water; of the divine aether, by aether; of destructive fire, by fire; of love, by love; of strife, by strife." He therefore, as Aristotle observes, drew no radical distinction between sense-apprehension and thought. He located the faculty of apprehension more specifically in the blood, conceiving that in it the combination of the elements was most complete. And the variety of apprehensive gift in different persons he attributed to the greater or lesser perfectness of this blood mixture in them individually. Those that were dull and stupid had a relative deficiency of the lighter and more invisible elements; those that were quick and impulsive had a relatively larger proportion of these. Again, specific faculties depended on local perfection of mixture in certain organs; orators having this perfectness in their tongues, cunning craftsmen possessing it in their hands, and so on. And the degrees of capacity of sensation, which he found in various animals, or even plants, he explained in similar fashion.

The process of sensation he conceived to be conditioned by an actual emission from the bodies perceived of elements or images of themselves which found access to our apprehension through channels congruous to their nature. But ordering, criticising, organising these various apprehensions was the Mind or *Nous*, which he conceived to be of divine nature, to be indeed an expression or emanation of the Divine. And here has been preserved a strangely interesting passage, in which he incorporates and develops in characteristic fashion the doctrine of transmigration of souls: "There is a decree of Necessity, a law given of old from the gods, eternal, sealed with mighty oaths, that when any heavenly creature (daemon) of those that are endowed with length of days, shall in waywardness of heart defile his hands with sin of deed or speech, he shall wander for thrice ten thousand seasons far from the dwellings of the blest, taking upon him in length of time all manner of mortal forms, traversing in turn the many toilsome paths of existence. Him the aetherial wrath hurries onward to the deep, and the deep spews him forth on to the threshold of earth, and unworn earth casts him up to the fires of the sun, and again the aether hurls him into the eddies. One receives him, and then another, but detested is he of them all. Of such am I also one, an exile and a wanderer from God, a slave to strife and its madness."

Thus to his mighty conception the life of all creation, and not of man only, was a great

expiation, an eternal round of punishment for sin; and in the unending flux of life each creature rose or fell in the scale of existence according to the deeds of good or ill done in each successive life; rising sometimes to the state of men, or among men to the high functions of physicians and prophets and kings, or among beasts to the dignity of the lion, or among trees to the beauty of the laurel; or, on the contrary, sinking through sin to lowest forms of bestial or vegetable life. Till at the last they who through obedience and right-doing have expiated their wrong, are endowed by the blessed gods with endless honour, to dwell for ever with them and share their banquets, untouched any more with human care and sorrow and pain.

The slaying of any living creature, therefore, Empedocles, like Pythagoras, abhorred, for all were kin. All foul acts were forms of worse than suicide; life should be a long act of worship, of expiation, of purification. And in the dim past he pictured a vision of a golden age, in which men worshipped not many gods, but Love only, and not with sacrifices of blood, but with pious images, and cunningly odorous incense, and offerings of fragrant myrrh. With abstinence also, and above all with that noblest abstinence, the abstinence from vice and wrong.

3. LEUCIPPUS AND DEMOCRITUS

Leucippus is variously called a native of Elea, of Abdera, of Melos, of Miletus. He was a pupil of Zeno the Eleatic. Democritus was a native of Abdera. They seem to have been almost contemporary with Socrates. The two are associated as thorough-going teachers of the 'Atomic Philosophy,' but Democritus, 'the laughing philosopher,' as he was popularly called in later times, in distinction from Heraclitus, 'the weeping philosopher,' was much the more famous. He lived to a great age. He himself refers to his travels and studies thus: "Above all the men of my time I travelled farthest, and extended my inquiries to places the most distant. I visited the most varied climates and countries, heard the largest number of learned men, nor has any one surpassed me in the gathering together of writings and their interpretation, no, not even the most learned of the Egyptians, with whom I spent five years." We are also informed that, through desire of learning, he visited Babylon and Chaldaea, to visit the astrologers and the priests.

Democritus was not less prolific as a writer than he was voracious as a student, and in him first the division of philosophy into certain great sections, such as physical, mathematical, ethical, was clearly [147] drawn. We are, however, mainly concerned with his teaching in its more strictly philosophical aspects. His main doctrine was professedly antithetical to that of the Eleatics, who, it will be remembered, worked out on abstract lines a theory of one indivisible, eternal, immovable Being. Democritus, on the contrary, declared for two co-equal elements, the Full and the Empty, or Being and Nonentity. The latter, he maintained, was as real as the former. As we should put it, Body is unthinkable except by reference to space which that body does not occupy, as well as to space which it does occupy; and conversely Space is unthinkable except by reference to body actually or potentially filling or defining it.

What Democritus hoped to get by this double or correlative system was a means of accounting for or conceiving of *change* in nature. The difficulty with the Eleatics was, as we have seen, how to understand whence or why the transition from that which absolutely is, to this strange, at least apparent, system of eternal flux and transformation. Democritus } hoped to get over this difficulty by starting as fully with that which *is not*, in other words, with that which *wants* change in order to have any recognisable being at all, as with that which *is*, and which therefore might be conceived as seeking and requiring only to be what it is.

