

Selections from *Timaeus**

I. THE WORKS OF REASON

Prelude: The Nature and Scope of Physics (27c-29d)

Tim. All men, Socrates, who have any degree of right feeling, at the beginning of every enterprise, whether small or great, always call upon God. And we, too, who are going to discourse of the nature of the universe, how created or how existing without creation, if we be not altogether out of our wits, must invoke the aid of Gods and Goddesses and pray that our words may be acceptable to them and consistent with themselves. Let this, then, be our invocation of the Gods, to which I add an exhortation of myself to speak in such manner as will be most intelligible to you, and will most accord with my own intent.

First then, in my judgment, we must make a distinction and ask, What is that which always is and has no becoming; and what is that which is always becoming and never is? That which is apprehended by intelligence and reason is always in the same state; but that which is conceived by opinion with the help of sensation and without reason, is always in a process of becoming and perishing and never really is. Now everything that becomes or is created must of necessity be created by some cause, for without a cause nothing can be created. The work of the creator, whenever he looks to the unchangeable and fashions the form and nature of his work after an unchangeable pattern, must necessarily be made fair and perfect; but when he looks to the created only, and uses a created pattern, it is not fair or perfect. Was the heaven then or the world, whether called by this or by any other more appropriate name-assuming the name, I am asking a question which has to be asked at the beginning of an enquiry

about anything-was the world, I say, always in existence and without beginning? or created, and had it a beginning? Created, I reply, being visible and tangible and having a body, and therefore sensible; and all sensible things are apprehended by opinion and sense and are in a process of creation and created. Now that which is created must, as we affirm, of necessity be created by a cause. But 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. And there is still a question to be asked about him: Which of the patterns had the artificer in view when he made the world-the pattern of the unchangeable, or of that which is created? If the world be indeed fair and the artificer good, it is manifest that he must have looked to that which is eternal; but if what cannot be said without blasphemy is true, then to the created pattern. Every one will see that he must have looked to, the eternal; for the world is the fairest of creations and he is the best of causes. And having been created in this way, the world has been framed in the likeness of that which is apprehended by reason and mind and is unchangeable, and must therefore of necessity, if this is admitted, be a copy of something. Now it is all-important that the beginning of everything should be according to nature. And in speaking of the copy and the original we may assume that words are akin to the matter which they describe; when they relate to the lasting and permanent and intelligible, they ought to be lasting and unalterable, and, as far as their nature allows, irrefutable and immovable-nothing less. But when they express only the copy or likeness and not the eternal things themselves, they need only be likely and analogous to the real words. As being is to becoming, so is truth to belief. If then, Socrates, amid the many opinions about the gods and the generation of the universe, we are not able to give notions which are altogether and in every respect exact and consistent with one another, do not be surprised. Enough, if we adduce probabilities as likely as any others; for we must remember that I who am the speaker, and you who are the judges, are only mortal men, and we ought to accept the tale which is probable and enquire no further.

*Selections from *Timaeus* (27c-40d; 47e-58c). Translated by Benjamin Jowett with headings and summaries taken from F. Conford, *Plato's Timaeus*, Macmillan, 1959.

Soc. Excellent, Timaeus; and we will do precisely as you bid us. The prelude is charming, and is already accepted by us-may we beg of you to proceed to the strain?

The motive of creation (29d-30c)

Tim. Let me tell you then why the creator made this world of generation. He was good, and the good can never have any 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.

Wherefore also finding the whole visible sphere not at rest, but moving in an irregular and disorderly fashion, out of disorder he brought order, considering that this was in every way better than the other. Now the deeds of the best could never be or have been other than the fairest; and the creator, reflecting on the things which are by nature visible, found that no unintelligent creature taken as a whole was fairer than the intelligent taken as a whole; and that intelligence could not be present in anything which was devoid of soul. For which reason, when he was framing the universe, he put intelligence in soul, and soul in body, that he might be the creator of a work which was by nature fairest and best. Wherefore, using the language of probability, we may say that the world became a living creature truly endowed with soul and intelligence by the providence of God.

The creator's model (30c-31a)

This being supposed, let us proceed to the next stage: In the likeness of what animal did the Creator make the world? It would be an unworthy thing to liken it to any nature which exists as a part only; for nothing can be beautiful which is like any imperfect thing; but let us suppose the world to be the very image of that whole of which all other animals both individually and in their tribes are portions. For the original of the universe contains in itself all intelligible beings, just as this world comprehends us and all other visible creatures. For

the Deity, intending to make this world like the fairest and most perfect of intelligible beings, framed one visible animal comprehending within itself all other animals of a kindred nature.

One world, not many (31a-b)

Are we right in saying that there is one world, or that they are many and infinite? There must be one only, if the created copy is to accord with the original. For that which includes all other intelligible creatures cannot have a second or companion; in that case there would be need of another living being which would include both, and of which they would be parts, and the likeness would be more truly said to resemble not them, but that other which included them. In order then that the world might be solitary, like the perfect animal, the creator made not two worlds or an infinite number of them; but there is and ever will be one only-begotten and created heaven.

