

Plato
Timaeus

INTRODUCTION AND ANALYSIS.

Of all the writings of Plato the *Timaeus* is the most obscure, yet it has nevertheless had the greatest influence over the ancient and mediaeval world. One danger with modern interpreters of Plato is the tendency to regard the *Timaeus* as the centre of his system. We do not know how Plato would have arranged his own dialogues, or whether the thought of arranging any of them, besides the two 'Trilogies' which he has expressly connected; was ever present to his mind. But, if he had arranged them, there are many indications that this is not the place which he would have assigned to the *Timaeus*. We observe, first of all, that the dialogue is put into the mouth of a Pythagorean philosopher, and not of Socrates. And this is required by dramatic propriety; for the investigation of nature was expressly renounced by Socrates in the *Phaedo*. Nor does Plato himself attribute any importance to his guesses at science. He is not at all absorbed by them, as he is by the IDEA of good. He is modest and hesitating, and confesses that his words partake of the uncertainty of the subject (*Tim.*). The dialogue is primarily concerned with the animal creation, including under this term the heavenly bodies, and with man only as one among the animals. But we can hardly suppose that Plato would have preferred the study of nature to man, or that he would have deemed the formation of the world and the human frame to have the same interest which he ascribes to the mystery of being and not-being, or to the great political problems which he discusses in the *Republic* and the *Laws*. There are no speculations on physics in the other dialogues of Plato, and he himself regards the consideration of them as a rational pastime only. He is beginning to feel the need of further divisions of knowledge; and is becoming aware that besides dialectic, mathematics, and the arts, there is another field which has been hitherto unexplored by him. But he has not as yet defined this intermediate territory which lies somewhere between medicine and mathematics, and he would have felt that there was as great an impiety in ranking theories of physics first in the order of knowledge, as in placing the body before the soul.

It is true, however, that the *Timaeus* is by no means confined to speculations on physics. The deeper foundations of the Platonic philosophy, such as the nature of God, the distinction of the sensible and intellectual, the great original conceptions of time and space, also appear in it. They are found principally in the first half of the dialogue. The construction of the heavens is for the most part ideal; the cyclic year serves as the connection between the world of absolute being and of generation, just as the number of population in the *Republic* is the expression or symbol of the transition from the ideal to the actual state. In some passages we are uncertain whether we are reading a description of astronomical facts or contemplating processes of the human mind, or of that divine mind (*Phil.*) which in Plato is hardly separable from it. The characteristics of man are transferred to the world-animal, as for example

when intelligence and knowledge are said to be perfected by the circle of the Same, and true opinion by the circle of the Other; and conversely the motions of the world-animal reappear in man; its amorphous state continues in the child, and in both disorder and chaos are gradually succeeded by stability and order. It is not however to passages like these that Plato is referring when he speaks of the uncertainty of his subject, but rather to the composition of bodies, to the relations of colours, the nature of diseases, and the like, about which he truly feels the lamentable ignorance prevailing in his own age.

We are led by Plato himself to regard the *Timaeus*, not as the centre or inmost shrine of the edifice, but as a detached building in a different style, framed, not after the Socratic, but after some Pythagorean model. As in the *Cratylus* and *Parmenides*, we are uncertain whether Plato is expressing his own opinions, or appropriating and perhaps improving the philosophical speculations of others. In all three dialogues he is exerting his dramatic and imitative power; in the *Cratylus* mingling a satirical and humorous purpose with true principles of language; in the *Parmenides* overthrowing Megarianism by a sort of ultra-Megarianism, which discovers contradictions in the one as great as those which have been previously shown to exist in the ideas. There is a similar uncertainty about the *Timaeus*; in the first part he scales the heights of transcendentalism, in the latter part he treats in a bald and superficial manner of the functions and diseases of the human frame. He uses the thoughts and almost the words of *Parmenides* when he discourses of being and of essence, adopting from old religion into philosophy the conception of God, and from the Megarians the IDEA of good. He agrees with *Empedocles* and the Atomists in attributing the greater differences of kinds to the figures of the elements and their movements into and out of one another. With *Heracleitus*, he acknowledges the perpetual flux; like *Anaxagoras*, he asserts the predominance of mind, although admitting an element of necessity which reason is incapable of subduing; like the Pythagoreans he supposes the mystery of the world to be contained in number. Many, if not all the elements of the Pre-Socratic philosophy are included in the *Timaeus*. It is a composite or eclectic work of imagination, in which Plato, without naming them, gathers up into a kind of system the various elements of philosophy which preceded him.

If we allow for the difference of subject, and for some growth in Plato's own mind, the discrepancy between the *Timaeus* and the other dialogues will not appear to be great. It is probable that the relation of the ideas to God or of God to the world was differently conceived by him at different times of his life. In all his later dialogues we observe a tendency in him to personify mind or God, and he therefore naturally inclines to view creation as the work of design. The creator is like a human artist who frames in his mind a plan which he executes by the help of his servants. Thus the language of philosophy which speaks of first and second causes is

crossed by another sort of phraseology: 'God made the world because he was good, and the demons ministered to him.' The *Timaeus* is cast in a more theological and less philosophical mould than the other dialogues, but the same general spirit is apparent; there is the same dualism or opposition between the ideal and actual—the soul is prior to the body, the intelligible and unseen to the visible and corporeal. There is the same distinction between knowledge and opinion which occurs in the *Theaetetus* and *Republic*, the same enmity to the poets, the same combination of music and gymnastics. The doctrine of transmigration is still held by him, as in the *Phaedrus* and *Republic*; and the soul has a view of the heavens in a prior state of being. The ideas also remain, but they have become types in nature, forms of men, animals, birds, fishes. And the attribution of evil to physical causes accords with the doctrine which he maintains in the *Laws* respecting the involuntariness of vice.

The style and plan of the *Timaeus* differ greatly from that of any other of the Platonic dialogues. The language is weighty, abrupt, and in some passages sublime. But Plato has not the same mastery over his instrument which he exhibits in the *Phaedrus* or *Symposium*. Nothing can exceed the beauty or art of the introduction, in which he is using words after his accustomed manner. But in the rest of the work the power of language seems to fail him, and the dramatic form is wholly given up. He could write in one style, but not in another, and the Greek language had not as yet been fashioned by any poet or philosopher to describe physical phenomena. The early physiologists had generally written in verse; the prose writers, like Democritus and Anaxagoras, as far as we can judge from their fragments, never attained to a periodic style. And hence we find the same sort of clumsiness in the *Timaeus* of Plato which characterizes the philosophical poem of Lucretius. There is a want of flow and often a defect of rhythm; the meaning is sometimes obscure, and there is a greater use of apposition and more of repetition than occurs in Plato's earlier writings. The sentences are less closely connected and also more involved; the antecedents of demonstrative and relative pronouns are in some cases remote and perplexing. The greater frequency of participles and of absolute constructions gives the effect of heaviness. The descriptive portion of the *Timaeus* retains traces of the first Greek prose composition; for the great master of language was speaking on a theme with which he was imperfectly acquainted, and had no words in which to express his meaning. The rugged grandeur of the opening discourse of *Timaeus* may be compared with the more harmonious beauty of a similar passage in the *Phaedrus*.

To the same cause we may attribute the want of plan. Plato had not the command of his materials which would have enabled him to produce a perfect work of art. Hence there are several new beginnings and resumptions and formal or artificial connections; we miss the 'callida junctura' of the earlier dialogues. His speculations about the Eternal, his

theories of creation, his mathematical anticipations, are supplemented by desultory remarks on the one immortal and the two mortal souls of man, on the functions of the bodily organs in health and disease, on sight, hearing, smell, taste, and touch. He soars into the heavens, and then, as if his wings were suddenly clipped, he walks ungracefully and with difficulty upon the earth. The greatest things in the world, and the least things in man, are brought within the compass of a short treatise. But the intermediate links are missing, and we cannot be surprised that there should be a want of unity in a work which embraces astronomy, theology, physiology, and natural philosophy in a few pages.

It is not easy to determine how Plato's cosmos may be presented to the reader in a clearer and shorter form; or how we may supply a thread of connexion to his ideas without giving greater consistency to them than they possessed in his mind, or adding on consequences which would never have occurred to him. For he has glimpses of the truth, but no comprehensive or perfect vision. There are isolated expressions about the nature of God which have a wonderful depth and power; but we are not justified in assuming that these had any greater significance to the mind of Plato than language of a neutral and impersonal character . . . With a view to the illustration of the *Timaeus* I propose to divide this Introduction into sections, of which the first will contain an outline of the dialogue: (2) I shall consider the aspects of nature which presented themselves to Plato and his age, and the elements of philosophy which entered into the conception of them: (3) the theology and physics of the *Timaeus*, including the soul of the world, the conception of time and space, and the composition of the elements: (4) in the fourth section I shall consider the Platonic astronomy, and the position of the earth. There will remain, (5) the psychology, (6) the physiology of Plato, and (7) his analysis of the senses to be briefly commented upon: (8) lastly, we may examine in what points Plato approaches or anticipates the discoveries of modern science.

Section 1.

Socrates begins the *Timaeus* with a summary of the *Republic*. He lightly touches upon a few points,—the division of labour and distribution of the citizens into classes, the double nature and training of the guardians, the community of property and of women and children. But he makes no mention of the second education, or of the government of philosophers.

And now he desires to see the ideal State set in motion; he would like to know how she behaved in some great struggle. But he is unable to invent such a narrative himself; and he is afraid that the poets are equally incapable; for, although he pretends to have nothing to say against them, he remarks that they are a tribe of imitators, who can only describe what they have seen. And he fears that the Sophists, who are plentifully supplied with graces of speech, in their erratic way of life having never had

a city or house of their own, may through want of experience err in their conception of philosophers and statesmen. 'And therefore to you I turn, Timaeus, citizen of Locris, who are at once a philosopher and a statesman, and to you, Critias, whom all Athenians know to be similarly accomplished, and to Hermocrates, who is also fitted by nature and education to share in our discourse.'

HERMOCRATES: 'We will do our best, and have been already preparing; for on our way home, Critias told us of an ancient tradition, which I wish, Critias, that you would repeat to Socrates.' 'I will, if Timaeus approves.' 'I approve.' Listen then, Socrates, to a tale of Solon's, who, being the friend of Dropidas my great-grandfather, told it to my grandfather Critias, and he told me. The narrative related to ancient famous actions of the Athenian people, and to one especially, which I will rehearse in honour of you and of the goddess. Critias when he told this tale of the olden time, was ninety years old, I being not more than ten. The occasion of the rehearsal was the day of the Apaturia called the Registration of Youth, at which our parents gave prizes for recitation. Some poems of Solon were recited by the boys. They had not at that time gone out of fashion, and the recital of them led some one to say, perhaps in compliment to Critias, that Solon was not only the wisest of men but also the best of poets. The old man brightened up at hearing this, and said: Had Solon only had the leisure which was required to complete the famous legend which he brought with him from Egypt he would have been as distinguished as Homer and Hesiod. 'And what was the subject of the poem?' said the person who made the remark. The subject was a very noble one; he described the most famous action in which the Athenian people were ever engaged. But the memory of their exploits has passed away owing to the lapse of time and the extinction of the actors. 'Tell us,' said the other, 'the whole story, and where Solon heard the story.' He replied— There is at the head of the Egyptian Delta, where the river Nile divides, a city and district called Sais; the city was the birthplace of King Amasis, and is under the protection of the goddess Neith or Athene. The citizens have a friendly feeling towards the Athenians, believing themselves to be related to them. Hither came Solon, and was received with honour; and here he first learnt, by conversing with the Egyptian priests, how ignorant he and his countrymen were of antiquity. Perceiving this, and with the view of eliciting information from them, he told them the tales of Phoroneus and Niobe, and also of Deucalion and Pyrrha, and he endeavoured to count the generations which had since passed. Thereupon an aged priest said to him: 'O Solon, Solon, you Hellenes are ever young, and there is no old man who is a Hellene.' 'What do you mean?' he asked. 'In mind,' replied the priest, 'I mean to say that you are children; there is no opinion or tradition of knowledge among you which is white with age; and I will tell you why. Like the rest of mankind you have suffered from convulsions of nature, which are chiefly brought about by the two great agencies of fire and water. The former is symbolized in the Hellenic tale of young Phaethon

who drove his father's horses the wrong way, and having burnt up the earth was himself burnt up by a thunderbolt. For there occurs at long intervals a derangement of the heavenly bodies, and then the earth is destroyed by fire. At such times, and when fire is the agent, those who dwell by rivers or on the seashore are safer than those who dwell upon high and dry places, who in their turn are safer when the danger is from water. Now the Nile is our saviour from fire, and as there is little rain in Egypt, we are not harmed by water; whereas in other countries, when a deluge comes, the inhabitants are swept by the rivers into the sea. The memorials which your own and other nations have once had of the famous actions of mankind perish in the waters at certain periods; and the rude survivors in the mountains begin again, knowing nothing of the world before the flood. But in Egypt the traditions of our own and other lands are by us registered for ever in our temples. The genealogies which you have recited to us out of your own annals, Solon, are a mere children's story. For in the first place, you remember one deluge only, and there were many of them, and you know nothing of that fairest and noblest race of which you are a seed or remnant. The memory of them was lost, because there was no written voice among you. For in the times before the great flood Athens was the greatest and best of cities and did the noblest deeds and had the best constitution of any under the face of heaven.' Solon marvelled, and desired to be informed of the particulars. 'You are welcome to hear them,' said the priest, 'both for your own sake and for that of the city, and above all for the sake of the goddess who is the common foundress of both our cities. Nine thousand years have elapsed since she founded yours, and eight thousand since she founded ours, as our annals record. Many laws exist among us which are the counterpart of yours as they were in the olden time. I will briefly describe them to you, and you shall read the account of them at your leisure in the sacred registers. In the first place, there was a caste of priests among the ancient Athenians, and another of artisans; also castes of shepherds, hunters, and husbandmen, and lastly of warriors, who, like the warriors of Egypt, were separated from the rest, and carried shields and spears, a custom which the goddess first taught you, and then the Asiatics, and we among Asiatics first received from her. Observe again, what care the law took in the pursuit of wisdom, searching out the deep things of the world, and applying them to the use of man. The spot of earth which the goddess chose had the best of climates, and produced the wisest men; in no other was she herself, the philosopher and warrior goddess, so likely to have votaries. And there you dwelt as became the children of the gods, excelling all men in virtue, and many famous actions are recorded of you. The most famous of them all was the overthrow of the island of Atlantis. This great island lay over against the Pillars of Heracles, in extent greater than Libya and Asia put together, and was the passage to other islands and to a great ocean of which the Mediterranean sea was only the harbour; and within the Pillars the empire of Atlantis reached in Europe to Tyrrhenia and in

Libya to Egypt. This mighty power was arrayed against Egypt and Hellas and all the countries bordering on the Mediterranean. Then your city did bravely, and won renown over the whole earth. For at the peril of her own existence, and when the other Hellenes had deserted her, she repelled the invader, and of her own accord gave liberty to all the nations within the Pillars. A little while afterwards there were great earthquakes and floods, and your warrior race all sank into the earth; and the great island of Atlantis also disappeared in the sea. This is the explanation of the shallows which are found in that part of the Atlantic ocean.'

Such was the tale, Socrates, which Critias heard from Solon; and I noticed when listening to you yesterday, how close the resemblance was between your city and citizens and the ancient Athenian State. But I would not speak at the time, because I wanted to refresh my memory. I had heard the old man when I was a child, and though I could not remember the whole of our yesterday's discourse, I was able to recall every word of this, which is branded into my mind; and I am prepared, Socrates, to rehearse to you the entire narrative. The imaginary State which you were describing may be identified with the reality of Solon, and our antediluvian ancestors may be your citizens. 'That is excellent, Critias, and very appropriate to a Panathenaic festival; the truth of the story is a great advantage.' Then now let me explain to you the order of our entertainment; first, Timaeus, who is a natural philosopher, will speak of the origin of the world, going down to the creation of man, and then I shall receive the men whom he has created, and some of whom will have been educated by you, and introduce them to you as the lost Athenian citizens of whom the Egyptian record spoke. As the law of Solon prescribes, we will bring them into court and acknowledge their claims to citizenship. 'I see,' replied Socrates, 'that I shall be well entertained; and do you, Timaeus, offer up a prayer and begin.'

TIMAEUS: All men who have any right feeling, at the beginning of any enterprise, call upon the Gods; and he who is about to speak of the origin of the universe has a special need of their aid. May my words be acceptable to them, and may I speak in the manner which will be most intelligible to you and will best express my own meaning!

First, I must distinguish between that which always is and never becomes and which is apprehended by reason and reflection, and that which always becomes and never is and is conceived by opinion with the help of sense. All that becomes and is created is the work of a cause, and that is fair which the artificer makes after an eternal pattern, but whatever is fashioned after a created pattern is not fair. Is the world created or uncreated?—that is the first question. Created, I reply, being visible and tangible and having a body, and therefore sensible; and if sensible, then created; and if created, made by a cause, and the cause is the ineffable father of all things, who had before him an eternal archetype. For to

imagine that the archetype was created would be blasphemy, seeing that the world is the noblest of creations, and God is the best of causes. And the world being thus created according to the eternal pattern is the copy of something; and we may assume that words are akin to the matter of which they speak. What is spoken of the unchanging or intelligible must be certain and true; but what is spoken of the created image can only be probable; being is to becoming what truth is to belief. And amid the variety of opinions which have arisen about God and the nature of the world we must be content to take probability for our rule, considering that I, who am the speaker, and you, who are the judges, are only men; to probability we may attain but no further.

SOCRATES: Excellent, Timaeus, I like your manner of approaching the subject—proceed.

TIMAEUS: Why did the Creator make the world?...He was good, and therefore not jealous, and being free from jealousy he desired that all things should be like himself. Wherefore he set in order the visible world, which he found in disorder. Now he who is the best could only create the fairest; and reflecting that of visible things the intelligent is superior to the unintelligent, he put intelligence in soul and soul in body, and framed the universe to be the best and fairest work in the order of nature, and the world became a living soul through the providence of God.

In the likeness of what animal was the world made?—that is the third question...The form of the perfect animal was a whole, and contained all intelligible beings, and the visible animal, made after the pattern of this, included all visible creatures.

Are there many worlds or one only?—that is the fourth question...One only. For if in the original there had been more than one they would have been the parts of a third, which would have been the true pattern of the world; and therefore there is, and will ever be, but one created world. Now that which is created is of necessity corporeal and visible and tangible,—visible and therefore made of fire,—tangible and therefore solid and made of earth. But two terms must be united by a third, which is a mean between them; and had the earth been a surface only, one mean would have sufficed, but two means are required to unite solid bodies. And as the world was composed of solids, between the elements of fire and earth God placed two other elements of air and water, and arranged them in a continuous proportion—

fire:air::air:water, and air:water::water:earth,

and so put together a visible and palpable heaven, having harmony and friendship in the union of the four elements; and being at unity with itself it was indissoluble except by the hand of the framer. Each of the elements was taken into the universe whole and entire; for he considered that the

animal should be perfect and one, leaving no remnants out of which another animal could be created, and should also be free from old age and disease, which are produced by the action of external forces. And as he was to contain all things, he was made in the all-containing form of a sphere, round as from a lathe and every way equidistant from the centre, as was natural and suitable to him. He was finished and smooth, having neither eyes nor ears, for there was nothing without him which he could see or hear; and he had no need to carry food to his mouth, nor was there air for him to breathe; and he did not require hands, for there was nothing of which he could take hold, nor feet, with which to walk. All that he did was done rationally in and by himself, and he moved in a circle turning within himself, which is the most intellectual of motions; but the other six motions were wanting to him; wherefore the universe had no feet or legs.

