PLATO

Timaeus

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EVERYMAN, I will go with thee,

and be thy guide,

In thy most need to go by thy side

PLATO

Born at Athens, 428–427 B.C. After the death of Socrates (399) he travelled in Greece, Egypt and Italy. About 387 he returned to Athens and founded the Academy, over which he presided for the remainder of his life, except for two visits to Sicily on political business (367 and 361). He died in 348–347 B.C.

PLATO

Timaeus

EDITED AND TRANSLATED WITH
AN INTRODUCTION BY
JOHN WARRINGTON

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INTRODUCTION

PLATO'S *Timaeus* dates probably from about 360 B.C. It is the first and only completed member of a projected trilogy, and was to have been followed by *Critias* and *Hermocrates*. Less than half of the former was written (it ends abruptly in the middle of a sentence); the latter was never begun. The introductory section of *Timaeus*, however, enables us to outline the scheme as a whole.

All three conversations were to take place on a festival of Athena, which is believed to be that of the Greater Panathenaea, on the grounds that it attracted numerous visitors to Athens from many parts of the Greek world. No year is indicated; but from the presence of Hermocrates we may infer a date earlier than 415 B.C., and perhaps before the outbreak of the Peloponnesian War. The year is in any case irrelevant.

On the previous day Socrates had been discoursing to a group of four men: the Athenian Critias (Plato's own great-grandfather) and three of the latter's guests, Timaeus of Locri in southern Italy, Hermocrates of Syracuse and another person, probably from Italy or Sicily, who is unnamed and prevented by illness from attending today's meeting.

Critias was chosen by Plato doubtless because the central theme of the trilogy required a very old man whose memory would carry him back to the days when Solon's verses were of recent composition. All commentators now agree in identifying Hermocrates with the great Syracusan statesman who did more than anyone else to defeat the Athenian expedition (415–413 B.C.), and who later tried unsuccessfully to reform the institutions of his own city. As we shall see when reconstructing the planned contents of *Hermocrates*, his gifts of statesmanship made him an appropriate choice; an ironic choice, moreover, for those who first listened to Critias' narrative of how Athens had nine thousand years earlier repelled the invasion from Atlantis, and thus saved the entire Mediterranean world from slavery, would have been reminded that their own most ambitious

attempt at colonial expansion had been thwarted half a century before by none other than Hermocrates.

Timaeus of Locri must be considered as an invention of Plato. The eminence ascribed to him in the early pages of the dialogue that bears his name makes it virtually inconceivable that an historical figure of such brilliance should have left not a single trace in the history of Greek political institutions or in that of Greek philosophy and science. An earlier belief in him as a real person was due to the fact that some otherwise unknown author of the first century A.D. produced in the name of Timaeus Locrus a treatise *On the Soul of the World and Nature*. This work was recognized as authentic by the Neoplatonists; and though it is mostly an imperfect summary of *Timaeus*, Plato was assumed to have made it the foundation of his own dialogue. The invention of Timaeus was necessary in the circumstances: the doctrine to be expounded in this first member of the trilogy called for a distinguished philosopher of the Western school, but no such thinker of suitable age was alive during the lifetime of Socrates.

The introductory section of *Timaeus* begins with a proposal from Socrates that the three now present with him shall divide among themselves the subject-matter appointed yesterday to be handled by all four. First, however, he himself will summarize his own discourse, from which the present meeting arose. He had been describing the institutions of an ideal state, and had concluded with a wish that he might see that state transposed from the realm of theory to the plane of historic truth. The ostensible reason for the summary to which he now proceeds is Timaeus' request for a short reminder of the task which he and his friends have undertaken. Granted the situation described by Plato, no such recapitulation was needed, because Critias and his guests have discussed the whole project and drawn up a scheme for its fulfilment; but the overall plan of the trilogy obliges the author to tell his readers at the outset that the citizens of the ideal state already outlined by Socrates are going to be identified with the prehistoric Athenians of Critias' tale, which is recounted briefly in the introductory section of *Timaeus* and was to have been told at greater length in the next dialogue.

This preliminary conversation brings us to the first of certain errors on the part of even fairly recent commentators, whose

disregard of the textual evidence has added confusion to the intrinsic difficulties of this noble work. Socrates' recapitulation of his earlier discourse does in fact summarize the external institutions of the state described in Books II–V of the *Republic*, from which it has been inferred that Plato intended *Timaeus* as a sequel to the *Republic*. The absurdity of this conclusion was shown as long ago as 1895 by Hirzel; and the theory might have been ignored here, but for its revival less than thirty years ago by the Loeb editor, R. G. Bury, who repeated it not as an hypothesis but as acknowledged fact. I shall not re-argue the matter in detail, but the following points may be noted. (1) Socrates' conversation with Glaucon and Adeimantus in the *Republic* takes place 'on the day after the feast of Bendis', i.e. on the 20th of the month Thargelion; the occasion of *Timaeus* is a festival of Athena, and no festival of that goddess fell on 21st Thargelion. (2) At *Timaeus* 19A, B it is clearly stated that Socrates' recapitulation is a 'fair summary', i.e. that it has omitted nothing of importance; but if Plato intended *Timaeus* 17C–19B as a fair summary of the whole *Republic*, he is here describing as of no importance at least three of the most significant topics of the earlier dialogue.

Now as to the design of the projected trilogy. In the *Republic* Plato had set out to discover the best means of eliminating the evils to which mankind is prey, and he sought those means in a political and social reform which would give the Greek city-state institutions modelled upon what he believed to be the fundamental and enduring characteristics of human nature. Towards the end of that great dialogue he becomes less hopeful of accomplishing any such reform; the ideal state must be regarded as a pattern laid up, so to speak, in heaven, whereby all existing constitutions can be approved or condemned. Moreover, since completing the *Republic*, Plato himself had experienced failure and disillusionment in his Sicilian venture. Now therefore, in the introduction to *Timaeus*, only the earlier books of the *Republic* are summarized; the later books flow from the question how to realize the ideal state, and are consequently ignored. Here, in this trilogy, that state will be conceived not as some possible future achievement, but as identical with the real Athens of a Golden Age.

But before relating in *Critias* the legend of Atlantis and the

destruction of civilization Plato gives us a sublime preface in the form of a long discourse by Timaeus, which is a myth of creation down to the fashioning of man. The process starts from the ideal world of the Demiurge and the eternal Forms, moving thence to the visible frame of the universe and thence again to the nature of man, whose subsequent fate will be told in Critias' story. Why this lengthy and often obscure cosmological preface which might seem at first glance irrelevant to the main theme? Clearly Plato is endeavouring to forge a link between the morality embodied in his ideal society and the organization of the world as a whole. In the *Republic* he had drawn a structural analogy between the city-state and the individual soul. Here he bases his concept both of man's individual life and of human society upon the unchanging and unchangeable foundation of the universal order. Throughout the discourse of Timaeus there runs this parallel of macrocosm and microcosm. Morality is the fruit neither of human evolution nor of human decree. It is nothing less than a spiritual harmony within the soul; and this latter is a duplicate in miniature of the world-soul, which possesses its own everlasting order and harmony imposed by Reason. Every human soul before its incarnation is granted a sight of that order, an order which continues to be manifested, though more obscurely, in the visible framework and functioning of the heavens.

Such is the message of *Timaeus*, delivered in the form of a myth and in language intensely poetic. The mythical character of the entire discourse must be kept in mind if one hopes to avoid a morass of misunderstanding. Some modern commentators have overlooked the purely mythical character of the Demiurge, crediting him with attributes proper to the God of Jewish-Christian theology and representing Plato as a monotheist on the threshold of Christianity! Yet it is absolutely plain from the text that the Demiurge, so far from creating *ex nihilo*, is strictly limited in the scope of his activity by the element of Necessity. Another equally preposterous interpretation is Taylor's theory that in *Timaeus* we have not Plato's own thought, but an unsuccessful conflation of Pythagorean mathematics and Empedoclean biology. To take such a view is to reject the whole of ancient and later tradition from Aristotle onwards. As Cornford remarks: 'It is hard to understand how anyone acquainted with the literature and art of the classical period can

imagine that the greatest philosopher of that period, at the height of his powers, could have wasted his time on so frivolous and futile an exercise in pastiche.'

In the next dialogue Critias was to repeat the now celebrated legend heard by Solon in Egypt: how nine thousand years ago Athens repulsed the formidable invasion from Atlantis, but, having thus saved freedom and civilization, was immediately afterwards engulfed (as also was Atlantis) by a cataclysm of flood and earthquake, leaving only a few uncultured shepherds on the mountain tops. This was the point at which Critias was to finish and Hermocrates to begin his discourse, the third and final member of the trilogy. There can be little doubt that he would have described the rebirth of civilization, its progress through subsequent ages and its prospects in the future. The material was already to hand in the shape of notes which Plato had made over a considerable period on the laws of various Greek states. It seems therefore more than likely that *Hermocrates* would have embodied the subject-matter which Plato, after abandoning his trilogy for some reason of which we cannot be certain, eventually worked up into Books III–X of the *Laws*.

Timaeus is by no means the 'easiest' of Plato's dialogues. Its biological and anatomical notions are hopelessly inaccurate, though their apparent absurdity is mitigated by the mythical nature of the whole discourse. It is the dense obscurity of the language in many places that makes a translation for Everyman's Library extremely difficult. This series aims to supply accurate and readable versions of the ancient classics for the general reader no less than for students who cannot work from the original Greek. Editorial policy therefore excludes anything in the nature of a full commentary which would run to at least twice and probably three times the length of the text. Some of the difficulties might have been circumvented by a much freer and therefore unfaithful rendering; but it is the business of a translator to translate, not to paraphrase or adapt. This I have done from the text of A. Rivaud (1922), but with frequent reference to that of J. Burnet and accepting a number of emendations proposed elsewhere, notably by Cornford. No general reader, however, could hope to find his way through

Timaeus without some guidance over and above the indispensable minimum of footnotes. Since the work, from page 13 onwards, forms a single unbroken discourse rather than a dialogue in the usual sense, I have felt entitled to break it up into sections and subsections, prefixing to most of them a brief summary printed in smaller type. All numbered and lettered headings with their prefatory notes are mine, not Plato's. The Stephanus numbers and letters are printed in square brackets.

My indebtedness to others is acknowledged in the following Select Bibliography, upon the contents of which I have been so largely dependent.

JOHN WARRINGTON.

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TIMAEUS

PERSONS OF THE DIALOGUE

Socrates *Hermocrates*
Timaeus *Critias*

INTRODUCTORY DIALOGUE

[17A] SOCRATES. One, two, three—but, my dear Timaeus, where is the fourth of our guests of yesterday who were going to entertain me today?

TIMAEUS. He suddenly felt unwell, Socrates; he would never willingly have stayed away from our gathering.

SOCR. In that case, surely, it's up to you and our friends here to supply for him in his absence.

[B] TIM. Undoubtedly, and we shall do our best not to disappoint you. After the lavish hospitality we received from you yesterday it would be utterly wrong if those of us who are left failed to entertain you cordially in return.

SOCR. Well, do you remember the task I set you, the various subjects I arranged that you should discuss?

TIM. More or less; if we've forgotten anything, you are here to remind us. But on second thoughts, if it's no trouble, you might run over them again briefly, so as to fix them more firmly in our minds.

[C] SOCR. Yes, I'll do that. When I was talking yesterday I was concerned with what, as it seemed to me, would be the best form of society and the sort of men who would compose it.

TIM. Yes, Socrates, and we all thoroughly approved of the society you described.

SOCR. I think I'm right in saying we began by dividing off the farmer class and all other craftsmen from the class responsible for defending the State.

TIM. Yes.

[D] SOCR. Then, having assigned a single occupation to each man, one craft suited to his natural talent, we said that those whose duty it is to fight on behalf of all must act exclusively

as guardians of the State, so as to prevent any outsider or anyone inside from venturing to do it harm; and that they should behave leniently when sitting in judgment on their subjects, as natural friends, [18] but show themselves stern in battle towards whatever enemies they encounter.

TIM. Perfectly true.

SOCR. We held, in fact, that the guardians' temperament should be both spirited and philosophic in the highest degree, enabling them to treat their friends with all due lenience and their foes with proper severity.

TIM. Yes.

SOCR. And what about their education? Didn't we agree they were to be trained in gymnastics, in music, and in all studies suited to such men?

TIM. We did.

[B] SOCR. And we said, I believe, that the men so trained were never to regard silver or gold or anything else as their personal property; like a garrison, which in return for its services receives from those it protects such a moderate wage as would reasonably suffice temperate men, they were to share all expenses and lead a common life together, having virtue as their constant preoccupation and free from all other activities.

TIM. So we agreed.

[C] SOCR. We then passed to the subject of women, arguing that their natures should be formed to the same harmonious blend of qualities as those of the men, and that the occupations assigned to them, both in war and in other concerns of life, should in every case be the same for all alike.

TIM. Quite so.

SOCR. And how about the procreation of children? But maybe memory can hardly fail us here; our proposals were so very unorthodox. We laid down that all should have their marriages and children in common, thus making sure that no one should ever recognize his own offspring, [D] but that each should consider all as a single family—as brothers and sisters, if of an age with themselves; as parents and grandparents, if older; as children and grandchildren, if younger.

TIM. Yes, as you say, that is easily remembered.

SOCR. Next, in order to ensure the perfect and unimpeded development of their natural qualities, we provided, you

remember, that the magistrates of both sexes must make secret arrangements for the contracting of marriage [E] by a certain method of drawing lots, which would mate both the better men and the worse with women of like nature. Secrecy will prevent the arrangement from creating ill-feeling among them, for they will ascribe the allotment to mere chance.

TIM. I remember that.

[19] SOCR. And do you recall how we said that the offspring of the better sort were to be educated, but those of the worse were to be spirited away to various other parts of the country; and as these grew up the rulers were to keep an eye on them and from time to time bring back again those whom they deemed worthy, filling their places with those who had proved unsatisfactory at home?

TIM. So we said.

SOCR. Well, that, I think, is a fair summary of yesterday's conversation. Is there anything, Timaeus, which we feel has been overlooked?

[B] TIM. No, no; that covers all we said, Socrates.

SOCR. Listen now while I go on to tell you what I feel about the society we have described. I feel rather like a man who has been looking at some beautiful animals in a painting, or maybe at real animals, alive but motionless, [C] and then is seized with a desire to watch them in motion, vigorously engaged in some such activity as would appear suitable to their physique. That is just how I feel about the State we have described: I should like to hear someone give an account of her contending with others in those forms of strife which international conflict generally assumes; in what a fine spirit she goes to war, and how she then displays in her dealings with each several State, as regards both military operations and oral negotiations, those qualities which befit her education and training.

[D] In this respect, Critias and Hermocrates, I am aware of my own inability ever to exalt our citizens and our State as they deserve. About that there is nothing extraordinary. But I have formed the same opinion about the poets also, past and present; not that I entertain a low opinion of poets in general, but everyone recognizes that an imitator of whatever kind [1]

[1] For poetry as an 'imitative' art, see *Republic*, 392D; 597E ff; and Aristotle, *Poetics*.

will reproduce most easily and successfully things among which he has lived from childhood upwards, whereas [E] it is hard for any man to reproduce satisfactorily in action what lies beyond the range of his early experience, and still harder in words. As regards the sophists, I consider them well versed in the making of fine speeches on many other subjects; but they are a class of men with no fixed abode, wandering from one city to the next, and I am therefore afraid they are liable to misunderstand philosopher-statesmen and give a false idea of what these latter are likely to do or say in time of war, whether in the conduct of hostilities or in the work of negotiation.

We are left, therefore, with the class to which you three belong—a class which by nature and upbringing shares the qualities of both the others. [29] Our friend Timaeus, for example, is a native of a very well governed State, Italian Locri,[1] and second to none of its citizens either in wealth or rank; and besides having occupied the highest offices and enjoyed the highest honours in that State, he has attained, I believe, the very summit of distinction in all branches of philosophy. As for Critias, every one of us here knows that he is no novice in any of the subjects we are discussing; and as regards Hermocrates, we must believe the many witnesses who declare him fully qualified in all such matters by nature and upbringing.

[B] Well, this was in my mind yesterday when I so gladly acceded to your request for a discourse on the constitution of society: I knew that, if you would consent to provide the sequel, none could do it more satisfactorily; you would be able to describe that State engaged in a war worthy of her and fulfilling our expectations, as no one else could. So, after doing my bit, I set you in turn the task of which I now remind you. [C] You agreed to consult among yourselves and requite my hospitality today; so here I am, ready for that feast in festal garb, and most eager to receive.

HERMOCRATES. Rest assured, Socrates, as our friend Timaeus said, we shall do our level best; nor indeed have we any excuse for refusing what you ask. Yesterday, in fact, as soon as we reached the guest-quarters at Critias's, where we are lodging

[1] Cf. *Laws*, 638B. The traditional lawgiver of Epizephyrian Locri was Zaleucus (*c.* 650 B.C.). *See* Aristotle, *Politics*, 1274^{a}22.

—no, indeed, earlier still, on our way back—we were talking about this very subject. [D] Critias here mentioned a story he had heard long ago; but come, Critias, let our friend hear it, so that he can help us to decide whether or not it is relevant to the theme he has set us.

CRITIAS. That shall be done, provided our third partner, Timaeus, also approves.

TIM. Of course I approve.

CRIT. Listen then, Socrates, to a story which, though strange, is none the less perfectly true, as Solon, wisest of the Seven Sages, once affirmed. Solon, you know—and indeed he often says as much in his poems—[E] was a relation and very dear friend of my great-grandfather Dropides; and Dropides told my grandfather Critias—as the old man himself in due course related to me—that the achievements of Athens in olden days, the record of which has perished through lapse of time and the destruction of human life, were great and admirable. Greatest of all was one [21] which it will now suit our purpose to recall both as payment of our indebtedness to you and also as a hymn of praise, chanted as it were in proper liturgical fashion, in honour of the goddess on this her feast day.[1]

SOCR. Splendid! But tell me, what was this ancient exploit that Critias described on Solon's authority as something not to be found in the records, though really performed by Athens?

CRIT. I will tell you the story I heard as an old tale from a man well on in years. At that time Critias, as he himself said, was already verging on ninety, and I was somewhere about ten. [B] We were keeping the festival of Apaturia; it was Children's Day,[2] and for us boys, as usual, there was a ceremony which consisted of competitions in recitation, for which our fathers gave prizes. Numerous poems by a great variety of authors were declaimed, and since the poems of Solon were then a novelty many of us children sang them. Now one of our fellow demesmen—either because he really thought so at the time, or by way of pleasing Critias—declared that in his opinion Solon was [C] the finest of poets as well as the wisest of men

[1] The Greater Panathenaea.

[2] Apaturia was celebrated in October in honour of Dionysus. Children's Day (*Cureotis*) was the third day, when boys born during the past twelve months were registered.

in all other respects. I remember the scene so well; my old grandfather was delighted and said with a smile: 'Ah, Amynander, *if only he had not* taken up poetry as a side-line, *but had applied himself* to it like others; and if he had completed the story he brought back from Egypt instead of having to lay it aside because of the seditions and other evils he found on his return to Athens—[D] why then, I say, neither Hesiod nor Homer nor any other poet would have become more famous than he.' 'What was that story, Critias?' Amynander asked. 'Its subject', answered Critias, 'was a tremendous exploit, worthy indeed to be accounted the most remarkable of all achievements, which was performed by this city, although the written record has not come down to us owing to lapse of time and the destruction of its actors.' 'Tell us the whole tale,' said Amynander. 'How and from whom did Solon hear this story which he repeated as actual fact?'

[E] 'Near the apex of the Egyptian Delta,' said Critias, 'where the stream of Nile divides, there is a province called the Saitic. The capital of this province is Sais (home of King Amasis [1]), the patroness of which is a goddess called by the Egyptians Neïth,[2] and in Greek, according to them, Athena. The natives profess themselves great lovers of Athens, and claim some kinship with our people here. Solon said that when he visited the place he was received with much honour; and further [22] that when he was questioning the most learned annalists among their priests about early Egyptian history, he found that neither he himself nor any other Greek had any worthwhile knowledge of antiquity. On one occasion, wishing to draw them out upon the subject of ancient times, he set about telling them the most venerable of our traditions—the story of Phoroneus, reputedly the first man, and Niobe. Then he proceeded to narrate the legend of how Deucalion and Pyrrha survived the Flood, [B] and traced the genealogy of their descendants. Lastly, by reckoning the generations, he tried to estimate how many years had passed since those events. But one of the priests, a very, very old man, said: "Really, Solon, you Greeks are still mere children; there is no

[1] The phil-hellene Pharaoh Aahmes, 569–525 B.C. *See* Herodotus, ii. 162 ff.

[2] *See* Herodotus, ii. 28. Plutarch identifies her with Isis.

such thing as an old man in Greece." "What do you mean?" asked Solon, to which the priest replied: "You are young in mind, every one of you; you possess no store of old belief based on long tradition, no knowledge that is hoary with age. And here is the reason: [C] Mankind often has been and often will be destroyed in various ways [1]—chiefly by fire and water, but also by innumerable less spectacular means. Yes; take, for example, the story common to both our countries, how once upon a time Phaethon, son of Helios, yoked his father's chariot but was unable to drive it along his father's course; he burnt up everything on earth, and himself perished by a thunderbolt.

'"Now that story, as it is told, has all the appearance of a fable; [D] it alludes in fact to a deviation of the heavenly bodies which move around the earth, and a destruction of the things on earth by raging fire—a destruction which recurs at long intervals. At such times all who live on mountains and in high regions where it is dry perish more completely than those who dwell near rivers or the sea. Here in Egypt we have the Nile, which preserves us in so many ways and in particular saves us from this calamity when it is unloosed.[2] Again, when the gods purge the earth with a deluge of water, the herdsmen and shepherds in the mountains are safe,[3] while the [E] town-dwellers in your part of the world are swept into the sea by the rivers. But here neither then nor at any other time does the water pour down over our fields from above; on the contrary, it all tends naturally to well up from below. For these reasons, then, the traditions preserved here are the most ancient on record; though in point of fact wherever there is [23] no excessive heat or cold to prevent it there always exists some human stock, now more, now less in number. From time immemorial every noble, great or otherwise remarkable event that has occurred, whether in your country or in ours or in some other place of which we know by report, has been set down in the records and kept here in our temples; whereas you and other peoples have only just been re-equipped with

[1] Cf. *Laws*, 676 ff.
[2] *luomenos*. Either by the melting of snows or by the opening of artificial dams and sluices.
[3] Cf. *Laws*, 677B.

writing and all the other necessaries of civilized life when once again, after the usual interval of years, a flood from heaven comes sweeping down like a plague, sparing none of you but the illiterate and uncultured. [B] So you start again like children, with no knowledge of what existed in old days here or in your own country. I tell you, Solon, the Greek genealogies you recited just now are little better then nursery tales. In the first place your people recall only one deluge, though many had occurred previously; nor are you aware of the fact that the noblest and most perfect race of men once lived in your present homeland. [C] From a tiny remnant of their seed you yourself and all your fellow citizens are sprung; but this has escaped your notice because generation after generation of survivors died powerless to express themselves in writing. Yes, Solon, once upon a time, before the greatest of deluges, what is now the Athenian State was the bravest in war and supremely well organized in all other respects too. It is said to have possessed the most magnificent works of art and the finest political constitution of any nation under heaven [D] of which we have heard tell."

'Solon was astonished by this information, and begged the priest to give him an exact and orderly account of our predecessors' exploits. "Solon," answered the priest, "I do not begrudge you the story; I will tell it for your own sake, for that of your city, but above all in honour of the goddess, patroness of your land and of ours, who has fostered both and instructed them in arts. [E] Yours she founded first by a thousand years, after receiving the seed of you from Ge and Hephaestus;[1] ours not until later; and the age of our civilization as recorded in our sacred books is eight thousand years. I am therefore going to tell you briefly about some of the laws framed by men who lived nine thousand years ago, and about the most splendid of their achievements; [24] later, when there is time, we will take the actual writings and go through the whole account in precise order and detail.

'"To obtain an idea of their laws, consider our own; you will find here today many parallels to your own institutions as they were at that time. You see first the priestly caste, set apart

[1] i.e. from the elements earth and fire. For the legend of Erechtheus, son of Ge and Hephaestus, and king of Athens, *see* Euripides' *Ion*.

from all others; next the class of craftsmen, of which each group works by itself without mixing with any other; then the classes of shepherds, hunters and farmers, each distinct and separate. [B] You have also no doubt observed that the military caste here is kept apart from all other branches of society, being obliged by law to concern itself exclusively with the business of war. Notice too the peculiarity of their equipment with shields and spears. We were the first Asian people to adopt these arms; the goddess instructed us to do so, just as she had instructed you in your part of the world. Again, in the sphere of practical wisdom, you doubtless see how much attention the law here has from the very beginning devoted to it, both as regards the order of the world, [C] discovering all the effects produced by divine causes in human affairs, right down to divination and the art of medicine which aims at health, and likewise by its mastery of all other subsidiary sciences.[1] Well, the goddess had adorned you earlier with all this regular and orderly system when she founded Athens, choosing your native land because she saw that the well tempered climate would bring forth men of the highest intelligence. Being a lover both of war and of wisdom, [D] the goddess chose a spot likely to produce men most akin to herself, and there made her first settlement.