The Body of the World

Why this consists of four primary bodies (31b-32c)

Now that which is created is of necessity corporeal, and also visible and tangible. And nothing is visible where there is no fire, or tangible which has no solidity, and nothing is solid without earth. Wherefore also God in the beginning of creation made the body of the universe to consist of fire and earth. But two things cannot be rightly put together without a third; there must be some bond of union between them. And the fairest bond is that which makes the most complete fusion of itself and the things which it combines; and proportion is best adapted to effect such a union. For whenever in any three numbers, whether cube or square, there is a mean, which is to the last term what the first term is to it; and again, when the mean is to the first term as the last term is to the mean-then the mean becoming first and last, and the first and last both becoming means, they will all of them of necessity come to be the same, and

having become the same with one another will be all one. If the universal frame had been created a surface only and having no depth, a single mean would have sufficed to bind together itself and the other terms; but now, as the world must be solid, and solid bodies are always compacted not by one mean but by two, God placed water and air in the mean between fire and earth, and made them to have the same proportion so far as was possible (as fire is to air so is air to water, and as air is to water so is water to earth); and thus he bound and put together a visible and tangible heaven. And for these reasons, and out of such elements which are in number four, the body of the world was created, and it was harmonised by proportion, and therefore has the spirit of friendship; and having been reconciled to itself, it was indissoluble by the hand of any other than the framer.

The world's body contains the whole of all the four primary bodies (32c-33b)

Now the creation took up the whole of each of the four elements; for the Creator compounded the world out of all the fire and all the water and all the air and all the earth, leaving no part of any of them nor any power of them outside. His intention was, in the first place, that the animal should be as far as possible a perfect whole and of perfect parts: secondly, that it should be one, leaving no remnants out of which another such world might be created: and also that it should be free from old age and unaffected by disease. Considering that if heat and cold and other powerful forces which unite bodies surround and attack them from without when they are unprepared, they decompose them, and by bringing diseases and old age upon them, make them waste away-for this cause and on these grounds he made the world one whole, having every part entire, and being therefore perfect and not liable to old age and disease.

It is a sphere, without organs or limbs, rotating on its axis (33b-34a)

And he gave to the world the figure which was suitable and also natural. Now to the animal which was to comprehend all animals,

that figure was suitable which comprehends within itself all other figures. Wherefore he made the world in the form of a globe, round as from a lathe, having its extremes in every direction equidistant from the centre, the most perfect and the most like itself of all figures; for he considered that the like is infinitely fairer than the unlike. This he finished off, making the surface smooth all around for many reasons; in the first place, because the living being had no need of eyes when there was nothing remaining outside him to be seen; nor of ears when there was nothing to be heard; and there was no surrounding atmosphere to be breathed; nor would there have been any use of organs by the help of which he might receive his food or get rid of what he had already digested, since there was nothing which went from him or came into him: for there was nothing beside him. Of design he was created thus, his own waste providing his own food, and all that he did or suffered taking place in and by himself. For the Creator conceived that a being which was self-sufficient would be far more excellent than one which lacked anything; and, as he had no need to take anything or defend himself against any one, the Creator did not think it necessary to bestow upon him hands: nor had he any need of feet, nor of the whole apparatus of walking; but the movement suited to his spherical form was assigned to him, being of all the seven that which is most appropriate to mind and intelligence; and he was made to move in the same manner and on the same spot, within his own limits revolving in a circle. All the other six motions were taken away from him, and he was made not to partake of their deviations. And as this circular movement required no feet, the universe was created without legs and without feet.

The World Soul

Summary. Transition to the World-Soul (34a-b)

Such was the whole plan of the eternal God about the god that was to be, to whom for this reason he gave a body, smooth and even, having a surface in every direction equidistant from the centre, a

body entire and perfect, and formed out of perfect bodies. And in the centre he put the soul, which he diffused throughout the body, making it also to be the exterior environment of it; and he made the universe a circle moving in a circle, one and solitary, yet by reason of its excellence able to converse with itself, and needing no other friendship or acquaintance. Having these purposes in view he created the world a blessed god.

Soul is prior to body (34b-c)

Now God did not make the soul after the body, although we are speaking of them in this order; for having brought them together he would never have allowed that the elder should be ruled by the younger; but this is a random manner of speaking which we have, because somehow we ourselves too are very much under the dominion of chance. Whereas he made the soul in origin and excellence prior to and older than the body, to be the ruler and mistress, of whom the body was to be the subject.

Composition of the World-Soul (35a)

And he made her out of the following elements and on this wise: Out of the indivisible and unchangeable, and also out of that which is divisible and has to do with material bodies, he compounded a third and intermediate kind of essence, partaking of the nature of the same and of the other, and this compound he placed accordingly in a mean between the indivisible, and the divisible and material. He took the three elements of the same, the other, and the essence, and mingled them into one form, compressing by force the reluctant and unsociable nature of the other into the same.