And so the thought of God made a God in the image of a perfect body, having intercourse with himself and needing no other, but in every part harmonious and self-contained and truly blessed. The soul was first made by him—the elder to rule the younger; not in the order in which our wayward fancy has led us to describe them, but the soul first and afterwards the body. God took of the unchangeable and indivisible and also of the divisible and corporeal, and out of the two he made a third nature, essence, which was in a mean between them, and partook of the same and the other, the intractable nature of the other being compressed into the same. Having made a compound of all the three, he proceeded to divide the entire mass into portions related to one another in the ratios of 1, 2, 3, 4, 9, 8, 27, and proceeded to fill up the double and triple intervals thus—

— over 1, $\frac{4}{3}$, $\frac{3}{2}$, — over 2, $\frac{8}{3}$, 3, — over 4, $\frac{16}{3}$, 6, — over 8: — over 1, $\frac{3}{2}$, 2, — over 3, $\frac{9}{2}$, 6, — over 9, $\frac{27}{2}$, 18, — over 27;

in which double series of numbers are two kinds of means; the one exceeds and is exceeded by equal parts of the extremes, e.g. 1, $\frac{4}{3}$, 2; the other kind of mean is one which is equidistant from the extremes—2, 4, 6. In this manner there were formed intervals of thirds, 3:2, of fourths, 4:3, and of ninths, 9:8. And next he filled up the intervals of a fourth with ninths, leaving a remnant which is in the ratio of 256:243. The entire compound was divided by him lengthways into two parts, which he united at the centre like the letter X, and bent into an inner and outer circle or sphere, cutting one another again at a point over against the point at which they cross. The outer circle or sphere was named the sphere of the same—the inner, the sphere of the other or diverse; and the one revolved horizontally to the right, the other diagonally to the left. To the sphere of the same which was undivided he gave dominion, but the sphere of the other or diverse was distributed into seven unequal orbits, having intervals in ratios of twos and threes, three of either sort, and he bade the orbits move in opposite directions to one another—three of them, the Sun,

Mercury, Venus, with equal swiftness, and the remaining four—the Moon, Saturn, Mars, Jupiter, with unequal swiftness to the three and to one another, but all in due proportion.

When the Creator had made the soul he made the body within her; and the soul interfused everywhere from the centre to the circumference of heaven, herself turning in herself, began a divine life of rational and everlasting motion. The body of heaven is visible, but the soul is invisible, and partakes of reason and harmony, and is the best of creations, being the work of the best. And being composed of the same, the other, and the essence, these three, and also divided and bound in harmonical proportion, and revolving within herself—the soul when touching anything which has essence, whether divided or undivided, is stirred to utter the sameness or diversity of that and some other thing, and to tell how and when and where individuals are affected or related, whether in the world of change or of essence. When reason is in the neighbourhood of sense, and the circle of the other or diverse is moving truly, then arise true opinions and beliefs; when reason is in the sphere of thought, and the circle of the same runs smoothly, then intelligence is perfected.

When the Father who begat the world saw the image which he had made of the Eternal Gods moving and living, he rejoiced; and in his joy resolved, since the archetype was eternal, to make the creature eternal as far as this was possible. Wherefore he made an image of eternity which is time, having an uniform motion according to number, parted into months and days and years, and also having greater divisions of past, present, and future. These all apply to becoming in time, and have no meaning in relation to the eternal nature, which ever is and never was or will be; for the unchangeable is never older or younger, and when we say that he ‘was’ or ‘will be,’ we are mistaken, for these words are applicable only to becoming, and not to true being; and equally wrong are we in saying that what has become IS become and that what becomes IS becoming, and that the non-existent IS non-existent..These are the forms of time which imitate eternity and move in a circle measured by number.

Thus was time made in the image of the eternal nature; and it was created together with the heavens, in order that if they were dissolved, it might perish with them. And God made the sun and moon and five other wanderers, as they are called, seven in all, and to each of them he gave a body moving in an orbit, being one of the seven orbits into which the circle of the other was divided. He put the moon in the orbit which was nearest to the earth, the sun in that next, the morning star and Mercury in the orbits which move opposite to the sun but with equal swiftness—this being the reason why they overtake and are overtaken by one another. All these bodies became living creatures, and learnt their appointed tasks, and began to move, the nearer more swiftly, the remoter more slowly, according to the diagonal movement of the other. And since this was

controlled by the movement of the same, the seven planets in their courses appeared to describe spirals; and that appeared fastest which was slowest, and that which overtook others appeared to be overtaken by them. And God lighted a fire in the second orbit from the earth which is called the sun, to give light over the whole heaven, and to teach intelligent beings that knowledge of number which is derived from the revolution of the same. Thus arose day and night, which are the periods of the most intelligent nature; a month is created by the revolution of the moon, a year by that of the sun. Other periods of wonderful length and complexity are not observed by men in general; there is moreover a cycle or perfect year at the completion of which they all meet and coincide...To this end the stars came into being, that the created heaven might imitate the eternal nature.

Thus far the universal animal was made in the divine image, but the other animals were not as yet included in him. And God created them according to the patterns or species of them which existed in the divine original. There are four of them: one of gods, another of birds, a third of fishes, and a fourth of animals. The gods were made in the form of a circle, which is the most perfect figure and the figure of the universe. They were created chiefly of fire, that they might be bright, and were made to know and follow the best, and to be scattered over the heavens, of which they were to be the glory. Two kinds of motion were assigned to them—first, the revolution in the same and around the same, in peaceful unchanging thought of the same; and to this was added a forward motion which was under the control of the same. Thus then the fixed stars were created, being divine and eternal animals, revolving on the same spot, and the wandering stars, in their courses, were created in the manner already described. The earth, which is our nurse, clinging around the pole extended through the universe, he made to be the guardian and artificer of night and day, first and eldest of gods that are in the interior of heaven. Vain would be the labour of telling all the figures of them, moving as in dance, and their juxta-positions and approximations, and when and where and behind what other stars they appear to disappear—to tell of all this without looking at a plan of them would be labour in vain.

The knowledge of the other gods is beyond us, and we can only accept the traditions of the ancients, who were the children of the gods, as they said; for surely they must have known their own ancestors. Although they give no proof, we must believe them as is customary. They tell us that Oceanus and Tethys were the children of Earth and Heaven; that Phoreys, Cronos, and Rhea came in the next generation, and were followed by Zeus and Here, whose brothers and children are known to everybody.

When all of them, both those who show themselves in the sky, and those who retire from view, had come into being, the Creator addressed them thus:— ‘Gods, sons of gods, my works, if I will, are indissoluble. That

which is bound may be dissolved, but only an evil being would dissolve that which is harmonious and happy. And although you are not immortal you shall not die, for I will hold you together. Hear me, then:—Three tribes of mortal beings have still to be created, but if created by me they would be like gods. Do ye therefore make them; I will implant in them the seed of immortality, and you shall weave together the mortal and immortal, and provide food for them, and receive them again in death.’ Thus he spake, and poured the remains of the elements into the cup in which he had mingled the soul of the universe. They were no longer pure as before, but diluted; and the mixture he distributed into souls equal in number to the stars, and assigned each to a star—then having mounted them, as in a chariot, he showed them the nature of the universe, and told them of their future birth and human lot. They were to be sown in the planets, and out of them was to come forth the most religious of animals, which would hereafter be called man. The souls were to be implanted in bodies, which were in a perpetual flux, whence, he said, would arise, first, sensation; secondly, love, which is a mixture of pleasure and pain; thirdly, fear and anger, and the opposite affections: and if they conquered these, they would live righteously, but if they were conquered by them, unrighteously. He who lived well would return to his native star, and would there have a blessed existence; but, if he lived ill, he would pass into the nature of a woman, and if he did not then alter his evil ways, into the likeness of some animal, until the reason which was in him reasserted her sway over the elements of fire, air, earth, water, which had engrossed her, and he regained his first and better nature. Having given this law to his creatures, that he might be guiltless of their future evil, he sowed them, some in the earth, some in the moon, and some in the other planets; and he ordered the younger gods to frame human bodies for them and to make the necessary additions to them, and to avert from them all but self-inflicted evil.

Having given these commands, the Creator remained in his own nature. And his children, receiving from him the immortal principle, borrowed from the world portions of earth, air, fire, water, hereafter to be returned, which they fastened together, not with the adamantine bonds which bound themselves, but by little invisible pegs, making each separate body out of all the elements, subject to influx and efflux, and containing the courses of the soul. These swelling and surging as in a river moved irregularly and irrationally in all the six possible ways, forwards, backwards, right, left, up and down. But violent as were the internal and alimentary fluids, the tide became still more violent when the body came into contact with flaming fire, or the solid earth, or gliding waters, or the stormy wind; the motions produced by these impulses pass through the body to the soul and have the name of sensations. Uniting with the ever-flowing current, they shake the courses of the soul, stopping the revolution of the same and twisting in all sorts of ways the nature of the other, and the harmonical ratios of twos and threes and the mean terms

which connect them, until the circles are bent and disordered and their motion becomes irregular. You may imagine a position of the body in which the head is resting upon the ground, and the legs are in the air, and the top is bottom and the left right. And something similar happens when the disordered motions of the soul come into contact with any external thing; they say the same or the other in a manner which is the very opposite of the truth, and they are false and foolish, and have no guiding principle in them. And when external impressions enter in, they are really conquered, though they seem to conquer.

By reason of these affections the soul is at first without intelligence, but as time goes on the stream of nutriment abates, and the courses of the soul regain their proper motion, and apprehend the same and the other rightly, and become rational. The soul of him who has education is whole and perfect and escapes the worst disease, but, if a man's education be neglected, he walks lamely through life and returns good for nothing to the world below. This, however, is an after-stage—at present, we are only concerned with the creation of the body and soul.

The two divine courses were encased by the gods in a sphere which is called the head, and is the god and lord of us. And to this they gave the body to be a vehicle, and the members to be instruments, having the power of flexion and extension. Such was the origin of legs and arms. In the next place, the gods gave a forward motion to the human body, because the front part of man was the more honourable and had authority. And they put in a face in which they inserted organs to minister in all things to the providence of the soul. They first contrived the eyes, into which they conveyed a light akin to the light of day, making it flow through the pupils. When the light of the eye is surrounded by the light of day, then like falls upon like, and they unite and form one body which conveys to the soul the motions of visible objects. But when the visual ray goes forth into the darkness, then unlike falls upon unlike—the eye no longer sees, and we go to sleep. The fire or light, when kept in by the eyelids, equalizes the inward motions, and there is rest accompanied by few dreams; only when the greater motions remain they engender in us corresponding visions of the night. And now we shall be able to understand the nature of reflections in mirrors. The fires from within and from without meet about the smooth and bright surface of the mirror; and because they meet in a manner contrary to the usual mode, the right and left sides of the object are transposed. In a concave mirror the top and bottom are inverted, but this is no transposition.

These are the second causes which God used as his ministers in fashioning the world. They are thought by many to be the prime causes, but they are not so; for they are destitute of mind and reason, and the lover of mind will not allow that there are any prime causes other than the rational and invisible ones—these he investigates first, and afterwards the causes of

things which are moved by others, and which work by chance and without order. Of the second or concurrent causes of sight I have already spoken, and I will now speak of the higher purpose of God in giving us eyes. Sight is the source of the greatest benefits to us; for if our eyes had never seen the sun, stars, and heavens, the words which we have spoken would not have been uttered. The sight of them and their revolutions has given us the knowledge of number and time, the power of enquiry, and philosophy, which is the great blessing of human life; not to speak of the lesser benefits which even the vulgar can appreciate. God gave us the faculty of sight that we might behold the order of the heavens and create a corresponding order in our own erring minds. To the like end the gifts of speech and hearing were bestowed upon us; not for the sake of irrational pleasure, but in order that we might harmonize the courses of the soul by sympathy with the harmony of sound, and cure ourselves of our irregular and graceless ways.

Thus far we have spoken of the works of mind; and there are other works done from necessity, which we must now place beside them; for the creation is made up of both, mind persuading necessity as far as possible to work out good. Before the heavens there existed fire, air, water, earth, which we suppose men to know, though no one has explained their nature, and we erroneously maintain them to be the letters or elements of the whole, although they cannot reasonably be compared even to syllables or first compounds. I am not now speaking of the first principles of things, because I cannot discover them by our present mode of enquiry. But as I observed the rule of probability at first, I will begin anew, seeking by the grace of God to observe it still.

In our former discussion I distinguished two kinds of being—the unchanging or invisible, and the visible or changing. But now a third kind is required, which I shall call the receptacle or nurse of generation. There is a difficulty in arriving at an exact notion of this third kind, because the four elements themselves are of inexact natures and easily pass into one another, and are too transient to be detained by any one name; wherefore we are compelled to speak of water or fire, not as substances, but as qualities. They may be compared to images made of gold, which are continually assuming new forms. Somebody asks what they are; if you do not know, the safest answer is to reply that they are gold. In like manner there is a universal nature out of which all things are made, and which is like none of them; but they enter into and pass out of her, and are made after patterns of the true in a wonderful and inexplicable manner. The containing principle may be likened to a mother, the source or spring to a father, the intermediate nature to a child; and we may also remark that the matter which receives every variety of form must be formless, like the inodorous liquids which are prepared to receive scents, or the smooth and soft materials on which figures are impressed. In the same way space or matter is neither earth nor fire nor air nor water, but an invisible and

formless being which receives all things, and in an incomprehensible manner partakes of the intelligible. But we may say, speaking generally, that fire is that part of this nature which is inflamed, water that which is moistened, and the like.

Let me ask a question in which a great principle is involved: Is there an essence of fire and the other elements, or are there only fires visible to sense? I answer in a word: If mind is one thing and true opinion another, then there are self-existent essences; but if mind is the same with opinion, then the visible and corporeal is most real. But they are not the same, and they have a different origin and nature. The one comes to us by instruction, the other by persuasion, the one is rational, the other is irrational; the one is movable by persuasion, the other immovable; the one is possessed by every man, the other by the gods and by very few men. And we must acknowledge that as there are two kinds of knowledge, so there are two kinds of being corresponding to them; the one uncreated, indestructible, immovable, which is seen by intelligence only; the other created, which is always becoming in place and vanishing out of place, and is apprehended by opinion and sense. There is also a third nature—that of space, which is indestructible, and is perceived by a kind of spurious reason without the help of sense. This is presented to us in a dreamy manner, and yet is said to be necessary, for we say that all things must be somewhere in space. For they are the images of other things and must therefore have a separate existence and exist in something (i.e. in space). But true reason assures us that while two things (i.e. the idea and the image) are different they cannot inhere in one another, so as to be one and two at the same time.

To sum up: Being and generation and space, these three, existed before the heavens, and the nurse or vessel of generation, moistened by water and inflamed by fire, and taking the forms of air and earth, assumed various shapes. By the motion of the vessel, the elements were divided, and like grain winnowed by fans, the close and heavy particles settled in one place, the light and airy ones in another. At first they were without reason and measure, and had only certain faint traces of themselves, until God fashioned them by figure and number. In this, as in every other part of creation, I suppose God to have made things, as far as was possible, fair and good, out of things not fair and good.

And now I will explain to you the generation of the world by a method with which your scientific training will have made you familiar. Fire, air, earth, and water are bodies and therefore solids, and solids are contained in planes, and plane rectilinear figures are made up of triangles. Of triangles there are two kinds; one having the opposite sides equal (isosceles), the other with unequal sides (scalene). These we may fairly assume to be the original elements of fire and the other bodies; what principles are prior to these God only knows, and he of men whom God

loves. Next, we must determine what are the four most beautiful figures which are unlike one another and yet sometimes capable of resolution into one another...Of the two kinds of triangles the equal-sided has but one form, the unequal-sided has an infinite variety of forms; and there is none more beautiful than that which forms the half of an equilateral triangle. Let us then choose two triangles; one, the isosceles, the other, that form of scalene which has the square of the longer side three times as great as the square of the lesser side; and affirm that, out of these, fire and the other elements have been constructed.

I was wrong in imagining that all the four elements could be generated into and out of one another. For as they are formed, three of them from the triangle which has the sides unequal, the fourth from the triangle which has equal sides, three can be resolved into one another, but the fourth cannot be resolved into them nor they into it. So much for their passage into one another: I must now speak of their construction. From the triangle of which the hypotenuse is twice the lesser side the three first regular solids are formed—first, the equilateral pyramid or tetrahedron; secondly, the octahedron; thirdly, the icosahedron; and from the isosceles triangle is formed the cube. And there is a fifth figure (which is made out of twelve pentagons), the dodecahedron—this God used as a model for the twelvefold division of the Zodiac.

Let us now assign the geometrical forms to their respective elements. The cube is the most stable of them because resting on a quadrangular plane surface, and composed of isosceles triangles. To the earth then, which is the most stable of bodies and the most easily modelled of them, may be assigned the form of a cube; and the remaining forms to the other elements,—to fire the pyramid, to air the octahedron, and to water the icosahedron,—according to their degrees of lightness or heaviness or power, or want of power, of penetration. The single particles of any of the elements are not seen by reason of their smallness; they only become visible when collected. The ratios of their motions, numbers, and other properties, are ordered by the God, who harmonized them as far as necessity permitted.

The probable conclusion is as follows:—Earth, when dissolved by the more penetrating element of fire, whether acting immediately or through the medium of air or water, is decomposed but not transformed. Water, when divided by fire or air, becomes one part fire, and two parts air. A volume of air divided becomes two of fire. On the other hand, when condensed, two volumes of fire make a volume of air; and two and a half parts of air condense into one of water. Any element which is fastened upon by fire is cut by the sharpness of the triangles, until at length, coalescing with the fire, it is at rest; for similars are not affected by similars. When two kinds of bodies quarrel with one another, then the tendency to decomposition continues until the smaller either escapes to its kindred element or

becomes one with its conqueror. And this tendency in bodies to condense or escape is a source of motion...Where there is motion there must be a mover, and where there is a mover there must be something to move. These cannot exist in what is uniform, and therefore motion is due to want of uniformity. But then why, when things are divided after their kinds, do they not cease from motion? The answer is, that the circular motion of all things compresses them, and as 'nature abhors a vacuum,' the finer and more subtle particles of the lighter elements, such as fire and air, are thrust into the interstices of the larger, each of them penetrating according to their rarity, and thus all the elements are on their way up and down everywhere and always into their own places. Hence there is a principle of inequality, and therefore of motion, in all time.

In the next place, we may observe that there are different kinds of fire— (1) flame, (2) light that burns not, (3) the red heat of the embers of fire. And there are varieties of air, as for example, the pure aether, the opaque mist, and other nameless forms. Water, again, is of two kinds, liquid and fusile. The liquid is composed of small and unequal particles, the fusile of large and uniform particles and is more solid, but nevertheless melts at the approach of fire, and then spreads upon the earth. When the substance cools, the fire passes into the air, which is displaced, and forces together and condenses the liquid mass. This process is called cooling and congealment. Of the fusile kinds the fairest and heaviest is gold; this is hardened by filtration through rock, and is of a bright yellow colour. A shoot of gold which is darker and denser than the rest is called adamant. Another kind is called copper, which is harder and yet lighter because the interstices are larger than in gold. There is mingled with it a fine and small portion of earth which comes out in the form of rust. These are a few of the conjectures which philosophy forms, when, leaving the eternal nature, she turns for innocent recreation to consider the truths of generation.

Water which is mingled with fire is called liquid because it rolls upon the earth, and soft because its bases give way. This becomes more equable when separated from fire and air, and then congeals into hail or ice, or the looser forms of hoar frost or snow. There are other waters which are called juices and are distilled through plants. Of these we may mention, first, wine, which warms the soul as well as the body; secondly, oily substances, as for example, oil or pitch; thirdly, honey, which relaxes the contracted parts of the mouth and so produces sweetness; fourthly, vegetable acid, which is frothy and has a burning quality and dissolves the flesh. Of the kinds of earth, that which is filtered through water passes into stone; the water is broken up by the earth and escapes in the form of air—this in turn presses upon the mass of earth, and the earth, compressed into an indissoluble union with the remaining water, becomes rock. Rock, when it is made up of equal particles, is fair and transparent, but the reverse when of unequal. Earth is converted into pottery when the watery part is suddenly drawn away; or if moisture remains, the earth, when fused by

fire, becomes, on cooling, a stone of a black colour. When the earth is finer and of a briny nature then two half-solid bodies are formed by separating the water,—soda and salt. The strong compounds of earth and water are not soluble by water, but only by fire. Earth itself, when not consolidated, is dissolved by water; when consolidated, by fire only. The cohesion of water, when strong, is dissolved by fire only; when weak, either by air or fire, the former entering the interstices, the latter penetrating even the triangles. Air when strongly condensed is indissoluble by any power which does not reach the triangles, and even when not strongly condensed is only resolved by fire. Compounds of earth and water are unaffected by water while the water occupies the interstices in them, but begin to liquefy when fire enters into the interstices of the water. They are of two kinds, some of them, like glass, having more earth, others, like wax, having more water in them.

Having considered objects of sense, we now pass on to sensation. But we cannot explain sensation without explaining the nature of flesh and of the mortal soul; and as we cannot treat of both together, in order that we may proceed at once to the sensations we must assume the existence of body and soul.