'"Accordingly you lived under the governance of laws such as I have mentioned, and even better laws, surpassing all mankind in every virtue, as befitted those who were the offspring and nurslings of gods. The many great achievements of your State are a source of wonder to those who study the records here; but there is one conspicuous above all both for its magnitude and for its moral grandeur. [E] Our records describe how Athens once halted the advance of an enormous host which had started from a distant point in the Atlantic and was insolently marching to attack the whole of Europe, and Asia as well. For in those days that ocean was navigable: due west of the strait which your countrymen tell me you call the Pillars of Heracles [2] lay an island larger than Libya [3] and Asia together; and travellers were able to cross from it to the

[1] The general meaning of this sentence is that the Egyptians based a applied arts and sciences on observation of the heavens.
[2] i.e. the Straits of Gibraltar. [3] i.e. Africa.

other islands, and thence to the opposite [25] continent that bounds that ocean which truly deserves the name. For all this area, lying within the strait of which I speak, appears to be a bay with a narrow entrance; whereas outside is real open sea, and the land surrounding it may be called in the fullest and truest sense a continent.

"'Now in this island of Atlantis there existed an immensely powerful confederation of kings, which held sway over the whole island, over many other islands besides, and over parts of the continent. Within the strait, too, their authority extended over Libya [B] as far as Egypt, and over Europe as far as Tyrrhenia. Well, this confederation once made a combined effort to enslave by one single onslaught both your country and ours and the whole Mediterranean area. Then it was, Solon, that the power of your State was revealed in its valour and strength for all the world to see. She distinguished herself above all in courage and the science of warfare: [C] acting at first as leader of the Greeks, and afterwards standing alone when deserted by everyone else, she faced the deadliest perils, defeated the invaders and erected her trophy. Thereby she saved from slavery those who had not as yet been enslaved, and all the rest of us who dwell within the bounds set by Heracles she ungrudgingly set free.

"'Subsequently, however, terrible earthquakes and floods occurred. [D] In one dreadful night and day the entire Athenian army was swallowed up by the earth, while the island of Atlantis was likewise engulfed by the sea and disappeared. Hence to this day that outer ocean cannot be traversed or explored, the way being blocked by mud, just below the surface, left by the island as it sank.'''

[E] Now, Socrates, you have heard in brief outline the account given by the elder Critias of what he was told by Solon. When you were talking yesterday, expressing your ideas of the State and its citizens, I was amazed when I called to mind the facts I am now relating: I thought to myself what a remarkable stroke of chance it was that your description coincided for the most part so exactly with Solon's narrative. [26] But I preferred to make no comment then and there; for owing to lapse of time my recollection of his story was not sufficiently precise, and I therefore decided that I ought not to

repeat it until I had first gone over it all carefully in my own mind. Because there was time to do this, I readily agreed to the theme you proposed yesterday, thinking we should be reasonably well equipped for the task of providing a suitable discourse—which in all such cases is the greatest problem. And so, as Hermocrates said, no sooner had I left yesterday than I began [B] telling our friends the story as I remembered it, and after parting from them I reviewed it again during the night and managed, as it were, to pick up all the threads. It is really quite extraordinary how one's childhood lessons 'grip the mind', as the saying is. I'm not at all sure I could remember all I heard yesterday; but as to that tale I heard long, long ago, I should be vastly surprised if a single detail of it has escaped me. I heard it first with a great deal of boyish delight; [C] I kept questioning the old man repeatedly, and he was eager to give me the information, so the story is stamped firmly on my mind like encaustic designs of an indelible painting. Finally, just after daybreak I related the same story to our friends here in order that they might be equally well provided with material for discourse.

Now therefore, Socrates—and this is the purpose of all I have been saying—I am ready to tell my tale, not merely in outline but in full detail exactly as I heard it. We will transfer the State you described yesterday and its citizens from the realm of theory to that of concrete fact; [D] we will assume the city to be Athens, and say that the citizens you imagined are in truth those actual progenitors of ours, of whom the priest spoke. They will fit to perfection, and there will be no inconsistency in declaring them to be the very men who lived at that time. Dividing the task between us, we will all endeavour to the best of our ability to do justice to the theme you have prescribed. Therefore, Socrates, we must consider whether this story meets with our approval, or whether we must go ahead and look for a substitute.

[E] SOCR. No, Critias, what better story than yours could we adopt? It will be perfectly in keeping with today's festival of the goddess, because of her association with it; and the fact that it is no invented fable, but genuine history, is all-important. How, indeed, and where shall we find other characters if we abandon these? Quite impossible. You three,

therefore, must now get on with the subject, and good luck go with you. [27] Having had my say yesterday, I must keep quiet and listen.

CRIT. Here then, Socrates, is the plan of the entertainment we have arranged for you. Seeing that Timaeus is our most learned astronomer and has specialized in the nature of the universe, we decided that he should speak first, beginning with the origin of the world and ending with the generation of mankind. I am to follow him, taking over from him the human race he has as it were created by his speech, and from you a body of highly trained individuals. [B] Then, in accordance with Solon's enactment, I am to bring these men before you, as before a court of law, and make them citizens of this State of ours, considering them as Athenians of that remote age whose existence, so long forgotten, has been revealed to us by declaration of the sacred records; and thereafter I am to proceed as if I were talking about men who are actual citizens of Athens.

SOCR. It looks as though you are going to reward me with a complete and magnificent banquet of discourse. Well then, Timaeus, it is apparently your task to lead off, but first you must invoke the gods as custom requires.

THE DISCOURSE OF TIMAEUS

PRELUDE: NATURE AND SCOPE OF PHYSICS

TIMAEUS begins by stating the broad principles of all that he is about to say, and defines the limitations of any discourse on physics. Having invoked the gods he lays down three general premisses, and then applies them in turn to the visible universe:

(*a*) The eternal is the intelligible; what comes to be is the sensible, and because the world is sensible it must be something that comes to be.

(*b*) Anything that comes to be must have a cause, a maker and father; but it is hard to discover him.

(*c*) A maker's work will be good only if he fashions it according to an eternal pattern; now the world is good, and therefore its pattern must have been eternal.

From all this it follows that no account of the physical universe can be more than 'likely', because that universe is merely a 'likeness' of immutable reality.

[C] TIM. That, Socrates, is what all do who have a grain of sense: always, at the start of any undertaking, great or small, they call upon a god. We here are about to discourse on the universe and describe how (if at all) it began to exist; so unless we are completely out of our minds we too must invoke gods and goddesses, praying that all we say may be pleasing to them and in consequence satisfactory to ourselves. [D] Let that then be sufficient invocation of the deities; the appeal to our own powers must be that you may most readily learn and I may most clearly expound my views on the subject before us.

In the first place, I think, we must draw the following distinction: What is that which is always real and has no becoming, [28] and what is that which is always becoming [1] and is never real? That which is apprehensible by thought with a rational account [2] is the thing that is always unchangeably

[1] i.e. that which is everlastingly in process of change.

[2] *meta logou*, the discursive arguments of dialectic and mathematics which provide a firmly based apprehension of truth and reality.

real; whereas that which is the object of belief together with irrational sensation is the thing that becomes and passes away, but never has real being. Again, everything that becomes must of necessity do so by the agency of some cause; without a cause nothing can come to be. Whenever the maker of an object looks to that which is always unchanging and uses a model of that kind in fashioning the form and quality of his work, all that he thus accomplishes must be good; [B] but if his eyes are set upon something that has come into existence and uses a generated model, the object thus fashioned will not be good. So as regards the whole Heaven or World—let us call it by whatever name fits it best—we must begin by asking that fundamental question which has to be asked about everything: Has it always existed, without any source of becoming; or has it come to be, starting from some principle? It has come to be; [1] for it is visible and tangible and possessed of a body, and all such things are sensible; [C] and sensibles, being apprehended by belief with the aid of sensation, are, as we saw, things that become and can be generated. And that which becomes, we said, must necessarily do so by the agency of some cause. To discover the maker and father of this universe would be hard enough; and having discovered him, it would be absolutely impossible to declare him to all men. Let us, however, go back to that question about the world: [29] After which of the models did its artificer [2] construct it—after that which is always in the same unchanging state, or after that which has come to be? Well, if this world is good and its maker is good, evidently he looked to the eternal; but if otherwise (an impious hypothesis), his eyes were upon that which has come to be. It is clear to everyone then that he looked to the eternal; for the world is the best of all things which have become, and he the best of all causes. So having come to be in this way, the world has been constructed on the model of that which is apprehensible by rational discourse and understanding and is always in the same state.

[1] i.e. it possesses the existence that is measured by time.
[2] *dēmiourgos*, the Demiurge. He is a mythical symbol standing for divine Reason. This Reason cannot be identified with the divine Reason present in the soul and body of the universe; but Plato declines to answer the question as to where it may be found. 'To discover the maker and father of this universe would be hard enough . . .'

[B] Further, on the strength of these premisses the world must inevitably be a likeness of something. Now no matter with what subject we have to deal, it is most important to begin at the natural beginning. Therefore in dealing with a copy and its model we must make this distinction: an account is of the same order as the things it expounds—an account of what is abiding and stable and discoverable by reason will itself be abiding and unchangeable in so far as it is possible for an account to be incontrovertible and irrefutable; it must never fall short of that; [C] while an account of what is fashioned after the likeness of that other, but is only a likeness, will itself be likely, standing to accounts of the former kind in a proportion—as truth is to belief so is reality to becoming. Therefore, Socrates, do not be surprised if in dealing with a great many matters touching the gods and the generation of the universe we prove unable to supply accounts that are always in all respects self-consistent and perfectly exact. We ought indeed to be only too glad if we manage to provide accounts that are inferior to none in likelihood, remembering that both I who speak and you who judge [D] are merely human creatures, so that it behoves us to be content with the probable account and refrain from seeking beyond it.

SOCR. Excellent, Timaeus! Of course we must accept it as you suggest; we have certainly listened to your prelude with admiration. So now please go right ahead and develop your main theme.

PART I. THE WORKS OF REASON

A. MOTIVE OF CREATION (29D–30C)

Preliminary to the all-important contrast between rational purpose and the irrational working of Necessity, Timaeus here explains the Demiurge's real motive for establishing an ordered world in the realm of Becoming.

TIM. Let us then state for what reason becoming and the universe were framed by their constructor. He was good; and in the good no jealousy in respect of anything ever arises. Being devoid of jealousy, therefore, he desired that all things should approach as near as possible to being like himself. We shall most surely be right in accepting from men of understanding that this is the supremely valid principle of becoming and of world order. [20] Desiring then that all things should be good and, so far as possible, nothing incomplete, the god took over all that is visible—not at rest, but in discordant and chaotic motion—and brought it from disorder into order, deeming that the latter state was in every way the better.

Now it was not, nor can it ever be, conceivable that the supremely good should do anything but what is best. [B] Taking thought, therefore, he found that among things that are by nature visible none that is without intelligence will ever be better than one that is rational, when each is taken as a whole, and further that intelligence cannot be present in anything other than soul. Because of this reasoning, when he constructed the universe he fashioned reason within soul and soul within body, to the end that the work he was accomplishing might be of its nature as excellent and perfect as possible. Thus then, in accordance with the likely account, we must declare that this world came to be, by the god's providence, in very truth a living creature endowed with [C] soul and reason.

B. THE MODEL USED BY THE DEMIURGE (30C–31A)

It was stated in the previous section that the visible world is a living being fashioned after the likeness of an eternal model. This latter Timaeus now describes: it is the ideal Living Creature belonging to the world of Forms including the ideal types of all species of animate being.

THIS being premissed, we must now ask the following question: What was the living creature in whose likeness he constructed the world? We cannot allow that it was any that ranks only as a species; for no copy of that which is incomplete can ever be good. Let us rather say that the world resembles most closely that Living Creature [1] of which all other living creatures, severally [2] and in their families [3] are parts. For that embraces and contains within [D] itself all the intelligible living creatures, just as this world contains ourselves and all other creatures that have been fashioned as visible things. For the god, desiring to make it most closely resemble that intelligible thing which is best and in all respects complete, constructed it as a single visible living creature, containing within itself all living [31] things whose nature is of the same order.

[1] A generic Form containing the Forms of all subordinate species, members of which inhabit the visible world.
[2] i.e. the Forms of indivisible species. See *Philebus*, 15A.
[3] i.e. the heavenly gods (stars, planets and Earth), birds, fishes and land animals.

C. ONLY ONE WORLD (31A–B)

The statement that the world is a *single* living creature raises the question whether there could be more than one copy of the model—a plurality of visible worlds as taught by the fifth-century Atomists and others. Such a possibility is here denied.

HAVE we, then, been correct in calling it one Heaven, or would we have spoken more truly of many and indeed of an infinite [1] number? One it must be called, if we are to hold that it was made according to its pattern. For that which embraces all the intelligible living creatures there are, could never be one of a pair, because then there would have to be yet another Living Creature embracing them both, and they would be parts of it; and thus our universe would be more correctly described as a likeness, not of them, but of that other which would embrace them. [B] Therefore, in order that this world might resemble the complete Living Creature in respect of its uniqueness, its maker did not fashion two worlds nor an indefinite number. No, this Heaven has come to be and is and shall be hereafter one and unique.

[1] The Atomists believed in innumerable worlds.

D. BODY OF THE WORLD

1. It Consists of Four Primary Bodies (31B–32C)

Not fewer than four primary bodies (fire, air, water, earth) are needed to give the body of the universe that highest degree of internal unity which follows naturally upon the uniqueness posited above. Timaeus depicts the primary bodies as materials waiting to be put together by the Demiurge.

In Part II he will impose on their unordered motions and powers certain geometrical shapes; all that he does for the present is to establish their quantities according to a definite ratio. This is an element of rational design in the body of the universe.

Now that which comes to be must be corporeal, and therefore visible and tangible; but nothing can be visible without
–fire, or tangible without something solid,[1] and nothing is solid without earth. Hence the god, when he began to construct the body of the universe, set about making it of fire and earth. Two things alone, however, cannot be properly conjoined without a third; [C] for there must be some bond between them tying them together. Now the best of all bonds is that which makes itself and the things it conjoins a unity in the fullest sense; and it is of the nature of a continued geometrical proportion to effect this most perfectly. For whenever, of three numbers, [32] the middle one between any two that are either cubes or squares is such that, as the first is to it, so is it to the last, and conversely as the last is to the middle, so is the middle to the first, then since the middle becomes first and last, while the last and first become middle, it follows that all will come to play the same part in relation to one another, and will thereby all form a unity.[2]

Now if it had been required that the body of the universe should be a plane surface with no depth, a single mean [B] would have sufficed to connect its fellows and itself; in fact, however, the world was to be solid in form, and solids are

[1] i.e. resistant to touch.

[2] Square numbers. $x^2 : xy = xy : y^2$.
Cube numbers. $x^3 : x^2y = x^2y : xy^2 = xy^2 : y^3$.

always conjoined not by one mean, but by two. Accordingly the god set water and air between fire and earth, and made them so far as possible proportional to one another, so that as fire is to air, so is air to water, and as air is to water, so is water to earth; and thus he constructed the frame of a world visible and tangible.

For these reasons and from such elements, four in number, [C] the body of the universe was brought into being, coming into concord by means of proportion; and from these it acquired Amity, so that coming into unity it became indissoluble by any agent other than him who bound it together.

2. It Contains the Whole of those Four Elements (32C–33B)

The Ionian cosmologists had taught an indefinite circumambient mass of body, surrounding the cosmos and serving, so to speak, as a stock-pile of materials from which a series of worlds could be framed, while the Atomists conceived an unlimited quantity of matter strewn throughout an infinite void. Timaeus here rejects both theories; the world's body, he maintains, is all-inclusive like its model. It must be (*a*) whole and complete, made up of parts that are likewise whole and complete; (*b*) unique; (*c*) everlasting, which it could not be if liable to attack from without.

Now the frame of the world took up the whole of each of those four primary bodies; its constructor made it consist of *all* the fire and water and air and earth, leaving no part or power of any one of them outside it. This was his purpose: [D] first, that it might be to the fullest extent a living creature [33] whole and complete, of complete parts; next, that it might be single, nothing being left over out of which such another might come into being; and further that it might be secure from age and sickness. For he perceived that when hot things and cold and all things having strong powers beset a composite body and assail it from without, they doom it to untimely dissolution and cause it to waste away by subjecting it to sickness and age. For this reason, and so considering, he fashioned it into a single whole compounded [B] of all the above-mentioned wholes complete and free from age and sickness.

3. It is a Rotatary Sphere Devoid of Organs and Limbs (33B–34A)

The mechanical causes which preserve the spherical shape of the world's body will be explained in Part II (58A). In the present section Plato confines himself to the Demiurge's rational desire that it shall have the most perfect of forms and motions. The sphere is more uniform than any other solid, and it alone, by rotating on its axis, can move within its own limits without change of place. The axial rotation of the world's body symbolizes the movement of Reason.

For shape he gave it that which suited and was akin to its nature; and the fitting shape for the living creature that was going to embrace within itself all living creatures would be the figure that comprises in itself all the figures there are. He therefore turned it, as on a lathe, rounded and spherical, with its extremities equidistant in all directions from centre to extremity—the most perfect and uniform of all figures, for he deemed uniformity to be infinitely better than its opposite. And all round on the outside he made it perfectly smooth, for several reasons. [C] It had no need of eyes, for nothing visible was left outside; nor of hearing, since there was nothing outside to be heard. There was no surrounding air to call for respiration, nor again did it need any organ whereby to receive food into itself or to excrete it again when drained of its juices. For nothing went out or came into it from anywhere, because there was nothing: it was designed [D] to supply its own waste as food for itself and to act and be acted upon entirely by itself and within itself; for its constructor thought it would be better self-sufficient rather than dependent on other things.

It needed neither hands with which to grasp or defend itself, nor feet or anything that would serve as support; so he saw no need to equip it with these unwanted limbs. [34] For he assigned to it the motion proper to its bodily form, namely that one of the seven which belongs especially to reason and intelligence; he therefore caused it to turn uniformly in the same place and within its own bounds, and made it revolve round and round; he withheld the other six motions [1] and fashioned it free of their wanderings. And since for this revolution it had no need of feet, he made it without legs or feet.

[1] Up and down, forwards and backwards, right and left.

E. THE WORLD-SOUL

1. Summary. Transition to the World-Soul (34A–B)

The summary lists certain perfections for which the body of the universe is indebted to divine providence; then we learn that its axial rotation is due to its soul, which extends from centre to circumference.

All this, then, was devised by the ever-existent god for the god who was one day to be. [B] According to this plan he made it smooth and uniform, everywhere equidistant from its centre, a body whole and complete compounded of complete bodies. And in the midst thereof he set a soul and extended it throughout the whole, and also wrapped its body round with soul on the outside; [1] and so he established one world alone, round and revolving in a circle, solitary but able by virtue of its excellence to keep itself company, needing no other acquaintance or friend but sufficient unto itself. For all these reasons the world he brought into being was a blessed god.

2. Soul Prior to Body (34B–C)

The world-soul, though prior in dignity to the body, is coeval with it; both are everlasting.

Now although this soul comes later in the account we are [C] now attempting, the god did not make it younger than the body; for when he united them he would not have allowed the elder to be ruled by the younger. Human nature partakes largely of the casual and random,[2] which becomes apparent in our speech; but the god made soul elder than body and prior in birth and excellence, to be the body's mistress and ruler.

[1] This does not mean that the soul extends beyond the body, but only that it reaches the extreme circumference.

[2] Because man is not wholly rational.

3. Composition of the World-Soul (35A)

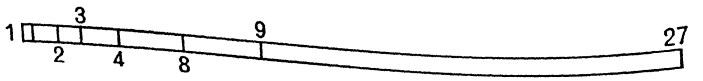
The Demiurge now compounds the world-soul from certain intermediate kinds of Existence, Sameness and Difference. To understand the meaning of Plato's symbolism here, it is necessary to have read *The Sophist* (Everyman's Library, No. 456).

[35] The things of which he constructed soul and the manner of its composition were as follows: First, between the indivisible Existence, which remains always in the same state, and the divisible Existence that becomes in bodies, he compounded a third form of Existence out of both. Second, in the case of Sameness and in that of Difference, he also on the same principle fashioned a compound intermediate between that kind of them which is indivisible and the kind that is divisible in bodies. Then, third, taking the three, he blended them all into one form, compelling the nature of Difference, hard though it was to mingle, into union with Sameness, and mixing them together with Existence.

4. Its Division into Harmonic Intervals (35B–36B)

Timaeus speaks of the triple compound as if it were a strip of pliable material. It will presently be split lengthwise and bent round into circles; but the Demiurge first marks it off into divisions corresponding to the intervals of a musical scale.

[B] Having thus made a unity of the three, he divided this whole into a suitable number of parts, each part being a blend of Sameness, Difference and Existence. And here is how he began the division:



First he took one portion [1] from the whole, and next a portion [2] double of this; the third [3] half as much again as the second, and three times the first; the fourth [4] double of the second; [C] the fifth [9] three times the third; the sixth [8]

eight times the first; [1] and the seventh [27] twenty-seven times the first.[2]

Next he proceeded to fill up both the double and the triple intervals, [36] cutting off further parts from the original mixture and placing them between the terms, so that within each interval there were two means, the one [harmonic] exceeding the one extreme and being exceeded by the other by the same fraction of the extremes, the other [arithmetical] exceeding the one extreme by the same number whereby it was exceeded by the other.

These links produced intervals of 3/2 and 4/3 and 9/8 within the original intervals.[3] [B] And he went on to fill in all the intervals of 4/3 [fourths] with the interval 9/8 [the tone], leaving over in each a fraction. This remaining interval of the fraction had its terms in the numerical proportion 256 : 243 [semitone approx.].[4] By this time the mixture from which he was cutting off these portions was all spent.

[1] 9 preceding 8, because 9 is a lower power, being 3^2 whereas 8 is 2^3.

[2] These intervals are now filled up with additional numbers until we have a series representing musical notes at intervals of a tone or a semitone.

[3] Inserting the harmonic and arithmetical means we get:

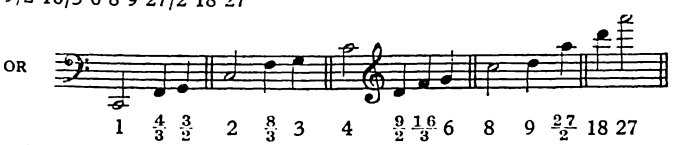
In the double intervals

1 4/3 3/2 2 8/3 [3] 4 16/3 6

In the triple intervals

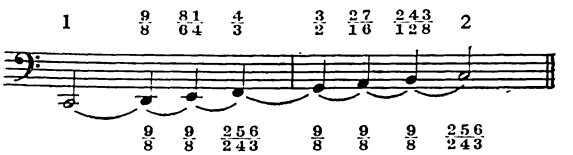
1 [3/2] [^{2}] 3 9/2 [^{6}] 9 27/2 ^{18} 27

Omitting bracketed numbers we get a single series: 1 4/3 3/2 2 8/3 3 4 9/2 16/3 6 8 9 27/2 18 27



The final step, taken in the sentence that follows, is to fill in every tetrachord with two intervals of a tone (9/8) and a remainder (256/243) approximately equal to a semitone.

[4] Taking now the first octave we can illustrate the result approximately as follows:

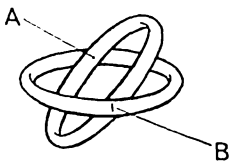


This process, applied throughout the remaining tetrachords, completes the entire range of notes from 1 to 27.

5. Construction of the Circles of the Same and the Different and of the Planetary Circles (36B–D)

The Demiurge now proceeds to split the band of soul-stuff horizontally. He then joins the two strips at their middle points and bends them round to form two circles corresponding to the sidereal equator and the zodiac, and representing the rational motions of the soul. Note that Timaeus has as yet said nothing about the bodies which exhibit those motions and the motions of the 'seven unequal circles'; his aim has been to stress the pre-eminent dignity of the soul and the fact that the self-moving soul originates all physical movement.

He then split this whole fabric lengthwise into two halves; and making the two intersect one another at the centres in the form of a cross +, [C] he bent each round into a circle, making each meet itself at a point [B] opposite to that [A] where they had been laid together.[1] He then included them in the motion that revolves in the same place, and made the one the outer, the other the inner circle. The outer movement he named the movement of the Same; the inner, the movement of the Different. He caused the movement of the Same to revolve to the right by way of the side; the movement of the Different to the left by way of the diagonal.[2]



And he gave supremacy to the revolution of the Same and uniform, [D] for he left it single and undivided; but the inner revolution he split in six places into seven unequal circles, severally corresponding to the double and triple intervals, of each of which there were three.[3] And he arranged that these circles should move in opposite directions to one another; while in speed three should be similar, but the other four

[1] The inner band is now tilted so as to make an oblique angle with the outer and thus complete the construction of an armillary sphere.