Division of the World-Soul into harmonic intervals (35b-36b)

When he had mingled them with the essence and out of three made one, he again divided this whole into as many portions as was fitting, each portion being a compound of the same, the other, and the essence. And he proceeded to divide after this manner:-First of all, he took away one part of the whole [1], and then he separated a second part which was double the first [2], and then he took away a

third part which was half as much again as the second and three times as much as the first [3], and then he took a fourth part which was twice as much as the second [4], and a fifth part which was three times the third [9], and a sixth part which was eight times the first [8], and a seventh part which was twenty-seven times the first [27]. After this he filled up the double intervals [i.e. between 1, 2, 4, 8] and the triple [i.e. between 1, 3, 9, 27] cutting off yet other portions from the mixture and placing them in the intervals, so that in each interval there were two kinds of means, the one exceeding and exceeded by equal parts of its extremes [as for example 1, $4/3$, 2, in which the mean $4/3$ is one-third of 1 more than 1, and one-third of 2 less than 2], the other being that kind of mean which exceeds and is exceeded by an equal number. Where there were intervals of $3/2$ and of $4/3$ and of $9/8$, made by the connecting terms in the former intervals, he filled up all the intervals of $4/3$ with the interval of $9/8$, leaving a fraction over; and the interval which this fraction expressed was in the ratio of 256 to 243. And thus the whole mixture out of which he cut these portions was all exhausted by him.

Construction of the Circles of the Same and the Different and the planetary circles (36b-d)

This entire compound he divided lengthways into two parts, which he joined to one another at the centre like the letter X, and bent them into a circular form, connecting them with themselves and each other at the point opposite to their original meeting-point; and, comprehending them in a uniform revolution upon the same axis, he made the one the outer and the other the inner circle. Now the motion of the outer circle he called the motion of the same, and the motion of the inner circle the motion of the other or diverse. The motion of the same he carried round by the side to the right, and the motion of the diverse diagonally to the left. And he gave dominion to the motion of the same and like, for that he left single and undivided; but the inner motion he divided in six places and made seven unequal circles having their intervals in ratios of two-and three, three of each, and bade the orbits proceed in a direction opposite to one another; and three [Sun, Mercury, Venus] he made to move with

equal swiftness, and the remaining four [Moon, Saturn, Mars, Jupiter] to move with unequal swiftness to the three and to one another, but in due proportion.

The world's body fitted to its soul (36d-e)

Now when the Creator had framed the soul according to his will, he formed within her the corporeal universe, and brought the two together, and united them centre to centre. The soul, interfused everywhere from the centre to the circumference of heaven, of which also she is the external envelopment, herself turning in herself, began a divine beginning of never ceasing and rational life enduring throughout all time.

Discourse in the World-soul (36e-37c)

The body of heaven is visible, but the soul is invisible, and partakes of reason and harmony, and being made by the best of intellectual and everlasting natures, is the best of things created. And because she is composed of the same and of the other and of the essence, these three, and is divided and united in due proportion, and in her revolutions returns upon herself, the soul, when touching anything which 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. And if any one affirms that in which these two are found to be other than the soul, he will say the very opposite of the truth.

Time, the moving likeness of Eternity (37c-38c)

When the father creator saw the creature which he had made moving and living, the created image of the eternal gods, he rejoiced, and in his joy determined to make the copy still more like the original; and as this was eternal, he sought to make the universe eternal, so far as might be. Now the nature of the ideal being was everlasting, but to bestow this attribute in its fulness upon a creature was impossible. Wherefore he resolved to have a moving image of eternity, and when he set in order the heaven, he made this image eternal but moving according to number, while eternity itself rests in unity; and this image we call time. For there were no days and nights and months and years before the heaven was created, but when he constructed the heaven he created them also. They are all parts of time, and the past and future are created species of time, which we unconsciously but wrongly transfer to the eternal essence; for we say that he "was," he "is," he "will be," but the truth is that "is" alone is properly attributed to him, and that "was" and "will be" only to be spoken of becoming in time, for they are motions, but that which is immovably the same cannot become older or younger by time, nor ever did or has become, or hereafter will be, older or younger, nor is subject at all to any of those states which affect moving and sensible things and of which generation is the cause. These are the forms of time, which imitates eternity and revolves according to a law of number. Moreover, when we say that what has become is become and what becomes is becoming, and that what will become is about to become and that the non-existent is non-existent-all these are inaccurate modes of expression. But perhaps this whole subject will be more suitably discussed on some other occasion.

Time, then, and the heaven came into being at the same instant in order that, having been created together, if ever there was to be a dissolution of them, they might be dissolved together. It was framed after the pattern of the eternal nature, that it might resemble this as far as was possible; for the pattern exists from eternity, and the created heaven has been, and is, and will be, in all time.