What makes fire burn? The fineness of the sides, the sharpness of the angles, the smallness of the particles, the quickness of the motion. Moreover, the pyramid, which is the figure of fire, is more cutting than any other. The feeling of cold is produced by the larger particles of moisture outside the body trying to eject the smaller ones in the body which they compress. The struggle which arises between elements thus unnaturally brought together causes shivering. That is hard to which the flesh yields, and soft which yields to the flesh, and these two terms are also relative to one another. The yielding matter is that which has the slenderest base, whereas that which has a rectangular base is compact and repellent. Light and heavy are wrongly explained with reference to a lower and higher in place. For in the universe, which is a sphere, there is no opposition of above or below, and that which is to us above would be below to a man standing at the antipodes. The greater or less difficulty in detaching any element from its like is the real cause of heaviness or of lightness. If you draw the earth into the dissimilar air, the particles of earth cling to their native element, and you more easily detach a small portion than a large. There would be the same difficulty in moving any of the upper elements towards the lower. The smooth and the rough are severally produced by the union of evenness with compactness, and of hardness with inequality.

Pleasure and pain are the most important of the affections common to the whole body. According to our general doctrine of sensation, parts of the body which are easily moved readily transmit the motion to the mind; but parts which are not easily moved have no effect upon the patient. The

bones and hair are of the latter kind, sight and hearing of the former. Ordinary affections are neither pleasant nor painful. The impressions of sight afford an example of these, and are neither violent nor sudden. But sudden replenishments of the body cause pleasure, and sudden disturbances, as for example cuttings and burnings, have the opposite effect.

>From sensations common to the whole body, we proceed to those of particular parts. The affections of the tongue appear to be caused by contraction and dilation, but they have more of roughness or smoothness than is found in other affections. Earthy particles, entering into the small veins of the tongue which reach to the heart, when they melt into and dry up the little veins are astringent if they are rough; or if not so rough, they are only harsh, and if excessively abstergent, like potash and soda, bitter. Purgatives of a weaker sort are called salt and, having no bitterness, are rather agreeable. Inflammatory bodies, which by their lightness are carried up into the head, cutting all that comes in their way, are termed pungent. But when these are refined by putrefaction, and enter the narrow veins of the tongue, and meet there particles of earth and air, two kinds of globules are formed—one of earthy and impure liquid, which boils and ferments, the other of pure and transparent water, which are called bubbles; of all these affections the cause is termed acid. When, on the other hand, the composition of the deliquescent particles is congenial to the tongue, and disposes the parts according to their nature, this remedial power in them is called sweet.

Smells are not divided into kinds; all of them are transitional, and arise out of the decomposition of one element into another, for the simple air or water is without smell. They are vapours or mists, thinner than water and thicker than air: and hence in drawing in the breath, when there is an obstruction, the air passes, but there is no smell. They have no names, but are distinguished as pleasant and unpleasant, and their influence extends over the whole region from the head to the navel.

Hearing is the effect of a stroke which is transmitted through the ears by means of the air, brain, and blood to the soul, beginning at the head and extending to the liver. The sound which moves swiftly is acute; that which moves slowly is grave; that which is uniform is smooth, and the opposite is harsh. Loudness depends on the quantity of the sound. Of the harmony of sounds I will hereafter speak.

Colours are flames which emanate from all bodies, having particles corresponding to the sense of sight. Some of the particles are less and some larger, and some are equal to the parts of the sight. The equal particles appear transparent; the larger contract, and the lesser dilate the sight. White is produced by the dilation, black by the contraction, of the particles of sight. There is also a swifter motion of another sort of fire which forces a way through the passages of the eyes, and elicits from them

a union of fire and water which we call tears. The inner fire flashes forth, and the outer finds a way in and is extinguished in the moisture, and all sorts of colours are generated by the mixture. This affection is termed by us dazzling, and the object which produces it is called bright. There is yet another sort of fire which mingles with the moisture of the eye without flashing, and produces a colour like blood—to this we give the name of red. A bright element mingling with red and white produces a colour which we call auburn. The law of proportion, however, according to which compound colours are formed, cannot be determined scientifically or even probably. Red, when mingled with black and white, gives a purple hue, which becomes umber when the colours are burnt and there is a larger admixture of black. Flame-colour is a mixture of auburn and dun; dun of white and black; yellow of white and auburn. White and bright meeting, and falling upon a full black, become dark blue; dark blue mingling with white becomes a light blue; the union of flame-colour and black makes leek-green. There is no difficulty in seeing how other colours are probably composed. But he who should attempt to test the truth of this by experiment, would forget the difference of the human and divine nature. God only is able to compound and resolve substances; such experiments are impossible to man.

These are the elements of necessity which the Creator received in the world of generation when he made the all-sufficient and perfect creature, using the secondary causes as his ministers, but himself fashioning the good in all things. For there are two sorts of causes, the one divine, the other necessary; and we should seek to discover the divine above all, and, for their sake, the necessary, because without them the higher cannot be attained by us.

Having now before us the causes out of which the rest of our discourse is to be framed, let us go back to the point at which we began, and add a fair ending to our tale. As I said at first, all things were originally a chaos in which there was no order or proportion. The elements of this chaos were arranged by the Creator, and out of them he made the world. Of the divine he himself was the author, but he committed to his offspring the creation of the mortal. From him they received the immortal soul, but themselves made the body to be its vehicle, and constructed within another soul which was mortal, and subject to terrible affections—pleasure, the inciter of evil; pain, which deters from good; rashness and fear, foolish counsellors; anger hard to be appeased; hope easily led astray. These they mingled with irrational sense and all-daring love according to necessary laws and so framed man. And, fearing to pollute the divine element, they gave the mortal soul a separate habitation in the breast, parted off from the head by a narrow isthmus. And as in a house the women's apartments are divided from the men's, the cavity of the thorax was divided into two parts, a higher and a lower. The higher of the two, which is the seat of courage and anger, lies nearer to the head, between the midriff and the

neck, and assists reason in restraining the desires. The heart is the house of guard in which all the veins meet, and through them reason sends her commands to the extremity of her kingdom. When the passions are in revolt, or danger approaches from without, then the heart beats and swells; and the creating powers, knowing this, implanted in the body the soft and bloodless substance of the lung, having a porous and springy nature like a sponge, and being kept cool by drink and air which enters through the trachea.

The part of the soul which desires meat and drink was placed between the midriff and navel, where they made a sort of manger; and here they bound it down, like a wild animal, away from the council-chamber, and leaving the better principle undisturbed to advise quietly for the good of the whole. For the Creator knew that the belly would not listen to reason, and was under the power of idols and fancies. Wherefore he framed the liver to connect with the lower nature, contriving that it should be compact, and bright, and sweet, and also bitter and smooth, in order that the power of thought which originates in the mind might there be reflected, terrifying the belly with the elements of bitterness and gall, and a suffusion of bilious colours when the liver is contracted, and causing pain and misery by twisting out of its place the lobe and closing up the vessels and gates. And the converse happens when some gentle inspiration coming from intelligence mirrors the opposite fancies, giving rest and sweetness and freedom, and at night, moderation and peace accompanied with prophetic insight, when reason and sense are asleep. For the authors of our being, in obedience to their Father's will and in order to make men as good as they could, gave to the liver the power of divination, which is never active when men are awake or in health; but when they are under the influence of some disorder or enthusiasm then they receive intimations, which have to be interpreted by others who are called prophets, but should rather be called interpreters of prophecy; after death these intimations become unintelligible. The spleen which is situated in the neighbourhood, on the left side, keeps the liver bright and clean, as a napkin does a mirror, and the evacuations of the liver are received into it; and being a hollow tissue it is for a time swollen with these impurities, but when the body is purged it returns to its natural size.

The truth concerning the soul can only be established by the word of God. Still, we may venture to assert what is probable both concerning soul and body.

The creative powers were aware of our tendency to excess. And so when they made the belly to be a receptacle for food, in order that men might not perish by insatiable gluttony, they formed the convolutions of the intestines, in this way retarding the passage of food through the body, lest mankind should be absorbed in eating and drinking, and the whole race become impervious to divine philosophy.

The creation of bones and flesh was on this wise. The foundation of these is the marrow which binds together body and soul, and the marrow is made out of such of the primary triangles as are adapted by their perfection to produce all the four elements. These God took and mingled them in due proportion, making as many kinds of marrow as there were hereafter to be kinds of souls. The receptacle of the divine soul he made round, and called that portion of the marrow brain, intending that the vessel containing this substance should be the head. The remaining part he divided into long and round figures, and to these as to anchors, fastening the mortal soul, he proceeded to make the rest of the body, first forming for both parts a covering of bone. The bone was formed by sifting pure smooth earth and wetting it with marrow. It was then thrust alternately into fire and water, and thus rendered insoluble by either. Of bone he made a globe which he placed around the brain, leaving a narrow opening, and around the marrow of the neck and spine he formed the vertebrae, like hinges, which extended from the head through the whole of the trunk. And as the bone was brittle and liable to mortify and destroy the marrow by too great rigidity and susceptibility to heat and cold, he contrived sinews and flesh—the first to give flexibility, the second to guard against heat and cold, and to be a protection against falls, containing a warm moisture, which in summer exudes and cools the body, and in winter is a defence against cold. Having this in view, the Creator mingled earth with fire and water and mixed with them a ferment of acid and salt, so as to form pulpy flesh. But the sinews he made of a mixture of bone and unfermented flesh, giving them a mean nature between the two, and a yellow colour. Hence they were more glutinous than flesh, but softer than bone. The bones which have most of the living soul within them he covered with the thinnest film of flesh, those which have least of it, he lodged deeper. At the joints he diminished the flesh in order not to impede the flexure of the limbs, and also to avoid clogging the perceptions of the mind. About the thighs and arms, which have no sense because there is little soul in the marrow, and about the inner bones, he laid the flesh thicker. For where the flesh is thicker there is less feeling, except in certain parts which the Creator has made solely of flesh, as for example, the tongue. Had the combination of solid bone and thick flesh been consistent with acute perceptions, the Creator would have given man a sinewy and fleshy head, and then he would have lived twice as long. But our creators were of opinion that a shorter life which was better was preferable to a longer which was worse, and therefore they covered the head with thin bone, and placed the sinews at the extremity of the head round the neck, and fastened the jawbones to them below the face. And they framed the mouth, having teeth and tongue and lips, with a view to the necessary and the good; for food is a necessity, and the river of speech is the best of rivers. Still, the head could not be left a bare globe of bone on account of the extremes of heat and cold, nor be allowed to become dull and senseless by an overgrowth of flesh. Wherefore it was covered by a peel or skin

which met and grew by the help of the cerebral humour. The diversity of the sutures was caused by the struggle of the food against the courses of the soul. The skin of the head was pierced by fire, and out of the punctures came forth a moisture, part liquid, and part of a skinny nature, which was hardened by the pressure of the external cold and became hair. And God gave hair to the head of man to be a light covering, so that it might not interfere with his perceptions. Nails were formed by combining sinew, skin, and bone, and were made by the creators with a view to the future when, as they knew, women and other animals who would require them would be framed out of man.

The gods also mingled natures akin to that of man with other forms and perceptions. Thus trees and plants were created, which were originally wild and have been adapted by cultivation to our use. They partake of that third kind of life which is seated between the midriff and the navel, and is altogether passive and incapable of reflection.

When the creators had furnished all these natures for our sustenance, they cut channels through our bodies as in a garden, watering them with a perennial stream. Two were cut down the back, along the back bone, where the skin and flesh meet, one on the right and the other on the left, having the marrow of generation between them. In the next place, they divided the veins about the head and interlaced them with each other in order that they might form an additional link between the head and the body, and that the sensations from both sides might be diffused throughout the body. In the third place, they contrived the passage of liquids, which may be explained in this way:—Finer bodies retain coarser, but not the coarser the finer, and the belly is capable of retaining food, but not fire and air. God therefore formed a network of fire and air to irrigate the veins, having within it two lesser nets, and stretched cords reaching from both the lesser nets to the extremity of the outer net. The inner parts of the net were made by him of fire, the lesser nets and their cavities of air. The two latter he made to pass into the mouth; the one ascending by the air-pipes from the lungs, the other by the side of the air-pipes from the belly. The entrance to the first he divided into two parts, both of which he made to meet at the channels of the nose, that when the mouth was closed the passage connected with it might still be fed with air. The cavity of the network he spread around the hollows of the body, making the entire receptacle to flow into and out of the lesser nets and the lesser nets into and out of it, while the outer net found a way into and out of the pores of the body, and the internal heat followed the air to and fro. These, as we affirm, are the phenomena of respiration. And all this process takes place in order that the body may be watered and cooled and nourished, and the meat and drink digested and liquefied and carried into the veins.

The causes of respiration have now to be considered. The exhalation of the breath through the mouth and nostrils displaces the external air, and at

the same time leaves a vacuum into which through the pores the air which is displaced enters. Also the vacuum which is made when the air is exhaled through the pores is filled up by the inhalation of breath through the mouth and nostrils. The explanation of this double phenomenon is as follows:—Elements move towards their natural places. Now as every animal has within him a fountain of fire, the air which is inhaled through the mouth and nostrils, on coming into contact with this, is heated; and when heated, in accordance with the law of attraction, it escapes by the way it entered toward the place of fire. On leaving the body it is cooled and drives round the air which it displaces through the pores into the empty lungs. This again is in turn heated by the internal fire and escapes, as it entered, through the pores.

The phenomena of medical cupping-glasses, of swallowing, and of the hurling of bodies, are to be explained on a similar principle; as also sounds, which are sometimes discordant on account of the inequality of them, and again harmonious by reason of equality. The slower sounds reaching the swifter, when they begin to pause, by degrees assimilate with them: whence arises a pleasure which even the unwise feel, and which to the wise becomes a higher sense of delight, being an imitation of divine harmony in mortal motions. Streams flow, lightnings play, amber and the magnet attract, not by reason of attraction, but because 'nature abhors a vacuum,' and because things, when compounded or dissolved, move different ways, each to its own place.

I will now return to the phenomena of respiration. The fire, entering the belly, minces the food, and as it escapes, fills the veins by drawing after it the divided portions, and thus the streams of nutriment are diffused through the body. The fruits or herbs which are our daily sustenance take all sorts of colours when intermixed, but the colour of red or fire predominates, and hence the liquid which we call blood is red, being the nurturing principle of the body, whence all parts are watered and empty places filled.

The process of repletion and depletion is produced by the attraction of like to like, after the manner of the universal motion. The external elements by their attraction are always diminishing the substance of the body: the particles of blood, too, formed out of the newly digested food, are attracted towards kindred elements within the body and so fill up the void. When more is taken away than flows in, then we decay; and when less, we grow and increase.

The young of every animal has the triangles new and closely locked together, and yet the entire frame is soft and delicate, being newly made of marrow and nurtured on milk. These triangles are sharper than those which enter the body from without in the shape of food, and therefore they cut them up. But as life advances, the triangles wear out and are no longer able to assimilate food; and at length, when the bonds which unite

the triangles of the marrow become undone, they in turn unloose the bonds of the soul; and if the release be according to nature, she then flies away with joy. For the death which is natural is pleasant, but that which is caused by violence is painful.

Every one may understand the origin of diseases. They may be occasioned by the disarrangement or disproportion of the elements out of which the body is framed. This is the origin of many of them, but the worst of all owe their severity to the following causes: There is a natural order in the human frame according to which the flesh and sinews are made of blood, the sinews out of the fibres, and the flesh out of the congealed substance which is formed by separation from the fibres. The glutinous matter which comes away from the sinews and the flesh, not only binds the flesh to the bones, but nourishes the bones and waters the marrow. When these processes take place in regular order the body is in health.

But when the flesh wastes and returns into the veins there is discoloured blood as well as air in the veins, having acid and salt qualities, from which is generated every sort of phlegm and bile. All things go the wrong way and cease to give nourishment to the body, no longer preserving their natural courses, but at war with themselves and destructive to the constitution of the body. The oldest part of the flesh which is hard to decompose blackens from long burning, and from being corroded grows bitter, and as the bitter element refines away, becomes acid. When tinged with blood the bitter substance has a red colour, and this when mixed with black takes the hue of grass; or again, the bitter substance has an auburn colour, when new flesh is decomposed by the internal flame. To all which phenomena some physician or philosopher who was able to see the one in many has given the name of bile. The various kinds of bile have names answering to their colours. Lymph or serum is of two kinds: first, the whey of blood, which is gentle; secondly, the secretion of dark and bitter bile, which, when mingled under the influence of heat with salt, is malignant and is called acid phlegm. There is also white phlegm, formed by the decomposition of young and tender flesh, and covered with little bubbles, separately invisible, but becoming visible when collected. The water of tears and perspiration and similar substances is also the watery part of fresh phlegm. All these humours become sources of disease when the blood is replenished in irregular ways and not by food or drink. The danger, however, is not so great when the foundation remains, for then there is a possibility of recovery. But when the substance which unites the flesh and bones is diseased, and is no longer renewed from the muscles and sinews, and instead of being oily and smooth and glutinous becomes rough and salt and dry, then the fleshy parts fall away and leave the sinews bare and full of brine, and the flesh gets back again into the circulation of the blood, and makes the previously mentioned disorders still greater. There are other and worse diseases which are prior to these; as when the bone through the density of the flesh does not receive sufficient air, and

becomes stagnant and gangrened, and crumbling away passes into the food, and the food into the flesh, and the flesh returns again into the blood. Worst of all and most fatal is the disease of the marrow, by which the whole course of the body is reversed. There is a third class of diseases which are produced, some by wind and some by phlegm and some by bile. When the lung, which is the steward of the air, is obstructed, by rheums, and in one part no air, and in another too much, enters in, then the parts which are unrefreshed by air corrode, and other parts are distorted by the excess of air; and in this manner painful diseases are produced. The most painful are caused by wind generated within the body, which gets about the great sinews of the shoulders—these are termed tetanus. The cure of them is difficult, and in most cases they are relieved only by fever. White phlegm, which is dangerous if kept in, by reason of the air bubbles, is not equally dangerous if able to escape through the pores, although it variegates the body, generating diverse kinds of leprosy. If, when mingled with black bile, it disturbs the courses of the head in sleep, there is not so much danger; but if it assails those who are awake, then the attack is far more dangerous, and is called epilepsy or the sacred disease. Acid and salt phlegm is the source of catarrh.

Inflammations originate in bile, which is sometimes relieved by boils and swellings, but when detained, and above all when mingled with pure blood, generates many inflammatory disorders, disturbing the position of the fibres which are scattered about in the blood in order to maintain the balance of rare and dense which is necessary to its regular circulation. If the bile, which is only stale blood, or liquefied flesh, comes in little by little, it is congealed by the fibres and produces internal cold and shuddering. But when it enters with more of a flood it overcomes the fibres by its heat and reaches the spinal marrow, and burning up the cables of the soul sets her free from the body. When on the other hand the body, though wasted, still holds out, then the bile is expelled, like an exile from a factious state, causing associating diarrhoeas and dysenteries and similar disorders. The body which is diseased from the effects of fire is in a continual fever; when air is the agent, the fever is quotidian; when water, the fever intermits a day; when earth, which is the most sluggish element, the fever intermits three days and is with difficulty shaken off.

Of mental disorders there are two sorts, one madness, the other ignorance, and they may be justly attributed to disease. Excessive pleasures or pains are among the greatest diseases, and deprive men of their senses. When the seed about the spinal marrow is too abundant, the body has too great pleasures and pains; and during a great part of his life he who is the subject of them is more or less mad. He is often thought bad, but this is a mistake; for the truth is that the intemperance of lust is due to the fluidity of the marrow produced by the loose consistency of the bones. And this is true of vice in general, which is commonly regarded as disgraceful, whereas it is really involuntary and arises from a bad habit of

the body and evil education. In like manner the soul is often made vicious by the influence of bodily pain; the briny phlegm and other bitter and bilious humours wander over the body and find no exit, but are compressed within, and mingle their own vapours with the motions of the soul, and are carried to the three places of the soul, creating infinite varieties of trouble and melancholy, of rashness and cowardice, of forgetfulness and stupidity. When men are in this evil plight of body, and evil forms of government and evil discourses are superadded, and there is no education to save them, they are corrupted through two causes; but of neither of them are they really the authors. For the planters are to blame rather than the plants, the educators and not the educated. Still, we should endeavour to attain virtue and avoid vice; but this is part of another subject.