[2] The revolution of the Same (east to west) represents the celestial equator; the revolution of the Different (west to east) represents the ecliptic. 'By way of the side' and 'by way of the diagonal' refer respectively to the plane of the terrestrial Equator and the NE.–SW. diagonal joining the tropics of Cancer and Capricorn.

[3] 2, 4, 8; 3, 9, 27.

should differ in speed from one another and from the three, though moving according to ratio.[1]

6. Body of the World Fitted to its Soul (36D–E)

The fitting of the motions symbolized by the soul-circles to the bodily framework, described earlier, starts the world on an endless course of intelligent life.

When the whole structure of the soul had been completed to its maker's mind, he next began fashioning within it all that is corporeal, [E] brought the two together and fitted them centre to centre. And the soul, being woven throughout from the centre to the farthest heaven and enveloping the latter on the outside,[2] revolving within her own limit, made a divine beginning of unceasing and intelligent life for all time.

7. Discourse in the World-Soul (36E–37C)

Like knows like, and on this principle the composition of the world-soul from Existence, Sameness and Difference enables it to know unchangeably real objects and to hold true beliefs about changing things in the realm of becoming.

Whereas the body of the heaven has been created visible, the soul is invisible, and, by virtue of sharing in reason and harmony, [37] is the best of things brought into being by the most excellent of entities intelligible and eternal. Inasmuch then as the soul has (*a*) been blended of Sameness, Difference and Existence, those three ingredients, and (*b*) has been divided and bound together in due proportion, and (*c*) revolves upon herself, it follows that whenever she makes contact with anything which has dispersed existence or with anything whose existence is indivisible, she is set in motion throughout herself [B] and tells in what respect exactly, and how, and in what sense, and when, it happens that something

[1] The three are Sun, Venus and Mercury; the four Moon, Mars, Jupiter and Saturn.

[2] *See* page 25, footnote 1.

is qualified as either the same or different with respect to any given thing, whatever it may be, with which it is the same or from which it differs, either as regards things that become or as regards things that are for ever changeless.

Now whenever discourse that is alike true, whether it concerns that which is different or that which is the same,[1] being carried on without speech or sound within the self-moved,[2] is about that which is sensible, and the circle of the Different, moving aright, reports its message throughout its entire soul—then there arise judgments and beliefs that are firm and true. [C] But whenever discourse is concerned with the rational, and the circle of the Same, spinning smoothly, declares it, the result must be rational understanding and knowledge. And if anyone calls that in which these two come to exist by any name other than 'soul', he will be speaking anything rather than truth.

8. Time, the Moving Likeness of Eternity (37C–38C)

Timaeus now leaves the spiritual motions (i.e. thoughts and judgments) of the world-soul, and turns to the physical movements of the visible heavenly bodies. Before the account of how the Demiurge fashions the planets, stars and Earth and sets them in the revolutions symbolized by the eight circles of the celestial machine, we have here a description of Time, the existence of which is impossible without the heavenly clock whose movements are its measure.

When the father who had engendered it [3] saw it in motion and alive, a shrine brought into being for the everlasting gods, he rejoiced and, being well pleased, he conceived the idea of making it still more like its model. Accordingly, as that model [D] is the ever-existent Living Being, he set about making the universe also like it, as far as possible, in that respect. Now the nature of that Living Being was eternal, a character with which it was impossible fully to endow a generated thing. But he planned to make as it were a moving likeness of eternity;

[1] The discourse is assumed to be true in either case, whether the judgments are affirmative or negative.
[2] i.e. the Heaven as a whole, self-moved by its self-moving soul.
[3] i.e. the world as a living and self-moved creature.

and, at the same time that he set in order the Heaven, he made, of eternity that abides in unity, an ever-flowing likeness moving according to number—that to which we have given the name Time.

[E] Before the Heaven came into being there were no days and nights, months and years; but he designed that they should now come to be simultaneously with the framing of the Heaven. They are all parts of Time, and 'was' and 'shall be' are forms of time; we are wrong when we thoughtlessly transfer them to eternal being. We say that it was and is and shall be; but 'is' alone really belongs to it and describes it truly; [38] 'was' and 'shall be' are properly applicable to becoming, which proceeds in time, for both are motions. But that which is ever and unchangeably in the same state cannot be becoming older or younger by the passage of time, nor can it ever become so; neither can it now have been or be on the way to becoming so; and in general it cannot be subject to any of the conditions that Becoming attaches to the moving things of sense, these having come into being as forms of time, which reflects eternity and revolves according to number. Moreover we make statements [B] such as 'what is past *is* past', 'what happens now *is* happening now', and again 'what will happen *is* what will happen' and 'the non-existent *is* non-existent'; yet not one of these expressions is correct.[1] But this, perhaps, may not be the right moment for a detailed discussion of these matters.[2]

At all events, Time came into being simultaneously with the Heaven, in order that, as they were brought into being together, so they might be dissolved together if ever their dissolution should occur. And it is made after the pattern of the ever-enduring nature, in order that it may resemble that pattern as closely as possible; [C] for the pattern is something that has being for all eternity, whereas the Heaven has been and is and shall be perpetually throughout time.

[1] It is incorrect to use the word 'is' both as a mere copula and in the sense of 'exists'.

[2] See *The Sophist*.

9. The Planets as Instruments of Time (38C–39E)

First of the heavenly bodies, which are also heavenly gods, Timaeus takes the planets. They are specially useful to mankind as delimiting regular periods of time and thus teaching men to count and calculate. It was, he says later, (47A) the observation of those periods that led to the discovery of number, to all the natural sciences and even to philosophy.

By virtue, therefore, of this scheme and purpose of the god with a view to the genesis of Time, in order that Time might be brought into being, Sun and Moon and five other stars—'planets' (i.e. wanderers) as they are called—were made for the definition and preservation of the numbers of Time. Having made a body for each of them, the god placed them in the circuits in which the revolution of the Different was moving—seven bodies in seven circuits: [D] the Moon in the circuit nearest the Earth; the sun in the second above the Earth; the Morning Star [Venus] and the one called sacred to Hermes [Mercury] in circles revolving so as, in point of speed, to run their race with the Sun, but endowed with the tendency contrary to his; [1] whereby the Sun, the star of Hermes and the Morning Star alike overtake and are overtaken by one another. As for the remainder,[2] if one were to explain where he enshrined them and for what reasons, [E] the account (though no more than subsidiary) would prove a heavier task than that which it subserved. Later perhaps, at our leisure, these points may receive the attention they deserve.

To resume: when each of the beings that were to co-operate in producing Time had attained the motion suitable to it, and when, as bodies bound together with living bonds, they had become living creatures and learnt their appointed task, then they began to revolve by way of the motion of the Different (which was aslant crossing the movement of the [39] Same and subject to it), some moving in greater circles more slowly, some in lesser circles more rapidly.

So because of the movement of the Same, those which

[1] Meaning, probably, that, whereas the Sun progresses always at the same pace, Venus and Mercury move sometimes faster, sometimes slower.
See Editor's Note on page 36.
[2] Mars, Jupiter and Saturn.

revolved most rapidly appeared to be overtaken by those which travelled more slowly, though actually overtaking them. For the movement of the Same, which gives all their circles a spiral twist because they have two distinct [1] forward motions in opposite directions, caused [B] the body which departs most slowly from itself—the swiftest of all movements—to appear to be keeping pace with it most closely.[2] And in order that there might be a conspicuous measure for the relative rapidity and slowness with which they travelled in their eight revolutions, the god kindled in the second orbit from the Earth a light—what we today call the Sun—so that he might fill the whole Heaven with its brightness and that all living things entitled thereto might possess number, learning it from the revolution of the Same and uniform. [C] In this manner and for these reasons day and night came into being, the period of the single and most intelligent revolution.[3] The month comes to be when the Moon completes her own circle and overtakes the Sun; the year, when the Sun has travelled round his own circle. The periods of the rest have been observed by only a very few men; and no names have been given them, nor are they reckoned one against another by numerical computation. Men hardly know, therefore, that the wanderings of these others are times at all, bewildering as they are in [D] number and of extraordinarily complicated pattern; nevertheless it is possible to grasp that the perfect number of time fulfils the perfect year [4] at the moment when the relative speeds of all the eight revolutions have completed their courses together and achieve their consummation, as measured by the circle of the Same and uniformly moving.

Thus then, and for these purposes, all those stars which have turnings [5] on their journey through the Heaven were brought into being—in order that this world may be as [E] like as possible to the perfect and intelligible Living Creature in respect of imitating its everlasting nature.

[1] i.e. as being in two different planes.
[2] Saturn appears to be nearest to the sphere of the fixed stars in respect of velocity. Cf. *Laws*, 822A ff.
[3] The single, undivided revolution of the Same, the sole movement of translation enjoyed by the fixed stars.
[4] The so-called Great Year, which is completed when all the planets return together to their original starting-points.
[5] i.e. the fixed stars, the planets and Earth.

10. Four Kinds of Living Creature. The Heavenly Gods (39E–40B)

The Demiurge, as already stated more than once, designed to fashion the universe as nearly as possible in the likeness of its eternal pattern. This he does by making the four main groups of living creatures, corresponding to the four regions of fire, air, water and earth. He himself makes only the living creatures of the first group, viz. the heavenly gods—fixed stars, planets and Earth. Since the planets and some of their motions have been mentioned above, this section deals principally with the fixed stars, but the planets are introduced in the final sentence.

Now up to this point, that is to say up to the genesis of time, the world had been wrought in other respects according to the similitude of its pattern; but it was still dissimilar inasmuch as it did not yet contain all the living creatures brought into being within it. So he set about fulfilling this remainder of his task, making the copy after the nature of the model. He deemed that this world should possess all the different forms that intelligence discerns contained in the truly existent Living Creature. Of these there are four: one, the heavenly race of gods; [1] second, winged things which journey through the air; [40] third, all the denizens of water; and fourth, all footed things that go on dry land. The form of the divine class he made chiefly of fire, that it might be as bright and fair as possible to see; and he made them spherical after the likeness of the universe, and set them in the intelligence of the supreme [2] to keep company with it, distributing them all around the heaven, to be in very truth its adornment,[3] embroidered over the whole. And he endowed each with two motions: [4] one uniform in the same place, so each always thinks the same [B] thoughts about the same thing; the other a forward motion, as each is subject to the revolution of the Same and uniform. But in respect of the other five motions he made each motionless and still, in order that each might be as perfect as possible.

[1] i.e. the fixed stars, the planets and Earth.
[2] i.e. the sphere of the Same.
[3] There is a play on the word *cosmos*, which means both 'adornment' and 'ordered world'.
[4] i.e. (1) the rotation of the star on its own axis, and (2) the diurnal revolution of the sphere of the fixed stars.

For this reason there came into being all the unwandering stars, living creatures divine and everlasting, which abide for ever revolving uniformly upon themselves. Those stars that have turnings and in that sense 'wander' [1] came to be in the manner already described.

11. Rotation of the Earth (40 B–C)

Lastly, the Earth is included with the fixed stars and planets. As a living creature it too must have a soul as well as a body; but since 'soul' is defined as 'the self-mover', Earth must be assumed to have its own axial rotation.

And he designed the Earth to be at once our nurse and, as she winds [2] round the axis that stretches right through, the guardian and maker of night and day, first and most venerable of all the gods that are within the heaven.

12. Other Movements of the Heavenly Bodies Omitted Here (40C–D)

To describe the evolutions in the dance of these same gods, their juxtapositions, the counter-revolutions of their circles relatively to one another, and their advances; to tell which of the gods come into line with one another at their conjunctions, and which in opposition, and in what order they pass in front of or behind one another, and at what periods of time they are severally hidden from our view and again [D] reappearing send panic fears and omens of the future to men who are unable to calculate—to describe all this without visible models [3] of these movements would be labour in vain. So let this much suffice in this connection, and here let our account of the nature of the visible and generated gods come to an end.

[1] *in that sense*, because they do not really wander. They keep to regular orbits, but 'turn' back at the limits of their spiral paths.

[2] *hillomenēn*. The meaning of this word in its present context has been disputed by commentators ancient and modern, for it appears to involve an inconsistency with the rest of Plato's astronomical scheme in *Timaeus*. The problem is discussed at length by Cornford (*Plato's Cosmology*, 1937, pp. 120–34). The best solution seems to be that Plato thought of the Earth as stationary in relation to absolute space, but as rotating once in twenty-four hours (in the reverse direction) in relation to the fixed stars.

[3] e.g. an armillary sphere, such as the Academy undoubtedly possessed and which Plato probably had before him as he wrote.

EDITOR'S NOTE

The following may be useful as a summary of the celestial motions described or implied in the foregoing astronomical sections:

A. SELF-MOTIONS OF THE WORLD-SOUL

(1) The Same (37C), imparted as axial rotation to the entire spherical body from centre to circumference (34A, B, 36E). (2) The Different, a single motion (36C, 37B, 38C), imparted to the planets alone by distribution among seven circles (36C, D).

B. MOTIONS OF PARTS

(1) *Individual stars:* (*a*) The Same, imparted to each as a 'forward' motion of daily revolution (40B). (*b*) Self-motion: axial rotation (40A).

(2) *The Seven Planets:* (*a*) The Same, imparted to each by the 'supremacy' of The Same (36C, 39A). (*b*) The Different, imparted to each as part of its proper movement along a circular course (the seven circles, 36C, D).[1] (*c*) Self-motions:

(i) Axial rotation of each (cf. 40A, B).

(ii) Varying speed of the seven (36D): Moon accelerates motion of the Different. Sun, Venus and Mercury together move with actual speed of the Different, completing their journey in a year. Only Sun has actual motion of the Different unmodified; Venus and Mercury modify it by retrogradation (38D). Mars, Jupiter and Saturn slow the movement of the Different by counter-revolution (40C). These are the three circles with motion contrary to the Different and to the other four (36D).

(iii) Retrogradation of all except Sun and Moon. This is the 'contrary tendency' (38D) explicitly ascribed to Venus and Mercury, but belonging also to Mars, Jupiter and Saturn. It is responsible for variations in the speed of each planet, and intermittent counter-revolution so accelerated as to halt the main motion and temporarily reverse its direction.

N.B. None of the motions described in (i), (ii) and (iii) above distorts in any way the circular course of planets' proper motion.

(3) *Earth:* (*a*) The Same, imparted as an element of the entire body of the world in process of axial rotation (34A, 36E). (*b*) Self-motion: axial rotation at the centre, relatively to the fixed stars, counteracting imparted motion of the Same (40B).

[1] (*a*) and (*b*) together produce the Spiral Twist (39A).

F. THE HUMAN SOUL AND BODY

1. THE GODS OF POPULAR BELIEF (40D–41A

The Demiurge has now completed the celestial mechanism. There remain, however, three other groups of living creatures, and the making of them will presently be entrusted to the created gods. But Timaeus has first a few words to say about the anthropomorphic gods of popular religion.

As regards the other divinities, it is too great a task for us to know and declare their generation. We must trust those who have proclaimed it in earlier times: being, as they claimed, descendants of gods, they must of course have had certain knowledge of their own ancestors! We cannot then mistrust the offspring of gods, even though their statements are devoid of probable or compelling proof; [E] when they profess to narrate their family history we must follow custom and accept what they say. Let us therefore take on their authority this account of the generation of these gods: To Earth and Heaven were born Oceanus and Tethys; to these, Phorkys, Cronos, Rhea and their company; [41] to Cronos and Rhea, Zeus, Hera and all their brothers and sisters whose names we know; and to these yet other offspring.

2. THE DEMIURGE CHARGES THE GODS (41A–D)

This speech, in which the Demiurge now delegates the making of inferior living creatures, is addressed not only to the visible gods, but also to the invisible powers which reveal themselves to such extent as they please and so give rise to the current beliefs in the Olympians and other divinities.

Anyway, when all the gods had come to birth—both those that revolve before our eyes [1] and those who manifest themselves in so far as they choose—the author of this universe addressed them as follows:

[1] i.e. the heavenly bodies; the others are the deities of popular belief—Zeus, Hera, etc.

'Gods, those gods whereof I am the artificer and those works whereof I am the father are indissoluble save with my consent. Now although whatever bond [B] has been fastened may be dissolved, yet it were the work of an evil being to will the dissolution of what has been well fitted together and is in good condition. Therefore, although you, having come into being are not immortal nor indissoluble altogether, nevertheless you shall not be dissolved nor incur the doom of death, finding my will a bond yet stronger and more sovereign than those wherewith you were bound together when you came into being.

'Now therefore mark what I declare unto you. There remain mortal creatures of three kinds that have not yet been brought into being. If these be not created, the Heaven will be imperfect; for it will not contain all the [C] kinds of living being, as contain them it must if it is to be perfect and complete. But if they received birth and life directly at my hands, they would be equal to gods. In order then that mortal beings may exist and this All may be truly all, turn as your nature directs to the fashioning of living creatures, imitating my power in generating you. In so far as it is fitting that something in them should share the name of the immortals, being called divine and ruling over those of them who at any time are willing to follow after righteousness and after yourselves —that part, having sown it as a seed and thus made a beginning, I will hand over to you. [D] For the rest, do you, weaving together mortal and immortal, make living beings; bring them to birth, feed them and cause them to grow; and when they perish receive them back again.'

3. Composition of Human Souls (41D–42D)

Here the Demiurge carries out his undertaking to fashion directly the immortal part of the individual souls that are to be embodied first in human form. It is made from the residue of the original ingredients of the world-soul, i.e. the intermediate kinds of Existence, Sameness and Difference. *See* 35A.

With these words he turned once more to the bowl in which he had mixed and blended the soul of the universe, and

poured into it the residue of the former ingredients, blending them now in somewhat the same way, only no longer so pure as before, but second or third in degree of purity. And when he had compounded the whole, he divided it into souls equal in number with the stars, and [E] distributed them, each soul to its particular star. Mounting them there as though in chariots, he showed them the nature of the universe and declared unto them the laws of Destiny: there would be appointed a first incarnation, in order that none should be condemned by him to disadvantage; and they were to be sown into the instruments of time, each into the one best suited to it, and to [42] be born the most godfearing of living creatures; and human nature being twofold,[1] the better sort should thereafter be called 'man'.

Whenever therefore they should of necessity have been implanted in bodies, and some part of their bodies should always be coming in and some part going out, there must be innate in them, first, sensation, common to all and arising from violent impressions; second, desire mingled with pleasure and pain; and in addition to these fear and [B] anger and all the feelings that accompany these and all that are of an opposite nature. And if they should master these passions, they would live righteously; if they were mastered by them, unrighteously.

And he who should live his appointed span well should travel back to the abode of his consort star and there spend a happy and congenial life;[2] but failing of this, he should change at his second birth into a woman; [C] and if in that state he still did not refrain from wickedness, then according to the character of his depravity he should constantly be changed into some beast of a nature resembling the formation of that character, and should find no relief from this painful process until, allowing the revolution of the Same and uniform within himself to draw into its train all that turmoil of fire and water and air and earth which had later gathered about it, he should control its irrational turbulence [D] by discourse of reason and return again to the form of his first and best state.

[1] Male and female.

[2] It is not clear whether this means that a soul which has remained pure for three lives escapes the cycle of transmigration (cf. *Phaedrus*, 249A), or that it spends some time on its star before reincarnation as man.

4. Sowing of Souls in Earth and Planets (42D–E)

After the immortal souls have received their vision of the nature of the universe and heard the laws of Destiny, they are sown like seeds in Earth and the planets, and given into the care of the created gods who are to add the body and those mortal parts of the soul entailed by temporary association with the body.

When he had made known to them all these ordinanaces, to the end that he might be in no way responsible for the future wickedness of anyone, he sowed them, some in the Earth, some in the Moon and some in the other instruments of time.[1] After this sowing he left to the newly created gods the task of moulding mortal bodies and of fashioning all that part of the human soul that was still lacking and all that these things entailed, and [E] of governing and guiding the mortal creature to the best of their ability, except in so far as it might be a cause of evil to itself.

5. State of the Newly Incarnate Soul (42E–44D)

The making of the mortal parts of the soul and the construction of its body are described in Part III (69A ff.). In Part II (47E ff.) we shall have a lengthy account of the structure and behaviour of the primary bodies—fire, air, water, earth—and of the physical processes of sensation. Meanwhile we are to be given a wonderful picture of the immortal principle of reason cast for the first time into the wild sea of bodily sensation and nutrition. 'The mythical machinery of the soul circles', says Cornford, 'is woven into an account of infant psychology with an imaginative power that few other writers could equal.'

When he had made all these arrangements, he confined himself to his own proper activity; and meanwhile his sons heeded their father's ordinance and set about giving it effect. They received the immortal principle of a mortal creature, and, imitating their own maker, borrowed from the world portions of fire and earth and water and air, [43] on condition that these should be repaid, and cemented together what they

[1] i.e. in the other planets.

took, not with the indissoluble bonds whereby they themselves were held together, but welding them with numerous rivets too small to be visible and thus making each body a unity of all the portions. And they confined the circuits of the immortal soul within the ebbing and flowing tide of the body.

These circuits, confined thus in a great river, neither controlled it nor were controlled, but caused and were subject to violent motions, so that the whole creature moved, but [B] advanced haphazardly without order or method, having all the six motions: [1] they went forward and backward, right and left, up and down, wandering every way in all the six directions. For strong as was the tide that brought them nourishment, flooding them and ebbing away, a still greater tumult was set up by the qualities of the things that collided with them, when the body of some creature happened [C] to encounter alien fire from without, or a solid concretion of earth and gently gliding water, or was overtaken by a blast of airborne winds, and the motions caused by all these things rushed through the body to the soul and impinged upon it. (For this reason all such motions were later called 'sensations',[2] the name which they still bear.) And so at the moment in question, causing for the time being a strong and extensive commotion and joining with that constantly flowing [D] current in stirring and violently shaking the circuits of the soul, they seriously interfered with the revolution of the Same by flowing counter to it, and hindered it from proceeding on its course and governing; [3] and they also dislocated the revolution of the Different. Consequently the intervals of the double and the triple [4] (three of each sort) and the connecting means of the ratios 3/2, 4/3 and 9/8, since they were not completely dissoluble save by him who bound them together, were [E] twisted by them in every sort of way, and all possible fractures and distortions of the circles were caused; with the result that they scarcely held together, and although they moved, their motion was irregular

[1] But not the seventh, rotation.
[2] Plato apparently derives *aisthēsis* (sensation) from *aïssein* (to rush). He regarded both sensations and qualities as movements; cf. *Theaetetus*, 156.
[3] i.e. the faculty of reason is completely paralysed.
[4] The harmonic intervals in the individual soul represent a harmony and orderliness which must be re-established by contemplation of the harmony of the world-soul, exemplified in the heavenly revolutions.

—at one time reversed, at another sideways, at another inverted. It was as when a man stands upside-down with his head on the ground, and keeps himself erect by thrusting his feet against some object: in such a case right and left both of the man and of the spectators appear reversed to the other party.[1] The same and similar effects occur with great intensity in the soul's revolutions; [44] and when they meet with something external that falls under the Same or the Different, they refer to it as the same as this or different from that contrary to the actual facts, and prove themselves mistaken and foolish. Also at such times no one of their revolutions is serving as governor and guide; but whatever revolutions are assailed by certain sensations coming from outside, which at the same time draw in their train the whole vessel of the soul, only *appear* at such times to be in control, while in reality they are overpowered. It is indeed on account of these affections that today, as in the beginning, a soul comes to be devoid of intelligence at first, [B] when it is bound in a mortal body.

But when the stream of growth and nutriment flows in less abundantly, and the revolutions, benefiting by the calm, once more pursue their own way and become still more settled with the passing of time, the revolutions are thenceforward corrected to the form belonging to the several circles in their natural motion; and, giving their right names to what is different and to what is the same, they set their possessor on the road to becoming rational. And now if some right nurture contributes help towards education, he becomes entirely [C] whole and undefiled, having escaped the worst of maladies;[2] whereas if he is negligent he travels through a maimed life and returns to Hades uninitiate and without understanding.

These results, however, come about at a later stage. Our present subject requires more detailed treatment; and as regards its preliminaries—the generation of bodies part by part, the soul, and the reasons and forethought of [D] the gods in producing them—we must go on to describe them on the principle of holding fast to the most likely account.

[1] It is understood, of course, that the man stands *facing* the spectators.
[2] i.e. ignorance.

6. The Human Body: Head and Limbs (44D–45B)

'Our present subject', which Timaeus here resumes, is the endowment of souls with bodies having sense-organs and all the concomitants of sense. The gods have first to lodge the immortal part of the soul, which they have taken over from the Demiurge. Since, however, we are still a long way from the addition of the mortal parts of the soul (69C), Timaeus here treats the body as consisting only of the head (which contains the immortal, rational part) together with limbs for its locomotion and eyes for its guidance.