The Planets as instruments of Time (38c-39e)

Such was the mind and thought of God in the creation of time. The sun and moon and five other stars, which are called the planets, were created by him in order to distinguish and preserve the numbers of time; and when he had made their several bodies, he placed them in the orbits in which the circle of the other was revolving in seven orbits seven stars. First, there was the moon in the orbit nearest the earth, and next the sun, in the second orbit above the earth; then came the morning star and the star sacred to Hermes, moving in orbits which have an equal swiftness with the sun, but in an opposite direction; and this is the reason why the sun and Hermes and Lucifer overtake and are overtaken by each other. To enumerate the places which he assigned to the other stars, and to give all the reasons why he assigned them, although a secondary matter, would give more trouble than the primary. These things at some future time, when we are at leisure, may have the consideration which they deserve, but not at present.

Now, when all the stars which were necessary to the creation of time had attained a motion suitable to them, and had become living creatures having bodies fastened by vital chains, and learnt their appointed task, moving in the motion of the diverse, which is diagonal, and passes through and is governed by the motion of the same, they revolved, some in a larger and some in a lesser orbit—those which had the lesser orbit revolving faster, and those which had the larger more slowly. Now by reason of the motion of the same, those which revolved fastest appeared to be overtaken by those which moved slower although they really overtook them; for the motion of the same made them all turn in a spiral, and, because some went one way and some another, that which receded most slowly from the sphere of the same, which was the swiftest, appeared to follow it most nearly. That there might be some visible measure of their relative swiftness and slowness as they proceeded in their eight courses, God lighted a fire, which we now call the sun, in the second from the earth of these orbits, that it might give light to the whole of heaven, and that the animals, as many as nature intended, might participate

in number, learning arithmetic from the revolution of the same and the like. Thus then, and for this reason the night and the day were created, being the period of the one most intelligent revolution. And the month is accomplished when the moon has completed her orbit and overtaken the sun, and the year when the sun has completed his own orbit. Mankind, with hardly an exception, have not remarked the periods of the other stars, and they have no name for them, and do not measure them against one another by the help of number, and hence they can scarcely be said to know that their wanderings, being infinite in number and admirable for their variety, make up time. And yet there is no difficulty in seeing that the perfect number of time fulfils the perfect year when all the eight revolutions, having their relative degrees of swiftness, are accomplished together and attain their completion at the same time, measured by the rotation of the same and equally moving. After this manner, and for these reasons, came into being such of the stars as in their heavenly progress received reversals of motion, to the end that the created heaven might imitate the eternal nature, and be as like as possible to the perfect and intelligible animal.

The four kinds of living creature. The heavenly gods (39e-40b)

Thus far and until the birth of time the created universe was made in the likeness of the original, but inasmuch as all animals were not yet comprehended therein, it was still unlike. What remained, the creator then proceeded to fashion after the nature of the pattern. Now as in the ideal animal the mind perceives ideas or species of a certain nature and number, he thought that this created animal ought to have species of a like nature and number. There are four such; one of them is the heavenly race of the gods; another, the race of birds whose way is in the air; the third, the watery species; and the fourth, the pedestrian and land creatures. Of the heavenly and divine, he created the greater part out of fire, that they might be the brightest of all things and fairest to behold, and he fashioned them after the likeness of the universe in the figure of a circle, and made them follow the intelligent motion of the supreme, distributing them over the whole circumference of heaven, which was to be a true cosmos or

glorious world spangled with them all over. And he gave to each of them two movements: the first, a movement on the same spot after the same manner, whereby they ever continue to think consistently the same thoughts about the same things; the second, a forward movement, in which they are controlled by the revolution of the same and the like; but by the other five motions they were unaffected, in order that each of them might attain the highest perfection. And for this reason the fixed stars were created, to be divine and eternal animals, ever-abiding and revolving after the same manner and on the same spot; and the other stars which reverse their motion and are subject to deviations of this kind, were created in the manner already described.

Rotation of the Earth (40b-c)

The earth, which is our nurse, clinging around the pole which is extended through the universe, he framed to be the guardian and artificer of night and day, first and eldest of gods that are in the interior of heaven.

The further movements of the heavenly bodies are too complicated for description here (40c-d)

Vain would be the attempt to tell all the figures of them circling as in dance, and their juxtapositions, and the return of them in their revolutions upon themselves, and their approximations, and to say which of these deities in their conjunctions meet, and which of them are in opposition, and in what order they get behind and before one another, and when they are severally eclipsed to our sight and again reappear, sending terrors and intimations of the future to those who cannot calculate their movements-to attempt to tell of all this without a visible representation of the heavenly system would be labour in vain. Enough on this head; and now let what we have said about the nature of the created and visible gods have an end.