Enough of disease—I have now to speak of the means by which the mind and body are to be preserved, a higher theme than the other. The good is the beautiful, and the beautiful is the symmetrical, and there is no greater or fairer symmetry than that of body and soul, as the contrary is the greatest of deformities. A leg or an arm too long or too short is at once ugly and unserviceable, and the same is true if body and soul are disproportionate. For a strong and impassioned soul may ‘fret the pigmy body to decay,’ and so produce convulsions and other evils. The violence of controversy, or the earnestness of enquiry, will often generate inflammations and rheums which are not understood, or assigned to their true cause by the professors of medicine. And in like manner the body may be too much for the soul, darkening the reason, and quickening the animal desires. The only security is to preserve the balance of the two, and to this end the mathematician or philosopher must practise gymnastics, and the gymnast must cultivate music. The parts of the body too must be treated in the same way—they should receive their appropriate exercise. For the body is set in motion when it is heated and cooled by the elements which enter in, or is dried up and moistened by external things; and, if given up to these processes when at rest, it is liable to destruction. But the natural motion, as in the world, so also in the human frame, produces harmony and divides hostile powers. The best exercise is the spontaneous motion of the body, as in gymnastics, because most akin to the motion of mind; not so good is the motion of which the source is in another, as in sailing or riding; least good when the body is at rest and the motion is in parts only, which is a species of motion imparted by physic. This should only be resorted to by men of sense in extreme cases; lesser diseases are not to be irritated by medicine. For every disease is akin to the living being and has an appointed term, just as life has, which depends on the form of the triangles, and cannot be protracted when they are worn out. And he who, instead of accepting his destiny, endeavours to prolong his life by medicine, is likely to multiply and magnify his diseases. Regimen and not medicine is the true cure, when a man has time at his disposal.

Enough of the nature of man and of the body, and of training and education. The subject is a great one and cannot be adequately treated as an appendage to another. To sum up all in a word: there are three kinds of soul located within us, and any one of them, if remaining inactive, becomes very weak; if exercised, very strong. Wherefore we should duly train and exercise all three kinds.

The divine soul God lodged in the head, to raise us, like plants which are not of earthly origin, to our kindred; for the head is nearest to heaven. He who is intent upon the gratification of his desires and cherishes the mortal soul, has all his ideas mortal, and is himself mortal in the truest sense. But he who seeks after knowledge and exercises the divine part of himself in godly and immortal thoughts, attains to truth and immortality, as far as is possible to man, and also to happiness, while he is training up within him the divine principle and indwelling power of order. There is only one way in which one person can benefit another; and that is by assigning to him his proper nurture and motion. To the motions of the soul answer the motions of the universe, and by the study of these the individual is restored to his original nature.

Thus we have finished the discussion of the universe, which, according to our original intention, has now been brought down to the creation of man. Completeness seems to require that something should be briefly said about other animals: first of women, who are probably degenerate and cowardly men. And when they degenerated, the gods implanted in men the desire of union with them, creating in man one animate substance and in woman another in the following manner:—The outlet for liquids they connected with the living principle of the spinal marrow, which the man has the desire to emit into the fruitful womb of the woman; this is like a fertile field in which the seed is quickened and matured, and at last brought to light. When this desire is unsatisfied the man is over-mastered by the power of the generative organs, and the woman is subjected to disorders from the obstruction of the passages of the breath, until the two meet and pluck the fruit of the tree.

The race of birds was created out of innocent, light-minded men, who thought to pursue the study of the heavens by sight; these were transformed into birds, and grew feathers instead of hair. The race of wild animals were men who had no philosophy, and never looked up to heaven or used the courses of the head, but followed only the influences of passion. Naturally they turned to their kindred earth, and put their forelegs to the ground, and their heads were crushed into strange oblong forms. Some of them have four feet, and some of them more than four,—the latter, who are the more senseless, drawing closer to their native element; the most senseless of all have no limbs and trail their whole body on the ground. The fourth kind are the inhabitants of the waters; these are made out of the most senseless and ignorant and impure

of men, whom God placed in the uttermost parts of the world in return for their utter ignorance, and caused them to respire water instead of the pure element of air. Such are the laws by which animals pass into one another.

And so the world received animals, mortal and immortal, and was fulfilled with them, and became a visible God, comprehending the visible, made in the image of the Intellectual, being the one perfect only-begotten heaven.

Section 2.

Nature in the aspect which she presented to a Greek philosopher of the fourth century before Christ is not easily reproduced to modern eyes. The associations of mythology and poetry have to be added, and the unconscious influence of science has to be subtracted, before we can behold the heavens or the earth as they appeared to the Greek. The philosopher himself was a child and also a man—a child in the range of his attainments, but also a great intelligence having an insight into nature, and often anticipations of the truth. He was full of original thoughts, and yet liable to be imposed upon by the most obvious fallacies. He occasionally confused numbers with ideas, and atoms with numbers; his a priori notions were out of all proportion to his experience. He was ready to explain the phenomena of the heavens by the most trivial analogies of earth. The experiments which nature worked for him he sometimes accepted, but he never tried experiments for himself which would either prove or disprove his theories. His knowledge was unequal; while in some branches, such as medicine and astronomy, he had made considerable proficiency, there were others, such as chemistry, electricity, mechanics, of which the very names were unknown to him. He was the natural enemy of mythology, and yet mythological ideas still retained their hold over him. He was endeavouring to form a conception of principles, but these principles or ideas were regarded by him as real powers or entities, to which the world had been subjected. He was always tending to argue from what was near to what was remote, from what was known to what was unknown, from man to the universe, and back again from the universe to man. While he was arranging the world, he was arranging the forms of thought in his own mind; and the light from within and the light from without often crossed and helped to confuse one another. He might be compared to a builder engaged in some great design, who could only dig with his hands because he was unprovided with common tools; or to some poet or musician, like Tynnichus (Ion), obliged to accommodate his lyric raptures to the limits of the tetrachord or of the flute.

The Hesiodic and Orphic cosmogonies were a phase of thought intermediate between mythology and philosophy and had a great influence on the beginnings of knowledge. There was nothing behind them; they were to physical science what the poems of Homer were to early Greek history. They made men think of the world as a whole; they

carried the mind back into the infinity of past time; they suggested the first observation of the effects of fire and water on the earth's surface. To the ancient physics they stood much in the same relation which geology does to modern science. But the Greek was not, like the enquirer of the last generation, confined to a period of six thousand years; he was able to speculate freely on the effects of infinite ages in the production of physical phenomena. He could imagine cities which had existed time out of mind (States.; Laws), laws or forms of art and music which had lasted, 'not in word only, but in very truth, for ten thousand years' (Laws); he was aware that natural phenomena like the Delta of the Nile might have slowly accumulated in long periods of time (Hdt.). But he seems to have supposed that the course of events was recurring rather than progressive. To this he was probably led by the fixedness of Egyptian customs and the general observation that there were other civilisations in the world more ancient than that of Hellas.

The ancient philosophers found in mythology many ideas which, if not originally derived from nature, were easily transferred to her—such, for example, as love or hate, corresponding to attraction or repulsion; or the conception of necessity allied both to the regularity and irregularity of nature; or of chance, the nameless or unknown cause; or of justice, symbolizing the law of compensation; are of the Fates and Furies, typifying the fixed order or the extraordinary convulsions of nature. Their own interpretations of Homer and the poets were supposed by them to be the original meaning. Musing in themselves on the phenomena of nature, they were relieved at being able to utter the thoughts of their hearts in figures of speech which to them were not figures, and were already consecrated by tradition. Hesiod and the Orphic poets moved in a region of half-personification in which the meaning or principle appeared through the person. In their vaster conceptions of Chaos, Erebus, Aether, Night, and the like, the first rude attempts at generalization are dimly seen. The Gods themselves, especially the greater Gods, such as Zeus, Poseidon, Apollo, Athene, are universals as well as individuals. They were gradually becoming lost in a common conception of mind or God. They continued to exist for the purposes of ritual or of art; but from the sixth century onwards or even earlier there arose and gained strength in the minds of men the notion of 'one God, greatest among Gods and men, who was all sight, all hearing, all knowing' (Xenophanes).

Under the influence of such ideas, perhaps also deriving from the traditions of their own or of other nations scraps of medicine and astronomy, men came to the observation of nature. The Greek philosopher looked at the blue circle of the heavens and it flashed upon him that all things were one; the tumult of sense abated, and the mind found repose in the thought which former generations had been striving to realize. The first expression of this was some element, rarefied by degrees into a pure abstraction, and purged from any tincture of sense. Soon an inner world of

ideas began to be unfolded, more absorbing, more overpowering, more abiding than the brightest of visible objects, which to the eye of the philosopher looking inward, seemed to pale before them, retaining only a faint and precarious existence. At the same time, the minds of men parted into the two great divisions of those who saw only a principle of motion, and of those who saw only a principle of rest, in nature and in themselves; there were born Heracliteans or Eleatics, as there have been in later ages born Aristotelians or Platonists. Like some philosophers in modern times, who are accused of making a theory first and finding their facts afterwards, the advocates of either opinion never thought of applying either to themselves or to their adversaries the criterion of fact. They were mastered by their ideas and not masters of them. Like the Heraclitean fanatics whom Plato has ridiculed in the Theaetetus, they were incapable of giving a reason of the faith that was in them, and had all the animosities of a religious sect. Yet, doubtless, there was some first impression derived from external nature, which, as in mythology, so also in philosophy, worked upon the minds of the first thinkers. Though incapable of induction or generalization in the modern sense, they caught an inspiration from the external world. The most general facts or appearances of nature, the circle of the universe, the nutritive power of water, the air which is the breath of life, the destructive force of fire, the seeming regularity of the greater part of nature and the irregularity of a remnant, the recurrence of day and night and of the seasons, the solid earth and the impalpable aether, were always present to them.

The great source of error and also the beginning of truth to them was reasoning from analogy; they could see resemblances, but not differences; and they were incapable of distinguishing illustration from argument. Analogy in modern times only points the way, and is immediately verified by experiment. The dreams and visions, which pass through the philosopher's mind, of resemblances between different classes of substances, or between the animal and vegetable world, are put into the refiner's fire, and the dross and other elements which adhere to them are purged away. But the contemporary of Plato and Socrates was incapable of resisting the power of any analogy which occurred to him, and was drawn into any consequences which seemed to follow. He had no methods of difference or of concomitant variations, by the use of which he could distinguish the accidental from the essential. He could not isolate phenomena, and he was helpless against the influence of any word which had an equivocal or double sense.

Yet without this crude use of analogy the ancient physical philosopher would have stood still; he could not have made even 'one guess among many' without comparison. The course of natural phenomena would have passed unheeded before his eyes, like fair sights or musical sounds before the eyes and ears of an animal. Even the fetichism of the savage is the beginning of reasoning; the assumption of the most fanciful of causes

indicates a higher mental state than the absence of all enquiry about them. The tendency to argue from the higher to the lower, from man to the world, has led to many errors, but has also had an elevating influence on philosophy. The conception of the world as a whole, a person, an animal, has been the source of hasty generalizations; yet this general grasp of nature led also to a spirit of comprehensiveness in early philosophy, which has not increased, but rather diminished, as the fields of knowledge have become more divided. The modern physicist confines himself to one or perhaps two branches of science. But he comparatively seldom rises above his own department, and often falls under the narrowing influence which any single branch, when pursued to the exclusion of every other, has over the mind. Language, too, exercised a spell over the beginnings of physical philosophy, leading to error and sometimes to truth; for many thoughts were suggested by the double meanings of words (Greek), and the accidental distinctions of words sometimes led the ancient philosopher to make corresponding differences in things (Greek). 'If they are the same, why have they different names; or if they are different, why have they the same name?'—is an argument not easily answered in the infancy of knowledge. The modern philosopher has always been taught the lesson which he still imperfectly learns, that he must disengage himself from the influence of words. Nor are there wanting in Plato, who was himself too often the victim of them, impressive admonitions that we should regard not words but things (States.). But upon the whole, the ancients, though not entirely dominated by them, were much more subject to the influence of words than the moderns. They had no clear divisions of colours or substances; even the four elements were undefined; the fields of knowledge were not parted off. They were bringing order out of disorder, having a small grain of experience mingled in a confused heap of a priori notions. And yet, probably, their first impressions, the illusions and mirages of their fancy, created a greater intellectual activity and made a nearer approach to the truth than any patient investigation of isolated facts, for which the time had not yet come, could have accomplished.

There was one more illusion to which the ancient philosophers were subject, and against which Plato in his later dialogues seems to be struggling—the tendency to mere abstractions; not perceiving that pure abstraction is only negation, they thought that the greater the abstraction the greater the truth. Behind any pair of ideas a new idea which comprehended them—the (Greek), as it was technically termed—began at once to appear. Two are truer than three, one than two. The words 'being,' or 'unity,' or 'essence,' or 'good,' became sacred to them. They did not see that they had a word only, and in one sense the most unmeaning of words. They did not understand that the content of notions is in inverse proportion to their universality—the element which is the most widely diffused is also the thinnest; or, in the language of the common logic, the greater the extension the less the comprehension. But this vacant idea of a whole without parts, of a subject without predicates, a rest without

motion, has been also the most fruitful of all ideas. It is the beginning of a priori thought, and indeed of thinking at all. Men were led to conceive it, not by a love of hasty generalization, but by a divine instinct, a dialectical enthusiasm, in which the human faculties seemed to yearn for enlargement. We know that 'being' is only the verb of existence, the copula, the most general symbol of relation, the first and most meagre of abstractions; but to some of the ancient philosophers this little word appeared to attain divine proportions, and to comprehend all truth. Being or essence, and similar words, represented to them a supreme or divine being, in which they thought that they found the containing and continuing principle of the universe. In a few years the human mind was peopled with abstractions; a new world was called into existence to give law and order to the old. But between them there was still a gulf, and no one could pass from the one to the other.

Number and figure were the greatest instruments of thought which were possessed by the Greek philosopher; having the same power over the mind which was exerted by abstract ideas, they were also capable of practical application. Many curious and, to the early thinker, mysterious properties of them came to light when they were compared with one another. They admitted of infinite multiplication and construction; in Pythagorean triangles or in proportions of 1:2:4:8 and 1:3:9:27, or compounds of them, the laws of the world seemed to be more than half revealed. They were also capable of infinite subdivision—a wonder and also a puzzle to the ancient thinker (Rep.). They were not, like being or essence, mere vacant abstractions, but admitted of progress and growth, while at the same time they confirmed a higher sentiment of the mind, that there was order in the universe. And so there began to be a real sympathy between the world within and the world without. The numbers and figures which were present to the mind's eye became visible to the eye of sense; the truth of nature was mathematics; the other properties of objects seemed to reappear only in the light of number. Law and morality also found a natural expression in number and figure. Instruments of such power and elasticity could not fail to be 'a most gracious assistance' to the first efforts of human intelligence.

There was another reason why numbers had so great an influence over the minds of early thinkers—they were verified by experience. Every use of them, even the most trivial, assured men of their truth; they were everywhere to be found, in the least things and the greatest alike. One, two, three, counted on the fingers was a 'trivial matter (Rep.), a little instrument out of which to create a world; but from these and by the help of these all our knowledge of nature has been developed. They were the measure of all things, and seemed to give law to all things; nature was rescued from chaos and confusion by their power; the notes of music, the motions of the stars, the forms of atoms, the evolution and recurrence of days, months, years, the military divisions of an army, the civil divisions of

a state, seemed to afford a 'present witness' of them—what would have become of man or of the world if deprived of number (Rep.)? The mystery of number and the mystery of music were akin. There was a music of rhythm and of harmonious motion everywhere; and to the real connexion which existed between music and number, a fanciful or imaginary relation was superadded. There was a music of the spheres as well as of the notes of the lyre. If in all things seen there was number and figure, why should they not also pervade the unseen world, with which by their wonderful and unchangeable nature they seemed to hold communion?

Two other points strike us in the use which the ancient philosophers made of numbers. First, they applied to external nature the relations of them which they found in their own minds; and where nature seemed to be at variance with number, as for example in the case of fractions, they protested against her (Rep.; Arist. Metaph.). Having long meditated on the properties of 1:2:4:8, or 1:3:9:27, or of 3, 4, 5, they discovered in them many curious correspondences and were disposed to find in them the secret of the universe. Secondly, they applied number and figure equally to those parts of physics, such as astronomy or mechanics, in which the modern philosopher expects to find them, and to those in which he would never think of looking for them, such as physiology and psychology. For the sciences were not yet divided, and there was nothing really irrational in arguing that the same laws which regulated the heavenly bodies were partially applied to the erring limbs or brain of man. Astrology was the form which the lively fancy of ancient thinkers almost necessarily gave to astronomy. The observation that the lower principle, e.g. mechanics, is always seen in the higher, e.g. in the phenomena of life, further tended to perplex them. Plato's doctrine of the same and the other ruling the courses of the heavens and of the human body is not a mere vagary, but is a natural result of the state of knowledge and thought at which he had arrived.

When in modern times we contemplate the heavens, a certain amount of scientific truth imperceptibly blends, even with the cursory glance of an unscientific person. He knows that the earth is revolving round the sun, and not the sun around the earth. He does not imagine the earth to be the centre of the universe, and he has some conception of chemistry and the cognate sciences. A very different aspect of nature would have been present to the mind of the early Greek philosopher. He would have beheld the earth a surface only, not mirrored, however faintly, in the glass of science, but indissolubly connected with some theory of one, two, or more elements. He would have seen the world pervaded by number and figure, animated by a principle of motion, immanent in a principle of rest. He would have tried to construct the universe on a quantitative principle, seeming to find in endless combinations of geometrical figures or in the infinite variety of their sizes a sufficient account of the multiplicity of phenomena. To these a priori speculations he would add a rude

conception of matter and his own immediate experience of health and disease. His cosmos would necessarily be imperfect and unequal, being the first attempt to impress form and order on the primaeval chaos of human knowledge. He would see all things as in a dream.

The ancient physical philosophers have been charged by Dr. Whewell and others with wasting their fine intelligences in wrong methods of enquiry; and their progress in moral and political philosophy has been sometimes contrasted with their supposed failure in physical investigations. 'They had plenty of ideas,' says Dr. Whewell, 'and plenty of facts; but their ideas did not accurately represent the facts with which they were acquainted.' This is a very crude and misleading way of describing ancient science. It is the mistake of an uneducated person—uneducated, that is, in the higher sense of the word—who imagines every one else to be like himself and explains every other age by his own. No doubt the ancients often fell into strange and fanciful errors: the time had not yet arrived for the slower and surer path of the modern inductive philosophy. But it remains to be shown that they could have done more in their age and country; or that the contributions which they made to the sciences with which they were acquainted are not as great upon the whole as those made by their successors. There is no single step in astronomy as great as that of the nameless Pythagorean who first conceived the world to be a body moving round the sun in space: there is no truer or more comprehensive principle than the application of mathematics alike to the heavenly bodies, and to the particles of matter. The ancients had not the instruments which would have enabled them to correct or verify their anticipations, and their opportunities of observation were limited. Plato probably did more for physical science by asserting the supremacy of mathematics than Aristotle or his disciples by their collections of facts. When the thinkers of modern times, following Bacon, undervalue or disparage the speculations of ancient philosophers, they seem wholly to forget the conditions of the world and of the human mind, under which they carried on their investigations. When we accuse them of being under the influence of words, do we suppose that we are altogether free from this illusion? When we remark that Greek physics soon became stationary or extinct, may we not observe also that there have been and may be again periods in the history of modern philosophy which have been barren and unproductive? We might as well maintain that Greek art was not real or great, because it had *nihil simile aut secundum*, as say that Greek physics were a failure because they admire no subsequent progress.

The charge of premature generalization which is often urged against ancient philosophers is really an anachronism. For they can hardly be said to have generalized at all. They may be said more truly to have cleared up and defined by the help of experience ideas which they already possessed. The beginnings of thought about nature must always have this character. A true method is the result of many ages of experiment and observation,

and is ever going on and enlarging with the progress of science and knowledge. At first men personify nature, then they form impressions of nature, at last they conceive 'measure' or laws of nature. They pass out of mythology into philosophy. Early science is not a process of discovery in the modern sense; but rather a process of correcting by observation, and to a certain extent only, the first impressions of nature, which mankind, when they began to think, had received from poetry or language or unintelligent sense. Of all scientific truths the greatest and simplest is the uniformity of nature; this was expressed by the ancients in many ways, as fate, or necessity, or measure, or limit. Unexpected events, of which the cause was unknown to them, they attributed to chance (Thucyd.). But their conception of nature was never that of law interrupted by exceptions,—a somewhat unfortunate metaphysical invention of modern times, which is at variance with facts and has failed to satisfy the requirements of thought.

Section 3.