Copying the round shape of the universe, the gods confined the two divine revolutions in a spherical body—the head, as we now call it—which is the divinest part of us and lord over all the rest. When they had assembled the whole body, they delivered it to the head to be the servant thereof, perceiving that it possessed all the motions that were to be.[1] In order therefore that the head might not go rolling on the ground with its heights [E] and hollows of all kinds, and lack means of climbing over the one and out of the other, they endowed it with a body as a vehicle for easy travel; hence the body is elongated and developed four limbs, extensible and flexible, the gods contriving thus with a view to its travelling. Clinging and supporting itself with these limbs, it is able to [45] journey through every region,[2] carrying atop of us the dwelling of the most divine and hallowed part. Thus and for those reasons arms and legs have sprouted. And the gods, deeming the front more honourable and fit to lead than the back, gave us movement for the most part in that direction. Therefore man must needs have the front of his body distinct from and unlike the back; so first they attached the face to that side of the globular head and fixed within it [B] organs for all the forethought of the soul, and appointed this, our natural front, to be the part enjoying leadership.

[1] i.e. the six rectilinear motions: up and down, forward and backward, right and left.

[2] Corresponding to the six rectilinear motions.

7. Eyes and Mechanism of Sight (45B–46A)

Sight is taken first of the senses because of the part it plays in locomotion, and also because it (with hearing, 47D, E) does most to reveal the harmony of the world.

First of the organs they constructed the eyes to bring us light, and fastened them there for the reason now to be described. They contrived that such fire as has the property not of burning but of yielding a gentle light should become the proper body of each day.[1] For [2] the pure fire within us is akin to this, and they caused it to flow through the eyes, making the entire fabric of the eyeball, and especially the pupil, smooth and close in texture,[3] [C] so as to let nothing pass that is of coarser material, but only fire of this kind to filter through pure by itself. Consequently, whenever there is daylight round about the visual current, this latter flows forth, like to like, and coalesces with it and forms into a single homogeneous body in a direct line with the eyes, wheresoever the current issuing from within collides with some external object. Thus the whole, because of its homogeneity, is likewise affected and transmits throughout the body to the soul the motions of anything it encounters [D] or that encounters it, and thereby produces the sensation we call 'seeing'.

But when the kindred fire [4] has withdrawn at nightfall, the visual ray is cut off; for issuing forth to meet with what is unlike it, it is itself changed and extinguished, no longer coalescing with the adjacent air, because this contains no fire. Hence it no longer sees, and further becomes an inducement to sleep. For when the eyelids, which the [E] gods contrived as a safeguard of vision, are shut, they imprison the fire's

[1] Each day has a body of its own, which *is* sunlight diffused in the air and withdraws at nightfall. But 'proper' (*oikeion*) suggests also that a 'gentle' (*hēmeron*) light is appropriate to day (*hēmera*).

[2] The connection with what precedes appears to be this: the gods made daylight (essentially a visible thing) of an appropriate sort of fire; *for* they intended man to see and accordingly devised that the fire inside his eye should be similar and able to coalesce with daylight.

[3] Plato is here following Empedocles, who likened the eye to a horn lantern and held that the fire in the eyeball is so fine that it can penetrate tissues impervious to water.

[4] i.e. the fire of daylight.

power inside, and this disperses and allays the motions within, and then quietness ensues. If this quiet be profound, we are overtaken by a dreamless sleep; [46] but when some stronger motions remain they produce images corresponding in character and number to the motions and the regions in which they persist—images that are copies made inside and remembered when we awake in the world outside.

8. Mirrored Images (46A–C)

This brief note has little if anything to do with the main argument; but it serves to emphasize the purely mechanical aspect of vision, which will be contrasted in the next section with its rational purpose.

It will not now be difficult to understand all that concerns the formation of images in mirrors and in any smooth reflecting surface. As a result first of the combination of the internal and external fires, and secondly of the formation on each occasion, at the smooth surface, of a single fire which is in various ways changed in form,[1] all [B] such reflections necessarily occur, the fire belonging to the face coalescing, on the smooth and bright surface, with the fire belonging to the visual ray.[2] Left appears right because reverse parts of the visual current make contact with reverse parts of the light from the seen face, contrary to the normal rule of impact. Contrariwise, right appears left and left right when the visual light changes sides in the act of coalescing with the light with which it does coalesce; and this occurs when [C] the smooth surface of the mirror, being concave, throws the right part of the visual current to the left and the left to the right. The same curvature turned lengthwise to the face causes the whole to appear upside-down, throwing the lower part of the ray towards the top and the upper part towards the bottom.

[1] This is a reference (*a*) to the transposition of right and left mentioned in the next sentence; (*b*) to the distortion due to the mirror's concavity, described below.

[2] See *Sophist*, 266C. The 'face', taken by way of illustration, is that of the observer himself or of someone else standing alongside him.

9. Contrast of Secondary Causes with Purpose of Sight and Hearing (46C–47E)

Timaeus's account of sight has led us to the borderland of the intelligent soul and the external visible world. Its plan, moreover, effects the transition from Part I to Part II of the discourse, the works of Reason to what comes about of Necessity. Although it is right and proper that we should study the mechanism of sight and other such secondary causes, they will not enable us to discover the true purpose they are rationally designed to serve.

Now all these things are among the secondary causes used by the god as means to achieving the best possible result. The great majority of people regard them [D] not as secondary, but as the *sole* causes of all things, producing effects by cooling or heating, solidifying or rarifying, and all processes of that kind. But such things are incapable of any plan or intelligence: we have to declare that the only existing thing which really possesses intelligence is soul, and this is an invisible thing, whereas fire, water, earth and air are visible bodies; and a lover of intelligence and knowledge cannot but seek first for the causation which belongs to the intelligent nature [E] and only in the second place for what belongs to things that are moved by others and that necessarily set others again in motion. We too must act on this principle: we must speak of both kinds of cause, but distinguish causes that work with intelligence to fashion what is good and desirable, from those which, being devoid of reason, produce their various effects at random and without order.

So much then for the secondary causes that have had a share in giving the eyes the power which they now possess. Next we must speak of their highest function on our behalf, [47] for the sake of which the god has bestowed them upon us. Sight, in my opinion, is the cause of the highest benefits to us inasmuch as no word of our present discourse about the universe could ever have been uttered, had we never beheld the stars, Sun and sky. But as it is, the sight of day and night, of months and the circling years, has resulted in the invention of number and endowed us with the concept of time and the study of the nature of the world. From these we [B] have

derived the whole of philosophy, than which no greater boon has ever come or will come to mortal man as a gift from heaven. This then I call the greatest benefit of eyesight; why hymn those things of less importance, which one who loves not wisdom, if he were deprived of the sight thereof, might 'bewail with fruitless moan'? [1] For our part, let us rather speak of eyesight as the cause of that benefit for these ends: the god devised and gave us vision in order that we might observe the circuits of intelligence in the skies and profit by them for the revolutions of our own thought, which are akin to them, though ours be troubled while they [C] are unperturbed; and that, by learning to know them and acquiring the power to calculate them correctly, we might reproduce the absolutely unerring revolutions of the god and reduce to ordered stability the wandering motions within ourselves.

The same account may be given of sound [2] and hearing: they are a gift from heaven for the same object and purpose. For not only was speech ordained to this same end, to which it so largely contributes, [D] but also all that part of music which is serviceable with respect to the hearing of sound [3] was given for the sake of harmony; [4] and harmony, whose motions are akin to the revolutions of the soul within us, has been given by the Muses to him whose intercourse with them is governed by intelligence, not for the sake of irrational pleasure (as is now supposed), but as an ally against the internal discord that has entered the revolution of the soul, to bring it into order and concord with itself. Rhythm also was an aid bestowed upon us by the same divinities for the same ends, [E] because in the majority of us our condition lacks measure and is poor in grace.

[1] Euripides, *Phoenissae*, 1762

[2] i.e. articulate speech and musical sound.

[3] i.e. vocal and instrumental music. Music, in Plato's sense of the word, included poetry and the thought it conveyed.

[4] 'Harmony' is the nearest English approach to Plato's *harmonia*, which means not the blending of concordant sounds, but the adjustment of notes in the concordant ratios of the scale.

PART II. WHAT COMES ABOUT OF NECESSITY

In Part I we have been viewing the universe from the standpoint of the Demiurge introducing order into chaos. Now we are going to approach it as though from the abyss that confronted him. Stage by stage Timaeus analyses the elements described earlier as 'taken over' by the Demiurge —all that was visible, not at rest, but in discordant and chaotic motion (30A)—until he arrives at the fundamental factor of Space, which enables him to move forward and discern rational design even in the primeval welter of fire, air, etc. The geometrical shapes of the primary bodies are constructed and assigned; those bodies are formed into particles of regular size and shape; their transformation into one another is explained as a process of disintegration and re-formation of the various solids; and even sensible qualities that affect the organs of our five senses are somehow correlated into the characteristics of geometrical shape. Thus at the end of Part II we shall have returned by another route to the mechanism of sensation, which effected the transition to the subjects with which Timaeus is about to deal.

1. NECESSITY. THE ERRANT CAUSE (48A–E)

The structure of the visible universe and (as far as he has been dealt with) of man, revealed the operation of a benevolent purpose; but Timaeus has noted more than once that achievement of the most ungrudging benevolence can be only 'as good as possible'—never perfect. The Demiurge has been acting throughout subject to conditions not of his own making, which limit the excellence of his work. We have now, therefore, to take account of another principle involved in his labour—the principle called here 'Necessity' or 'the Errant Cause'.[1]

OUR discourse so far, excepting a few matters,[2] has exhibited the works wrought by the craftsmanship of Reason; but we must now set alongside them the things that come about of necessity. [48] For the generation of this universe was a mixed result of the combination of Necessity and Reason. Reason overruled Necessity by persuading her to guide the majority of those things that become towards what is best; [3] in that way and on that principle this universe was constructed in the beginning by the victory of rational persuasion over Necessity. If then we are really to tell how it came into being on this principle, we must introduce also the Errant Cause and explain how its nature is to cause motion. Thus therefore we must retrace our steps, and, taking in its turn [B] a second principle

[1] This first section is of fundamental importance for an understanding of the entire discourse. The reader must at all costs resist a temptation which has ensnared so many commentators—the temptation to interpret *Timaeus* in terms of Jewish-Christian theology. Attempts to do this have led to serious misunderstanding of Plato's thought, and in particular to a false interpretation of the word 'necessity'. 'This word', says Grote (*Plato*, iii. 36), 'is now usually understood as denoting what is fixed, permanent, unalterable, knowable beforehand. In the Platonic *Timaeus* it means the very reverse: the indeterminate, the inconstant, the anomalous, that which can be neither understood nor predicted. It is Force, Movement or Change, with the negative attribute of not being regular, or intelligible, or determined by any knowable antecedent or condition.' Necessity is, in fact, an irrational element in the world-soul; there is always some chaos in the cosmos.

[2] i.e. the account of the mechanism of sight.

[3] This is the central statement of the whole dialogue.

concerned in the origin of these same things, start anew upon our present theme as we did upon that of our earlier discourse.

We must in fact take a look at the very nature of fire and water, air and earth, before the generation of the Heaven, and their condition [1] before the latter's existence. For as yet no one has explained their generation; men speak as if they knew what fire and each of the others is, positing them as first principles, elements (letters,[2] so to speak) of the universe, whereas anyone with a grain of intelligence [C] should not rank them in this analogy with syllables. Today, however, our remarks must be limited as follows. We are not now going to speak of the 'first principle' or 'principles'—or whatever term men elect to use —of all things, if only because of the difficulty of expressing our views by this present method of exposition.[3] So you must not press me for the explanation. [D] Nor indeed could I ever convince myself that I should do right in shouldering so great a task; but clinging to what I said at the outset—the value of a probable account—I will try to give an explanation of all these matters in detail, no less probable than another (nay, more so), starting from the beginning in the same way as before.[4] Once again, therefore, at the outset of our discourse let us call upon a protecting deity to grant us a safe voyage through a strange and unfamiliar exposition [E] to the conclusion dictated by probability; and so let us begin once more.

[1] *pathē*. The word probably extends not only to their inner state but also to their behaviour and their construction.

[2] *stoikheia*. This was the normal word for letters of the alphabet. Plato (*Theaetetus*, 201E) is the first extant writer to apply it to physical elements.

[3] i.e. a method which seeks only 'probability' or 'likelihood'. To attain to 'first principles' the dialectical method would be needed.

[4] Note, however, that the next section begins with a statement that the new starting-point must be a fuller classification than that from which we started before.

2. THE RECEPTACLE OF BECOMING (48E–49A)

The new starting-point is found in the very beginning of Timaeus's discourse: his distinction between the intelligible and unchanging model and the changing and visible copy. This latter, we now find, is not self-subsistent, but needs something to hold it, just as a mirror is required to hold a reflection. And so a third factor must now be introduced, one that had no place in Part I among the works of Reason.

OUR new starting-point in describing the universe must, however, be a fuller classification than we made before. We then distinguished two things; but now we must draw attention to a third. The two sufficed for our earlier discourse; one posited as model, intelligible and forever unchangingly real; [49] the other, a copy of that model, which becomes and is visible. Thinking that the two would suffice, we did not then distinguish a third; but now, it seems, the argument obliges us to attempt to reveal and describe a form that is difficult and obscure. What nature, then, must we conceive it to possess, and what is the active manifestation of that nature? This, above all else: that it is the Receptacle (nurse, as it were) of all Becoming.

3. FIRE, AIR, WATER AND EARTH ARE NAMES OF QUALITIES ONLY (49A–50A)

What then, exactly, is the Receptacle? Timaeus begins his search for an answer to this question by considering fire, air, water and earth as the contents of the Receptacle. Rejecting the theories both of the Milesians and of the pluralists, he will not allow that fire, etc. are 'things' with a constant nature. We have now to think of qualities which are not also 'things', but only transient appearances in that Receptacle, which alone has some kind of permanency.

TRUE, however, though this statement is, it needs to be expressed more clearly; but that is particularly hard inasmuch as [B] it necessitates our raising a prior difficulty about fire and the things that rank therewith. It is not easy to say, with respect to any one of these, which we ought to call really water rather than fire, or indeed which we should call by any one name rather than by all of them together or by each severally, so as to use language in a sound and reliable way. How then and in what terms are we to speak of this matter, and what is that prior difficulty that calls for solution?

To begin with, consider the thing we now call water. This, when it is compacted, we see (as we imagine) becoming earth and stones, and this same thing, when it is dissolved [C] and dispersed, becoming wind and air; air becoming fire by combustion; and, in reverse, fire, when condensed and extinguished, returning again to the form of air, and air coming together once more and condensing into mist and cloud; and from these, as they are still more closely compacted, flowing water; and from water yet again earth and stones. Thus, as it seems, they transmit in a cycle the process of passing into one another. [D] Since, therefore, in this way no one of these things ever makes its appearance as the *same* thing, which of them can we confidently affirm to be *this*—whatever it may be —and not something else, without feeling ourselves utterly at a loss? It cannot be done; but by far the safest course is to speak of them in the following terms. Whenever we observe a

thing (fire, for example) to be constantly changing, we should refer to it in every case not as 'this', but as 'what is of such and such a quality', and to water not as 'this', but always as 'what is of such and such a quality'; nor must we describe anything else as having some permanence, [E] among all the things we indicate by the words 'this' or 'that' in the belief that we are pointing out some definite thing. For they glide away before there is time to denote them as 'that' or 'this' or by any expression that represents them as having permanent being. We should not apply these terms to any of them; the description we should use in the case of each and all is 'that which is of a certain quality and has the same sort of quality as it perpetually recurs in the cycle'. We must, in fact, designate as 'fire' that which is at all times of such and such a quality; and so too with anything else that is in process of becoming. Only with reference to that *in* which all of them are forever coming to be, [50] making their appearance and again vanishing out of it, may we use the words 'this' or 'that'; we must not apply any of these expressions to that which is of some quality—hot or cold or any of the opposites, or to any combination of these last.

4. THE RECEPTACLE LIKENED TO PLASTIC MATERIAL (50A–C)

Turning from the contents to the Receptacle itself, Timaeus starts to explain its nature by means of an analogy. It is likened to a quantity of plastic material (gold) moulded and remoulded into different shapes. The nature of the gold is constant; the shapes are fashioned only to be destroyed and make way for others.

BUT I must try my hardest to explain this thing once again still more clearly. Suppose a man had moulded geometrical figures of all kinds out of gold,[1] and were unceasingly to remould each into all the others. In such a case, [B] if someone pointed to one of them and asked what it was, much the safest answer in respect of truth would be to say 'gold', and never to speak of a triangle, etc. as *these* things, as though they had being, since they are in process of change even while one is asserting their existence. Rather one should be satisfied if they admit with any certainty even of the description 'what is of such and such a quality'. Now the same account must be given of that nature which receives all bodies. It must be called always the same; for it never departs at all from its own character, [C] since it is always receiving all things and never in any way whatsoever assumes any character resembling any of the things that enter it: it is there by nature as a matrix for everything, changed and diversified by the things that enter it, and because of them it *appears* to possess different qualities at different times; while things that pass in and out of it are copies of the eternal things, impressions taken from them in a strange manner that is hard to express but which we will follow up later.[2]

[1] Note, however, that this illustration is defective inasmuch as the figures are made out of and consist of gold, whereas the contents of Plato's Receptacle are not made out of it.

[2] This undertaking is fulfilled, if at all, at 52C.

5. THE RECEPTACLE HAS NO DISTINCTIVE QUALITIES (50C–51B)

The foregoing analogy was imperfect in that gold possesses sensible qualities of its own which are unaffected by variations of shape. Timaeus will now correct this defect by adding that the Receptacle has no qualities of its own 'before' the others enter it. He prefaces this important statement with an image of father-mother-child, in order to show the relations between the eternal Form, the Receptacle and Becoming.

FOR the present, at all events, we must conceive three things: that which becomes, that in which it becomes, and the model [D] according to whose likeness that which becomes is born. Indeed one may aptly compare the Recipient to a mother, the model to a father, and the nature that arises between them to their offspring. Also we must notice that if there is to be an impress presenting all diversities of aspect, the thing itself in which the impress comes to be situated cannot have been duly prepared unless it is devoid of all those qualities which it is to receive from elsewhere. [E] For if it were like any of the things that come in upon it, the result would be that when things of contrary or wholly different nature entered thus, it would, in receiving them, intrude its own features and so reproduce them badly. Hence that which is to receive in itself all characters must be free from all qualities—just like the base which makers of perfumed ointments skilfully contrive at the start of their work, making the liquids that are to receive the scents as odourless as possible; or again, like those who, when preparing to take impressions in some soft substance, allow no shape to appear therein beforehand, but begin by making the surface as smooth and even as possible. [51] In the same way, that which is in due course to receive throughout its extent, and many times over, all likenesses of the intelligible and eternal things ought in its own nature to be free of all qualities. For this reason the mother and Receptacle of what has come to be visible and otherwise sensible must not be called earth or

air or fire or water, nor any of their compounds or components; [1] but we shall not go astray if we call it a nature invisible and without character, all-receiving, partaking in some [B] very perplexing way of the intelligible and very difficult to apprehend. So far as one can get at its nature from what has been said so far, the most correct account of it would be as follows: that part of it which has been made fiery appears at any given time as fire; the parts that is liquefied as water; and as earth or air those parts which receive likenesses of these.

[1] By 'compounds' he means bodies formed from two or more of the four primary bodies; by 'components', the qualities into which each of those primary bodies might be analysed.

6. IDEAL MODELS OF THE FOUR PRIMARY BODIES (51B–E)

The previous section referred to 'copies' of fire, air, water and earth as 'received' into the Receptacle. This raises the question whether there are models serving as originals of those copies.

BUT a more thorough inquiry into the subject raises a question that must be determined by argument.[1] Is there such a thing as 'fire just in itself' [C] or any of the other things we are always describing in such terms, as things that 'are just in themselves'? [C] Or are the things which we see or otherwise perceive by the bodily senses the only things that have independent and absolute reality; and has nothing else, besides them, any sort of being at all? Are we talking nonsense whenever we say that there is such a thing as an intelligible Form of anything? Is this nothing more than a word?

It would be improper to dismiss the question before us without trial or verdict, merely asseverating that it is so, and equally improper to intrude a lengthy digression into a discourse that is already long. [D] If we could see our way briefly to draw an important distinction,[2] that would best suit the occasion. This, then, is the view for which I cast my vote: if intelligence and true belief are two different kinds, then these things—Forms that we cannot perceive but only think of—certainly exist in themselves; but if, as some maintain, there is no difference between true belief and intelligence, then all the things we perceive through the bodily senses must be postulated as the most certain reality. [E] Now we must affirm that they are two different things, because they are distinct in origin and unlike in nature. The one [3] is produced in us by instruction, the other by persuasion; the one can always give

[1] i.e. rather than by 'what has been said so far'.
[2] *scil.* between the two orders of existence, corresponding to the two kinds of apprehension distinguished in the next sentence.
[3] i.e. intelligence. Cf. *Republic*, v.

a true account of itself, while the other can give none; the one cannot be shaken by persuasion, whereas the other can be won over; and we must acknowledge that true belief is shared by all mankind, intelligence only by the gods and a handful of mortals.

7. SUMMARY ACCOUNT OF THE THREE FACTORS: FORM, COPY AND SPACE AS THE RECEPTACLE (51E–52D)

So far Timaeus has dealt with the notion of a Receptacle of Becoming; with its contents, the sensible qualities and their combinations; and lastly with the ideal models. In this section he gives us a brief account of these three factors, in reverse order.

THIS being so, we must agree that [52] there is, firstly, the unchanging Form, ungenerated and indestructible, which neither receives anything else into itself from elsewhere nor itself enters into anything else anywhere, invisible and otherwise imperceptible—that, in fact, which thinking has as its object.

Secondly, there is that which has the same name and is similar to that Form; is sensible; is generated; is perpetually in motion, coming to be in a certain place and again departing from it; apprehensible by belief involving perception.

Thirdly, there is Space, which is everlasting, not admitting of destruction; [B] affording a situation for all things that come into being, but itself apprehended without the senses by a kind of bastard reasoning, and scarcely an object of belief. This indeed is what we behold as in a dream and say that anything that is must of necessity be in some place and occupy some room, and that what is not somewhere on earth or in heaven is nothing. [C] Because of this dreaming state we prove unable to bestir ourselves and draw all these and other kindred distinctions (even in the case of the waking and truly existing nature), and thus to state the truth: namely that, whereas for an image—since not even the very principle on which it has come into being belongs to that image, but it is the ever-moving semblance of something else—it is proper that it should come to be *in* something, clinging to existence as best it may on pain of being nothing at all, on the other hand that

which has real being enjoys the support of the exactly true account, which declares that, so long as two things are different, neither can ever come to be in the other in such a way that [D] the two should become at once both one and the same thing and also two.

8. THE ORIGINAL CHAOS (52D–53D)

Having, so far as possible, considered the Receptacle and its contents in abstraction from the element of rational design, Timaeus goes on in this section to sum up the three factors needed for the production of a visible world, and then to describe the Receptacle and contents imagined as existing 'before' the coming into being of the ordered world. Presently we shall learn what the Demiurge did when he took over this chaos.

[D] LET this, then, be given as the summary account according to my judgment: that there were Being, Space, Becoming—three distinct things—even before the Heaven came into being. Now the nurse of Becoming, being made watery and fiery and receiving the characters of earth and air, and qualified by all the other affections that accompany these, [E] exhibited every sort of diverse appearance; owing, however, to the fact that it was filled with powers that were neither alike nor evenly balanced, there was no equipoise in any part of it, but it was everywhere swayed unevenly and shaken by those things, and by its motion shook them in turn. And they, being thus moved, were continually being separated and scattered in various directions; just as when things are shaken and winnowed by means of winnowing baskets [1] and other instruments used for cleaning corn, [53] the dense and heavy things go one way, while the thin and light are carried to another point and settle there.[2] So also at that time the four kinds were shaken by the Recipient, which itself was in motion like an instrument for shaking; it separated the most dissimilar kinds farthest apart from one another, and concentrated the most like closest together, in such a way that the different kinds came to occupy different regions even before the ordered whole consisting of them came into being. Before that, all

[1] The winnowing basket was not a sieve, but a wide shovel-like basket, high at one end and flattening out towards the other.

[2] The winnowing basket was shaken and jerked so as to drive the chaff toward the flat (open) end and out, thus leaving clean grain in the basket.

these kinds were devoid of proportion or measure. [B] Fire, water, earth and air possessed some traces of their own nature, but were altogether in such a condition as one would expect for anything when deity is absent from it. Such being their nature when the ordering of the universe was undertaken, the god started by giving them a distinct configuration by means of shapes and numbers. That he framed them with the greatest possible perfection, which they previously lacked, must be taken above all as a principle we steadfastly maintain; [C] what I must now endeavour to explain to you is the distinct construction and the origin of each. My exposition will be unfamiliar; but since you have been trained in the branches of learning to which I shall be obliged to have recourse, you will be able to follow me.

9. CONSTRUCTION OF THE FIGURES OF THE PRIMARY BODIES (53C–55C)

Timaeus now moves upward from the abyss to the lowest level at which the element of order and design is wrought by the Dimiurge. After a short interruption (section 10) the god will be shown assigning regular geometrical shapes to the four primary bodies (55D–56C). Meanwhile, here, we have an account of him constructing the regular solids later to be so assigned. They are not the actual shapes of existing particles, which can be no more than imperfect copies, but the perfect types belonging to the intelligible realm of mathematics.