Having got his principle of stability and his principle of change on an equal footing, Democritus next laid it down that all the differences visible in things were differences either of

shape, of arrangement, or of position; practically, that is, he considered that what seem, to us to be qualitative differences in things, *e.g.* hot or cold, sweet or sour, green or yellow, are only resulting impressions from different shapes, or different arrangements, or different modes of presentation, among the atoms of which things are composed.

Coming now to that which *is*, Democritus, as against the Eleatics, maintained that this was not a unity, some one immovable, unchangeable existence, but an innumerable number of atoms, invisible by reason of their smallness, which career through empty space (that which *is not*), and by their union bring objects into being, by their separation bring these to destruction. The action of these atoms on each other depended on the manner in which they were brought into contact; but in any case the unity of any object was only an apparent unity, it being really constituted of a multitude of interlaced and mutually related particles, and all growth or increase of the object being conditioned by the introduction into the structure of additional atoms from without.

For the motions of the atoms he had no anterior cause to offer, other than necessity or fate. They existed, and necessarily and always had existed, in a state of whirl; and for that which always had been he maintained that no preceding cause could legitimately or reasonably be demanded.

Nothing, then, could come out of nothing; all the visible structure of the universe had its origin in the movements of the atoms that constituted it, and conditioned its infinite changes. The atoms, by a useful but perhaps too convenient metaphor, he called the *seeds* of all things. They were infinite in number, though not infinite in the number, of their shapes. Many atoms were similar to each other, and this similarity formed a basis of union among them, a warp, so to speak, or solid foundation across which the woof of dissimilar atoms played to constitute the differences of things.

Out of this idea of an eternal eddy or whirl Democritus developed a cosmogony. The lighter atoms he imagined flew to the outmost rim of the eddy, there constituting the heavenly fires and the heavenly aether. The heavier atoms gathered at the centre, forming successively air and water and the solid earth. Not that there was only one such system or world, but rather multitudes of them, all varying one from the other; some without sun or moon, others with greater luminaries than those of our system, others with a greater number. All, however, had necessarily a centre; all as systems were necessarily spherical.

As regards the atoms he conceived that when they differed in weight this must be in respect of a difference in their essential size. In this he was no doubt combating the notion that the atoms say of lead or gold were in their substance, taking equal quantities, of greater weight than atoms of water or air. The difference of weight in objects depended on the proportion which the atoms in them bore to the amount of empty space which was interlaced with them. On the other hand, a piece of iron was lighter yet harder than a piece of lead of equal size, because of the special way in which the atoms in it were linked together. There were fewer atoms in it, but they were, in consequence of their structure and arrangement, more tightly strung.

In all this Democritus was with great resolution working out what we may call a strictly mechanical theory of the universe. Even the soul or life-principle in living creatures was simply a structure of the finest and roundest (and therefore most nimble) atoms, with which he compared the extremely attenuated dust particles visible in their never-ending dance in a beam of light passed into a darkened room. This structure of exceeding tenuity and nimbleness was the source of the motion characteristic of living creatures, and provided that elastic counteracting force to the inward-pressing nimble air, whereby were produced the phenomena of respiration. Every object, in fact, whether living or not, kept its form and distinctive existence by its possession in degree of a kind of soul or spirit of resistance in its structure, adequate to counteract the

pressure of external forces upon its particles.

Sensation and perception were forms in which these external forces acted upon the more nimble and lively existences, more particularly on living creatures. For every body was continually sending forth emanations or images resembling itself sufficiently in form and structure to affect perceptive bodies with an apprehension of that form and structure. These images travelled by a process of successive transmission, similar to that by which wave-motions are propagated in water. They were, in other words, not movements of the *particles* of the objects, which latter must otherwise in time grow less and fade away, but a modification in the arrangement of the particles immediately next the object, which modification reproduced itself in the next following, and so on right through the medium to the perceptive body.

These images tended by extension in all directions to reach vast dimensions at times, and to influence the minds of men in sleep and on other occasions in strange ways. Hence men imagined gods, and attributed those mighty phenomena of nature—earthquakes, tempests, lightning and thunder, and dire eclipses of sun and moon, to the vaguely visible powers which they imagined they saw. There was indeed a soul or spirit of the universe, as there was a soul or spirit of every individual thing that constituted it. But this was only a finer system of atoms after all. All else is convention or dream; the only realities are Atoms and Emptiness, Matter and Space.

Of absolute verity through the senses we know nothing; our perceptions are only conventional interpretations of we know not what. For to other living creatures these same sensations have other meanings than they have to us, and even the same person is not always affected alike by the same thing; which then is the true of two differing perceptions we cannot say. And therefore either there is no such thing as truth, or, at all events, we know through the senses nothing of it. The only genuine knowledge is that which transcends appearances, and reasons out what is, irrespective of appearances,—in other words, the only genuine knowledge is that of the (atomic) philosopher. And his knowledge is the result of the happy mixture of his atoms whereby all is in equal balance, neither too hot nor too cold. Such a man seeing in the mind's eye the whole universe a tissue of whirling and interlacing atoms, with no real mystery or terror before or after, will live a life of cheerful fearlessness, undisturbed by terrors of a world to come or of powers unseen. His happiness is not in feastings or in gold, but in a mind at peace. And three human perfections he will seek to attain: to reason rightly, to speak graciously, to do his duty.

John Marshall. *A Short History of Greek Philosophy*. Chapters 6-8. London: Percival and Co., 1891.

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