Plato's account of the soul is partly mythical or figurative, and partly literal. Not that either he or we can draw a line between them, or say, 'This is poetry, this is philosophy'; for the transition from the one to the other is imperceptible. Neither must we expect to find in him absolute consistency. He is apt to pass from one level or stage of thought to another without always making it apparent that he is changing his ground. In such passages we have to interpret his meaning by the general spirit of his writings. To reconcile his inconsistencies would be contrary to the first principles of criticism and fatal to any true understanding of him.

There is a further difficulty in explaining this part of the *Timaeus*—the natural order of thought is inverted. We begin with the most abstract, and proceed from the abstract to the concrete. We are searching into things which are upon the utmost limit of human intelligence, and then of a sudden we fall rather heavily to the earth. There are no intermediate steps which lead from one to the other. But the abstract is a vacant form to us until brought into relation with man and nature. God and the world are mere names, like the Being of the Eleatics, unless some human qualities are added on to them. Yet the negation has a kind of unknown meaning to us. The priority of God and of the world, which he is imagined to have created, to all other existences, gives a solemn awe to them. And as in other systems of theology and philosophy, that of which we know least has the greatest interest to us.

There is no use in attempting to define or explain the first God in the Platonic system, who has sometimes been thought to answer to God the Father; or the world, in whom the Fathers of the Church seemed to recognize 'the firstborn of every creature.' Nor need we discuss at length how far Plato agrees in the later Jewish idea of creation, according to

which God made the world out of nothing. For his original conception of matter as something which has no qualities is really a negation. Moreover in the Hebrew Scriptures the creation of the world is described, even more explicitly than in the *Timaeus*, not as a single act, but as a work or process which occupied six days. There is a chaos in both, and it would be untrue to say that the Greek, any more than the Hebrew, had any definite belief in the eternal existence of matter. The beginning of things vanished into the distance. The real creation began, not with matter, but with ideas. According to Plato in the *Timaeus*, God took of the same and the other, of the divided and undivided, of the finite and infinite, and made essence, and out of the three combined created the soul of the world. To the soul he added a body formed out of the four elements. The general meaning of these words is that God imparted determinations of thought, or, as we might say, gave law and variety to the material universe. The elements are moving in a disorderly manner before the work of creation begins; and there is an eternal pattern of the world, which, like the 'idea of good,' is not the Creator himself, but not separable from him. The pattern too, though eternal, is a creation, a world of thought prior to the world of sense, which may be compared to the wisdom of God in the book of *Ecclesiasticus*, or to the 'God in the form of a globe' of the old Eleatic philosophers. The visible, which already exists, is fashioned in the likeness of this eternal pattern. On the other hand, there is no truth of which Plato is more firmly convinced than of the priority of the soul to the body, both in the universe and in man. So inconsistent are the forms in which he describes the works which no tongue can utter—his language, as he himself says, partaking of his own uncertainty about the things of which he is speaking.

We may remark in passing, that the Platonic compared with the Jewish description of the process of creation has less of freedom or spontaneity. The Creator in Plato is still subject to a remnant of necessity which he cannot wholly overcome. When his work is accomplished he remains in his own nature. Plato is more sensible than the Hebrew prophet of the existence of evil, which he seeks to put as far as possible out of the way of God. And he can only suppose this to be accomplished by God retiring into himself and committing the lesser works of creation to inferior powers. (Compare, however, *Laws* for another solution of the difficulty.)

Nor can we attach any intelligible meaning to his words when he speaks of the visible being in the image of the invisible. For how can that which is divided be like that which is undivided? Or that which is changing be the copy of that which is unchanging? All the old difficulties about the ideas come back upon us in an altered form. We can imagine two worlds, one of which is the mere double of the other, or one of which is an imperfect copy of the other, or one of which is the vanishing ideal of the other; but we cannot imagine an intellectual world which has no qualities—'a thing in itself'—a point which has no parts or magnitude, which is nowhere, and

nothing. This cannot be the archetype according to which God made the world, and is in reality, whether in Plato or in Kant, a mere negative residuum of human thought.

There is another aspect of the same difficulty which appears to have no satisfactory solution. In what relation does the archetype stand to the Creator himself? For the idea or pattern of the world is not the thought of God, but a separate, self-existent nature, of which creation is the copy. We can only reply, (1) that to the mind of Plato subject and object were not yet distinguished; (2) that he supposes the process of creation to take place in accordance with his own theory of ideas; and as we cannot give a consistent account of the one, neither can we of the other. He means (3) to say that the creation of the world is not a material process of working with legs and arms, but ideal and intellectual; according to his own fine expression, 'the thought of God made the God that was to be.' He means (4) to draw an absolute distinction between the invisible or unchangeable which is or is the place of mind or being, and the world of sense or becoming which is visible and changing. He means (5) that the idea of the world is prior to the world, just as the other ideas are prior to sensible objects; and like them may be regarded as eternal and self-existent, and also, like the IDEA of good, may be viewed apart from the divine mind.

There are several other questions which we might ask and which can receive no answer, or at least only an answer of the same kind as the preceding. How can matter be conceived to exist without form? Or, how can the essences or forms of things be distinguished from the eternal ideas, or essence itself from the soul? Or, how could there have been motion in the chaos when as yet time was not? Or, how did chaos come into existence, if not by the will of the Creator? Or, how could there have been a time when the world was not, if time was not? Or, how could the Creator have taken portions of an indivisible same? Or, how could space or anything else have been eternal when time is only created? Or, how could the surfaces of geometrical figures have formed solids? We must reply again that we cannot follow Plato in all his inconsistencies, but that the gaps of thought are probably more apparent to us than to him. He would, perhaps, have said that 'the first things are known only to God and to him of men whom God loves.' How often have the gaps in Theology been concealed from the eye of faith! And we may say that only by an effort of metaphysical imagination can we hope to understand Plato from his own point of view; we must not ask for consistency. Everywhere we find traces of the Platonic theory of knowledge expressed in an objective form, which by us has to be translated into the subjective, before we can attach any meaning to it. And this theory is exhibited in so many different points of view, that we cannot with any certainty interpret one dialogue by another; e.g. the *Timaeus* by the *Parmenides* or *Phaedrus* or *Philebus*.

The soul of the world may also be conceived as the personification of the

numbers and figures in which the heavenly bodies move. Imagine these as in a Pythagorean dream, stripped of qualitative difference and reduced to mathematical abstractions. They too conform to the principle of the same, and may be compared with the modern conception of laws of nature. They are in space, but not in time, and they are the makers of time. They are represented as constantly thinking of the same; for thought in the view of Plato is equivalent to truth or law, and need not imply a human consciousness, a conception which is familiar enough to us, but has no place, hardly even a name, in ancient Greek philosophy. To this principle of the same is opposed the principle of the other—the principle of irregularity and disorder, of necessity and chance, which is only partially impressed by mathematical laws and figures. (We may observe by the way, that the principle of the other, which is the principle of plurality and variation in the *Timaeus*, has nothing in common with the ‘other’ of the Sophist, which is the principle of determination.) The element of the same dominates to a certain extent over the other—the fixed stars keep the ‘wanderers’ of the inner circle in their courses, and a similar principle of fixedness or order appears to regulate the bodily constitution of man. But there still remains a rebellious seed of evil derived from the original chaos, which is the source of disorder in the world, and of vice and disease in man.

But what did Plato mean by essence, (Greek), which is the intermediate nature compounded of the Same and the Other, and out of which, together with these two, the soul of the world is created? It is difficult to explain a process of thought so strange and unaccustomed to us, in which modern distinctions run into one another and are lost sight of. First, let us consider once more the meaning of the Same and the Other. The Same is the unchanging and indivisible, the heaven of the fixed stars, partaking of the divine nature, which, having law in itself, gives law to all besides and is the element of order and permanence in man and on the earth. It is the rational principle, mind regarded as a work, as creation—not as the creator. The old tradition of Parmenides and of the Eleatic Being, the foundation of so much in the philosophy of Greece and of the world, was lingering in Plato’s mind. The Other is the variable or changing element, the residuum of disorder or chaos, which cannot be reduced to order, nor altogether banished, the source of evil, seen in the errors of man and also in the wanderings of the planets, a necessity which protrudes through nature. Of this too there was a shadow in the Eleatic philosophy in the realm of opinion, which, like a mist, seemed to darken the purity of truth in itself.—So far the words of Plato may perhaps find an intelligible meaning. But when he goes on to speak of the Essence which is compounded out of both, the track becomes fainter and we can only follow him with hesitating steps. But still we find a trace reappearing of the teaching of Anaxagoras: ‘All was confusion, and then mind came and arranged things.’ We have already remarked that Plato was not acquainted with the modern distinction of subject and object, and therefore he

sometimes confuses mind and the things of mind—(Greek) and (Greek). By (Greek) he clearly means some conception of the intelligible and the intelligent; it belongs to the class of (Greek). Matter, being, the Same, the eternal,—for any of these terms, being almost vacant of meaning, is equally suitable to express indefinite existence,—are compared or united with the Other or Diverse, and out of the union or comparison is elicited the idea of intelligence, the ‘One in many,’ brighter than any Promethean fire (Phil.), which co-existing with them and so forming a new existence, is or becomes the intelligible world...So we may perhaps venture to paraphrase or interpret or put into other words the parable in which Plato has wrapped up his conception of the creation of the world. The explanation may help to fill up with figures of speech the void of knowledge.

The entire compound was divided by the Creator in certain proportions and reunited; it was then cut into two strips, which were bent into an inner circle and an outer, both moving with an uniform motion around a centre, the outer circle containing the fixed, the inner the wandering stars. The soul of the world was diffused everywhere from the centre to the circumference. To this God gave a body, consisting at first of fire and earth, and afterwards receiving an addition of air and water; because solid bodies, like the world, are always connected by two middle terms and not by one. The world was made in the form of a globe, and all the material elements were exhausted in the work of creation.

The proportions in which the soul of the world as well as the human soul is divided answer to a series of numbers 1, 2, 3, 4, 9, 8, 27, composed of the two Pythagorean progressions 1, 2, 4, 8 and 1, 3, 9, 27, of which the number 1 represents a point, 2 and 3 lines, 4 and 8, 9 and 27 the squares and cubes respectively of 2 and 3. This series, of which the intervals are afterwards filled up, probably represents (1) the diatonic scale according to the Pythagoreans and Plato; (2) the order and distances of the heavenly bodies; and (3) may possibly contain an allusion to the music of the spheres, which is referred to in the myth at the end of the Republic. The meaning of the words that ‘solid bodies are always connected by two middle terms’ or mean proportionals has been much disputed. The most received explanation is that of Martin, who supposes that Plato is only speaking of surfaces and solids compounded of prime numbers (i.e. of numbers not made up of two factors, or, in other words, only measurable by unity). The square of any such number represents a surface, the cube a solid. The squares of any two such numbers (e.g. 2 squared, 3 squared = 4, 9), have always a single mean proportional (e.g. 4 and 9 have the single mean 6), whereas the cubes of primes (e.g. 3 cubed and 5 cubed) have always two mean proportionals (e.g. 27:45:75:125). But to this explanation of Martin’s it may be objected, (1) that Plato nowhere says that his proportion is to be limited to prime numbers; (2) that the limitation of surfaces to squares is also not to be found in his words; nor (3) is there

any evidence to show that the distinction of prime from other numbers was known to him. What Plato chiefly intends to express is that a solid requires a stronger bond than a surface; and that the double bond which is given by two means is stronger than the single bond given by one. Having reflected on the singular numerical phenomena of the existence of one mean proportional between two square numbers are rather perhaps only between the two lowest squares; and of two mean proportionals between two cubes, perhaps again confining his attention to the two lowest cubes, he finds in the latter symbol an expression of the relation of the elements, as in the former an image of the combination of two surfaces. Between fire and earth, the two extremes, he remarks that there are introduced, not one, but two elements, air and water, which are compared to the two mean proportionals between two cube numbers. The vagueness of his language does not allow us to determine whether anything more than this was intended by him.

Leaving the further explanation of details, which the reader will find discussed at length in Boeckh and Martin, we may now return to the main argument: Why did God make the world? Like man, he must have a purpose; and his purpose is the diffusion of that goodness or good which he himself is. The term 'goodness' is not to be understood in this passage as meaning benevolence or love, in the Christian sense of the term, but rather law, order, harmony, like the idea of good in the Republic. The ancient mythologers, and even the Hebrew prophets, had spoken of the jealousy of God; and the Greek had imagined that there was a Nemesis always attending the prosperity of mortals. But Plato delights to think of God as the author of order in his works, who, like a father, lives over again in his children, and can never have too much of good or friendship among his creatures. Only, as there is a certain remnant of evil inherent in matter which he cannot get rid of, he detaches himself from them and leaves them to themselves, that he may be guiltless of their faults and sufferings.

Between the ideal and the sensible Plato interposes the two natures of time and space. Time is conceived by him to be only the shadow or image of eternity which ever is and never has been or will be, but is described in a figure only as past or future. This is one of the great thoughts of early philosophy, which are still as difficult to our minds as they were to the early thinkers; or perhaps more difficult, because we more distinctly see the consequences which are involved in such an hypothesis. All the objections which may be urged against Kant's doctrine of the ideality of space and time at once press upon us. If time is unreal, then all which is contained in time is unreal—the succession of human thoughts as well as the flux of sensations; there is no connecting link between (Greek) and (Greek). Yet, on the other hand, we are conscious that knowledge is independent of time, that truth is not a thing of yesterday or tomorrow, but an 'eternal now.' To the 'spectator of all time and all existence' the universe remains at rest. The truths of geometry and arithmetic in all their

combinations are always the same. The generations of men, like the leaves of the forest, come and go, but the mathematical laws by which the world is governed remain, and seem as if they could never change. The ever-present image of space is transferred to time—succession is conceived as extension. (We remark that Plato does away with the above and below in space, as he has done away with the absolute existence of past and future.) The course of time, unless regularly marked by divisions of number, partakes of the indefiniteness of the Heraclitean flux. By such reflections we may conceive the Greek to have attained the metaphysical conception of eternity, which to the Hebrew was gained by meditation on the Divine Being. No one saw that this objective was really a subjective, and involved the subjectivity of all knowledge. 'Non in tempore sed cum tempore finxit Deus mundum,' says St. Augustine, repeating a thought derived from the Timaeus, but apparently unconscious of the results to which his doctrine would have led.

The contradictions involved in the conception of time or motion, like the infinitesimal in space, were a source of perplexity to the mind of the Greek, who was driven to find a point of view above or beyond them. They had sprung up in the decline of the Eleatic philosophy and were very familiar to Plato, as we gather from the Parmenides. The consciousness of them had led the great Eleatic philosopher to describe the nature of God or Being under negatives. He sings of 'Being unbegotten and imperishable, unmoved and never-ending, which never was nor will be, but always is, one and continuous, which cannot spring from any other; for it cannot be said or imagined not to be.' The idea of eternity was for a great part a negation. There are regions of speculation in which the negative is hardly separable from the positive, and even seems to pass into it. Not only Buddhism, but Greek as well as Christian philosophy, show that it is quite possible that the human mind should retain an enthusiasm for mere negations. In different ages and countries there have been forms of light in which nothing could be discerned and which have nevertheless exercised a life-giving and illumining power. For the higher intelligence of man seems to require, not only something above sense, but above knowledge, which can only be described as Mind or Being or Truth or God or the unchangeable and eternal element, in the expression of which all predicates fail and fall short. Eternity or the eternal is not merely the unlimited in time but the truest of all Being, the most real of all realities, the most certain of all knowledge, which we nevertheless only see through a glass darkly. The passionate earnestness of Parmenides contrasts with the vacuity of the thought which he is revolving in his mind.

Space is said by Plato to be the 'containing vessel or nurse of generation.' Reflecting on the simplest kinds of external objects, which to the ancients were the four elements, he was led to a more general notion of a substance, more or less like themselves, out of which they were fashioned. He would not have them too precisely distinguished. Thus seems to have

arisen the first dim perception of (Greek) or matter, which has played so great a part in the metaphysical philosophy of Aristotle and his followers. But besides the material out of which the elements are made, there is also a space in which they are contained. There arises thus a second nature which the senses are incapable of discerning and which can hardly be referred to the intelligible class. For it is and it is not, it is nowhere when filled, it is nothing when empty. Hence it is said to be discerned by a kind of spurious or analogous reason, partaking so feebly of existence as to be hardly perceivable, yet always reappearing as the containing mother or nurse of all things. It had not that sort of consistency to Plato which has been given to it in modern times by geometry and metaphysics. Neither of the Greek words by which it is described are so purely abstract as the English word 'space' or the Latin 'spatium.' Neither Plato nor any other Greek would have spoken of (Greek) or (Greek) in the same manner as we speak of 'time' and 'space.'

Yet space is also of a very permanent or even eternal nature; and Plato seems more willing to admit of the unreality of time than of the unreality of space; because, as he says, all things must necessarily exist in space. We, on the other hand, are disposed to fancy that even if space were annihilated time might still survive. He admits indeed that our knowledge of space is of a dreamy kind, and is given by a spurious reason without the help of sense. (Compare the hypotheses and images of Rep.) It is true that it does not attain to the clearness of ideas. But like them it seems to remain, even if all the objects contained in it are supposed to have vanished away. Hence it was natural for Plato to conceive of it as eternal. We must remember further that in his attempt to realize either space or matter the two abstract ideas of weight and extension, which are familiar to us, had never passed before his mind.

Thus far God, working according to an eternal pattern, out of his goodness has created the same, the other, and the essence (compare the three principles of the Philebus—the finite, the infinite, and the union of the two), and out of them has formed the outer circle of the fixed stars and the inner circle of the planets, divided according to certain musical intervals; he has also created time, the moving image of eternity, and space, existing by a sort of necessity and hardly distinguishable from matter. The matter out of which the world is formed is not absolutely void, but retains in the chaos certain germs or traces of the elements. These Plato, like Empedocles, supposed to be four in number—fire, air, earth, and water. They were at first mixed together; but already in the chaos, before God fashioned them by form and number, the greater masses of the elements had an appointed place. Into the confusion (Greek) which preceded Plato does not attempt further to penetrate. They are called elements, but they are so far from being elements (Greek) or letters in the higher sense that they are not even syllables or first compounds. The real elements are two triangles, the rectangular isosceles which has but one form, and the most

beautiful of the many forms of scalene, which is half of an equilateral triangle. By the combination of these triangles which exist in an infinite variety of sizes, the surfaces of the four elements are constructed.

That there were only five regular solids was already known to the ancients, and out of the surfaces which he has formed Plato proceeds to generate the four first of the five. He perhaps forgets that he is only putting together surfaces and has not provided for their transformation into solids. The first solid is a regular pyramid, of which the base and sides are formed by four equilateral or twenty-four scalene triangles. Each of the four solid angles in this figure is a little larger than the largest of obtuse angles. The second solid is composed of the same triangles, which unite as eight equilateral triangles, and make one solid angle out of four plane angles—six of these angles form a regular octahedron. The third solid is a regular icosahedron, having twenty triangular equilateral bases, and therefore 120 rectangular scalene triangles. The fourth regular solid, or cube, is formed by the combination of four isosceles triangles into one square and of six squares into a cube. The fifth regular solid, or dodecahedron, cannot be formed by a combination of either of these triangles, but each of its faces may be regarded as composed of thirty triangles of another kind. Probably Plato notices this as the only remaining regular polyhedron, which from its approximation to a globe, and possibly because, as Plutarch remarks, it is composed of $12 \times 30 = 360$ scalene triangles (Platon. Quaest.), representing thus the signs and degrees of the Zodiac, as well as the months and days of the year, God may be said to have 'used in the delineation of the universe.' According to Plato earth was composed of cubes, fire of regular pyramids, air of regular octahedrons, water of regular icosahedrons. The stability of the last three increases with the number of their sides.

The elements are supposed to pass into one another, but we must remember that these transformations are not the transformations of real solids, but of imaginary geometrical figures; in other words, we are composing and decomposing the faces of substances and not the substances themselves—it is a house of cards which we are pulling to pieces and putting together again (compare however Laws). Yet perhaps Plato may regard these sides or faces as only the forms which are impressed on pre-existent matter. It is remarkable that he should speak of each of these solids as a possible world in itself, though upon the whole he inclines to the opinion that they form one world and not five. To suppose that there is an infinite number of worlds, as Democritus (Hippolyt. Ref. Haer. I.) had said, would be, as he satirically observes, 'the characteristic of a very indefinite and ignorant mind.'