IN THE first place, then, it is of course plain to everyone that fire, earth, water and air are bodies; and all body has depth. Furthermore depth must be bounded by surface, and every surface that is rectilinear is composed of triangles. [D] Now all triangles are derived from two, each having one right angle and the other angles acute. Of these triangles, one [1] has on either side the half of a right angle, the division of which is determined by equal sides; the other [2] has unequal parts of a right angle allotted to unequal sides. This we assume as the first beginning of fire and other bodies, following the account in which probability is combined with necessity; [3] the principles still more remote than these are known to the god and to those men who enjoy his favour.

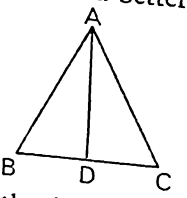
[E] We must now determine the following question: What are the most perfect bodies that can be constructed, four in number, unlike one another, but such that some can be generated out of one another by resolution? If we can arrive at the answer to this, we have the truth concerning the generation of earth and fire and of the bodies which stand as proportionals between them. For to no one shall we concede that there are visible bodies more perfect than these, each of which

[1] The right-angled isosceles. [2] The right-angled scalene.

[3] The account is probable inasmuch as one cannot be sure that the entire theory attributing the figures of regular solids to fire, air, etc. is the truth. It is necessary inasmuch as the necessarily given properties of Space and the logical necessity of geometrical construction flow from the original assumption.

corresponds to a single type.[1] We must therefore do our best to construct the four kinds of body that are the most perfect and declare that we have adequately [2] grasped the constitution of these things.

[54] Now, of the two triangles the isosceles is of one type only; the scalene, of an indefinite number. Of this unbounded multitude we must choose the best, if we are to make a satisfactory beginning. Accordingly, if anyone can claim to have chosen a better kind for the construction of these bodies, his will be the victory, not of an enemy but of a friend. For ourselves, however, we postulate as the best of these triangles one sort, passing over all the rest; that, namely, a pair of which make up [B] the equilateral triangle.[3] The reason is too long a story; but if anyone should challenge us and discover that it is not so, he is more than welcome to the prize. So much then for the choice of the two triangles, of which the bodies of fire and the rest have been fashioned: the one isosceles [the half-square], the other having the square of the greater side three times that of the lesser [the half equilateral].[4]



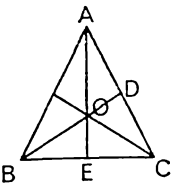
Greater precision is now required on a point that was not stated clearly enough a while ago.[5] It seemed [6] as if all the four kinds could pass through one another into one another, [C] but this appearance was deceptive; for the triangles we selected give rise to four types, and whereas three are constructed out of the triangle with unequal sides, only the fourth is constructed out of the isosceles. Consequently it is impossible for all of them to pass into one another by resolution, many of the small forming a few of the greater and conversely. But three of them [7] can do so; for those are all com-

[1] i.e. a type of solid figure.
[2] Adequately, that is, for the purpose of explaining the physical transformation of fire, air, etc. The complete geometrical process would take much too long.
[3] i.e. ABD+ACD = ABC.
[4] In the triangle ABD, AB = 2 BD, and $(AB)^2 = (BD)^2+(AD)^2$; ∴ $4(BD^2) = (BD)^2+(AD)^2$, so that $3(BD)^2 = (AD)^2$.
[5] At 53E, where he said that *some* (not all) primary bodies could pass into one another by resolution.
[6] *See* 49B, C.
[7] Fire, water and air. Earth is excluded because of the decision to assign the cube to it.

posed of one triangle, and when the larger bodies are broken up several small ones will be formed of the same triangles, assuming their proper figures; [D] and again, when several of the smaller bodies are resolved into their triangles, the total number made up by them will give rise to a single new figure of larger size belonging to a single body. So much for their passing into one another.

In the next place we have to explain what sort of figure each body has, and the numbers [1] that combine to compose it.

First will come the construction of the simplest and smallest figure [the pyramid]. Its element is the triangle whose hypotenuse is twice as long as the shorter side. If a pair of such triangles are put together by the diagonal,[2] [E] and this is done three times, the diagonals and the shorter sides resting on the same point as a centre, then a single equilateral triangle is formed of triangles six in number.

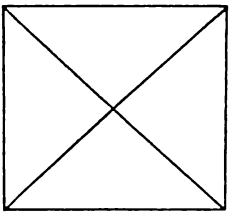


If four equilateral triangles are put together, their plane angles meeting in groups of three make one solid angle—[55] that [3] which comes next after the most obtuse of plane angles. When four such angles are produced, the simplest solid figure [4] is constructed, whose property is to divide the whole circumference [5] into equal and similar parts.

A second body [6] is formed of the same elementary triangles when these latter are assembled in a group of eight equilaterals and yield a solid angle consisting of four plane angles. With the production of six such solid angles the second body is complete. [B] The third body [7] is made up of one hundred and twenty of the elementary triangles conjoined, and of twelve solid angles, each contained by five equilateral triangular planes; and it has twenty equilateral triangular bases.

Here one of the two elements,[8] having generated those bodies, had played its part to the full. But the isosceles

[1] Probably the numbers of elementary triangles.
[2] Presumably the diagonal of the trapezium DOEC, i.e. the hypotenuse CO.
[3] 180°. [4] The pyramid.
[5] The circumference of the sphere in which the pyramid is imagined to be drawn.
[6] The octahedron. [7] The icosahedron.
[8] The scalene triangle.



triangle went on to generate the fourth body,[1] being assembled in sets of four, with their right angles meeting at the centre, so as to form a single equilateral quadrangle. [C] Six such quadrangles, joined together, produced eight solid angles, each composed of a set of three plane right angles. The shape of the body thus constructed was cubical, having six quadrangular equilateral planes as its face.

There still remained one construction, the fifth;[2] and the god used it for the whole,[3] adorning it with a pattern of animal figures.[4]

[1] The cube. [2] The dodecahedron.
[3] i.e. for the sphere of the universe, to which the dodecahedron approaches most closely in volume.
[4] The reference is probably to the signs of the zodiac and other constellations in the sky.

10. MAY THERE BE FIVE WORLDS? (55C–D)

This interruption of the main argument raises once again, and for no satisfactory reason, the question whether there may be more than one ordered world.

Now if anyone, taking account of all these things, should raise the pertinent question whether the number of worlds ought to be described as indefinite or limited, [D] he would conclude that the doctrine of an indefinite number is the opinion of a man who is indeed indefinite about matters on which he should be definitely informed.[1] But if he stopped short at the question whether it is correct to speak of them as being really one or five, he might with more reason experience some doubt. Our own verdict, according to the probable account,[2] pronounces the world to be by nature a single god; but another, looking to other considerations, will decide otherwise. He, however, may be disregarded.

[1] For the pun on *apeiros* ('unlimited' and 'unversed'), cf. *Philebus*, 17E.
[2] 31A, B.

11. THE REGULAR FIGURES ASSIGNED TO THE FOUR PRIMARY BODIES (55D–56C)

LET us next distribute the figures whose construction we have just described, among fire, earth, water and air.

To earth let us assign the cubical figure; [E] for of the four kinds earth is the most immobile and the most plastic [1] of bodies. The figures whose bases are the most stable must best answer that description; and as a base, if we take the triangles we assumed at the outset, the face of the equilateral triangle is by nature more stable than that of the triangle with unequal sides; and moreover, of the two equilateral surfaces respectively composed of the two triangles, the square is necessarily a more stable base than the triangle, both in its parts and as a whole. [56] We shall therefore preserve the probability of our account if we assign this figure to earth; and of the remainder the least mobile to water, the most mobile to fire, and the intermediate figure to air. Again, we shall assign the smallest [2] body to fire, the largest to water, and the intermediate to air; and again the body with the sharpest angles to fire, the next to air, the third to water.

Now, as regards all these figures, that which has the fewest faces [3] must be the most mobile, [B] since it has the sharpest cutting edges and the sharpest points in every direction, and also the lightest, being composed of the smallest number of similar parts; the second [4] must come second in this respect; the third,[5] third. Hence, in accordance with valid reasoning as well as probability, among the solid figures we have constructed, we may take the pyramid as the element or seed of

[1] It is most plastic because it keeps whatever shape into which it is moulded. 'Immobile' here means not 'stable', but 'hardest to move'; for the icosahedron (water) is said in the next paragraph to be the hardest to move of the other three solids, whereas (58D) it is the least stable.

[2] At 57C we are to learn that each primary body has several grades of size. Here Plato assumes for convenience that all three bodies have equilateral faces of the same area.

[3] i.e. the pyramid.

[4] The octahedron.

[5] The icosahedron.

fire; the second in order of generation [octahedron] as that of air; the third [icosahedron] as that of water.

Now we must think of all these bodies [1] as so small [C] that a single body of any one of these kinds is invisible to us on account of its smallness, though when a number are combined their masses can be seen. And as regards their quantities,[2] their motions and their powers in general, we must assume that the god adjusted them in due proportion after bringing them in every detail to the most absolute perfection allowed by Necessity voluntarily complying with persuasion.

[1] i.e. all four, including earth.
[2] i.e. the total quantities of the four several kinds.

12. TRANSFORMATION OF THE PRIMARY BODIES (56C–57C)

Transformation of some of the regular solids into others can now be described in terms conditioned by the assumptions of the foregoing theory. Those assumptions are as follows: (*a*) Particles can be broken down into their triangular or square faces, which can be further reduced to the elementary triangles from which they originated; (*b*) these elementary triangles can continue in existence, move around in space, and re-form into the same or different; but (*c*) earth triangles, because they are of a different pattern, can re-form only as earth triangles.

FROM all that we have so far said concerning the kinds, [D] the following would be the most probable account of the facts.

Earth, when it encounters fire and is dissolved by its sharpness, would drift about—whether, when dissolved, it be enveloped in fire itself or in a mass of air or of water—until such time as its own parts, meeting one another somewhere, recombine and again become earth; for they can never pass into any other kind.

But (*a*) when water is broken up into parts by fire or, again, by air, it is possible for one particle of fire and two of air to arise by combination; [E] and (*b*) the fragments of air, from a single particle that is dissolved, can become two particles of fire. Conversely (*c*) when a little fire, enveloped in a large amount of air or water or (perhaps) earth, is kept in motion within these masses as they move in place, and offers fight, but is eventually overcome and shattered into fragments, two particles of fire unite to make one figure of air. And (*d*) when air is overpowered and disintegrated, a single complete figure of water will be compacted from two and a half complete figures of air.

[57] Let us reconsider this account once more as follows. (*a*) When one of the other kinds is enveloped in fire and cut up by the sharpness of its angles and edges, then (i) if it is recombined into the shape of fire, the cutting-up process

terminates; for no homogeneous and identical kind can bring about any change in, or undergo any change from, that which is in the same condition as itself; but (ii) so long as, while passing into some other kind, a weaker body is in conflict with a stronger, the resolution does not cease. [B] On the other hand (*b*), when a few smaller particles are enveloped in a large number of bigger ones and are being shattered and quenched, then (i) if they consent to combine into the figure of the prevailing kind the quenching process terminates—air is produced from fire, water from air; but (ii) if the smaller particles are on their way to air or water, and one of the other kinds meets them and joins battle, the process of their resolution does not cease until either they are completely dissolved by the thrusting and escape of their own kindred, or they are overwhelmed and some of them combine into a single body uniform with the victorious body and make their home with it. [C] Moreover, in the course of this ordeal, they are all interchanging their positions. For while the main masses of the various kinds stand apart from one another, each in its own place, because of the motion of the Recipient, the portions which from time to time become unlike them and similar to other kinds are carried by the shaking towards the place of those others to which they are assimilated.

13. FIRE, AIR, WATER AND EARTH EACH EXIST IN DIFFERENT GRADES OF SIZE (57C–D)

Up to the present we have learned only that the particles are so small as to be invisible. Now we are told that there are specific varieties of fire, air, etc., owing to differences in the size of the triangles and therefore of the particles they compose.

SUCH then are the causes underlying the formation of all the uncompounded and primary bodies. The reason why there are several varieties within their kinds must be sought in the construction of each of the two elementary triangles: [D] the construction in each case originally produced its triangle not of one size only, but some smaller and some larger, the number of those differences being equal to that of the varieties within the kinds. Consequently, when they combine with themselves or with one another, there is an infinite diversity, and that diversity must be kept in view by those who intend to put forward a probable account of Nature.

14. MOTION AND REST (57D–58C)

Timaeus has still to explain why the attraction of like to like does not sort the four primary bodies into an equal number of four distinct homogeneous masses, which would thenceforward be inert since the aforesaid attraction is the sole mechanical force at work in the chaos described earlier. He might have answered that the universe is animated by a self-moving soul which of its nature sustains constant motion. But in this second part of the discourse mechanical explanations alone are to be given, so far as they are valid; for it is concerned with secondary causes and what takes place of Necessity. In the present section Timaeus tells us how it is of the nature of the Errant Cause to produce motion (48A).

Now concerning motion and rest, [E] if we cannot agree as to how and under what conditions they arise, our subsequent reasoning will meet with numerous obstacles. We have already said something about them, but there is this to be added: motion will never exist in a state of homogeneity. For it is difficult, or rather impossible, that what is to be moved should exist without that which is to move it, or what is to produce motion without that which is to be moved by it. In the absence of either there is no motion; and they cannot possibly be homogeneous. Accordingly we must invariably presuppose rest in a state of homogeneity, and attribute motion to a state that is heterogeneous. [58] Furthermore, inequality is a cause of heterogeneity; and we have already described [1] the origin of inequality. We have not, however, yet explained why the several bodies have not been entirely separated according to their kinds and so ceased from transformation and locomotion. We must therefore resume our explanation as follows. The circuit of the universe, once it has comprehended the four kinds, being round and tending by nature to come together upon itself, constricts them all and allows no room to be left void. [B] Hence fire, more than all the rest, has made its way

in among all the others; [1] and, in the second degree, air, because it comes next in fineness of particles; and so on with the remainder. For the kinds that have the largest constituent particles leave the largest gaps in their texture, and those with the smallest the least.[2] So the coming together entailed by the process of condensation forces the small bodies together into the interstices between the large ones. And therefore when the small are set alongside the large, and the lesser disintegrate the larger while the larger give rise to a combination of the lesser, all are [C] changing the direction of their motion hither and thither towards their own regions; for each, in changing its size, changes also the locality of its region. Thus, then, and by these means there is a permanent safeguard for the occurrence of that heterogeneity which ensures that the perpetual motion of these bodies will be unceasing.

[1] At 78A Plato tells us that fire, having the smallest particles of all, passes through water, earth and air and all bodies consisting thereof.

[2] Thus the icosahedra which compose a volume of water, no matter how densely packed, inevitably have larger gaps between them than those between the octahedra of equal grade in a volume of air.

15. VARIETIES AND COMPOUNDS OF FIRE, AIR, ETC. (58C–61C)

Since each of the regular solids exists in a limited number of different grades of size (57C, D), there are (*a*) a corresponding number of grades of water, etc., each consisting of particles of uniform size. There are also (*b*) non-uniform varieties of water, etc., consisting of particles of water, etc. only, but of more than a single grade; and (*c*) compounds of more than one primary body, e.g. earth and water. Further, since every grade of each of the primary bodies can enter into such compounds, there will be a very large number of possible combinations (57D).

IN THE next place we must observe that there are several varieties of fire: flame; the effluence of flame which does not burn furnishes the eyes with light; [D] and what is left of fire in glowing embers when flame is quenched. Likewise with air: there is the brightest and most translucent kind called 'aether', the most turbid called 'murk' and 'gloom', and other nameless kinds whose formation is due to the inequality of the triangles.

The primary division of water is twofold: (*a*) the liquid, and (*b*) the fusible.[1]

(*a*) The liquid, inasmuch as it contains portions of the small grades of water, unequal in size, is in itself mobile and can easily be set in motion by something else, because of its non-uniformity [2] and the shape of its figure.

(*b*) The other type, composed [E] of large and uniform particles, is harder to move than the former, and heavy, being solidified by its uniformity. But under the influence of fire, as the latter enters and breaks it down, it loses its uniformity and consequently attains greater mobility; and, when it has become easy to move, the thrust of the adjacent air spreads it over the ground. Each of these two processes has been given a name: 'melting' for the reduction in bulk of the particles, 'flowing' for the spreading over the ground.

[1] i.e. the metals; cf. 59B ff.
[2] i.e. of its not being of the same grade in size.

[59] When, on the contrary, the fire is being driven out of it again, that fire does not pass out into emptiness; it thrusts against the adjacent air, which in turn thrusts the liquid mass, while it is still easily moved, into the places left vacant by the fire and makes it a homogeneous compound. As the fire which brought about the lack of uniformity withdraws, the liquid, being thus forced together and recovering its uniformity, settles into its original state. The withdrawal of the fire is termed cooling; the contraction which ensues upon that withdrawal is called 'being in a solid state'.

[B] Of all these fusible varieties of water, as we have called them, one is gold. It is very dense, consisting of extremely fine and uniform particles. Gold is unique in its kind, tinged with shining [1] and yellow hue; it is the treasure most highly esteemed, which has been filtered through rock and there compacted.

The 'scion of gold', which is very hard because of its density, and is darkly coloured, is called adamant.[2]

Another variety has particles closely resembling those of gold, but of more than one grade. It surpasses gold as regards density in one way,[3] and is harder because it contains a little fine earth; [C] but it is lighter by virtue of its larger interstices. This formation is copper, one of the bright and solid kinds of water. The portion of earth mixed with it appears by itself on the surface when the two substances begin to be separated again by the action of time; it is called 'verdigris'.

To enumerate the other substances of this kind, following the method of a probable account, would be no complicated task. When a man, by way of recreation, lays aside discourse about eternal realities and derives harmless amusement from such plausible accounts of becoming, [D] he will make for his life a sober and sensible pastime. So now let us give it free play

[1] 'Shining' and [C] below 'bright' are used here as names of colours.

[2] *Adamas*. Haematite and platinum have been suggested, upon no cogent evidence. The word originally meant 'tempered iron', but was later used of the diamond (Pliny's *auri nodus*, 'scion of gold'). It has therefore been conjectured that diamond is the substance referred to here, 'darkly coloured' being due to a misunderstanding. Plato, very likely, had never seen a diamond, and imagined it on the strength of an uncertain description to be a metal.

[3] In so far as icosahedra of different sizes can be more closely packed, the smaller ones helping to fill the interstices between the larger.

and go on to expound the probabilities that come next in this subject as follows.

Water that is mixed with fire [1] and is fine and liquid (it is termed 'liquid' because of its motion, i.e. its rolling course *over the ground* [2]), and also soft because its bases give way, being less stable than those of earth—such water, I say, when separated off from fire and air, [E] becomes more uniform and at the same time is thrust together upon itself by the action of the particles as they evacuate it.[3] Water so compacted, when it suffers this change at the farthest limit above the earth, is hail; when on the ground, ice. Water that is less affected and still only half congealed is called 'snow' above the earth, and when congealed from surface dew is known as 'hoar-frost'.

Mixtures consisting of most of the grades of water are given the comprehensive name 'juices', being filtered through the plants that grow from the earth; while their several differences arise from a variety of combinations. [60] Many of the varieties they present are nameless; but the four kinds which contain fire are specially conspicuous and have been given names. One is wine, which heats soul and body together. Next is the oily kind, which is smooth and divides the visual stream and therefore appears bright and shiny to the eye, and glistens; it includes resin, castor oil, olive oil itself and all others having the same property. [B] The third kind, which relaxes the contracted pores of the mouth to their normal state, and thereby produces sweetness, has received the general name 'honey'.[4] Last there is a kind which dissolves the flesh by burning, a frothy substance distinct [5] from all other juices and called 'bitter juice'.[6]

Of the varieties of earth, that which has been strained through water becomes a stony substance in the following way. When the water mixed with it is broken up in the mixing, it changes into the form of air; and having become air, it

[1] Fire in this case is no part of its constitution, but a foreign body which keeps the water liquid.

[2] A fanciful derivation of *hugron* (liquid) from *huper gēn rheon* (flowing over the ground).

[3] Cf. 59A.

[4] 'Honey' here denotes that found in flowers, not the confection produced by bees; it also includes the sweet gums exuded by certain trees.

[5] Meaning, probably, with a notably different flavour.

[6] Apparently another general term.

rushes up towards its own region. [C] But since there was no empty space surrounding it, it thrust against the adjacent air. This air, being heavy, when it is thrust and poured around the mass of earth, presses it hard and forces it together into the spaces whence the newly formed air has been ascending. Earth compressed by air so as to be indissoluble by water forms stone, the finer being the transparent kind consisting of equal and homogeneous particles, the baser of the opposite sort.

The kind that has been robbed of all moisture by the rapid operation of fire [D], a more brittle formation than the other, is what we have named 'earthenware'; but occasionally, when some moisture is left and gives rise to earth fusible by fire, the dark-coloured stuff that results from its cooling is lava.

Moreover there are two kinds which result likewise when a large amount of water has departed from the mixture; but the particles of earth in their composition are finer and have a saline taste. These become only half solid and are once again soluble by water. The one that gets rid of grease and dirt is soda; the other, [E] which blends agreeably in the combinations of flavour, is salt, a substance which, according to human convention, is pleasing to the gods.

The compounds of earth and water which are soluble by fire, but not by water, are compacted thus for the following reasons:

(*a*) Neither fire nor air dissolves masses of earth, because their particles are smaller than the interstices in the texture of earth, and therefore, having adequate room to pass through without forcible effort, they do not loosen the earth but leave it undissolved. [61] Earth then, when not forcibly compressed, is dissolved in this manner by water only; but if it *is* so compressed fire alone can dissolve it, for no entrance remains for anything other than fire.

(*b*) Water, again, when most forcibly compressed is dispersed by fire only; though when the consistency is weaker, both fire and air disperse it, the latter by way of its interstices, the former by actually breaking it down into its triangles; while (*c*) air forcibly compressed cannot be resolved by anything except into its elements, and when not so compressed, is dissolved by fire alone.

So as regards these bodies compounded of earth and water, [B] so long as water occupies the interstices of the earth in such a body, though these be forcibly compressed, the particles of water attacking it from without can find no entrance, and therefore, flowing round the whole mass, they leave it undissolved; whereas the particles of fire make their way into the interstices between the water particles and, acting upon them (fire upon water) in the same way that water acts upon earth, are the sole agents that can cause the compound body to be dissolved and set flowing. Of these compounds, some contain less water than earth, namely all kinds of glass [C] and all those varieties of stone that are called fusible; others contain more water, namely all the substances with a consistency like that of wax or incense.

16. HOT AND COLD; HARD AND SOFT; HEAVY AND LIGHT (61C–64A)

The circle outlined in the prefatory note to Part II is now complete. So far the external objects of sense have been considered as supposedly independent of the effects they produce in contact with the sentient organs. But since we know of their existence by sensation and perception alone, any mention of their properties would have implied perception and thereby have anticipated the account, still to come, of the organs of sense and the sentient part of the soul. The present section treats of certain qualities common to all external bodies and perceived by the sense of touch. Sections 17–21 will be concerned with other sensible qualities.

WE HAVE now, I think, sufficiently explained the varieties consequent upon diversity of shapes, combinations and transformations of one body into another. Next we must try to make clear how they come to possess their qualities.

In the first place our account must, from beginning to end, assume the presence of sensation; but we have not yet described the making of flesh and all that goes with it, or the mortal part of the soul.[1] [D] No satisfactory account of these can be given, however, apart from all the qualities connected with sensation, nor indeed of the latter apart from the former; and to treat both together is hardly possible. We must therefore begin by assuming one side, and afterwards go back to study what we have assumed. In order then that our account may proceed from the kinds of bodies to their qualities, let us presuppose what is entailed by the existence of body and soul.[2]

For a start, let us see how we come to call fire 'hot', a question we may study by observing the rending and cutting effect of fire upon our bodies. [E] We are all aware that the

[1] We have already learned (42A) that the implantation of the immortal part in a body necessitates sensation. So far only sight and hearing have been discussed (45B ff.)

[2] The mortal parts of the soul and the principal organs of the body are dealt with in Part III.

sensation is of something piercing; and we may deduce the fineness of the edges, the sharpness of the angles, the smallness of the particles and the rapidity of the movement, all of which properties render fire energetic and trenchant, cleaving and penetrating whatever it encounters. [62] When we recall the construction of its figure we appreciate that this substance, above all others, penetrates the body, divides it minutely, and gives the affection we call 'hot' its quality and its proper name.[1]

The opposite quality is self-evident, but it shall not go unexplained. The particles of fluid in the vicinity of the body, when they enter it, drive out the particles smaller than themselves,[2] and being unable to find room in their places they compress the moisture within us and solidify it by reducing [B] what was not uniform and was therefore in motion to immobility, which ensues upon uniformity and compression. But a thing that is unnaturally contracted struggles, forcing itself apart once more into its normal state. This struggling and shaking we call trembling and shivering; and the word 'cold' is applied to this affection as a whole and to the agent responsible for it.