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II. WHAT COMES ABOUT OF NECESSITY

Necessity. The Errant Cause (47e-48e)

Thus far in what we have been saying, with small exception, the works of intelligence have been set forth; and now we must place by the side of them in our discourse the things which come into being through necessity-for the creation is mixed, being made up of necessity and mind. Mind, the ruling power, persuaded necessity to bring the greater part of created things to perfection, and thus and after this manner in the beginning, when the influence of reason got the better of necessity, the universe was created. But if a person will truly tell of the way in which the work was accomplished, he must include the other influence of the variable cause as well. Wherefore, we must return again and find another suitable beginning, as about the former matters, so also about these. To which end we must consider the nature of fire, and water, and air, and earth, such as they were prior to the creation of the heaven, and what was happening to them in this previous state; for no one has as yet explained the manner of their generation, but we speak of fire and the rest of them, whatever they mean, as though men knew their natures, and we maintain them to be the first principles and letters or elements of the whole, when they cannot reasonably be compared by a man of any sense even to syllables or first compounds. And let me say thus much: I will not now speak of the first principle or principles of all things, or by whatever name they are to be called, for this reason-because it is difficult to set forth my opinion according to the method of discussion which we are at present employing. Do not imagine, any more than I can bring myself to imagine, that I should be right in undertaking so great and difficult a task. Remembering what I said at first about probability, I will do my best to give as probable an explanation as any other-or rather, more probable; and I will first go back to the beginning and try to speak of each thing and of all. Once more, then, at the commencement of my discourse, I call upon God, and beg him to be our saviour out of a strange and unwonted enquiry, and to bring us to the haven of probability. So now let us begin again.

The Receptacle of Becoming (48e-49a)

This new beginning of our discussion of the universe requires a fuller division than the former; for then we made two classes, now a third must be revealed. The two sufficed for the former discussion: one, which we assumed, was a pattern intelligible and always the same; and the second was only the imitation of the pattern, generated and visible. There is also a third kind which we did not distinguish at the time, conceiving that the two would be enough. But now the argument seems to require that we should set forth in words another kind, which is difficult of explanation and dimly seen. What nature are we to attribute to this new kind of being? We reply, that it is the receptacle, and in a manner the nurse, of all generation.

Fire, Air, etc., are names of qualities, not substances (40a-50a)

I have spoken the truth; but I must express myself in clearer language, and this will be an arduous task for many reasons, and in particular because I must first raise questions concerning fire and the other elements, and determine what each of them is; for to say, with any probability or certitude, which of them should be called water rather than fire, and which should be called any of them rather than all or some one of them, is a difficult matter. How, then, shall we settle this point, and what questions about the elements may be fairly raised?

In the first place, we see that what we just now called water, by condensation, I suppose, becomes stone and earth; and this same element, when melted and dispersed, passes into vapour and air. Air, again, when inflamed, becomes fire; and again fire, when condensed and extinguished, passes once more into the form of air; and once more, air, when collected and condensed, produces cloud and mist; and from these, when still more compressed, comes flowing water, and from water comes earth and stones once more; and thus generation appears to be transmitted from one to the other in a circle. Thus, then, as the several elements never present themselves in the same form, how can any one have the assurance to assert positively that any of them, whatever it may be, is one thing rather than another?

No one can. But much the safest plan is to speak of them as follows:- Anything which we see to be continually changing, as, for example, fire, we must not call "this" or "that," but rather say that it is "of such a nature"; nor let us speak of water as "this"; but always as "such"; nor must we imply that there is any stability in any of those things which we indicate by the use of the words "this" and "that," supposing ourselves to signify something thereby; for they are too volatile to be detained in any such expressions as "this," or "that," or "relative to this," or any other mode of speaking which represents them as permanent. We ought not to apply "this" to any of them, but rather the word "such"; which expresses the similar principle circulating in each and all of them; for example, that should be called "fire" which is of such a nature always, and so of everything that has generation. That in which the elements severally grow up, and appear, and decay, is alone to be called by the name "this" or "that"; but that which is of a certain nature, hot or white, or anything which admits of opposite equalities, and all things that are compounded of them, ought not to be so denominated.

The Receptacle compared to a mass of plastic material (50a-c)

Let me make another attempt to explain my meaning more clearly. Suppose a person to make all kinds of figures of gold and to be always transmuting one form into all the rest -- somebody points to one of them and asks what it is. By far the safest and truest answer is, That is gold; and not to call the triangle or any other figures which are formed in the gold "these," as though they had existence, since they are in process of change while he is making the assertion; but if the questioner be willing to take the safe and indefinite expression, "such," we should be satisfied. And the same argument applies to the universal nature which receives all bodies -- that must be always called the same; for, while receiving all things, she never departs at all from her own nature, and never in any way, or at any time, assumes a form like that of any of the things which enter into her; she is the natural recipient of all impressions, and is stirred and informed by them, and appears different from time to time by reason of them. But the forms which enter into and go out of her are the

likenesses of real existences modelled after their patterns in wonderful and inexplicable manner, which we will hereafter investigate.