The twenty triangular faces of an icosahedron form the faces or sides of two regular octahedrons and of a regular pyramid ($20 = 8 \times 2 + 4$); and therefore, according to Plato, a particle of water when decomposed is

supposed to give two particles of air and one of fire. So because an octahedron gives the sides of two pyramids ($8 = 4 \times 2$), a particle of air is resolved into two particles of fire.

The transformation is effected by the superior power or number of the conquering elements. The manner of the change is (1) a separation of portions of the elements from the masses in which they are collected; (2) a resolution of them into their original triangles; and (3) a reunion of them in new forms. Plato himself proposes the question, Why does motion continue at all when the elements are settled in their places? He answers that although the force of attraction is continually drawing similar elements to the same spot, still the revolution of the universe exercises a condensing power, and thrusts them again out of their natural places. Thus want of uniformity, the condition of motion, is produced. In all such disturbances of matter there is an alternative for the weaker element: it may escape to its kindred, or take the form of the stronger—becoming denser, if it be denser, or rarer if rarer. This is true of fire, air, and water, which, being composed of similar triangles, are interchangeable; earth, however, which has triangles peculiar to itself, is capable of dissolution, but not of change. Of the interchangeable elements, fire, the rarest, can only become a denser, and water, the densest, only a rarer: but air may become a denser or a rarer. No single particle of the elements is visible, but only the aggregates of them are seen. The subordinate species depend, not upon differences of form in the original triangles, but upon differences of size. The obvious physical phenomena from which Plato has gathered his views of the relations of the elements seem to be the effect of fire upon air, water, and earth, and the effect of water upon earth. The particles are supposed by him to be in a perpetual process of circulation caused by inequality. This process of circulation does not admit of a vacuum, as he tells us in his strange account of respiration.

Of the phenomena of light and heavy he speaks afterwards, when treating of sensation, but they may be more conveniently considered by us in this place. They are not, he says, to be explained by 'above' and 'below,' which in the universal globe have no existence, but by the attraction of similars towards the great masses of similar substances; fire to fire, air to air, water to water, earth to earth. Plato's doctrine of attraction implies not only (1) the attraction of similar elements to one another, but also (2) of smaller bodies to larger ones. Had he confined himself to the latter he would have arrived, though, perhaps, without any further result or any sense of the greatness of the discovery, at the modern doctrine of gravitation. He does not observe that water has an equal tendency towards both water and earth. So easily did the most obvious facts which were inconsistent with his theories escape him.

The general physical doctrines of the *Timaeus* may be summed up as follows: (1) Plato supposes the greater masses of the elements to have

been already settled in their places at the creation: (2) they are four in number, and are formed of rectangular triangles variously combined into regular solid figures: (3) three of them, fire, air, and water, admit of transformation into one another; the fourth, earth, cannot be similarly transformed: (4) different sizes of the same triangles form the lesser species of each element: (5) there is an attraction of like to like—smaller masses of the same kind being drawn towards greater: (6) there is no void, but the particles of matter are ever pushing one another round and round (Greek). Like the atomists, Plato attributes the differences between the elements to differences in geometrical figures. But he does not explain the process by which surfaces become solids; and he characteristically ridicules Democritus for not seeing that the worlds are finite and not infinite.

Section 4.

The astronomy of Plato is based on the two principles of the same and the other, which God combined in the creation of the world. The soul, which is compounded of the same, the other, and the essence, is diffused from the centre to the circumference of the heavens. We speak of a soul of the universe; but more truly regarded, the universe of the *Timaeus* is a soul, governed by mind, and holding in solution a residuum of matter or evil, which the author of the world is unable to expel, and of which Plato cannot tell us the origin. The creation, in Plato's sense, is really the creation of order; and the first step in giving order is the division of the heavens into an inner and outer circle of the other and the same, of the divisible and the indivisible, answering to the two spheres, of the planets and of the world beyond them, all together moving around the earth, which is their centre. To us there is a difficulty in apprehending how that which is at rest can also be in motion, or that which is indivisible exist in space. But the whole description is so ideal and imaginative, that we can hardly venture to attribute to many of Plato's words in the *Timaeus* any more meaning than to his mythical account of the heavens in the *Republic* and in the *Phaedrus*. (Compare his denial of the 'blasphemous opinion' that there are planets or wandering stars; all alike move in circles—*Laws*.) The stars are the habitations of the souls of men, from which they come and to which they return. In attributing to the fixed stars only the most perfect motion—that which is on the same spot or circulating around the same—he might perhaps have said that to 'the spectator of all time and all existence,' to borrow once more his own grand expression, or viewed, in the language of Spinoza, 'sub specie aeternitatis,' they were still at rest, but appeared to move in order to teach men the periods of time. Although absolutely in motion, they are relatively at rest; or we may conceive of them as resting, while the space in which they are contained, or the whole *anima mundi*, revolves.

The universe revolves around a centre once in twenty-four hours, but the orbits of the fixed stars take a different direction from those of the planets. The outer and the inner sphere cross one another and meet again at a point opposite to that of their first contact; the first moving in a circle from left to right along the side of a parallelogram which is supposed to be inscribed in it, the second also moving in a circle along the diagonal of the same parallelogram from right to left; or, in other words, the first describing the path of the equator, the second, the path of the ecliptic. The motion of the second is controlled by the first, and hence the oblique line in which the planets are supposed to move becomes a spiral. The motion of the same is said to be undivided, whereas the inner motion is split into seven unequal orbits—the intervals between them being in the ratio of two and three, three of either:—the Sun, moving in the opposite direction to Mercury and Venus, but with equal swiftness; the remaining four, Moon, Saturn, Mars, Jupiter, with unequal swiftness to the former three and to one another. Thus arises the following progression:— Moon 1, Sun 2, Venus 3, Mercury 4, Mars 8, Jupiter 9, Saturn 27. This series of numbers is the compound of the two Pythagorean ratios, having the same intervals, though not in the same order, as the mixture which was originally divided in forming the soul of the world.

Plato was struck by the phenomenon of Mercury, Venus, and the Sun appearing to overtake and be overtaken by one another. The true reason of this, namely, that they lie within the circle of the earth's orbit, was unknown to him, and the reason which he gives—that the two former move in an opposite direction to the latter—is far from explaining the appearance of them in the heavens. All the planets, including the sun, are carried round in the daily motion of the circle of the fixed stars, and they have a second or oblique motion which gives the explanation of the different lengths of the sun's course in different parts of the earth. The fixed stars have also two movements—a forward movement in their orbit which is common to the whole circle; and a movement on the same spot around an axis, which Plato calls the movement of thought about the same. In this latter respect they are more perfect than the wandering stars, as Plato himself terms them in the *Timaeus*, although in the *Laws* he condemns the appellation as blasphemous.

The revolution of the world around earth, which is accomplished in a single day and night, is described as being the most perfect or intelligent. Yet Plato also speaks of an 'annus magnus' or cyclical year, in which periods wonderful for their complexity are found to coincide in a perfect number, i.e. a number which equals the sum of its factors, as $6 = 1 + 2 + 3$. This, although not literally contradictory, is in spirit irreconcilable with the perfect revolution of twenty-four hours. The same remark may be applied to the complexity of the appearances and occultations of the stars, which, if the outer heaven is supposed to be moving around the centre once in twenty-four hours, must be confined to the effects produced by

the seven planets. Plato seems to confuse the actual observation of the heavens with his desire to find in them mathematical perfection. The same spirit is carried yet further by him in the passage already quoted from the *Laws*, in which he affirms their wanderings to be an appearance only, which a little knowledge of mathematics would enable men to correct.

We have now to consider the much discussed question of the rotation or immobility of the earth. Plato's doctrine on this subject is contained in the following words:—'The earth, which is our nurse, compacted (OR revolving) around the pole which is extended through the universe, he made to be the guardian and artificer of night and day, first and eldest of gods that are in the interior of heaven'. There is an unfortunate doubt in this passage (1) about the meaning of the word (Greek), which is translated either 'compacted' or 'revolving,' and is equally capable of both explanations. A doubt (2) may also be raised as to whether the words 'artificer of day and night' are consistent with the mere passive causation of them, produced by the immobility of the earth in the midst of the circling universe. We must admit, further, (3) that Aristotle attributed to Plato the doctrine of the rotation of the earth on its axis. On the other hand it has been urged that if the earth goes round with the outer heaven and sun in twenty-four hours, there is no way of accounting for the alternation of day and night; since the equal motion of the earth and sun would have the effect of absolute immobility. To which it may be replied that Plato never says that the earth goes round with the outer heaven and sun; although the whole question depends on the relation of earth and sun, their movements are nowhere precisely described. But if we suppose, with Mr. Grote, that the diurnal rotation of the earth on its axis and the revolution of the sun and outer heaven precisely coincide, it would be difficult to imagine that Plato was unaware of the consequence. For though he was ignorant of many things which are familiar to us, and often confused in his ideas where we have become clear, we have no right to attribute to him a childish want of reasoning about very simple facts, or an inability to understand the necessary and obvious deductions from geometrical figures or movements. Of the causes of day and night the pre-Socratic philosophers, and especially the Pythagoreans, gave various accounts, and therefore the question can hardly be imagined to have escaped him. On the other hand it may be urged that the further step, however simple and obvious, is just what Plato often seems to be ignorant of, and that as there is no limit to his insight, there is also no limit to the blindness which sometimes obscures his intelligence (compare the construction of solids out of surfaces in his account of the creation of the world, or the attraction of similars to similars). Further, Mr. Grote supposes, not that (Greek) means 'revolving,' or that this is the sense in which Aristotle understood the word, but that the rotation of the earth is necessarily implied in its adherence to the cosmical axis. But (a) if, as Mr. Grote assumes, Plato did not see that the rotation of the earth on its axis and of the sun and outer heavens around the earth in equal times was

inconsistent with the alternation of day and night, neither need we suppose that he would have seen the immobility of the earth to be inconsistent with the rotation of the axis. And (b) what proof is there that the axis of the world revolves at all? (c) The comparison of the two passages quoted by Mr Grote (see his pamphlet on 'The Rotation of the Earth') from Aristotle *De Coelo*, Book II (Greek) clearly shows, although this is a matter of minor importance, that Aristotle, as Proclus and Simplicius supposed, understood (Greek) in the *Timaeus* to mean 'revolving.' For the second passage, in which motion on an axis is expressly mentioned, refers to the first, but this would be unmeaning unless (Greek) in the first passage meant rotation on an axis. (4) The immobility of the earth is more in accordance with Plato's other writings than the opposite hypothesis. For in the *Phaedo* the earth is described as the centre of the world, and is not said to be in motion. In the *Republic* the pilgrims appear to be looking out from the earth upon the motions of the heavenly bodies; in the *Phaedrus*, Hestia, who remains immovable in the house of Zeus while the other gods go in procession, is called the first and eldest of the gods, and is probably the symbol of the earth. The silence of Plato in these and in some other passages (*Laws*) in which he might be expected to speak of the rotation of the earth, is more favourable to the doctrine of its immobility than to the opposite. If he had meant to say that the earth revolves on its axis, he would have said so in distinct words, and have explained the relation of its movements to those of the other heavenly bodies. (5) The meaning of the words 'artificer of day and night' is literally true according to Plato's view. For the alternation of day and night is not produced by the motion of the heavens alone, or by the immobility of the earth alone, but by both together; and that which has the inherent force or energy to remain at rest when all other bodies are moving, may be truly said to act, equally with them. (6) We should not lay too much stress on Aristotle or the writer *De Caelo* having adopted the other interpretation of the words, although Alexander of Aphrodisias thinks that he could not have been ignorant either of the doctrine of Plato or of the sense which he intended to give to the word (Greek). For the citations of Plato in Aristotle are frequently misinterpreted by him; and he seems hardly ever to have had in his mind the connection in which they occur. In this instance the allusion is very slight, and there is no reason to suppose that the diurnal revolution of the heavens was present to his mind. Hence we need not attribute to him the error from which we are defending Plato.

After weighing one against the other all these complicated probabilities, the final conclusion at which we arrive is that there is nearly as much to be said on the one side of the question as on the other, and that we are not perfectly certain, whether, as Bockh and the majority of commentators, ancient as well as modern, are inclined to believe, Plato thought that the earth was at rest in the centre of the universe, or, as Aristotle and Mr. Grote suppose, that it revolved on its axis. Whether we assume the earth

to be stationary in the centre of the universe, or to revolve with the heavens, no explanation is given of the variation in the length of days and nights at different times of the year. The relations of the earth and heavens are so indistinct in the *Timaeus* and so figurative in the *Phaedo*, *Phaedrus* and *Republic*, that we must give up the hope of ascertaining how they were imagined by Plato, if he had any fixed or scientific conception of them at all.

Section 5.

The soul of the world is framed on the analogy of the soul of man, and many traces of anthropomorphism blend with Plato's highest flights of idealism. The heavenly bodies are endowed with thought; the principles of the same and other exist in the universe as well as in the human mind. The soul of man is made out of the remains of the elements which had been used in creating the soul of the world; these remains, however, are diluted to the third degree; by this Plato expresses the measure of the difference between the soul human and divine. The human soul, like the cosmical, is framed before the body, as the mind is before the soul of either—this is the order of the divine work—and the finer parts of the body, which are more akin to the soul, such as the spinal marrow, are prior to the bones and flesh. The brain, the containing vessel of the divine part of the soul, is (nearly) in the form of a globe, which is the image of the gods, who are the stars, and of the universe.

There is, however, an inconsistency in Plato's manner of conceiving the soul of man; he cannot get rid of the element of necessity which is allowed to enter. He does not, like Kant, attempt to vindicate for men a freedom out of space and time; but he acknowledges him to be subject to the influence of external causes, and leaves hardly any place for freedom of the will. The lusts of men are caused by their bodily constitution, though they may be increased by bad education and bad laws, which implies that they may be decreased by good education and good laws. He appears to have an inkling of the truth that to the higher nature of man evil is involuntary. This is mixed up with the view which, while apparently agreeing with it, is in reality the opposite of it, that vice is due to physical causes. In the *Timaeus*, as well as in the *Laws*, he also regards vices and crimes as simply involuntary; they are diseases analogous to the diseases of the body, and arising out of the same causes. If we draw together the opposite poles of Plato's system, we find that, like Spinoza, he combines idealism with fatalism.

The soul of man is divided by him into three parts, answering roughly to the charioteer and steeds of the *Phaedrus*, and to the (Greek) of the *Republic* and *Nicomachean Ethics*. First, there is the immortal nature of which the brain is the seat, and which is akin to the soul of the universe. This alone thinks and knows and is the ruler of the whole. Secondly, there

is the higher mortal soul which, though liable to perturbations of her own, takes the side of reason against the lower appetites. The seat of this is the heart, in which courage, anger, and all the nobler affections are supposed to reside. There the veins all meet; it is their centre or house of guard whence they carry the orders of the thinking being to the extremities of his kingdom. There is also a third or appetitive soul, which receives the commands of the immortal part, not immediately but mediately, through the liver, which reflects on its surface the admonitions and threats of the reason.

The liver is imagined by Plato to be a smooth and bright substance, having a store of sweetness and also of bitterness, which reason freely uses in the execution of her mandates. In this region, as ancient superstition told, were to be found intimations of the future. But Plato is careful to observe that although such knowledge is given to the inferior parts of man, it requires to be interpreted by the superior. Reason, and not enthusiasm, is the true guide of man; he is only inspired when he is demented by some distemper or possession. The ancient saying, that 'only a man in his senses can judge of his own actions,' is approved by modern philosophy too. The same irony which appears in Plato's remark, that 'the men of old time must surely have known the gods who were their ancestors, and we should believe them as custom requires,' is also manifest in his account of divination.

The appetitive soul is seated in the belly, and there imprisoned like a wild beast, far away from the council chamber, as Plato graphically calls the head, in order that the animal passions may not interfere with the deliberations of reason. Though the soul is said by him to be prior to the body, yet we cannot help seeing that it is constructed on the model of the body—the threefold division into the rational, passionate, and appetitive corresponding to the head, heart and belly. The human soul differs from the soul of the world in this respect, that it is enveloped and finds its expression in matter, whereas the soul of the world is not only enveloped or diffused in matter, but is the element in which matter moves. The breath of man is within him, but the air or aether of heaven is the element which surrounds him and all things.

Pleasure and pain are attributed in the *Timaeus* to the suddenness of our sensations—the first being a sudden restoration, the second a sudden violation, of nature (*Phileb.*). The sensations become conscious to us when they are exceptional. Sight is not attended either by pleasure or pain, but hunger and the appeasing of hunger are pleasant and painful because they are extraordinary.

Section 6.

I shall not attempt to connect the physiological speculations of Plato either

with ancient or modern medicine. What light I can throw upon them will be derived from the comparison of them with his general system.

There is no principle so apparent in the physics of the *Timaeus*, or in ancient physics generally, as that of continuity. The world is conceived of as a whole, and the elements are formed into and out of one another; the varieties of substances and processes are hardly known or noticed. And in a similar manner the human body is conceived of as a whole, and the different substances of which, to a superficial observer, it appears to be composed—the blood, flesh, sinews—like the elements out of which they are formed, are supposed to pass into one another in regular order, while the infinite complexity of the human frame remains unobserved. And diseases arise from the opposite process—when the natural proportions of the four elements are disturbed, and the secondary substances which are formed out of them, namely, blood, flesh, sinews, are generated in an inverse order.

Plato found heat and air within the human frame, and the blood circulating in every part. He assumes in language almost unintelligible to us that a network of fire and air envelopes the greater part of the body. This outer net contains two lesser nets, one corresponding to the stomach, the other to the lungs; and the entrance to the latter is forked or divided into two passages which lead to the nostrils and to the mouth. In the process of respiration the external net is said to find a way in and out of the pores of the skin: while the interior of it and the lesser nets move alternately into each other. The whole description is figurative, as Plato himself implies when he speaks of a 'fountain of fire which we compare to the network of a creel.' He really means by this what we should describe as a state of heat or temperature in the interior of the body. The 'fountain of fire' or heat is also in a figure the circulation of the blood. The passage is partly imagination, partly fact.

He has a singular theory of respiration for which he accounts solely by the movement of the air in and out of the body; he does not attribute any part of the process to the action of the body itself. The air has a double ingress and a double exit, through the mouth or nostrils, and through the skin. When exhaled through the mouth or nostrils, it leaves a vacuum which is filled up by other air finding a way in through the pores, this air being thrust out of its place by the exhalation from the mouth and nostrils. There is also a corresponding process of inhalation through the mouth or nostrils, and of exhalation through the pores. The inhalation through the pores appears to take place nearly at the same time as the exhalation through the mouth; and conversely. The internal fire is in either case the propelling cause outwards—the inhaled air, when heated by it, having a natural tendency to move out of the body to the place of fire; while the impossibility of a vacuum is the propelling cause inwards.

Thus we see that this singular theory is dependent on two principles

largely employed by Plato in explaining the operations of nature, the impossibility of a vacuum and the attraction of like to like. To these there has to be added a third principle, which is the condition of the action of the other two,—the interpenetration of particles in proportion to their density or rarity. It is this which enables fire and air to permeate the flesh.

Plato's account of digestion and the circulation of the blood is closely connected with his theory of respiration. Digestion is supposed to be effected by the action of the internal fire, which in the process of respiration moves into the stomach and minces the food. As the fire returns to its place, it takes with it the minced food or blood; and in this way the veins are replenished. Plato does not enquire how the blood is separated from the faeces.

Of the anatomy and functions of the body he knew very little,—e.g. of the uses of the nerves in conveying motion and sensation, which he supposed to be communicated by the bones and veins; he was also ignorant of the distinction between veins and arteries;—the latter term he applies to the vessels which conduct air from the mouth to the lungs;—he supposes the lung to be hollow and bloodless; the spinal marrow he conceives to be the seed of generation; he confuses the parts of the body with the states of the body—the network of fire and air is spoken of as a bodily organ; he has absolutely no idea of the phenomena of respiration, which he attributes to a law of equalization in nature, the air which is breathed out displacing other air which finds a way in; he is wholly unacquainted with the process of digestion. Except the general divisions into the spleen, the liver, the belly, and the lungs, and the obvious distinctions of flesh, bones, and the limbs of the body, we find nothing that reminds us of anatomical facts. But we find much which is derived from his theory of the universe, and transferred to man, as there is much also in his theory of the universe which is suggested by man. The microcosm of the human body is the lesser image of the macrocosm. The courses of the same and the other affect both; they are made of the same elements and therefore in the same proportions. Both are intelligent natures endued with the power of self-motion, and the same equipoise is maintained in both. The animal is a sort of 'world' to the particles of the blood which circulate in it. All the four elements entered into the original composition of the human frame; the bone was formed out of smooth earth; liquids of various kinds pass to and fro; the network of fire and air irrigates the veins. Infancy and childhood is the chaos or first turbid flux of sense prior to the establishment of order; the intervals of time which may be observed in some intermittent fevers correspond to the density of the elements. The spinal marrow, including the brain, is formed out of the finest sorts of triangles, and is the connecting link between body and mind. Health is only to be preserved by imitating the motions of the world in space, which is the mother and nurse of generation. The work of digestion is carried on by the superior sharpness of the triangles forming the substances of the human body to

those which are introduced into it in the shape of food. The freshest and acutest forms of triangles are those that are found in children, but they become more obtuse with advancing years; and when they finally wear out and fall to pieces, old age and death supervene.