'Hard' is used of anything to which our flesh yields, 'soft' of anything that yields to flesh; and hard and soft things are likewise so called with reference to one another. A thing is yielding when it has a small base; [C] the figure composed of square faces, having a firm standing, is most stubborn; so also is anything that is contracted to the greatest density and is therefore particularly resistant.

'Heavy' and 'light' can be most clearly explained by examining them along with the terms 'above' and 'below'. It is quite incorrect to suppose that there are by nature two opposite regions dividing the universe between them, one 'below', towards which all things sink that have corporeal mass, the other 'above', towards which everything is reluctant to rise. [D] For since the whole Heaven is spherical, all the points that are extreme by virtue of their being equidistant from the centre must be extremities in precisely the same way;

[1] He treats *thermos* (hot) as *kermos*, and derives it from *kermatizein* (to divide minutely).

[2] These latter particles would seem to be fire and air.

while the centre, being distant by the same measure from all the extremes, must be considered as the point 'opposite' to them all. Such being the nature of the ordered world, which of the said points could one describe either as 'above' or as 'below' without being justly rebuked for employing a wholly unsuitable term? The central region in it cannot rightly be described as being by nature either 'above' or 'below', but only as 'at the centre'; while the circumference is not, of course, central nor is there any difference—a difference, I mean, that distinguishes one part of it from another in relation to the centre—which does not belong equally to some part on the opposite side.

[E] What pair of contrary terms can be applied to a thing that is uniform in every direction, and in what sense could they properly be used? If we further suppose that there is a solid body poised at the centre of it all, [63] this body will not move towards any of the points on the extremity, because they are all alike in every direction; rather, if a man were actually to walk round and round that body, he would repeatedly stand at his own antipodes and call the same point on its surface 'above' and 'below'.[1] For since the whole is spherical, as we saw just now, there is no sense in referring to one region as 'above' and another as 'below'.

As regards the source of these terms and the things to which they really apply, and which have led us into the habit of using the words to describe a division of the universe as a whole, [B] we may reach an agreement on the basis of the following supposition. Imagine a man in that region of the universe which is assigned exclusively to fire, taking his stand on the main mass towards which fire moves, and suppose it possible for him to detach portions of fire and weigh them in the scales of a balance. When he lifts the beam and [C] forcibly drags the fire into the alien air, obviously the smaller portion will yield under the force he thus applies more readily than will the larger; for when two masses are raised aloft together by a

[1] This sentence may be paraphrased as follows: Nothing will cause the central body to *fall down* in any direction, because there is no 'down' to which it could fall. On the contrary, a man walking round and round it will be speaking of 'above' and 'below' with reference to every direction in turn, since at any given moment he will imagine himself 'on top of' the body which is 'below' him. Cf. Aristotle, *De Caelo*, 308ª20.

single effort, the lesser inevitably follows the constraint more readily than the greater, which will offer more resistance; and accordingly the large mass will be said to be 'heavy' and to tend 'downwards', the small to be 'light' and to tend 'upwards'. Now this is exactly what we ought to detect ourselves doing in our own region here. Standing on the Earth, when we are endeavouring to distinguish between earthy substances or sometimes pure earth, we are dragging the two things [1] into the alien air by violence and against their nature; both cling to their own kind, [D] but the smaller yields more readily to our constraint than the larger and follows it more promptly into the alien element. Thus we have come to call it 'light', and the region into which we compel it, 'above'; when the thing behaves in the opposite manner, we use the terms 'heavy' and 'below'. Consequently the mutual relation of these things must vary, because the main masses of the kinds occupy regions opposite to one another: what is 'light' or 'heavy' or 'above' or 'below' in one region will be found to become, or be, the contrary [E] of what is 'light' or 'heavy' and so forth in the opposite region, or to be inclined at an angle with every possible difference of direction.[2] There is this one fact, however, to be noted in every case, that it is the passage of each kind towards its kindred that renders the moving thing 'heavy' and the region to which it moves 'below', while the contrary names are attached to their opposites.

So much then for our account of those affections. I imagine that no one will fail to see how 'smooth' and 'rough' are to be explained. The latter is due to a combination of hardness and unevenness, [64] the former to evenness combined with closeness of texture.

[1] i.e. the two portions weighed against one another.

[2] Plato means simply that since the Earth is at the centre and fire the whole way round the circumference, so that 'the main masses occupy opposite regions', the line along which a stone falls or fire rises will be in a different direction for every point on the Earth's surface.

17. PLEASURE AND PAIN (64A–65B)

BEFORE leaving the affections common to the body as a whole, we have to consider the very important question of what causes the pleasantness or painfulness in those we have been discussing, and further to explain those affections which, having attained to sensation through the organs of the body, may also be accompanied by inherent pain or pleasure.

Now in seeking the explanation of any affection, perceptible or imperceptible, we must begin [B] by recalling the distinction drawn earlier between what is mobile and what is immobile; all the explanations for which we are hunting are to be sought along this trail. When something that is naturally mobile is invaded by even a slight affection, it spreads it all round, one particle transmitting the same effect to another until they reach the consciousness and report the quality of the agent. The immobile, on the other hand, being too stable to pass on the motion, merely experiences the affection without imparting its activity to any of its neighbours; [C] consequently, since the particles do not transmit it to one another, the original affection remains in them incapable of being passed on to the living creature as a whole, and leaves the subject without sensation. This is the case with bones and hair and all other parts of us that consist mainly of earth; whereas the previously mentioned conditions apply chiefly to sight and hearing, because in them fire and air play the largest part.

The nature of pleasure and pain must therefore be conceived as follows: [D] An affection which violently disturbs our normal state, if it occurs all of a sudden, is painful, while the sudden return to that state is pleasant; these are perceptible, whereas a gentle and gradual change of either sort is imperceptible.

Any process, however, that takes place with great facility yields perceptions in the highest degree, but involves no pain or pleasure. Such are the affections that occur in the visual stream itself, which was indeed described earlier as a body

formed in the daylight in very close connection with our own. [E] No pain is produced by cuts or burns in that stream or by anything else which is done to it, nor pleasure when it returns to its normal state, although there are intense and very clear perceptions according as it is acted upon and itself meets and touches any object; for no violence whatsoever accompanies the severing and re-forming of the stream. On the other hand, organs consisting of larger particles, which yield to the agent reluctantly and transmit the motions to the whole, experience pleasure and pain—pain while they are being wrenched from their normal state, pleasure while they are being restored thereto. [65] Those in which departure from the normal state or depletion is gradual, while replenishment is sudden and extensive, are aware of the replenishment but not of the depletion, and so provide the mortal part of the soul with keen pleasure but no pain. This is evident in the case of sweet odours. Wherever the disturbance of a normal state is sudden, but the return gradual and difficult, [B] the opposite results ensue, as may be observed in the case of cuts or burns in the body.

18. TASTES (65B–66C)

A FAIRLY full account has now been given of the affections common to the body as a whole and of the names given to the agents that produce them. Our next step is to explain, if we can, the affections that occur in particular organs of our bodies and, in addition, how they are caused by their respective agents.

[C] First then we must do our best to make clear what we omitted a while ago when speaking about flavours,[1] namely the affections peculiar to the tongue. These, like most of the others too, seem to arise from contractions and dilations of some sort; and in addition they depend more than any of the rest on degrees of roughness and smoothness. There are small veins which serve the tongue as a sort of testing-instrument and extend to the heart. Now when earth particles make their way in through these and make contact with the moist, soft flesh, [D] they are melted down and contract and dry up the veins. If comparatively rough they are felt as 'astringent'; if their roughening effect is slighter, as 'harsh'.

Substances which rinse the small veins and cleanse the whole area of the tongue are called 'acrid' if they do that excessively and attack the substance of the tongue to the point of dissolving part of it; such, for example, is the property of soda. [E] Those which are not so drastic as soda and rinse the tongue less thoroughly are saline without acrid roughness and indeed quite pleasant to the taste.

Others, which absorb the warmth of the mouth and are softened thereby, becoming fiery and in their turn scorching that which heated them, mount upwards because of their lightness to the senses in the head, clearing whatever they encounter. [66] These properties have caused all such substances to be described as 'pungent'.

Again, there are the particles of substances reduced to a fine texture by decomposition before penetrating into the narrow

[1] 60A, B, E.

veins—particles that are proportional both to the earthy and to the airy particles residing in the veins, with the result that they set these in motion around one another, and, in the course of this swirling, cause them to form an enclosure and (as particles of one sort make their way into those of a different sort) to produce hollow films stretched round those that pass into the inside. Thus, when hollow films of moisture, [B] earthy or pure according to circumstances, are stretched round air, they form, as moist air-containers, hollow globules of water. Some, consisting of pure moisture which forms a transparent enclosure, are called 'bubbles'; while, if the moisture is earthy and seethes and rises all together, we speak of 'frothing' and 'fermentation'. The thing to which these effects are due is called 'acid'.

An affection opposite to all those just described results from an opposite cause. [C] When the composition of the entering particles in liquids, being naturally akin to the normal state of the tongue, soothes and smooths the roughest parts and relaxes or contracts those which are unnaturally shrunken or dilated, and thereby settles them in their normal state, any such remedy for violent affections is always pleasant and welcome, and has been termed 'sweet'.

19. ODOURS (66D–67A)

[D] So MUCH for tastes. As regards the faculty residing in the nostrils, no definite types [1] are discernible. An odour is in every instance a half-formed thing, and no type of regular figure has the proportions requisite for possessing one. Our nostril-veins have a structure too narrow for earth and water and too wide for fire and air. Hence no one has ever detected an odour in any of those bodies; odours arise from substances in process of liquefaction, decomposition, dissolution or evaporation; they occur in [E] the intermediate stage when water is changing into air or vice versa. All odours are vapour or mist, mist being that which is on the way from air to water, vapour what is on the way from water to air; consequently all odours are more rarefied than water and denser than air. Their nature becomes clear when a man forcibly inhales the air through something that obstructs the passage of his breath: in such a case no odour filters through with it; nothing reaches him but the air stripped of all scent.

[67] Accordingly the varieties of odour fall into two groups. They have no names, because they are not made up of a definite number of simple types and we can only distinguish them here as pleasant and unpleasant. The unpleasant roughens and does violence to the whole cavity lying between the head and the navel, whereas the pleasant soothes this region and restores it with satisfaction to its natural state.

[1] i.e. varieties of smell capable of classification by names corresponding to those of the different tastes.

20. SOUNDS (67A–C)

THIRD among the organs of sensations we are studying is that of hearing; and the affections occurring therein must now be explained. [B] Speaking generally, we may define sound as the stroke inflicted by air on the brain and blood [1] through the ears and transmitted to the soul; while the motion to which it gives rise, starting in the head and ending in the region of the liver, is hearing. A rapid motion produces a high-pitched sound; the slower the motion, the lower the pitch. If the motion is regular, the sound is uniform and smooth; if irregular, the sound is harsh. [C] According as the motion is extensive or more limited, the sound is loud or soft. Consonance of sounds must be postponed to a later section of our discourse.[2]

[1] Note that Plato is unaware of the function of the eardrum.
[2] 80A.

21. COLOURS (67C–68D)

THERE is still a fourth kind of sensation which requires classification, since it embraces numerous varieties. These are known by the general term 'colour', a flame which streams off from every sort of body and has its particles so proportioned to the visual stream as to produce sensation. [D] So far we have explained [1] only how that current arises; so it is right and proper to give here reasoned account of the colours, as follows.[2]

The particles that come from other bodies are in some cases larger and in some smaller than those of the visual stream itself; or they may be of the same size. Those of the same size are imperceptible—'transparent' we call them. The larger, which contract the stream, and the smaller, which dilate it, are analogous to what is cold or hot to the flesh, and also to what is astringent or burning ('pungent' as we call it) to the tongue. [E] These are black and white, affections which are due to those particles and similar in character, though occurring in a different field and therefore manifesting themselves in a different guise. The name should be assigned accordingly: 'white' to what dilates the visual current, 'black' to what contracts it.

When the more penetrating motion belonging to a different variety of fire falls upon the current and dilates it right up to the eyes and forcibly thrusts apart and dissolves the very passages of the eyeball, [68] it causes the discharge of a volume of fire and water which we call a tear. Itself being fire, it meets fire from the opposite direction leaping out like a flash of lightning, while the ingoing fire is quenched in the

[1] 45B.

[2] This section is not easy to grasp, because Greek words denoting colours are not the same as our own, and are therefore hard to identify; and also because Plato, having started by talking about different colour-sensations produced by the action of various fire-particles on the visual stream, refers to compound colours as if they were pigments formed by an admixture of others.

moisture; and in this confusion all sorts of colours are produced. We call the effect 'dazzling' and 'flashing'.[1]

[B] Next there is the variety of fire midway between these two, reaching the eyeball's moisture and mixed therewith, but not flashing. The radiance of the fire through the moisture with which it is mingled gives blood-colour, which we call 'red'.[2]

Bright blended with red and white yields orange. In what proportions they are mixed it would be foolish to state, even if one knew; the matter is one in which nobody could be even fairly confident of offering either firm proof or a likely estimate.

[C] Red blended with black and white is purple; or dark violet when those constituents are more thoroughly burned and more black is added to the mixture.

Tawny is obtained by blending orange and grey, the latter being a mixture of black and white; while yellow is a combination of white with orange.

White combined with bright and steeped in dense black gives a dark blue colour; dark blue mixed with white, pale blue-green; tawny with black, green.[3]

[D] The foregoing examples will show clearly enough by what combinations the remaining colours should be represented in order to preserve the probability of our account. Any attempt, however, to subject these matters to a practical test would suggest ignorance of the difference between human nature and divine, namely that whereas divinity has sufficient knowledge and power to blend plurality into unity and to resolve unity into plurality, no mortal is now, or ever will be, equal to either task.

[1] Both words are used as names of colours.

[2] Aristotle, who considered water as a dark substance, states that white light seen through a dark medium appears red, as the sun does through smoke or mist (*Meteor*, 374ª3).

[3] *Prasios* is generally taken to mean green (*prason* = leek). If this is correct, Plato is evidently mistaken; cf. 83B, where he tells us that red + black gives a 'bilious' colour. Aristotle uses *prasinos* for green, and *prasion* = horehound. According to Theophrastus, Democritus derived *prasinos* from *porphyroun* (crimson) and *isalis* (woad).

22. CONCLUSION (68E–69A)

[E] ALL these things, then, being necessarily so constituted, were taken over by the maker of the fairest and best of all things that become, when he generated the self-sufficing and most perfect god; he employed causes of this order as subservient, while he himself contrived the good in all things that come to be. We must therefore distinguish two sorts of cause, the necessary and the divine. The divine we ought to seek in all things for the sake of attaining to a life of such happiness as our nature admits; [69] the necessary for the sake of the divine, reckoning that without the former those other objects upon which we are intent cannot by themselves be perceived or apprehended, nor can we in any other way partake of them.

PART III. CO-OPERATION OF REASON AND NECESSITY

1. THE MORTAL PARTS OF THE SOUL ARE ADDED (69A–D)

In this opening section of Part III Timaeus looks back over the stages whereby Part I led to the point which we have just reached again by another route. In Part I the rational soul was created by the Demiurge. Part II has analysed the corporeal down to its foundation, Space (the Receptacle), and rebuilt it by the introduction of regular geometrical shape imposed on chaotic motions and powers. The action one upon another of the simple bodies thus formed has been described in terms of necessary causation rather than of rational design. In Part III we are going to observe the co-operation of Reason and Necessity in the work of the created gods, whose business it is to frame the mortal parts of the soul and the bodily organs to house them. Notice that the distinction between those gods and the Demiurge is not everywhere retained: the work is ascribed sometimes to 'the gods', sometimes to 'the god'.

THE materials for our building now lie ready sorted and to hand; I mean the kinds of cause we have distinguished, which are to be fitted together in the fabric of what we have yet to say. Let us therefore return briefly to our starting-point and quickly repeat the journey that led us to the point whence we have now reached the same position once again; [B] and then try to crown our story with an ending worthy of all that has gone before.[1]

As was said at the outset, these things were in a state of disorder, and the god introduced into them all every kind of measure in every respect wherein it was possible for each one to be in harmonious proportion both with itself and with the rest. For they originally lacked any such proportion, unless by mere chance,[2] nor was there anything that merited the names we use today—fire, water and the rest; [C] but all these he

[1] And worthy indeed it is (89D–92D).

[2] Instances of *apparent* order might occur in the chaos described at 53A as a result of the attraction of like to like; also in the casual vortices of the Atomists and in the system of Empedocles.

first set in order, and then framed from them this universe, a single living creature containing within itself all living creatures, mortal and immortal. Of the divine he himself undertook to be the maker; the task of fashioning the generation of mortals he entrusted to his own offspring. They, having taken over an immortal principle of soul, proceeded in imitation of him to construct for it a mortal body englobing it round about.[1] For a vehicle they gave it the body as a whole, and in it they built another and different form of soul, the mortal having in itself [D] dire and necessary affections:[2] first pleasure, the strongest lure of evil; next, pains that flee from good; temerity, too, and fear, a couple of imprudent counsellors; passion hard to dissuade, and hope so easily misled. These they combined with irrational sense and desire that shrinks from no venture, and so of necessity compounded the mortal element.

[1] i.e. confining it in the head. Cf. 44B.
[2] Cf. 42A.

2. BODILY SEATS OF THE TWO MORTAL PARTS OF THE SOUL (69D–72D)

This section deals with the corporeal dwelling-places of the soul's mortal parts, and explains why the latter is situated remote from the divine part. At 44D–45B the skull was described as a spherical body enclosing the revolutions of the immortal soul. The head, containing the brain and the divine part of the soul, is the human counterpart of the spherical body of the universe containing the revolutions of the world-soul. The limbs were considered simply as a vehicle to make possible the locomotion of the head; the apparatus of sight as an instrument enabling the body to find its way around. The eyes alone were discussed at length, for the whole account was occupied with soul and body from the standpoint of movement.

Timaeus, however, stated earlier (42A) that the implanting of the immortal soul in a body constantly subject to waste and replenishment would entail sensation and perception, due to 'violent affections' from without; and these 'necessary affections' now demand further study. Sensation has already been dealt with at length in Part II, so it remains to specify the corporeal seats of the emotions and of nutritional appetites, which are lodged in the heart, lungs, belly, liver, spleen, etc. Timaeus describes the positions, structure and functions of those organs, not physiologically, but relatively to the feelings and appetites of the two mortal parts of the soul. He stresses their purposes as the residence of feelings and desires that motivate moral behaviour, rather than their essential role in preserving physical life. The organs are accordingly taken in two groups separated by the diaphragm, corresponding to the higher and lower parts of the mortal soul distinguished in the *Republic*.

FEARING, no doubt, to pollute the divine part on their account, except in so far as was absolutely inevitable, [E] they lodged the mortal apart therefrom in a different dwelling-place in the body, building between head and breast, as an isthmus and boundary, the neck, which they placed between the two to keep them asunder. In the breast, then, and the so-called trunk they confined the mortal kind of soul. And since part of it has a nobler nature, part a baser, [70] they built another partition across the cavity of the trunk, as if marking off the men's quarters from the women's, and set the midriff as a screen between them.

That part of the soul, then, which possesses a manly spirit

and feels the urge to conquest they lodged nearer the head, between the midriff and the neck, so as to bring it within hearing of reason's discourse and join therewith in forcibly restraining the desires, whenever the latter refuse willing obedience to orders from the citadel. [B] The heart, then, the knot of the veins and the wellspring of the blood that circulates impetuously throughout all the members, they settled in the guardroom, in order that, when the spirit boils with wrath on receipt of a message from reason that some wrong is at work in the members (either coming from outside or maybe from the desires within), every sentient part of the body might quickly, through all the narrow channels, become aware of the injunctions and threats and listen with complete obedience, and thus allow the noblest part to be leader among them all.

[C] Further, as a means of relief for the throbbing of the heart when danger is foreseen or anger stirred—for they knew that all such swelling of passion would arise from the action of fire—they devised and implanted the structure of the lung. This, in the first place, is soft and bloodless; it is also perforated within by cavities like a sponge, in order that by receiving breath and drink it might cool the heart [D] and so afford relief and comfort in the burning. For this purpose they cut the channels of the windpipe to reach the lung, and set the lung itself around the heart as a kind of buffer, so that, when the spirit therein was at the height of passion, the heart might leap against a yielding substance and be cooled, and so, being in less distress, be the better able to help the spirited element in the service of reason.

That part of the soul whose appetite craves for meat and drink and all its requirements arising from the body's nature, they lodged between the midriff and [E] the boundary towards the navel, constructing in all this region as it were a manger for the body's nourishment. There they tethered it like a beast which, though undomesticated, had to be kept and fed along with the rest if the mortal race was to exist at all. Accordingly they stationed it here so that, feeding continually at its stall and living as remote as possible from the seat of counsel, it might cause a minimum of uproar and turmoil and allow the highest part to take counsel in peace for the common benefit of each and all.

[71] Knowing, too, that it would not understand the dictates of reason and that, even though it managed somehow to become aware of any such dictate, it would have no natural instinct to pay heed, but would most readily fall under the spell of images and phantoms night and day, Heaven,[1] designing to obtain this very influence, formed the liver and set it in the creature's abode, [B] and contrived it as a substance close in texture, smooth and bright, containing both sweetness and bitterness. The purpose was that the influence proceeding from the reason should impress its thoughts upon the liver, which would receive them like a mirror and give back visible images. This influence would overawe the appetitive part at such times as, assuming a role in keeping with the bitterness of the liver, it threatens with stern approach; swiftly suffusing this bitterness throughout the liver, it would cause bilious colours to appear thereon; make it all rough and wrinkled by contraction; [C] and (as it shrinks and bends down the lobe, obstructs the vessels and closes the entrance [2]) produce pain and nausea. On the other hand, when some inspiration of gentleness from the mind paints images of the opposite sort, it brings relief from the bitterness, because it will not rouse or have dealings with a nature contrary to its own; instead, using towards it a sweetness akin to that in the liver itself, [D] and rectifying the organ so as to make it all straight and smooth and free, it causes that part of the soul which is lodged in the region of the liver to thrive in wellbeing and serenity of mood, and by night to spend its time in the untroubled exercise of divination by dreams, since it was given no share in rational discourse and understanding. For those who made us, remembering their father's injunction when he bade them frame the mortal race as perfectly as possible, [E] tried thus to set the less noble part of us on the right road, by establishing the seat of divination here, in order that it might attain to some awareness of truth.

[1] *theos*, following a plural participle with which the sentence begins. The reference is, of course, to the secondary gods who work under orders from the Demiurge. 'Heaven' seems to me the best way of preserving the vagueness of *theos* and of avoiding any possibility of misunderstanding on the reader's part.

[2] The lobe is the right lobe; the vessels, the biliary vesicle; the entrance, the *porta vena*.

There are good grounds for believing that divination [1] is heaven's gift to human unwisdom; for no man in his normal senses achieves true and inspired divination, but only when the power of understanding is fettered in sleep or he is distraught by some disorder or, perhaps, by divine possession. It is for the man in his ordinary senses to recall and interpret the utterances, in dream or in waking life, of divination or possession, and by reflection [72] to discern in what manner and to whom all the seer's visions portend some good or evil, past, present or future. When a man has been overtaken by frenzy and continues in that condition, it is not for him to decide the meaning of his own visions and utterances; rather the old proverb is true, that only the sound in mind can handle his own affairs and know himself. It is therefore the custom to appoint spokesmen [2] [B] to adjudge inspired divination. These are themselves named 'diviners' by some who are quite unaware that they are interpreters of riddling oracle and deserve to be called not 'diviners' but spokesmen of those who practise divination.

This then is the reason why the liver has such a nature and situation as we have described: it is for the sake of divination. So long as any creature [3] remains alive, the indications given by such an organ are comparatively clear; but when deprived of life it becomes blind and its signs are too dim [C] to have any sure significance.

Again, the structure of the neighbouring organ [4] and its seat on the left are for the sake of the liver, to keep it always bright and clean, like a napkin provided for wiping a mirror and always laid ready beside it. So, when any impurities due to bodily disorders occur in the region of the liver, they are all purged away and absorbed by the spleen, which, having bloodless cavities, is loose in texture. [D] Hence, when it is filled with these offscourings it waxes swollen and festered, and, when the body is cleaned out, subsides again and returns to its original state.

[1] Cf. *Phaedrus*, 244A ff; *Republic*, 364B; *Laws*, 772D.
[2] Cf. *Laws*, 871C; Euripides, *Ion*, 413 ff.
[3] 'Any creature' must include brute beasts; for he proceeds to deny the possibility of divination from the liver of sacrificial victims, although their dream images could not result from the activity, which they do not possess.
[4] i.e. the spleen.