The Receptacle has no qualities of its own (50c-51b)

For the present we have only to conceive of three natures: first, that which is in process of generation; secondly, that in which the generation takes place; and thirdly, that of which the thing generated is a resemblance. And we may liken the receiving principle to a mother, and the source or spring to a father, and the intermediate nature to a child; and may remark further, that if the model is to take every variety of form, then the matter in which the model is fashioned will not be duly prepared, unless it is formless, and free from the impress of any of these shapes which it is hereafter to receive from without. For if the matter were like any of the supervening forms, then whenever any opposite or entirely different nature was stamped upon its surface, it would take the impression badly, because it would intrude its own shape. Wherefore, that which is to receive all forms should have no form; as in making perfumes they first contrive that the liquid substance which is to receive the scent shall be as inodorous as possible; or as those who wish to impress figures on soft substances do not allow any previous impression to remain, but begin by making the surface as even and smooth as possible. In the same way that which is to receive perpetually and through its whole extent the resemblances of all eternal beings ought to be devoid of any particular form. Wherefore, the mother and receptacle of all created and visible and in any way sensible things, is not to be termed earth, or air, or fire, or water, or any of their compounds or any of the elements from which these are derived, but is an invisible and formless being which receives all things and in some mysterious way partakes of the intelligible, and is most incomprehensible. In saying this we shall not be far wrong; as far, however, as we can attain to a knowledge of her from the previous considerations, we may truly say that fire is that part of her nature which from time to time is inflamed, and water that which is moistened, and that the mother substance becomes earth and air, in so far as she receives the impressions of them.

Ideal models of Fire, Air, Water, Earth (51b-e)

Let us consider this question more precisely. Is there any self-existent fire? and do all those things which we call self-existent exist? or are only those things which we see, or in some way perceive through the bodily organs, truly existent, and nothing whatever besides them? And is all that which, we call an intelligible essence nothing at all, and only a name? Here is a question which we must not leave unexamined or undetermined, nor must we affirm too confidently that there can be no decision; neither must we interpolate in our present long discourse a digression equally long, but if it is possible to set forth a great principle in a few words, that is just what we want.

Thus I state my view: If mind and true opinion are two distinct classes, then I say that there certainly are these self-existent ideas unperceived by sense, and apprehended only by the mind; if, however, as some say, true opinion differs in no respect from mind, then everything that we perceive through the body is to be regarded as most real and certain. But we must affirm that to be distinct, for they have a distinct origin and are of a different nature; the one is implanted in us by instruction, the other by persuasion; the one is always accompanied by true reason, the other is without reason; the one cannot be overcome by persuasion, but the other can: and lastly, every man may be said to share in true opinion, but mind is the attribute of the gods and of very few men.

Summary description of the three factors: Form, Copy, and Space as the Receptacle (51e-52d)

Wherefore also we must acknowledge that there is one kind of being which is always the same, uncreated and indestructible, never receiving anything into itself from without, nor itself going out to any other, but invisible and imperceptible by any sense, and of which the contemplation is granted to intelligence only. And there is another nature of the same name with it, and like to it, perceived by sense, created, always in motion, becoming in place and again vanishing out of place, which is apprehended by opinion and sense.

And there is a third nature, which is space, and is eternal, and admits not of destruction and provides a home for all created things, and is apprehended without the help of sense, by a kind of spurious reason, and is hardly real; which we behold as in a dream, say of all existence that it must of necessity be in some place and occupy a space, but that what is neither in heaven nor in earth has no existence. Of these and other things of the same kind, relating to the true and waking reality of nature, we have only this dreamlike sense, and we are unable to cast off sleep and determine the truth about them. For an image, since the reality, after which it is modelled, does not belong to it, and it exists ever as the fleeting shadow of some other, must be inferred to be in another [i.e. in space], grasping existence in some way or other, or it could not be at all. But true and exact reason, vindicating the nature of true being, maintains that while two things [i.e. the image and space] are different they cannot exist one of them in the other and so be one and also two at the same time.

Description of Chaos (52d-53b)

Thus have I concisely given the result of my thoughts; and my verdict is that being and space and generation, these three, existed in their three ways before the heaven; and that the nurse of generation, moistened by water and inflamed by fire, and receiving the forms of earth and air, and experiencing all the affections which accompany these, presented a strange variety of appearances; and being full of powers which were neither similar nor equally balanced, was never in any part in a state of equipoise, but swaying unevenly hither and thither, was shaken by them, and by its motion again shook them; and the elements when moved were separated and carried continually, some one way, some another; as, when rain is shaken and winnowed by fans and other instruments used in the threshing of corn, the close and heavy particles are borne away and settle in one direction, and the loose and light particles in another. In this manner, the four kinds or elements were then shaken by the receiving vessel, which, moving like a winnowing machine, scattered far away from one another the elements most unlike, and forced the most

similar elements into close contact. Wherefore also the various elements had different places before they were arranged so as to form the universe. At first, they were all without reason and measure. But when the world began to get into order, fire and water and earth and air had only certain faint traces of themselves, and were altogether such as everything might be expected to be in the absence of God; this, I say, was their nature at that time, and God fashioned them by form and number. Let it be consistently maintained by us in all that we say that God made them as far as possible the fairest and best, out of things which were not fair and good....