As in the Republic, Plato is still the enemy of the purgative treatment of physicians, which, except in extreme cases, no man of sense will ever adopt. For, as he adds, with an insight into the truth, 'every disease is akin to the nature of the living being and is only irritated by stimulants.' He is of opinion that nature should be left to herself, and is inclined to think that physicians are in vain (Laws—where he says that warm baths would be more beneficial to the limbs of the aged rustic than the prescriptions of a not over-wise doctor). If he seems to be extreme in his condemnation of medicine and to rely too much on diet and exercise, he might appeal to nearly all the best physicians of our own age in support of his opinions, who often speak to their patients of the worthlessness of drugs. For we ourselves are sceptical about medicine, and very unwilling to submit to the purgative treatment of physicians. May we not claim for Plato an anticipation of modern ideas as about some questions of astronomy and physics, so also about medicine? As in the Charmides he tells us that the body cannot be cured without the soul, so in the Timaeus he strongly asserts the sympathy of soul and body; any defect of either is the occasion of the greatest discord and disproportion in the other. Here too may be a presentiment that in the medicine of the future the interdependence of mind and body will be more fully recognized, and that the influence of the one over the other may be exerted in a manner which is not now thought possible.

Section 7.

In Plato's explanation of sensation we are struck by the fact that he has not the same distinct conception of organs of sense which is familiar to ourselves. The senses are not instruments, but rather passages, through which external objects strike upon the mind. The eye is the aperture through which the stream of vision passes, the ear is the aperture through which the vibrations of sound pass. But that the complex structure of the eye or the ear is in any sense the cause of sight and hearing he seems hardly to be aware.

The process of sight is the most complicated (Rep.), and consists of three elements—the light which is supposed to reside within the eye, the light of the sun, and the light emitted from external objects. When the light of the eye meets the light of the sun, and both together meet the light issuing from an external object, this is the simple act of sight. When the particles of light which proceed from the object are exactly equal to the particles of the visual ray which meet them from within, then the body is transparent. If they are larger and contract the visual ray, a black colour is produced; if

they are smaller and dilate it, a white. Other phenomena are produced by the variety and motion of light. A sudden flash of fire at once elicits light and moisture from the eye, and causes a bright colour. A more subdued light, on mingling with the moisture of the eye, produces a red colour. Out of these elements all other colours are derived. All of them are combinations of bright and red with white and black. Plato himself tells us that he does not know in what proportions they combine, and he is of opinion that such knowledge is granted to the gods only. To have seen the affinity of them to each other and their connection with light, is not a bad basis for a theory of colours. We must remember that they were not distinctly defined to his, as they are to our eyes; he saw them, not as they are divided in the prism, or artificially manufactured for the painter's use, but as they exist in nature, blended and confused with one another.

We can hardly agree with him when he tells us that smells do not admit of kinds. He seems to think that no definite qualities can attach to bodies which are in a state of transition or evaporation; he also makes the subtle observation that smells must be denser than air, though thinner than water, because when there is an obstruction to the breathing, air can penetrate, but not smell.

The affections peculiar to the tongue are of various kinds, and, like many other affections, are caused by contraction and dilation. Some of them are produced by rough, others by abstergent, others by inflammatory substances,—these act upon the testing instruments of the tongue, and produce a more or less disagreeable sensation, while other particles congenial to the tongue soften and harmonize them. The instruments of taste reach from the tongue to the heart. Plato has a lively sense of the manner in which sensation and motion are communicated from one part of the body to the other, though he confuses the affections with the organs. Hearing is a blow which passes through the ear and ends in the region of the liver, being transmitted by means of the air, the brain, and the blood to the soul. The swifter sound is acute, the sound which moves slowly is grave. A great body of sound is loud, the opposite is low. Discord is produced by the swifter and slower motions of two sounds, and is converted into harmony when the swifter motions begin to pause and are overtaken by the slower.

The general phenomena of sensation are partly internal, but the more violent are caused by conflict with external objects. Proceeding by a method of superficial observation, Plato remarks that the more sensitive parts of the human frame are those which are least covered by flesh, as is the case with the head and the elbows. Man, if his head had been covered with a thicker pulp of flesh, might have been a longer-lived animal than he is, but could not have had as quick perceptions. On the other hand, the tongue is one of the most sensitive of organs; but then this is made, not to be a covering to the bones which contain the marrow or source of life, but

with an express purpose, and in a separate mass.

Section 8.

We have now to consider how far in any of these speculations Plato approximated to the discoveries of modern science. The modern physical philosopher is apt to dwell exclusively on the absurdities of ancient ideas about science, on the haphazard fancies and a priori assumptions of ancient teachers, on their confusion of facts and ideas, on their inconsistency and blindness to the most obvious phenomena. He measures them not by what preceded them, but by what has followed them. He does not consider that ancient physical philosophy was not a free enquiry, but a growth, in which the mind was passive rather than active, and was incapable of resisting the impressions which flowed in upon it. He hardly allows to the notions of the ancients the merit of being the stepping-stones by which he has himself risen to a higher knowledge. He never reflects, how great a thing it was to have formed a conception, however imperfect, either of the human frame as a whole, or of the world as a whole. According to the view taken in these volumes the errors of ancient physicists were not separable from the intellectual conditions under which they lived. Their genius was their own; and they were not the rash and hasty generalizers which, since the days of Bacon, we have been apt to suppose them. The thoughts of men widened to receive experience; at first they seemed to know all things as in a dream: after a while they look at them closely and hold them in their hands. They begin to arrange them in classes and to connect causes with effects. General notions are necessary to the apprehension of particular facts, the metaphysical to the physical. Before men can observe the world, they must be able to conceive it.

To do justice to the subject, we should consider the physical philosophy of the ancients as a whole; we should remember, (1) that the nebular theory was the received belief of several of the early physicists; (2) that the development of animals out of fishes who came to land, and of man out of the animals, was held by Anaximander in the sixth century before Christ (Plut. Symp. Quaest; Plac. Phil.); (3) that even by Philolaus and the early Pythagoreans, the earth was held to be a body like the other stars revolving in space around the sun or a central fire; (4) that the beginnings of chemistry are discernible in the 'similar particles' of Anaxagoras. Also they knew or thought (5) that there was a sex in plants as well as in animals; (6) they were aware that musical notes depended on the relative length or tension of the strings from which they were emitted, and were measured by ratios of number; (7) that mathematical laws pervaded the world; and even qualitative differences were supposed to have their origin in number and figure; (8) the annihilation of matter was denied by several of them, and the seeming disappearance of it held to be a transformation

only. For, although one of these discoveries might have been supposed to be a happy guess, taken together they seem to imply a great advance and almost maturity of natural knowledge.

We should also remember, when we attribute to the ancients hasty generalizations and delusions of language, that physical philosophy and metaphysical too have been guilty of similar fallacies in quite recent times. We by no means distinguish clearly between mind and body, between ideas and facts. Have not many discussions arisen about the Atomic theory in which a point has been confused with a material atom? Have not the natures of things been explained by imaginary entities, such as life or phlogiston, which exist in the mind only? Has not disease been regarded, like sin, sometimes as a negative and necessary, sometimes as a positive or malignant principle? The 'idols' of Bacon are nearly as common now as ever; they are inherent in the human mind, and when they have the most complete dominion over us, we are least able to perceive them. We recognize them in the ancients, but we fail to see them in ourselves.

Such reflections, although this is not the place in which to dwell upon them at length, lead us to take a favourable view of the speculations of the *Timaeus*. We should consider not how much Plato actually knew, but how far he has contributed to the general ideas of physics, or supplied the notions which, whether true or false, have stimulated the minds of later generations in the path of discovery. Some of them may seem old-fashioned, but may nevertheless have had a great influence in promoting system and assisting enquiry, while in others we hear the latest word of physical or metaphysical philosophy. There is also an intermediate class, in which Plato falls short of the truths of modern science, though he is not wholly unacquainted with them. (1) To the first class belongs the teleological theory of creation. Whether all things in the world can be explained as the result of natural laws, or whether we must not admit of tendencies and marks of design also, has been a question much disputed of late years. Even if all phenomena are the result of natural forces, we must admit that there are many things in heaven and earth which are as well expressed under the image of mind or design as under any other. At any rate, the language of Plato has been the language of natural theology down to our own time, nor can any description of the world wholly dispense with it. The notion of first and second or co-operative causes, which originally appears in the *Timaeus*, has likewise survived to our own day, and has been a great peace-maker between theology and science. Plato also approaches very near to our doctrine of the primary and secondary qualities of matter. (2) Another popular notion which is found in the *Timaeus*, is the feebleness of the human intellect—'God knows the original qualities of things; man can only hope to attain to probability.' We speak in almost the same words of human intelligence, but not in the same manner of the uncertainty of our knowledge of nature. The reason is that the latter is assured to us by

experiment, and is not contrasted with the certainty of ideal or mathematical knowledge. But the ancient philosopher never experimented: in the *Timaeus* Plato seems to have thought that there would be impiety in making the attempt; he, for example, who tried experiments in colours would 'forget the difference of the human and divine natures.' Their indefiniteness is probably the reason why he singles them out, as especially incapable of being tested by experiment. (Compare the saying of Anaxagoras—Sext. Pyrrh.—that since snow is made of water and water is black, snow ought to be black.)

The greatest 'divination' of the ancients was the supremacy which they assigned to mathematics in all the realms of nature; for in all of them there is a foundation of mechanics. Even physiology partakes of figure and number; and Plato is not wrong in attributing them to the human frame, but in the omission to observe how little could be explained by them. Thus we may remark in passing that the most fanciful of ancient philosophies is also the most nearly verified in fact. The fortunate guess that the world is a sum of numbers and figures has been the most fruitful of anticipations. The 'diatonic' scale of the Pythagoreans and Plato suggested to Kepler that the secret of the distances of the planets from one another was to be found in mathematical proportions. The doctrine that the heavenly bodies all move in a circle is known by us to be erroneous; but without such an error how could the human mind have comprehended the heavens? Astronomy, even in modern times, has made far greater progress by the high a priori road than could have been attained by any other. Yet, strictly speaking—and the remark applies to ancient physics generally—this high a priori road was based upon a posteriori grounds. For there were no facts of which the ancients were so well assured by experience as facts of number. Having observed that they held good in a few instances, they applied them everywhere; and in the complexity, of which they were capable, found the explanation of the equally complex phenomena of the universe. They seemed to see them in the least things as well as in the greatest; in atoms, as well as in suns and stars; in the human body as well as in external nature. And now a favourite speculation of modern chemistry is the explanation of qualitative difference by quantitative, which is at present verified to a certain extent and may hereafter be of far more universal application. What is this but the atoms of Democritus and the triangles of Plato? The ancients should not be wholly deprived of the credit of their guesses because they were unable to prove them. May they not have had, like the animals, an instinct of something more than they knew?

Besides general notions we seem to find in the *Timaeus* some more precise approximations to the discoveries of modern physical science. First, the doctrine of equipoise. Plato affirms, almost in so many words, that nature abhors a vacuum. Whenever a particle is displaced, the rest push and thrust one another until equality is restored. We must remember that

these ideas were not derived from any definite experiment, but were the original reflections of man, fresh from the first observation of nature. The latest word of modern philosophy is continuity and development, but to Plato this is the beginning and foundation of science; there is nothing that he is so strongly persuaded of as that the world is one, and that all the various existences which are contained in it are only the transformations of the same soul of the world acting on the same matter. He would have readily admitted that out of the protoplasm all things were formed by the gradual process of creation; but he would have insisted that mind and intelligence—not meaning by this, however, a conscious mind or person—were prior to them, and could alone have created them. Into the workings of this eternal mind or intelligence he does not enter further; nor would there have been any use in attempting to investigate the things which no eye has seen nor any human language can express.

Lastly, there remain two points in which he seems to touch great discoveries of modern times—the law of gravitation, and the circulation of the blood.

(1) The law of gravitation, according to Plato, is a law, not only of the attraction of lesser bodies to larger ones, but of similar bodies to similar, having a magnetic power as well as a principle of gravitation. He observed that earth, water, and air had settled down to their places, and he imagined fire or the exterior aether to have a place beyond air. When air seemed to go upwards and fire to pierce through air—when water and earth fell downward, they were seeking their native elements. He did not remark that his own explanation did not suit all phenomena; and the simpler explanation, which assigns to bodies degrees of heaviness and lightness proportioned to the mass and distance of the bodies which attract them, never occurred to him. Yet the affinities of similar substances have some effect upon the composition of the world, and of this Plato may be thought to have had an anticipation. He may be described as confusing the attraction of gravitation with the attraction of cohesion. The influence of such affinities and the chemical action of one body upon another in long periods of time have become a recognized principle of geology.

(2) Plato is perfectly aware—and he could hardly be ignorant—that blood is a fluid in constant motion. He also knew that blood is partly a solid substance consisting of several elements, which, as he might have observed in the use of ‘cupping-glasses’, decompose and die, when no longer in motion. But the specific discovery that the blood flows out on one side of the heart through the arteries and returns through the veins on the other, which is commonly called the circulation of the blood, was absolutely unknown to him.

A further study of the *Timaeus* suggests some after-thoughts which may be conveniently brought together in this place. The topics which I propose

briefly to reconsider are (a) the relation of the *Timaeus* to the other dialogues of Plato and to the previous philosophy; (b) the nature of God and of creation (c) the morality of the *Timaeus*:—

(a) The *Timaeus* is more imaginative and less scientific than any other of the Platonic dialogues. It is conjectural astronomy, conjectural natural philosophy, conjectural medicine. The writer himself is constantly repeating that he is speaking what is probable only. The dialogue is put into the mouth of *Timaeus*, a Pythagorean philosopher, and therefore here, as in the *Parmenides*, we are in doubt how far Plato is expressing his own sentiments. Hence the connexion with the other dialogues is comparatively slight. We may fill up the lacunae of the *Timaeus* by the help of the *Republic* or *Phaedrus*: we may identify the same and other with the (Greek) of the *Philebus*. We may find in the *Laws* or in the *Statesman* parallels with the account of creation and of the first origin of man. It would be possible to frame a scheme in which all these various elements might have a place. But such a mode of proceeding would be unsatisfactory, because we have no reason to suppose that Plato intended his scattered thoughts to be collected in a system. There is a common spirit in his writings, and there are certain general principles, such as the opposition of the sensible and intellectual, and the priority of mind, which run through all of them; but he has no definite forms of words in which he consistently expresses himself. While the determinations of human thought are in process of creation he is necessarily tentative and uncertain. And there is least of definiteness, whenever either in describing the beginning or the end of the world, he has recourse to myths. These are not the fixed modes in which spiritual truths are revealed to him, but the efforts of imagination, by which at different times and in various manners he seeks to embody his conceptions. The clouds of mythology are still resting upon him, and he has not yet pierced 'to the heaven of the fixed stars' which is beyond them. It is safer then to admit the inconsistencies of the *Timaeus*, or to endeavour to fill up what is wanting from our own imagination, inspired by a study of the dialogue, than to refer to other Platonic writings,—and still less should we refer to the successors of Plato,—for the elucidation of it.

More light is thrown upon the *Timaeus* by a comparison of the previous philosophies. For the physical science of the ancients was traditional, descending through many generations of Ionian and Pythagorean philosophers. Plato does not look out upon the heavens and describe what he sees in them, but he builds upon the foundations of others, adding something out of the 'depths of his own self-consciousness.' Socrates had already spoken of God the creator, who made all things for the best. While he ridiculed the superficial explanations of phenomena which were current in his age, he recognised the marks both of benevolence and of design in the frame of man and in the world. The apparatus of winds and waters is contemptuously rejected by him in the *Phaedo*, but he thinks

that there is a power greater than that of any Atlas in the 'Best' (Phaedo; Arist. Met.). Plato, following his master, affirms this principle of the best, but he acknowledges that the best is limited by the conditions of matter. In the generation before Socrates, Anaxagoras had brought together 'Chaos' and 'Mind'; and these are connected by Plato in the *Timaeus*, but in accordance with his own mode of thinking he has interposed between them the idea or pattern according to which mind worked. The circular impulse (Greek) of the one philosopher answers to the circular movement (Greek) of the other. But unlike Anaxagoras, Plato made the sun and stars living beings and not masses of earth or metal. The Pythagoreans again had framed a world out of numbers, which they constructed into figures. Plato adopted their speculations and improved upon them by a more exact knowledge of geometry. The Atomists too made the world, if not out of geometrical figures, at least out of different forms of atoms, and these atoms resembled the triangles of Plato in being too small to be visible. But though the physiology of the *Timaeus* is partly borrowed from them, they are either ignored by Plato or referred to with a secret contempt and dislike. He looks with more favour on the Pythagoreans, whose intervals of number applied to the distances of the planets reappear in the *Timaeus*. It is probable that among the Pythagoreans living in the fourth century B.C., there were already some who, like Plato, made the earth their centre. Whether he obtained his circles of the Same and Other from any previous thinker is uncertain. The four elements are taken from Empedocles; the interstices of the *Timaeus* may also be compared with his (Greek). The passage of one element into another is common to Heracleitus and several of the Ionian philosophers. So much of a syncretist is Plato, though not after the manner of the Neoplatonists. For the elements which he borrows from others are fused and transformed by his own genius. On the other hand we find fewer traces in Plato of early Ionic or Eleatic speculation. He does not imagine the world of sense to be made up of opposites or to be in a perpetual flux, but to vary within certain limits which are controlled by what he calls the principle of the same. Unlike the Eleatics, who relegated the world to the sphere of not-being, he admits creation to have an existence which is real and even eternal, although dependent on the will of the creator. Instead of maintaining the doctrine that the void has a necessary place in the existence of the world, he rather affirms the modern thesis that nature abhors a vacuum, as in the *Sophist* he also denies the reality of not-being (Aristot. *Metaph.*). But though in these respects he differs from them, he is deeply penetrated by the spirit of their philosophy; he differs from them with reluctance, and gladly recognizes the 'generous depth' of Parmenides (*Theaet.*).

There is a similarity between the *Timaeus* and the fragments of Philolaus, which by some has been thought to be so great as to create a suspicion that they are derived from it. Philolaus is known to us from the *Phaedo* of Plato as a Pythagorean philosopher residing at Thebes in the latter half of the fifth century B.C., after the dispersion of the original Pythagorean

society. He was the teacher of Simmias and Cebes, who became disciples of Socrates. We have hardly any other information about him. The story that Plato had purchased three books of his writings from a relation is not worth repeating; it is only a fanciful way in which an ancient biographer dresses up the fact that there was supposed to be a resemblance between the two writers. Similar gossiping stories are told about the sources of the Republic and the Phaedo. That there really existed in antiquity a work passing under the name of Philolaus there can be no doubt. Fragments of this work are preserved to us, chiefly in Stobaeus, a few in Boethius and other writers. They remind us of the Timaeus, as well as of the Phaedrus and Philebus. When the writer says (Stob. Eclog.) that all things are either finite (definite) or infinite (indefinite), or a union of the two, and that this antithesis and synthesis pervades all art and nature, we are reminded of the Philebus. When he calls the centre of the world (Greek), we have a parallel to the Phaedrus. His distinction between the world of order, to which the sun and moon and the stars belong, and the world of disorder, which lies in the region between the moon and the earth, approximates to Plato's sphere of the Same and of the Other. Like Plato (Tim.), he denied the above and below in space, and said that all things were the same in relation to a centre. He speaks also of the world as one and indestructible: 'for neither from within nor from without does it admit of destruction' (Tim). He mentions ten heavenly bodies, including the sun and moon, the earth and the counter-earth (Greek), and in the midst of them all he places the central fire, around which they are moving—this is hidden from the earth by the counter-earth. Of neither is there any trace in Plato, who makes the earth the centre of his system. Philolaus magnifies the virtues of particular numbers, especially of the number 10 (Stob. Eclog.), and descants upon odd and even numbers, after the manner of the later Pythagoreans. It is worthy of remark that these mystical fancies are nowhere to be found in the writings of Plato, although the importance of number as a form and also an instrument of thought is ever present to his mind. Both Philolaus and Plato agree in making the world move in certain numerical ratios according to a musical scale: though Bockh is of opinion that the two scales, of Philolaus and of the Timaeus, do not correspond...We appear not to be sufficiently acquainted with the early Pythagoreans to know how far the statements contained in these fragments corresponded with their doctrines; and we therefore cannot pronounce, either in favour of the genuineness of the fragments, with Bockh and Zeller, or, with Valentine Rose and Schaarschmidt, against them. But it is clear that they throw but little light upon the Timaeus, and that their resemblance to it has been exaggerated.