3. SUMMARY AND TRANSITION TO THE REMAINDER OF THE BODY (72D–73A)

So far Timaeus has been dealing with the respective abodes of the two mortal parts of the soul; now he considers 'the remainder of the body'. This phrase refers first to the viscera below the navel, the lower boundary of the appetite; their service to the soul is declared, and then Timaeus proceeds directly to 'the remainder of the body'—in a wider sense.

AS REGARDS the soul, then, we have explained what part of it is mortal and what divine, and where, in what company, and for what reasons the two are lodged apart. We could confidently assert that our account is true only if it were first confirmed by Heaven; but that it is probable we may venture to declare now, and shall be able to do so with even more assurance as our inquiry proceeds.

[E] Our next subject must be dealt with on the same principles: this was [1] the manner in which the remainder of the body came to be. Now the design that would most fittingly account for its construction would be something like this. The framers of mankind knew how intemperate we would be in the matter of food and drink, and that gluttony would result in our using far more than the moderate or necessary amount. By way of precaution, therefore, against the danger of disease bringing swift destruction and of the mortal race coming to a sudden and untimely end while yet in its infancy, [73] they appointed the so-called lower belly [2] as a receptacle to hold the superfluous food and drink, and wound the bowels round in coils therein. The purpose here was to prevent the nourishment passing through so rapidly as to constrain the body to crave replenishment too soon, and, thus making it insatiable, render all mankind incapable, through gluttony, of all culture and philosophy, deaf to the bidding of the most divine element of our nature.

[1] *See* 61C, where it is said that we still have to describe the formation of flesh, etc.

[2] i.e. the abdomen. The 'upper belly' was the thorax.

4. THE MAIN STRUCTURE OF THE HUMAN BODY (73B–76E)

The most notable feature of the foregoing account is the restriction of the appetitive element to nutritional desires to the exclusion of reproduction; the sexual craving is postponed until the Appendix (90E). In this section Timaeus gives a fuller description of the human frame—marrow, seed and brain; bone, flesh and sinews; skin, hair and nails—which is regarded as a vessel consisting of superimposed layers and holding at its core the marrow in which the bonds of life are secured.

(*a*) *Marrow, Seed and Brain*

[B] Here are the facts so far as bone, flesh and all suchlike substances are concerned. The starting-point for all these was the coming into being of the marrow; the bonds of life were made fast therein as the roots of the mortal creature for as long as the soul should be tied to the body; while the marrow itself is formed of other things. The god [1] set apart from their various kinds those triangles which, being unwarped and smooth, were originally able to produce fire, water, air and earth of the most exact form.[2] Mixing these in due proportion to one another, he fashioned therefrom the marrow, contriving thus a compound of seeds of every sort for every mortal kind.[3] Next he implanted and tied therein the various kinds of souls;[4] also from the outset, while making his original distribution, he divided the marrow into shapes corresponding in number and fashion to those which the several kinds were destined to wear. And he moulded into spherical shape the ploughland, so to speak, that was to contain the divine seed; [5] [D] and this part of the marrow he

[1] *ho theos*, the Demiurge. In the next sentence and throughout the remainder of this account of the human body he is to be understood as acting through the agency of the secondary gods to whom he entrusted the task.
[2] Bodies in the realm of becoming lack the absolute perfection of mathematical figures; they are simply copies of the latter.
[3] *scil.* of animal. [4] i.e. of brute beasts as well as of man. [5] i.e. the semen.

called 'brain',[1] signifying that, when each living creature was completed, the vessel containing this should be the head. That part, however, which was to contain the remaining (mortal) kind of soul he divided into shapes at once rounded and elongated, naming them all 'marrow'. From these, as if from anchors, he threw out bonds to fasten all the soul; and now began to construct our whole body round this thing,[2] first framing round the whole of it a solid shield of bone.

(*b*) *Bone, Flesh and Sinews*

[E] The bone he constructed as follows. Having sifted earth till it was pure and smooth, he kneaded it and soaked it with marrow; then he plunged the stuff into fire, next dipped it in water, and again in fire and once more in water; and by thus transferring it several times from one to the other he made it insoluble by either. This then he used, first to turn a bony sphere to surround the creature's brain, and in this sphere he left a narrow outlet; [74] and further, to surround the marrow along the back and neck, he moulded vertebrae of bone, which he set as pivots, starting from the head, through the whole length of the trunk. Thus, to protect all the seed, he fenced it in a stony enclosure, and in this he made joints, employing in their case the property of the Different, inserted between them for the sake of movement and bending.

[B] Further, considering that the texture of bone was too brittle and inflexible, and also that if it were raised to the heat of fire and again became cold it would decay and quickly bring about destruction of the seed within it, for these reasons he designed the sinews and the flesh in such a way that, by binding together all the limbs with sinew contracting and relaxing about their sockets, he might enable the body to bend or stretch itself. The flesh, in turn, was to serve as a defence against burning heat and a shelter against the cold of winter, and also as a protection against falls, like our acquired coverings of felt: it would yield to bodies softly and gently, [C] and it contained in itself a warm moisture which in summer it might perspire and so spread a native coolness all over the body by moistening it outside, whereas in winter we

[1] *egkephalon*, from *en*, in, and *kephale*, head.
[2] i.e. the brain and marrow.

would have this fire as a fairly good protection against attacks of the besieging frost outside. With this intent he who moulded us like wax compounded flesh, soft and full of sap, by making a judicious blend of water, fire and earth, which he steeped in a ferment of acid and saline. [D] As for the sinews, he made them by mixing bone with unfermented flesh into a substance having properties intermediate between those two, adding a yellow colour; hence the sinews acquired a quality more tense and consistent than flesh, but softer and more elastic than bone. With these the god enveloped the bones and marrow, binding the bones together with sinews, and then wrapped them all in a shroud of flesh.

(*c*) *Uneven Distribution of Flesh*

[E] Those bones in which there is most life [1] he enclosed in the smallest amount of flesh; those having least life in them he fenced around with flesh in greatest quantity and of the toughest kind. Moreover at the joints of the bones, wherever no compelling reason seemed to require it, he caused but little flesh to grow. This was in order that flesh should not impede the bending of the joints and so stiffen the body as to make it difficult to move about; and secondly in order that the solidity of many layers of flesh closely packed together might not cause dullness of sensation in the region of the mind. [75] For this reason the thighs and shins and the vicinity of the hips, the bones of the upper arms and forearms, and all other parts that have no joints, as well as the bones within the body that are devoid of intelligence because they have so little soul residing in marrow—all these have a full complement of flesh. Those parts, on the contrary, which possess intelligence have less—except where he formed a mass of flesh to be in itself a sense-organ, as for instance the structure known as the tongue. With most parts, however, it is as aforesaid; for the constitution of this frame which necessarily comes into being and is reared along with us [B] in no wise permits the co-existence of dense bone and abundant flesh with keenly responsive sensation. For if these two characters had agreed to keep company, the structure of the head would have possessed them above all, and the human race, bearing a head fortified with flesh and

[1] i.e. the skull and spine.

sinew, would have enjoyed a life twice or many times as long as now, healthier and more free from pain. But as it was, the artificers of our being wondered [C] whether they should make a long-lived but inferior race or one with less longevity but nobler, and agreed that everyone must from every point of view prefer the shorter and better life to the longer and worse. Therefore they covered in the head with thin bone, but not with flesh and sinews, since it has no flexions. Accordingly the head which they attached to the body of every man is in all respects more sensitive and intelligent, but much weaker. The sinews too, on the same principle and for these reasons, were set by the god all round the neck up to the base of the head and welded by means of uniformity,[1] and he fastened to them the extremities of the jawbones immediately below the face; while he distributed the rest among all the limbs, linking joint to joint. The mouth was equipped by our makers for its functions with teeth, tongue and lips [E] arranged as now, for the sake of what is necessary and of what is best. They contrived it as the passage through which necessary things might enter and the best things pass out. For all that comes in to provide sustenance to the body is necessary; but the issuing stream of discourse, ministering to intelligence, is of all streams the fairest and noblest.

(*d*) *Skin, Hair and Nails*

The head, however, could not be left to consist only of bare bone, because of the excessive heat or cold according to season; nor, on the other hand, could it be so swathed in a mass of flesh as to become dull and insensitive. [76] From the flesh, therefore, which was not completely dried up in the process, a superfluously large film [2] was separated to form what is now called 'skin'. This, on account of the moisture in the brain, grew and closed in on itself to form a robe all round

[1] *homoiotēti*. Most translators have taken this as meaning 'symmetrically', but I can find no such usage elsewhere. In any case it is not easy to see how either uniformity or symmetrical arrangement can be said to 'weld' the sinews. Cook's suggestion (*Metaphysical Basis of Plato's Ethics*, page 139) that Plato is contrasting the flexibility of the vertebral column with the rigidity of the head involves taking 'head' instead of 'sinews' as the object of 'welded'—an almost impossible construe of the Greek.

[2] i.e. more skin was formed on the fleshy parts of the face than these latter required, and it grows upwards over the cranium to form the scalp.

the head; and the moisture rising from beneath the sutures watered it and closed it, like a tightened knot, on the crown. The sutures are of many different patterns owing to the action of the revolutions and of the nutriment, being more or less numerous according as the conflict between those powers is more or less violent.[1]

[B] Now the divine part punctured this skin all round with fire;[2] and when the moisture exuded through the resulting holes, all that was purely moist and hot vanished, but the part compounded of the same ingredients as the skin was lifted by the motion and extended into a long thread outside, of a fineness to match that of the puncture; but its movement was so slow that it was driven back by the surrounding air without, and, coiling back under the skin, took root there. [C] To these processes is due all the hair that grows on the skin; it is a thread-shaped substance of identical nature with the skin, but harder and denser owing to the felting brought about by the cooling, whereby every hair was felted together as it was detached from the skin. Making use, then, of the means just described, our creator made our heads shaggy, thinking that hair and not flesh was the right thing to serve as a covering to protect the brain; it would be both light and sufficient [D] to provide shade in summer and shelter in winter, without presenting an obstacle to readiness of perception.

Further, where the fabric of sinew, skin and bone terminates in fingers and toes, a compound of the three, when dried off, forms a single hard skin consisting of them all. Such were the means employed in its making, but the real reason and purpose of the work were for the sake of creatures that were to be thereafter. For our constructors knew [E] that one day men would become women and also beasts,[3] and that many creatures would need nails[4] for many purposes; hence they designed the rudiments of this growth from the very birth of mankind.

Such then were their reasons and purposes in causing the growth of skin, of hair, and of nails at the extremities of the limbs.

[1] The conflict is that described at 43A ff. as taking place in infancy.
[2] i.e. the fire in the brain, making its way upwards toward its like.
[3] By metempsychosis, not by evolution.
[4] i.e. claws and hoofs.

5. PLANTS (76E–77C)

Timaeus now goes on to deal with the working of necessary functions entailed by the physical environment, particularly with the digestion of food and with respiration. But his account is preceded by a note on the sustenance afforded by plants, which are introduced at this point because one cannot imagine man living without anything to eat, and what he eats must be described before the mechanism of digestion. Animal food is excluded because the formation of brute beasts is itself postponed (91D–92C).

THE parts and limbs of the mortal creature [77] had now been combined into a living whole; but since that creature had of necessity to spend his life surrounded by fire and air, he was doomed to be dissolved and depleted by them, and the gods therefore contrived to succour him. They engendered a substance kindred in nature to man's, but combined with other shapes and senses, so as to be a living creature of a different sort. These are trees, plants and seeds, now trained by husbandry into domestication with us, though formerly there were none but the wild species, which are the older. [B] Anything possessing life has every right to be called a living creature; and the kind of which we are at present speaking has the third form of soul, which, as we said,[1] is seated between the midriff and the navel; this has no share whatever in belief or in reasoning and understanding, but only in sensation, pleasant or painful, and appetites. For it is always subject to all affections, but its formation has not endowed it with any power to observe the nature of its own affections and to reflect thereon by revolving within itself and about itself, [C] rejecting motion from without and exercising motion of its own. Therefore it lives indeed, and is nothing else than a living creature; but it remains stationary, fixed and rooted, because it is denied self-motion.[2]

[1] Cf. 70D ff.; 72E ff.
[2] i.e. self motion from one place to another.

6. THE IRRIGATION SYSTEM (77C–E)

This and the next four sections are likely to baffle the unwary, because Timaeus seems to be describing simultaneously digestion, circulation of blood, respiration, transpiration and even the passing on of sense impressions. Some of these processes receive little more than a glance, and the anatomical connections between the several organs are imperfectly explained. These sections, however, will be more easily understood if it is remembered that Plato was chiefly concerned with a problem in hydraulics, which is solved by the interconnection of these systems. The whole body is nourished by the blood. But blood is formed from food in the belly, near the bottom of the trunk; how then does it rise to the head and get distributed throughout the body? Forget, temporarily, all you know of modern anatomy; bear in mind that Plato made no distinction between arteries and veins, and was quite unaware that the heart has anything to do with the flow of blood; and the following steps of his solution of this mechanical problem will not be all that difficult to grasp. (*a*) Timaeus first describes the two main conduits of the irrigation system (77C–E). (*b*) He tells how the blood is driven through those conduits, the necessary impulsion being furnished by the respiratory system which is treated here as if its chief function were to pump blood (77E–79A). (*c*) Respiration itself is explained as a mechanical process: the motion is sustained by the natural striving of the internal fire towards its own kind, and by the 'circular thrust' so imparted to the air (79A–E). This section is followed by (*d*) a digression on other examples of the circular thrust operating mechanically in inanimate things (79E–80C). Lastly (*e*) we are told how the action of fire in the belly converts food and drink into blood, which is then propelled by this machinery through the veins to make good the waste in all parts of the body. A final paragraph explains why growth occurs in youth, and later old age and decay set in, terminating in natural death.

Now when the higher powers had planted all these kinds as sustenance for us inferior beings, they made throughout the body itself a system of conduits cut like runnels in a garden, so that it might be, as it were, watered by an inflowing stream. First they cut as covered conduits, [D] beneath the juncture of skin and flesh, two veins [1] along the back corresponding to the

[1] According to Aristotle (*Hist. Anim.* iii, 2), Diogenes of Apollonia speaks of two principal veins, 'extending through the belly along the backbone, one to right and one to left . . .' These appear to be the ones intended by Plato here; they have been identified with the Hepatitis (right) and the Splenitis (left).

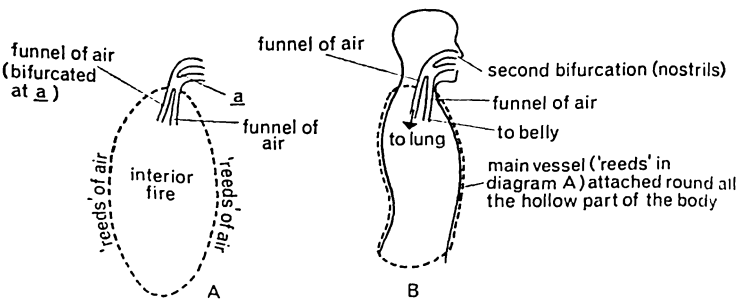
twofold form of the body, with a right side and a left. These they brought down alongside the spine, enclosing between them also the generative marrow, in order that this might thrive to the utmost and also that, by running downhill, the current might flow easily thence to the other parts and make the irrigation uniform.

Next, [E] they split up these veins in the region of the head and plaited the ends so as to pass across one another in opposite directions, slanting those from the right towards the left side of the body and those from the left towards the right side. This was partly in order to provide the head with a bond that would aid the skin to connect it with the body, since there were no sinews holding it all round the crown,[1] and partly in order that the body as a whole might be made aware of the effect of sense-perceptions coming from the members on either side.[2]

[1] The sinews, as explained at 75D, terminated at the base of the head.
[2] Cf. 70B, where it is stated that blood from the heart transmits to all sentient parts a message from the brain, which has been alerted by perception.

7. THE DRIVING POWER OF THE SYSTEM: RESPIRATION (78A–79A)

[78] THEIR next step was to arrange for the water-carrying in a manner now to be described, which we shall understand more easily if we first agree upon the following principle. All bodies consisting of small particles are impervious to larger particles, but those consisting of the larger can be penetrated by the smaller; and since fire has smaller particles than any other kind, it passes through water, earth, air and all bodies composed of these, so that nothing is impervious to it. This principle must be conceived as applying to our belly: [B] when



food and drink fall into it, it retains them; but it cannot imprison the air we breathe or fire, because their particles are smaller than those of its own structure. Accordingly the god made use of these for the water-carrying from the belly to the veins, weaving out of air and fire a network like a fisherman's weel.[1] This had a pair of funnels at the entrance, one of which again he caused to bifurcate;[2] and from these funnels he stretched reeds, as it were, all round throughout the whole length to the extremities of the network. [C] The whole interior of the basket he composed of fire, while the funnels

[1] *See* diagram A.

[2] At point *a* on diagram A.

and main vessel *were of air*.[1] He took this structure and set it about the living creature he had moulded, as follows.[2] The part consisting of the funnels he let into the mouth; and this part being twofold, he prolonged one of the funnels by way of the windpipes into the lung, and the other alongside the windpipes into the belly. He divided the first funnel into two parts, giving both a common outlet via the nostrils,[3] so that when the other passage was not functioning by way of the mouth, all its currents too might be replenished from this one. [D] The rest, I mean the main vessel of the weel, he attached all round the hollow part of the body.[4] And all this he caused at one moment to flow together inwards on to the funnels—softly, because they are made of air; while at another moment the funnels flow back, and the network sinks in through the body (this latter being porous) and then out again; meanwhile the rays of fire stretched through inside follow the movement of the air in either direction. This process was to continue unceasingly so long as the mortal creature holds together; [E] it is in fact the process which the name-giver [5] called inhalation and exhalation. All this that our body does and experiences results in its being nourished and keeping alive as it is watered and cooled; for each time that, as the breath passes out, the interior fire connected with it follows its movement and in its continuous rise and fall passes in through the belly and [79] lays hold on the meat and drink, it dissolves them and, dividing them up small, forces them through the outlets in the direction of its advance, discharging them into the veins, like water from a spring into runnels, and making the currents of the veins flow through the body as through an aqueduct.

[1] Note this point, which explains the system of respiration below.
[2] *See* diagram B.
[3] The 'second bifurcation' shown in diagram B.
[4] The resultant outline marks the limits of a coat of air enveloping the trunk.
[5] Cf. *Cratylus*, 438–439.

8. THE CIRCULAR THRUST (79A–E)

BUT let us once again consider the means whereby the effect of respiration has come to take place in the manner it now does. This is how it was. [B] Since there is no vacancy into which any moving object could find its way, and the air we breathe does move out from us, the consequence is plain for all to see: it does not go out into a void, but expels the adjacent air from its place. What is thus expelled keeps on displacing its neighbours in succession, and in the course of this compulsion the air is all driven round and enters the place whence the breath emerged, filling it up again as it follows the breath. All this proceeds simultaneously, as when a wheel is made to revolve, because there is no vacancy. [C] In the act, therefore, of discharging the breath outwards the region of the chest and lung is refilled by the air surrounding the body, as it is driven round and makes its way inwards through the porous flesh. Again, when the air is turned back and is moving outwards through the body, it thrusts round the respiration inwards via the passage of mouth and nostrils.

[D] We must suppose that the start of this process is to be explained as follows. In every living creature the parts about the blood and veins are the hottest, like a fountain of fire residing within it.[1] Actually it was to this that we referred when we said that the outside parts of our network weel were made of air, but that *the whole extent of the central part was woven of fire*. Now we must agree that the hot naturally moves outward towards its kindred in its own region; and that, since there are two ways through, one via the surface of the body and the other via mouth and nostrils, [E] whenever the hot moves towards the air in one quarter it gives a thrust round to the air in the other quarter; and the air thus propelled, falling into the fire, is heated, while the air which passes out is cooled. And as the heat changes and the air which travels via one outlet becomes warmer, this latter tends more to take the opposite

[1] Principally in the heart; cf. 70 A–C.

direction along that route, moving towards its like, and imparts a circular thrust to the air which travels via the other passage. This in turn undergoes the same effect and reacts identically every time. Under the two impulses, therefore, it gives rise to a motion like that of a wheel oscillating backwards and forwards, and so it produces inhalation and exhalation.

9. SECONDARY PHENOMENA ACCOUNTED FOR BY THE CIRCULAR THRUST (79E–80C)

To THIS cause, moreover, we may trace [80] the phenomena associated with medical cupping instruments, with the process of swallowing, and with the flight of projectiles, which continue to move after their discharge either through the air or along the ground.[1]

This same principle will also explain why sounds,[2] which occur as high or low in pitch according as they are swift or slow,[3] are as they travel sometimes inharmonious because the motion to which they give rise in ourselves lacks correspondence, sometimes concordant because there is correspondence. The slower sounds, when they catch up with the motions of the swifter sounds which reach their destination earlier, find these motions [B] drawing to an end and already having reached correspondence with the motions imparted to them by the slower sounds. In so doing, the slower sounds cause no disturbance when they impart a fresh motion; rather, by joining on the beginning of a slower motion in correspondence with the quicker now drawing to an end, they produce a single combined effect in which high and low are blended. Hence the pleasure they give to the unintelligent, and the delight they afford to the wise by the representation of the divine harmony in mortal movements.

There are, in addition, the flowing of any stream of water, [C] the falling of thunderbolts, and the so-called attraction of amber and of the loadstone which cause much amazement. In

[1] For an explanation of how the circular thrust makes a void unnecessary in these cases, *see* Plutarch, *Plat. Qu.*, vii, 1004D ff.

[2] The following account of concord and dissonance was promised at 67C.

[3] This is *not* a reference to transmission of sound by vibrations, a theory quite unknown to Plato. It is falsely attributed to him by Archer-Hind and Taylor, who go on to deplore his theory of consonance as 'entirely unsatisfactory' and 'quite perverse'! Incidentally, Plato knew nothing whatever about the eardrum.

none of these cases is there any real attraction. Proper investigation will show clearly that there is no void; that the objects concerned thrust themselves round, one upon another; that the several kinds of body, as they are disintegrated or put together, all interchange the regions towards which they move; and that the results which seem preternatural are due to the complication of these effects.

10. FORMATION AND CONVEYANCE OF BLOOD. GROWTH AND DECAY. NATURAL DEATH (80D–81E)

[D] Now the process of respiration, whence this discussion arose, takes place, as we have already said, on the following principle and by the following means. The fire cuts up our food and oscillates inside us as it accompanies the breath; and by thus oscillating with it, fills the veins from the belly by discharging thence the cut-up food. Thereby, in every living creature, the streams of nourishment are kept flowing throughout the body. [E] The particles, being freshly divided and derived from kindred substances—from fruits or herbs which the god made to grow for just this purpose of feeding us—assume all varieties of colour because of their mixing together; but their prevailing hue is red, a characteristic worked into moisture by fire that cuts and dyes it.[1] Hence the colour of the stream throughout the body takes on the appearance we have described; this stream we call blood, upon which the flesh and the whole body feed [81] in such a way that every member draws fluid therefrom to replenish the base of the depleted part. The manner of this replenishment and evacuation is like that movement of all things in the universe whereby each thing is borne towards its own kind. For the elements which besiege us outside are forever dissolving and distributing our substance, sending away each kind of body to join its own kind; while on the other hand the substances in the blood, broken up small within us and finding themselves comprehended by the individual living creature which is constructed like a heaven to include them,[2] are compelled to imitate the motion of the universe. [B] Accordingly each substance that is split up into fragments within us straightway replenishes the depleted part by moving towards its own kind.

Now whenever outflow exceeds intake, all things diminish;

[1] Cf. 68B. [2] Cf. 58A.

when the opposite occurs they grow. So when the frame of the whole creature is young and the triangles of its constituent bodies are still fresh as it were from the workshop, their joints are firmly interlocked, although the consistency of the mass as a whole is soft, [C] having been quite recently formed of marrow and nourished on milk. Accordingly, since any triangles composing the meat and drink, which enter from without and are contained within the young creature, are older and weaker than its own, it overwhelms them with its newly made triangles and cuts them up, and thus causes the creature to wax large, nourishing it with a host of substances akin to its own.[1] But when the root of the triangles [2] is loosened owing to the numerous [D] struggles in which they have long been engaged with so many others, they are no longer able to cut up into their own likeness the incoming triangles of the nourishment, but are themselves easily divided by the invaders from outside. So in these circumstances every living creature is overwhelmed and wastes away; and this condition is known as old age.

Finally, when the conjoined bonds of the triangles in the marrow no longer withstand the strain, but fall asunder, they release in their turn the bonds of the soul; and the latter, when thus naturally set free, takes flight with pleasure. [E] For whereas all that is contrary to nature is painful, what takes place in the natural way is pleasant. So death itself, on this principle, is opposed to nature and painful when it results from disease or wounds; but when it comes to terminate the natural processes of old age it is of all deaths the least distressing and is accompanied rather by pleasure than by pain.

[1] Cf. *Phaedo*, 96D.

[2] i.e. the radical structure of the primary triangles. 'Root' here denotes the sides, viz. the lines along which triangles are joined to form a corpuscle.