Construction of the figures of the four primary bodies (53c-55c)

In the first place, then, as is evident to all, fire and earth and water and air are bodies. And every sort of body possesses solidity, and every solid must necessarily be contained in planes; and every plane rectilinear figure is composed of triangles; and all triangles are originally of two kinds, both of which are made up of one right and two acute angles; one of them has at either end of the base the half of a divided right angle, having equal sides, while in the other the right angle is divided into unequal parts, having unequal sides. These, then, proceeding by a combination of probability with demonstration, we assume to be the original elements of fire and the other bodies; but the principles which are prior to these God only knows, and he of men who is the friend God. And next we have to determine what are the four most beautiful bodies which are unlike one another, and of which some are capable of resolution into one another; for having discovered thus much, we shall know the true origin of earth and fire and of the proportionate and intermediate elements. And then we shall not be willing to allow that there are any distinct kinds of visible bodies fairer than these. Wherefore we must endeavour to construct the four forms of bodies which excel in beauty, and then we shall be able to say that we have sufficiently apprehended their nature. Now of the two triangles, the isosceles has one form only; the scalene or unequal-sided has an infinite number. Of the infinite forms we must select the most beautiful, if we are to proceed in due order, and any one who can point out a more

beautiful form than ours for the construction of these bodies, shall carry off the palm, not as an enemy, but as a friend. Now, the one which we maintain to be the most beautiful of all the many triangles (and we need not speak of the others) is that of which the double forms a third triangle which is equilateral; the reason of this would be long to tell; he who disproves what we are saying, and shows that we are mistaken, may claim a friendly victory. Then let us choose two triangles, out of which fire and the other elements have been constructed, one isosceles, the other having the square of the longer side equal to three times the square of the lesser side.

Now is the time to explain what was before obscurely said: there was an error in imagining that all the four elements might be generated by and into one another; this, I say, was an erroneous supposition, for there are generated from the triangles which we have selected four kinds—three from the one which has the sides unequal; the fourth alone is framed out of the isosceles triangle. Hence they cannot all be resolved into one another, a great number of small bodies being combined into a few large ones, or the converse. But three of them can be thus resolved and compounded, for they all spring from one, and when the greater bodies are broken up, many small bodies will spring up out of them and take their own proper figures; or, again, when many small bodies are dissolved into their triangles, if they become one, they will form one large mass of another kind. So much for their passage into one another. I have now to speak of their several kinds, and show out of what combinations of numbers each of them was formed. The first will be the simplest and smallest construction, and its element is that triangle which has its hypotenuse twice the lesser side. When two such triangles are joined at the diagonal, and this is repeated three times, and the triangles rest their diagonals and shorter sides on the same point as a centre, a single equilateral triangle is formed out of six triangles; and four equilateral triangles, if put together, make out of every three plane angles one solid angle, being that which is nearest to the most obtuse of plane angles; and out of the combination of these four angles arises the first solid form which distributes into equal and similar parts the

whole circle in which it is inscribed. The second species of solid is formed out of the same triangles, which unite as eight equilateral triangles and form one solid angle out of four plane angles, and out of six such angles the second body is completed. And the third body is made up of 120 triangular elements, forming twelve solid angles, each of them included in five plane equilateral triangles, having altogether twenty bases, each of which is an equilateral triangle. The one element [that is, the triangle which has its hypotenuse twice the lesser side] having generated these figures, generated no more; but the isosceles triangle produced the fourth elementary figure, which is compounded of four such triangles, joining their right angles in a centre, and forming one equilateral quadrangle. Six of these united form eight solid angles, each of which is made by the combination of three plane right angles; the figure of the body thus composed is a cube, having six plane quadrangular equilateral bases. There was yet a fifth combination which God used in the delineation of the universe.

Might there be five worlds? (55c-d)

Now, he who, duly reflecting on all this, enquires whether the worlds are to be regarded as indefinite or definite in number, will be of opinion that the notion of their indefiniteness is characteristic of a sadly indefinite and ignorant mind. He, however, who raises the question whether they are to be truly regarded as one or five, takes up a more reasonable position. Arguing from probabilities, I am of opinion that they are one; another, regarding the question from another point of view, will be of another mind.

Assignment of the regular figures to the four primary bodies (55d-56c)

But, leaving this enquiry, let us proceed to distribute the elementary forms, which have now been created in idea, among the four elements.