That there is a degree of confusion and indistinctness in Plato's account both of man and of the universe has been already acknowledged. We cannot tell (nor could Plato himself have told) where the figure or myth ends and the philosophical truth begins; we cannot explain (nor could Plato himself have explained to us) the relation of the ideas to appearance,

of which one is the copy of the other, and yet of all things in the world they are the most opposed and unlike. This opposition is presented to us in many forms, as the antithesis of the one and many, of the finite and infinite, of the intelligible and sensible, of the unchangeable and the changing, of the indivisible and the divisible, of the fixed stars and the planets, of the creative mind and the primeval chaos. These pairs of opposites are so many aspects of the great opposition between ideas and phenomena—they easily pass into one another; and sometimes the two members of the relation differ in kind, sometimes only in degree. As in Aristotle's matter and form the connexion between them is really inseparable; for if we attempt to separate them they become devoid of content and therefore indistinguishable; there is no difference between the idea of which nothing can be predicated, and the chaos or matter which has no perceptible qualities—between Being in the abstract and Nothing. Yet we are frequently told that the one class of them is the reality and the other appearance; and one is often spoken of as the double or reflection of the other. For Plato never clearly saw that both elements had an equal place in mind and in nature; and hence, especially when we argue from isolated passages in his writings, or attempt to draw what appear to us to be the natural inferences from them, we are full of perplexity. There is a similar confusion about necessity and free-will, and about the state of the soul after death. Also he sometimes supposes that God is immanent in the world, sometimes that he is transcendent. And having no distinction of objective and subjective, he passes imperceptibly from one to the other; from intelligence to soul, from eternity to time. These contradictions may be softened or concealed by a judicious use of language, but they cannot be wholly got rid of. That an age of intellectual transition must also be one of inconsistency; that the creative is opposed to the critical or defining habit of mind or time, has been often repeated by us. But, as Plato would say, 'there is no harm in repeating twice or thrice' (Laws) what is important for the understanding of a great author.

It has not, however, been observed, that the confusion partly arises out of the elements of opposing philosophies which are preserved in him. He holds these in solution, he brings them into relation with one another, but he does not perfectly harmonize them. They are part of his own mind, and he is incapable of placing himself outside of them and criticizing them. They grow as he grows; they are a kind of composition with which his own philosophy is overlaid. In early life he fancies that he has mastered them: but he is also mastered by them; and in language (Sophist) which may be compared with the hesitating tone of the Timaeus, he confesses in his later years that they are full of obscurity to him. He attributes new meanings to the words of Parmenides and Heracleitus; but at times the old Eleatic philosophy appears to go beyond him; then the world of phenomena disappears, but the doctrine of ideas is also reduced to nothingness. All of them are nearer to one another than they themselves supposed, and nearer to him than he supposed. All of them are antagonistic to sense and

have an affinity to number and measure and a presentiment of ideas. Even in Plato they still retain their contentious or controversial character, which was developed by the growth of dialectic. He is never able to reconcile the first causes of the pre-Socratic philosophers with the final causes of Socrates himself. There is no intelligible account of the relation of numbers to the universal ideas, or of universals to the idea of good. He found them all three, in the Pythagorean philosophy and in the teaching of Socrates and of the Megarians respectively; and, because they all furnished modes of explaining and arranging phenomena, he is unwilling to give up any of them, though he is unable to unite them in a consistent whole.

Lastly, Plato, though an idealist philosopher, is Greek and not Oriental in spirit and feeling. He is no mystic or ascetic; he is not seeking in vain to get rid of matter or to find absorption in the divine nature, or in the Soul of the universe. And therefore we are not surprised to find that his philosophy in the *Timaeus* returns at last to a worship of the heavens, and that to him, as to other Greeks, nature, though containing a remnant of evil, is still glorious and divine. He takes away or drops the veil of mythology, and presents her to us in what appears to him to be the form-fairer and truer far—of mathematical figures. It is this element in the *Timaeus*, no less than its affinity to certain Pythagorean speculations, which gives it a character not wholly in accordance with the other dialogues of Plato.

(b) The *Timaeus* contains an assertion perhaps more distinct than is found in any of the other dialogues (*Rep.*; *Laws*) of the goodness of God. 'He was good himself, and he fashioned the good everywhere.' He was not 'a jealous God,' and therefore he desired that all other things should be equally good. He is the IDEA of good who has now become a person, and speaks and is spoken of as God. Yet his personality seems to appear only in the act of creation. In so far as he works with his eye fixed upon an eternal pattern he is like the human artificer in the *Republic*. Here the theory of Platonic ideas intrudes upon us. God, like man, is supposed to have an ideal of which Plato is unable to tell us the origin. He may be said, in the language of modern philosophy, to resolve the divine mind into subject and object.

The first work of creation is perfected, the second begins under the direction of inferior ministers. The supreme God is withdrawn from the world and returns to his own accustomed nature (*Tim.*). As in the *Statesman*, he retires to his place of view. So early did the Epicurean doctrine take possession of the Greek mind, and so natural is it to the heart of man, when he has once passed out of the stage of mythology into that of rational religion. For he sees the marks of design in the world; but he no longer sees or fancies that he sees God walking in the garden or haunting stream or mountain. He feels also that he must put God as far as

possible out of the way of evil, and therefore he banishes him from an evil world. Plato is sensible of the difficulty; and he often shows that he is desirous of justifying the ways of God to man. Yet on the other hand, in the Tenth Book of the Laws he passes a censure on those who say that the Gods have no care of human things.

The creation of the world is the impression of order on a previously existing chaos. The formula of Anaxagoras—'all things were in chaos or confusion, and then mind came and disposed them'—is a summary of the first part of the Timaeus. It is true that of a chaos without differences no idea could be formed. All was not mixed but one; and therefore it was not difficult for the later Platonists to draw inferences by which they were enabled to reconcile the narrative of the Timaeus with the Mosaic account of the creation. Neither when we speak of mind or intelligence, do we seem to get much further in our conception than circular motion, which was deemed to be the most perfect. Plato, like Anaxagoras, while commencing his theory of the universe with ideas of mind and of the best, is compelled in the execution of his design to condescend to the crudest physics.

(c) The morality of the Timaeus is singular, and it is difficult to adjust the balance between the two elements of it. The difficulty which Plato feels, is that which all of us feel, and which is increased in our own day by the progress of physical science, how the responsibility of man is to be reconciled with his dependence on natural causes. And sometimes, like other men, he is more impressed by one aspect of human life, sometimes by the other. In the Republic he represents man as freely choosing his own lot in a state prior to birth—a conception which, if taken literally, would still leave him subject to the dominion of necessity in his after life; in the Statesman he supposes the human race to be preserved in the world only by a divine interposition; while in the Timaeus the supreme God commissions the inferior deities to avert from him all but self-inflicted evils—words which imply that all the evils of men are really self-inflicted. And here, like Plato (the insertion of a note in the text of an ancient writer is a literary curiosity worthy of remark), we may take occasion to correct an error. For we too hastily said that Plato in the Timaeus regarded all 'vices and crimes as involuntary.' But the fact is that he is inconsistent with himself; in one and the same passage vice is attributed to the relaxation of the bodily frame, and yet we are exhorted to avoid it and pursue virtue. It is also admitted that good and evil conduct are to be attributed respectively to good and evil laws and institutions. These cannot be given by individuals to themselves; and therefore human actions, in so far as they are dependent upon them, are regarded by Plato as involuntary rather than voluntary. Like other writers on this subject, he is unable to escape from some degree of self-contradiction. He had learned from Socrates that vice is ignorance, and suddenly the doctrine seems to him to be confirmed by observing how much of the good and bad

in human character depends on the bodily constitution. So in modern times the speculative doctrine of necessity has often been supported by physical facts.

The *Timaeus* also contains an anticipation of the stoical life according to nature. Man contemplating the heavens is to regulate his erring life according to them. He is to partake of the repose of nature and of the order of nature, to bring the variable principle in himself into harmony with the principle of the same. The ethics of the *Timaeus* may be summed up in the single idea of 'law.' To feel habitually that he is part of the order of the universe, is one of the highest ethical motives of which man is capable. Something like this is what Plato means when he speaks of the soul 'moving about the same in unchanging thought of the same.' He does not explain how man is acted upon by the lesser influences of custom or of opinion; or how the commands of the soul watching in the citadel are conveyed to the bodily organs. But this perhaps, to use once more expressions of his own, 'is part of another subject' or 'may be more suitably discussed on some other occasion.'

There is no difficulty, by the help of Aristotle and later writers, in criticizing the *Timaeus* of Plato, in pointing out the inconsistencies of the work, in dwelling on the ignorance of anatomy displayed by the author, in showing the fancifulness or unmeaningness of some of his reasons. But the *Timaeus* still remains the greatest effort of the human mind to conceive the world as a whole which the genius of antiquity has bequeathed to us.

...

One more aspect of the *Timaeus* remains to be considered—the mythological or geographical. Is it not a wonderful thing that a few pages of one of Plato's dialogues have grown into a great legend, not confined to Greece only, but spreading far and wide over the nations of Europe and reaching even to Egypt and Asia? Like the tale of Troy, or the legend of the Ten Tribes (Ewald, *Hist. of Isr.*), which perhaps originated in a few verses of II Esdras, it has become famous, because it has coincided with a great historical fact. Like the romance of King Arthur, which has had so great a charm, it has found a way over the seas from one country and language to another. It inspired the navigators of the fifteenth and sixteenth centuries; it foreshadowed the discovery of America. It realized the fiction so natural to the human mind, because it answered the enquiry about the origin of the arts, that there had somewhere existed an ancient primitive civilization. It might find a place wherever men chose to look for it; in North, South, East, or West; in the Islands of the Blest; before the entrance of the Straits of Gibraltar, in Sweden or in Palestine. It mattered little whether the description in Plato agreed with the locality assigned to it or not. It was a legend so adapted to the human mind that it made a

habitation for itself in any country. It was an island in the clouds, which might be seen anywhere by the eye of faith. It was a subject especially congenial to the ponderous industry of certain French and Swedish writers, who delighted in heaping up learning of all sorts but were incapable of using it.

M. Martin has written a valuable dissertation on the opinions entertained respecting the Island of Atlantis in ancient and modern times. It is a curious chapter in the history of the human mind. The tale of Atlantis is the fabric of a vision, but it has never ceased to interest mankind. It was variously regarded by the ancients themselves. The stronger heads among them, like Strabo and Longinus, were as little disposed to believe in the truth of it as the modern reader in Gulliver or Robinson Crusoe. On the other hand there is no kind or degree of absurdity or fancy in which the more foolish writers, both of antiquity and of modern times, have not indulged respecting it. In the Middle Ages the legend seems to have been half-forgotten until revived by the discovery of America. It helped to form the Utopia of Sir Thomas More and the New Atlantis of Bacon, although probably neither of those great men were at all imposed upon by the fiction. It was most prolific in the seventeenth or in the early part of the eighteenth century, when the human mind, seeking for Utopias or inventing them, was glad to escape out of the dulness of the present into the romance of the past or some ideal of the future. The later forms of such narratives contained features taken from the Edda, as well as from the Old and New Testament; also from the tales of missionaries and the experiences of travellers and of colonists.

The various opinions respecting the Island of Atlantis have no interest for us except in so far as they illustrate the extravagances of which men are capable. But this is a real interest and a serious lesson, if we remember that now as formerly the human mind is liable to be imposed upon by the illusions of the past, which are ever assuming some new form.

When we have shaken off the rubbish of ages, there remain one or two questions of which the investigation has a permanent value:—

1. Did Plato derive the legend of Atlantis from an Egyptian source? It may be replied that there is no such legend in any writer previous to Plato; neither in Homer, nor in Pindar, nor in Herodotus is there any mention of an Island of Atlantis, nor any reference to it in Aristotle, nor any citation of an earlier writer by a later one in which it is to be found. Nor have any traces been discovered hitherto in Egyptian monuments of a connexion between Greece and Egypt older than the eighth or ninth century B.C. It is true that Proclus, writing in the fifth century after Christ, tells us of stones and columns in Egypt on which the history of the Island of Atlantis was engraved. The statement may be false—there are similar tales about columns set up ‘by the Canaanites whom Joshua drove out’ (Procop.); but even if true, it would only show that the legend, 800 years after the time of

Plato, had been transferred to Egypt, and inscribed, not, like other forgeries, in books, but on stone. Probably in the Alexandrian age, when Egypt had ceased to have a history and began to appropriate the legends of other nations, many such monuments were to be found of events which had become famous in that or other countries. The oldest witness to the story is said to be Crantor, a Stoic philosopher who lived a generation later than Plato, and therefore may have borrowed it from him. The statement is found in Proclus; but we require better assurance than Proclus can give us before we accept this or any other statement which he makes.

Secondly, passing from the external to the internal evidence, we may remark that the story is far more likely to have been invented by Plato than to have been brought by Solon from Egypt. That is another part of his legend which Plato also seeks to impose upon us. The verisimilitude which he has given to the tale is a further reason for suspecting it; for he could easily 'invent Egyptian or any other tales' (Phaedrus). Are not the words, 'The truth of the story is a great advantage,' if we read between the lines, an indication of the fiction? It is only a legend that Solon went to Egypt, and if he did he could not have conversed with Egyptian priests or have read records in their temples. The truth is that the introduction is a mosaic work of small touches which, partly by their minuteness, and also by their seeming probability, win the confidence of the reader. Who would desire better evidence than that of Critias, who had heard the narrative in youth when the memory is strongest at the age of ten from his grandfather Critias, an old man of ninety, who in turn had heard it from Solon himself? Is not the famous expression—'You Hellenes are ever children and there is no knowledge among you hoary with age,' really a compliment to the Athenians who are described in these words as 'ever young'? And is the thought expressed in them to be attributed to the learning of the Egyptian priest, and not rather to the genius of Plato? Or when the Egyptian says—'Hereafter at our leisure we will take up the written documents and examine in detail the exact truth about these things'—what is this but a literary trick by which Plato sets off his narrative? Could any war between Athens and the Island of Atlantis have really coincided with the struggle between the Greeks and Persians, as is sufficiently hinted though not expressly stated in the narrative of Plato? And whence came the tradition to Egypt? or in what does the story consist except in the war between the two rival powers and the submersion of both of them? And how was the tale transferred to the poem of Solon? 'It is not improbable,' says Mr. Grote, 'that Solon did leave an unfinished Egyptian poem' (Plato). But are probabilities for which there is not a tittle of evidence, and which are without any parallel, to be deemed worthy of attention by the critic? How came the poem of Solon to disappear in antiquity? or why did Plato, if the whole narrative was known to him, break off almost at the beginning of it?

While therefore admiring the diligence and erudition of M. Martin, we

cannot for a moment suppose that the tale was told to Solon by an Egyptian priest, nor can we believe that Solon wrote a poem upon the theme which was thus suggested to him—a poem which disappeared in antiquity; or that the Island of Atlantis or the antediluvian Athens ever had any existence except in the imagination of Plato. Martin is of opinion that Plato would have been terrified if he could have foreseen the endless fancies to which his Island of Atlantis has given occasion. Rather he would have been infinitely amused if he could have known that his gift of invention would have deceived M. Martin himself into the belief that the tradition was brought from Egypt by Solon and made the subject of a poem by him. M. Martin may also be gently censured for citing without sufficient discrimination ancient authors having very different degrees of authority and value.

2. It is an interesting and not unimportant question which is touched upon by Martin, whether the Atlantis of Plato in any degree held out a guiding light to the early navigators. He is inclined to think that there is no real connexion between them. But surely the discovery of the New World was preceded by a prophetic anticipation of it, which, like the hope of a Messiah, was entering into the hearts of men? And this hope was nursed by ancient tradition, which had found expression from time to time in the celebrated lines of Seneca and in many other places. This tradition was sustained by the great authority of Plato, and therefore the legend of the Island of Atlantis, though not closely connected with the voyages of the early navigators, may be truly said to have contributed indirectly to the great discovery.

The *Timaeus* of Plato, like the *Protagoras* and several portions of the *Phaedrus* and *Republic*, was translated by Cicero into Latin. About a fourth, comprehending with lacunae the first portion of the dialogue, is preserved in several MSS. These generally agree, and therefore may be supposed to be derived from a single original. The version is very faithful, and is a remarkable monument of Cicero's skill in managing the difficult and intractable Greek. In his treatise *De Natura Deorum*, he also refers to the *Timaeus*, which, speaking in the person of Velleius the Epicurean, he severely criticises.

>From the garden of the *Timaeus*, as from the other dialogues of Plato, we may still gather a few flowers and present them at parting to the reader. There is nothing in Plato grander and simpler than the conversation between Solon and the Egyptian priest, in which the youthfulness of Hellas is contrasted with the antiquity of Egypt. Here are to be found the famous words, 'O Solon, Solon, you Hellenes are ever young, and there is not an old man among you'—which may be compared to the lively saying of Hegel, that 'Greek history began with the youth Achilles and left off with the youth Alexander.' The numerous arts of verisimilitude by which Plato insinuates into the mind of the reader the truth of his narrative have been

already referred to. Here occur a sentence or two not wanting in Platonic irony (Greek—a word to the wise). ‘To know or tell the origin of the other divinities is beyond us, and we must accept the traditions of the men of old time who affirm themselves to be the offspring of the Gods—that is what they say—and they must surely have known their own ancestors. How can we doubt the word of the children of the Gods? Although they give no probable or certain proofs, still, as they declare that they are speaking of what took place in their own family, we must conform to custom and believe them.’ ‘Our creators well knew that women and other animals would some day be framed out of men, and they further knew that many animals would require the use of nails for many purposes; wherefore they fashioned in men at their first creation the rudiments of nails.’ Or once more, let us reflect on two serious passages in which the order of the world is supposed to find a place in the human soul and to infuse harmony into it. ‘The soul, when touching anything that has essence, whether dispersed in parts or undivided, is stirred through all her powers to declare the sameness or difference of that thing and some other; and to what individuals are related, and by what affected, and in what way and how and when, both in the world of generation and in the world of immutable being. And when reason, which works with equal truth, whether she be in the circle of the diverse or of the same,—in voiceless silence holding her onward course in the sphere of the self-moved,—when reason, I say, is hovering around the sensible world, and when the circle of the diverse also moving truly imparts the intimations of sense to the whole soul, then arise opinions and beliefs sure and certain. But when reason is concerned with the rational, and the circle of the same moving smoothly declares it, then intelligence and knowledge are necessarily perfected;’ where, proceeding in a similar path of contemplation, he supposes the inward and the outer world mutually to imply each other. ‘God invented and gave us sight to the end that we might behold the courses of intelligence in the heaven, and apply them to the courses of our own intelligence which are akin to them, the unperturbed to the perturbed; and that we, learning them and partaking of the natural truth of reason, might imitate the absolutely unerring courses of God and regulate our own vagaries.’ Or let us weigh carefully some other profound thoughts, such as the following. ‘He who neglects education walks lame to the end of his life, and returns imperfect and good for nothing to the world below.’ ‘The father and maker of all this universe is past finding out; and even if we found him, to tell of him to all men would be impossible.’ ‘Let me tell you then why the Creator made this world of generation. He was good, and the good can never have jealousy of anything. And being free from jealousy, he desired that all things should be as like himself as they could be. This is in the truest sense the origin of creation and of the world, as we shall do well in believing on the testimony of wise men: God desired that all things should be good and nothing bad, so far as this was attainable.’ This is the leading thought in the *Timaeus*, just as the IDEA of Good is the leading thought of the *Republic*, the one

expression describing the personal, the other the impersonal Good or God, differing in form rather than in substance, and both equally implying to the mind of Plato a divine reality. The slight touch, perhaps ironical, contained in the words, 'as we shall do well in believing on the testimony of wise men,' is very characteristic of Plato.

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