11. DISEASES OF THE BODY (81E–86A)

Following up his account of senile decay and natural death, Timaeus here classifies bodily diseases: those due to excess, defect or misplacement of the primary bodies; those of the secondary tissues; and those due to breath, phlegm or bile.

THE origin of diseases is, I think, clear to everyone. [82] Since there are four kinds which make up the body—earth, fire, water and air—disorders and diseases arise from the unnatural prevalence or deficiency of these, or from their transference from their own proper place to an alien situation; or again, since there are several varieties of fire, etc., from the taking in by any bodily part of an unsuitable variety; and from all suchlike causes. For when any one of the kinds is formed or shifts its place contrary to nature, [B] parts that were formerly cold are heated, the dry becomes moist, and so too with the light and heavy, and they undergo changes of every sort. The only way, as we maintain, in which any part can be left unchanged, sound and healthy is that the same thing should be coming to and departing from it with steadfast uniformity and in due proportion; any element that oversteps these bounds in its entering or going out will precipitate a wide variety of alterations as well as countless diseases and corruptions.

Again, in view of the fact that nature includes secondary formations, [C] careful consideration will take note of a second class of diseases. Since marrow, bone, flesh and sinew —and blood too, though in a different way—are composed of the bodies we named earlier, most of the diseases affecting them arise in the same manner as those just mentioned; but the most severe afflictions manifest themselves as a corruption of these structures, which takes place when the process of their formation is reversed.

In the order of nature flesh and sinews arise from the blood —[D] sinew from fibrine (because they are cognate), flesh

from the compacting [1] of the blood from which the fibrine is being removed. From sinews and flesh, again, derives the viscous and oily matter which glues the flesh to the structure of the bones and also nourishes the growth of the bone itself which envelopes the marrow; while at the same time the purest part, consisting of triangles of the smoothest and most slippery sort, filters through the close texture of the bones and, [E] as it is distilled from them in drops, waters the marrow. When the various structures are formed in this order, the result as a rule is health.

Disease comes when the order is reversed. Thus when the flesh is decomposed and discharges the fruits of its decomposition back into the veins, these are then filled with large quantities of all sorts of blood together with air; this has a diversity of colours and bitter flavours, in addition to acid and saline qualities, and develops bile, serum and phlegm of every sort. All these products of breaking down and corruption first destroy the blood itself; [83] then, ceasing to supply the body with nourishment, they are carried in all directions through the veins, no longer preserving the order of natural circulation. They are at loggerheads among themselves because they can get no enjoyment of one another; and as they make war upon every unit of the body that stands firm in the ranks, they spread corruption and dissolution.

Now when the flesh which is decomposed is of very great age, it resists concoction; it turns black under long exposure to burning, and, being bitter because it is eaten all through, [B] it is dangerous in its attack upon any part of the body that is not yet corrupted. Sometimes, when the bitter stuff has been fined down, the black colour acquires acidity in place of the bitterness. At other times, when the bitterness is steeped in blood, it takes on a redder hue, and the mixture of the black with this redness gives it the 'bilious' colour. Or again, a yellow colour may be combined with the bitterness when the flesh decomposed by the fire of the inflammation is of recent origin.

[C] To all these the common name 'bile' has been given,

[1] Most probably through the agency of 'innate heat'; for at 85D it is stated that when the blood is cold in a dead body blood without fibrine remains liquid.

either by physicians, or perhaps by someone capable of surveying a number of dissimilar cases and discerning in them all a single feature deserving a name; while each of the several varieties of bile recognized [1] has been specially defined according to its colour.

The serum of black and acid bile (unlike that of blood, which is an innocuous lymph) is dangerous when combined with a saline quality by the action of heat; and this is known as acid phlegm. There is also the product resulting from the decomposition of young and tender flesh, accompanied by air.[2] [D] This is inflated by air and enveloped in moisture so as to form bubbles, individually too small to be seen but becoming visible in the aggregate because the froth so generated causes them to appear white in colour. All this decomposition of tender flesh in combination with air we call white phlegm. Freshly forming phlegm, moreover, itself has a lymph, [E] namely sweat, tears and all other such fluid matter that is daily purged from the body.

All these things become agents of disease when the blood, instead of being replenished naturally from food and drink, derives its increase from the opposite quarter, contrary to the normal routine of nature.

Now when the various sorts of flesh are broken down by diseases, so long as their roots continue firm, the force of the attack is reduced by half, for the mischief can still be easily repaired. [84] But when that which binds flesh to bone [3] begins to ail and the stream that is separated off from flesh and sinews no longer serves to nourish bone and bind flesh thereto, but instead of being oily, smooth and viscous becomes rough and saline, parched by an unhealthy way of living, then, I say, all the substance affected in that manner crumbles back again into the flesh and sinews as it withdraws from the bones; [B] while the flesh, falling away from its roots, leaves the sinews bare and full of brine, and itself falls back into the bloodstream to aggravate the disorders previously described.[4]

Serious though these affections of the body are, graver still

[1] i.e. black, bilious and yellow.
[2] It is explained below (84E) that air is produced inside the body by decomposition of flesh.
[3] *See* 82D.
[4] *See* 82E–83A.

are those that go deeper and occur when the density of the flesh prevents the bone from receiving enough ventilation. Through mouldiness the bone is heated to excess and decays; no longer ingesting its proper food it [C] goes rather the contrary way and crumbles back into the nourishing fluid; and the latter again falls into flesh, and the flesh into the blood, thus rendering the afflictions of the part previously mentioned [1] all the more virulent.

Finally, the most extreme case of all is when the substance of the marrow becomes diseased through some deficiency or excess. This results in the gravest and deadly disorders, since the entire substance of the body is compelled to flow in a backward direction.

A third class of diseases must be distinguished under three heads: (1) from breath, (2) from phlegm and (3) from bile.

(1) When the lung, whose function is to supply the body with breath, is blocked by rheums and affords no clear passages, the breath is unable to reach some parts and causes them to putrefy for lack of refreshment; while too much of it passes into other quarters, where it forces its way through the veins and contorts them, dissolves the body, and is intercepted when it reaches the midriff. [E] Hence arise countless painful disorders, frequently accompanied by profuse sweating.

Often, too, when flesh disintegrates, air forms inside the body and, being powerless to escape, causes pangs identical with those due to breath that has come from outside. These torments are most severe when the air, gathering and swelling up around the sinews [2] and small veins there, causes them to stretch backwards the tendons of the back and the sinews attached to them. It is from the resulting tension, of course, that the disorders have derived their names, tetanus and opisthotonus. The cure is difficult; indeed such cases are, for the most part, terminated by supervening fevers.

[85] (2) White phlegm, when intercepted, is dangerous, on account of the air in the bubbles; but if it succeeds in finding

[1] i.e. the flesh, sinews and viscous fluid.

[2] *neura*. Its meaning here is doubtful. If 'sinews' is (as normally) correct, 'there' must refer to the small veins round the head (77E) and the sinews at its base (75D).

its way out to the surface of the body it is milder, though it disfigures the body by producing white pustules and kindred maladies. When it is mixed with black bile and spreads over the divine circuits in the head, throwing them into confusion, [B] its attack, if it occurs during sleep, is comparatively mild, but if that assault finds the victim awake it is harder to shake off. As an affliction of the sacred part it is very rightly called 'the sacred disease'.[1]

Acid and saline phlegm is the fount of all disorders that occur by defluxion; they have received many different names according to the line of flow.

(3) Inflammations of any part of the body, so called from its being burnt or 'inflamed', are all due to bile. If the bile manages to escape outwards, its seething throws up eruptions of various kinds; [C] if imprisoned within, it begets many inflammatory diseases. The most serious is when the bile, mingling with pure blood, breaks up the proper disposition of the fibrine. This latter is distributed throughout the blood to ensure its retaining a due proportion of rarity and density, in order that heat may not liquefy it to such an extent as to make it run out through the porous texture of the body, [D] and also that excessive density may not render it too sluggish for easy circulation in the veins. The fibrine, thanks to its composition, preserves the due balance. Even after death when the blood is cooling, if the fibrine is collected all the rest of the blood is liquefied; whereas, if the fibrine is left, it quickly congeals the blood with the aid of the surrounding cold. Such being the function of fibrine in the blood, bile (which originated as old blood and is now dissolved back again from flesh into blood), when it enters the blood hot, liquid [E] and in small quantities at first, congeals under the influence of the fibrine; and during this process and the quenching of its natural heat it sets up internal chill and shivering. As the bile flows in more abundantly, however, it overpowers the fibrine with its own heat, and by boiling up shakes it into disarray; and if it proves sufficiently strong to obtain permanent hold, it penetrates to the substance of the marrow and in consuming it loosens the soul from her moorings there and sets her free.

[1] i.e. epilepsy.

When the flow is less abundant and the body resists dissolution the bile itself is overpowered; then either it is ejected over the whole surface of the body, or else, after being forced through the veins into the lower or upper belly, banished from the body like exiles from a state in the throes of civil war, [85] it causes diarrhoea, dysentery and all such disorders.

When [1] the body has fallen sick mainly through excess of fire, it produces continuous heats and fevers; excess of air causes quotidian fevers; excess of water, tertian, because water is more sluggish than air or fire. Excess of earth, which ranks as the most sluggish of the four, is purged in fourfold periods and produces quartan fevers which are difficult to shake off.

[1] This paragraph on fevers belongs rather to sub-section (1) above, which is concerned with diseases due to excess or defect of one of the four primary bodies.

12. DISEASES IN THE SOUL (86B–87B)

This section deals with disorders of the soul arising from an inherited constitution of the body or from a bad upbringing. Timaeus stresses the initial disadvantages of poor physique, which begets a tendency to vice; and he links this matter with Socrates's theory that no one is willingly or wittingly bad.

[B] Such is the manner in which disorders of the body come about; disorders of the soul are caused by the condition of the body as follows. It will be allowed that folly is a disorder of the soul; and there are two kinds of folly—madness and stupidity. Any affection, therefore, that brings on either of them must be called a disorder; and among the gravest disorders of the soul we must recognize excessive pleasures and pains. When a man suffers transports of joy [C] or torments of pain, he can neither see nor hear aright in his immoderate haste to grasp the one or escape the other; he is frenzied, and his capacity for reasoning is then at its lowest ebb. Moreover, when the seed in a man's marrow becomes supercharged with moisture, like a tree carrying too much fruit, he is filled on each occasion with intense agony and with pleasure equally intense, both in his desires and in their satisfaction. [D] For most of his life he is maddened by these strong pleasures and pains; and when the body renders his soul sick and senseless he is commonly considered to be not sick, but deliberately wicked. But the truth is that sexual intemperance is a disease of the soul, arising largely from the condition of a single substance [1] which, owing to the porosity of the bones, floods the body with its moisture. One would not indeed be far wrong, when speaking of all so-called over-indulgence in pleasure, in saying that it is unjustly made a matter of reproach, as if men were voluntarily bad. [E] No one is voluntarily bad; the bad man becomes so on account of some faulty habit of body and unenlightened upbringing, and these are unwelcome afflictions that overtake any man against his will.

[1] i.e. the marrow, or that part of it which forms the seed.

Again, where pains are involved, the soul likewise derives many defects from the body. When acid and salt phlegms or bitter bilious humours roam about the body and, finding no exit, [87] are imprisoned within and fall into confusion by mingling their own vapour with the motion of the soul, they give rise to all manner of disorders of the soul which vary in intensity and extent. Penetrating to the three seats of the soul, according to the region they severally invade, they beget many different sorts of bad temper and low spirits, of rashness and cowardice, of dullness and oblivion.

Furthermore when men of such deplorable composition [B] live in cities with evil forms of government, where no less evil discourse is carried on both in public and in private, and where, too, no curriculum of studies that might counteract this poison is followed from youth upward—that is how all of us who are bad become so, through two altogether involuntary causes.[1] The blame for these must fall upon the parents rather than the offspring,[2] and upon those who give rather than those who are given nurture. Nevertheless a man must do his level best by means of education, pursuits and study to escape from badness and lay hold upon its opposite.

[1] i.e. defective constitution and bad upbringing. Cf. 86E.
[2] Cf. *Laws*, 755D.

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[2] Cf. *Laws*, 755D.

13. REMEDIES FOR DISPROPORTION BETWEEN SOUL AND BODY (87B–89D)

Timaeus has just referred to the corrupting influences of a badly governed society and the educational reforms needed to counteract them. But a cosmological and physical discourse such as this is not the right context for political and moral topics; so in the present section Timaeus turns back to the living creature as a compound of soul and body, and in particular to disorders due to lack of proportion between them. These disorders are to be rectified not by the drastic operation of drugs, but by allowing soul and body the regimen and exercise that each requires.

THE foregoing subject, however, belongs to another kind of discourse; [C] here it is natural and fitting to set forth in turn the countervailing treatment, the methods whereby body and soul are kept healthy, for it is only right that one should dwell upon good rather than upon evil.

Now the good is always beautiful, and the beautiful never lacking in proportion; so a living creature that is to be endowed with these qualities must be well proportioned. Trifling proportions are easily noticed and estimated; but the most important and decisive escape our reckoning. [D] In respect of health and sickness, goodness and badness, the proportion or disproportion between soul and body themselves is more important than any other; yet we disregard this and fail to observe that when a powerful and truly great soul has as its vehicle an outward form too small and weak, or again when the two are ill matched in the contrary way, the creature as a whole is not beautiful, because it falls short in the most essential proportions; while the opposite condition is, for him who has eyes to see, the fairest and loveliest object of contemplation.[1] [E] Just as a body that is out of proportion, through excess in the size of its legs or some other members, is not only ugly but in the interaction of its parts brings upon itself countless troubles together with much fatigue and frequent

[1] Cf. *Republic*, 402D.

falls due to awkward convulsive movement, so is it, we must suppose, with the composite creature we call an animal. When the latter's soul is too strong for the body and [88] of ardent temperament, she dislocates the entire frame and fills it with maladies from within; when she devotes herself to study and research, she causes it to waste away; in teaching and controversy, whether public or private, she inflames and racks its fabric through the ensuing rivalry and contention, and by bringing on rheums ensnares the majority of so-called physicians into laying the blame on the innocent part. On the other hand, when a large body, too big for the soul, [B] is conjoined with a small and feeble mind, whereas man's natural appetites are twofold—desire of food for the body and desire of wisdom for our divinest part—the motions of the stronger part prevail and, by augmenting their own power at the same time as they render that of the soul dull, slow to learn and forgetful, they produce in her that worst of ailments, stupidity.

Now against both these perils there is one safeguard: not to exercise the soul without the body, nor the body without the soul,[1] in order that both may hold their own and emerge equally balanced and sound. Thus the mathematician or one who is preoccupied with any other intellectual discipline must give his body its rightful amount of exercise by taking part in athletic training; while he who is set upon moulding his body must compensate his soul with her appropriate exercise in the cultivation of the mind and higher education generally. Only so can one deserve to be called in the true sense a man of noble breeding.[2]

The various parts also should be cared for on the same principle, in imitation of the universal frame. [D] For as the body is heated and cooled within by what enters it, and again is dried and moistened by what is outside, and suffers affections consequent upon disturbances of both these kinds, if a man delivers his body to these motions in a state of rest, it is overpowered and brought to ruin. But if he imitates what we have called [3] the foster-mother and nurse of the universe and

[1] Cf. *Laws*, 728E.

[2] *kalos k'agathos*. In common parlance these words denoted a member of the upper class. Here, of course, they have also their literal meaning: beautiful and good.

[3] Cf. 53A.

never, if possible, allows the body to remain inert; if he keeps it moving and, by repeatedly giving it a shake, constantly holds in check the internal and external motions in a natural balance; [E] if, by thus shaking it in moderation, he brings into orderly array one with another (as we described earlier when speaking of the universe) those affections and particles that wander about the body according to their affinities; then he will not be leaving foe at the side of foe to breed war and disease in his body, but will have ranged friend with friend for the achievement of health.

[89] Finally as regards motions, the best is that produced in oneself by oneself, since it is most nearly akin to the movement of thought and of the universe. Motion effected by another is inferior; worst of all is that whereby external agents move one or more separate parts of the body while the latter is completely at rest. Accordingly the best of all methods of purifying or bracing the body is gymnastic exercise; next best the swaying motion of a boat or carriage which causes no fatigue. A third kind, though sometimes [B] useful in cases of dire necessity, should under no other circumstances be employed by any sensible man; I mean medical purgation by drugs. Disorders should not be irritated by drugs unless they involve grave danger. For every disease has a settled constitution rather like that of living creatures. The composition of the living creature is such that it has a regular period of life for the species generally; [1] and each individual too is born with its allotted span, apart from unavoidable accidents, [C] because the triangles in every creature are from the outset put together with a capacity to endure for a certain length of time, beyond which life can never be prolonged.[2] So also with the constitution of diseases: if this suffer violence by drugs in defiance of their predestined period, the result is often that trifling maladies become serious or their number is increased. Hence, so far as leisure permits, one should control all disorders by regimen [D] rather than irritate a stubborn mischief by drugs.

[1] Cf. Aristotle, *De Gen. et Corr.*, 336[b]10. [2] Cf. 81D.

14. CARE OF THE SOUL (89D–90D)

Leaving now the care of the whole living creature, especially of its bodily part, Timaeus turns in this noble passage to care of the soul and its training for the dominion it should wield. The leading principle has already been declared in the *Republic*. Each of the soul's three parts has its proper sphere of interests and desires, and none of them should be inhibited; if too much of the soul's energy is directed into one of the three spheres, the others are bound to be adversely affected. The remainder of the section is concerned with that innermost desire (Eros) of the divine part, which, as explained in the *Symposium*, is man's craving for the immortality or divinity that can be recovered only by pursuit of wisdom.

SO MUCH for the care of the living creature as a whole and of its bodily part, and for the way in which a man may best lead a rational life, both governing and being governed by himself. Still more should precedence be given to the training of the part destined to govern, in order that it may be as fully equipped as possible for its task of sovereignty. To handle this subject in detail would itself be a sufficient task; [1] [E] but, as a side issue, it may not be irrelevant to offer the following observations with a view to determining the matter in conformity with our previous exposition. As we have said more than once,[2] there reside in us three distinct forms of soul, each having its own motions. We may therefore say now as briefly as possible that whichever of those three lives in idleness and inactivity with respect to its own motions inevitably becomes the weakest, whereas any that gives itself regular exercise will be strongest. [90] We must therefore take care that their motions be kept in due proportion to one another.

As regards the supreme form of soul in us, we must conceive that the god has conferred it upon each man as a guiding genius—that which we say dwells in the highest point of our body and lifts us from earth towards our celestial affinity, like a plant whose roots are not in earth, but in the heavens. And

[1] See *Republic*, vii; *Laws*, vii and xii *ad fin.*

[2] 69D; 79D; 87A.

this is most true, for it is to the heavens, whence the soul first came to birth, that the divine part attaches the head or root of us and thereby keeps the whole body erect. [B] Now if a man is entirely dedicated to appetites and ambitions and devotes all his energies to these, all his thoughts must needs be mortal, and he cannot help but become altogether mortal (so far as that is possible) since he has fostered the growth of his mortality. If, however, he has set his heart upon learning and true wisdom, and has exercised that part of himself above all others, [C] he is surely bound to think thoughts immortal and divine, if he lay hold upon truth; nor can he fail to possess immortality in the fullest measure that human nature allows. And inasmuch as he is forever cherishing the divine part and tending the guardian genius that dwells with him in good estate, he must needs be superlatively happy. Now there is one way only of caring for anything, namely to give it the nourishment and motions proper to it. The motions akin to the divine part in us [D] are the thoughts and revolutions of the universe; these therefore every man should follow, and correcting those circuits in the head that were deranged at birth, by learning to recognize the harmonies and revolutions of the world, he should bring the intelligent part, according to its pristine nature, unto the likeness of that which intelligence discerns, and thereby achieve the best life set by the gods before mankind both for this present time and for the time to come.[1]

[1] Cf. Aristotle, *Nic. Eth.*, x. 7.

APPENDIX

THE SEXES DIFFERENTIATED. BRUTE BEASTS CREATED. CONCLUSION OF THE DISCOURSE (90E–92C)

This final section of the discourse, coming after the magnificent climax in the previous section, serves as a kind of appendix. The most sublime form of Eros, spoken of there, has its seat in the brain, atop the column of spinal marrow. The marrow is also the seed, whereby the human species perpetuates itself in time; and arrangement must now be made for this 'Eros of begetting', by forming an outlet for the seed and fashioning the organs of generation, which are here described fantastically as actual living creatures appended to the already completed human animal. It is probable that this work was left until almost the very last because Plato wished to suggest that sexual desire is not the basic form of Eros, but a mere incident of temporal existence.

The created gods now finish their appointed task by making the remaining groups of living creatures: birds, land-animals and fishes. Timaeus set out to discourse chiefly upon the universe and the nature of man; so the brute beasts call for a mere glance. Their forms are considered as degraded types, for the sake of the doctrine of punishment by metempsychosis with which the souls were threatened before their first incarnation (42C). The three groups correspond to the three parts of the soul, which the men doomed to degradation have respectively misused.

The concluding sentence remarks that with the formation of the lower animals the universe has become what the Demiurge undertook to produce: the unique, visible image of 'that Living Creature of which all other living creatures . . . are parts'.

[E] AND now, it would seem, we have practically completed the task laid upon us at the outset, which was to tell the story of the universe down to the generation of mankind. As for processes by which the other living creatures have come into being, since little need be said they shall receive no more than a brief mention; in that way, I think, our exposition will preserve a reasonable balance.

Let us therefore state the matter as follows, *according to the probable account*. Of those who were born as men, all that were cowardly and spent their life in wrongdoing were transformed at second birth [1] into women; [91] hence it was at that time that the gods contrived the craving for sexual intercourse, fashioning one animate creature in us males, and another in women. The two were made by them in the following way. From the conduit of our drink, where it receives liquid that has passed through the lungs by the kidneys into the bladder and ejects it with the air that presses upon it, they pierced a hole giving access to the compact marrow which runs from the head down the neck and along the spine and has in fact, earlier in this discourse,[2] been termed 'seed'. [B] This marrow, being instinct with life and finding an outlet, implanted in the part occupied by this outlet a keen appetite for egress and so brought it to completion as an Eros of begetting.[3] Hence it is that in men the genital organ is disobedient and self-willed, like a creature deaf to reason and determined, because of frenzied appetite, to carry all before it. [C] In women, on the other hand, there is the so-called matrix or womb, a living creature desirous of childbearing. For the same reason,[4] if it remains long unfruitful, beyond the due season, it is vexed and aggrieved, and wandering about the body and blocking the channels of the breath it causes the utmost distress by preventing respiration; until at length the Eros of the one and the Desire of the other bring the pair together, [D] pluck as it were the fruit from the tree [5] and sow the ploughland of the womb with living creatures still unformed and so small as to be invisible, and again, differentiating their parts, nourish them till they grow large within, and thereafter accomplish the birth of the living creature by bringing them to

[1] Cf. 41D ff.

[2] *See* 73C; 74B; 86C.

[3] This extraordinary passage is intelligible if we bear in mind first that Plato treats sexual desire itself as a living creature. The seed produces the phallus, completing the part occupied by the outlet as an 'Eros of begetting', of which the phallus itself is an embodiment.

[4] i.e. because it is instinct with life.

[5] At 86C he compared excess of seed to superabundance of fruit on a tree, which is here relieved by plucking of the fruit. The marrow is comparable to an inverted tree, with the brain as its root (*see* 90A) and the spinal column for its trunk.

the light of day. Such is the origin of women and of all that is female.

Birds were made by transformation: growing feathers in place of hair, they derived from harmless but light-witted men who studied the heavens but imagined in their simplicity that most reliable evidence in such matters is obtained through the eye.

[E] Brutes that go on land came from men who had no use for philosophy, and paid no heed whatever to the heavens, because they had ceased to employ the circuits in the head and followed the lead of those parts of the soul that reside in the breast. Owing to these practices they allowed their fore limbs and heads to be drawn down earthwards by natural affinity and there supported; and their heads became elongated and assumed any random shape into which their circles were crushed together through inactivity. [92] Because of this their kind was born with four or more feet, heaven endowing the more witless with the greater number of props, in order that they might be all the more dragged earthwards. The very stupid, whose whole bodies were stretched at all points upon the earth, since they no longer required feet, the gods made footless, crawling along the ground.

[B] The fourth kind, denizens of water, came from the most foolish and senseless of all. The gods who remoulded their form considered these unworthy any more to breathe the pure air, because their souls were polluted with every sort of evil-doing; instead of allowing them to breathe the fine clear air, they thrust them down to inhale the muddy water of the deep. Hence came fishes and shell-fish and all creatures that inhabit the water; they are assigned the last and lowest habitation as punishment for the uttermost degree of folly. [C] These are the principles on which, now as then, all living creatures change one into another, shifting their place with the loss or gain of understanding or of folly.

Now at long last we may say that our discourse on the

universe is ended. For this world, having received its full complement of living creatures, mortal and immortal, has become a visible living creature embracing all that are visible, and an image of the intelligible, a perceptible god, supreme in greatness and excellence, in beauty and perfection, this Heaven single in its kind and unique.

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