To earth, then, let us assign the cubical form; for earth is the most immoveable of the four and the most plastic of all bodies, and that which has the most stable bases must of necessity be of such a

nature. Now, of the triangles which we assumed at first, that which has two equal sides is by nature more firmly based than that which has unequal sides; and of the compound figures which are formed out of either, the plane equilateral quadrangle has necessarily, a more stable basis than the equilateral triangle, both in the whole and in the parts. Wherefore, in assigning this figure to earth, we adhere to probability; and to water we assign that one of the remaining forms which is the least moveable; and the most moveable of them to fire; and to air that which is intermediate. Also we assign the smallest body to fire, and the greatest to water, and the intermediate in size to air; and, again, the acutest body to fire, and the next in acuteness to, air, and the third to water. Of all these elements, that which has the fewest bases must necessarily be the most moveable, for it must be the acutest and most penetrating in every way, and also the lightest as being composed of the smallest number of similar particles: and the second body has similar properties in a second degree, and the third body in the third degree. Let it be agreed, then, both according to strict reason and according to probability, that the pyramid is the solid which is the original element and seed of fire; and let us assign the element which was next in the order of generation to air, and the third to water. We must imagine all these to be so small that no single particle of any of the four kinds is seen by us on account of their smallness: but when many of them are collected together their aggregates are seen. And the ratios of their numbers, motions, and other properties, everywhere God, as far as necessity allowed or gave consent, has exactly perfected, and harmonised in due proportion.

Transformation of the primary bodies (56c-57c)

From all that we have just been saying about the elements or kinds, the most probable conclusion is as follows: earth, when meeting with fire and dissolved by its sharpness, whether the dissolution take place in the fire itself or perhaps in some mass of air or water, is borne hither and thither, until its parts, meeting together and mutually harmonising, again become earth; for they can never take any other form. But water, when divided by fire or by air, on reforming, may become one part fire and two parts air; and a single

volume of air divided becomes two of fire. Again, when a small body of fire is contained in a larger body of air or water or earth, and both are moving, and the fire struggling is overcome and broken up, then two volumes of fire form one volume of air; and when air is overcome and cut up into small pieces, two and a half parts of air are condensed into one part of water. Let us consider the matter in another way. When one of the other elements is fastened upon by fire, and is cut by the sharpness of its angles and sides, it coalesces with the fire, and then ceases to be cut by them any longer. For no element which is one and the same with itself can be changed by or change another of the same kind and in the same state. But so long as in the process of transition the weaker is fighting against the stronger, the dissolution continues. Again, when a few small particles, enclosed in many larger ones, are in process of decomposition and extinction, they only cease from their tendency to extinction when they consent to pass into the conquering nature, and fire becomes air and air water. But if bodies of another kind go and attack them [i.e. the small particles], the latter continue to be dissolved until, being completely forced back and dispersed, they make their escape to their own kindred, or else, being overcome and assimilated to the conquering power, they remain where they are and dwell with their victors, and from being many become one. And owing to these affections, all things are changing their place, for by the motion of the receiving vessel the bulk of each class is distributed into its proper place; but those things which become unlike themselves and like other things, are hurried by the shaking into the place of the things to which they grow like.

Every primary body exists in various grades of size (57c-d)

Now all unmixed and primary bodies are produced by such causes as these. As to the subordinate species which are included in the greater kinds, they are to be attributed to the varieties in the structure of the two original triangles. For either structure did not originally produce the triangle of one size only, but some larger and some smaller, and there are as many sizes as there are species of the four elements. Hence when they are mingled with themselves and with one

another there is an endless variety of them, which those who would arrive at the probable truth of nature ought duly to consider.

Motion and rest (57d-58c)

Unless a person comes to an understanding about the nature and conditions of rest and motion, he will meet with many difficulties in the discussion which follows. Something has been said of this matter already, and something more remains to be said, which is, that motion never exists in what is uniform. For to conceive that anything can be moved without a mover is hard or indeed impossible, and equally impossible to conceive that there can be a mover unless there be something which can be moved-motion cannot exist where either of these are wanting, and for these to be uniform is impossible; wherefore we must assign rest to uniformity and motion to the want of uniformity. Now inequality is the cause of the nature which is wanting in uniformity; and of this we have already described the origin. But there still remains the further point-why things when divided after their kinds do not cease to pass through one another and to change their place-which we will now proceed to explain. In the revolution of the universe are comprehended all the four elements, and this being circular and having a tendency to come together, compresses everything and will not allow any place to be left void. Wherefore, also, fire above all things penetrates everywhere, and air next, as being next in rarity of the elements; and the two other elements in like manner penetrate according to their degrees of rarity. For those things which are composed of the largest particles have the largest void left in their compositions, and those which are composed of the smallest particles have the least. And the contraction caused by the compression thrusts the smaller particles into the interstices of the larger. And thus, when the small parts are placed side by side with the larger, and the lesser divide the greater and the greater unite the lesser, all the elements are borne up and down and hither and thither towards their own places; for the change in the size of each changes its position in space. And these causes generate an inequality which is always maintained, and is continually creating a perpetual motion of the elements in all time.