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PLATO'S

INTELLIGENT

DESIGN

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And they told me to sing of the family of blessed ones who are for ever, and at the beginning and the ending always to sing of themselves.

Hesiod,
Theogony: 33-34
[his invocation of the Muses]
(ca 8th century BCE).

Prelude:

Machu Picchu

Together let us climb, American love.
Together let us kiss these stones of secrecy.

Sube conmigo, amor americano.
Besa conmigo las piedras secretas.

Pablo Neruda,
The Heights of Macchu Piccu,
September, 1945.

Few people can have had many thrills quite like the one Hiram Bingham had when he discovered ruins of what had once been an Incan city, unexpectedly and precariously perched on the knife-edge of a ridge joining two peaks, Machu Picchu and Huayna Picchu (Big Peak and Little Peak), high in the Andes Mountain Range in Peru. He was excited, but also mystified. Was it an abandoned Incan city – or a monastery? or a fortress? or a "University of Idolatry", as some later suggested? In 1911, Bingham was not in a position to know quite what it was that he had discovered. There were precious few clues on the site, apart from the snugly fitted, massive stones that manifestly had once constituted walls, lanes, stairways, aqueducts, drains, and other constructions of monumental architecture.

These stone ruins can be reached by a three days' walk along Incan trails that follow high ridges, winding northwest from the ancient Incan capital city, Cuzco. But Bingham did not follow the high trails of the Incas. Being an explorer of European descent, he followed rivers that plunged, at first westwards, down steep, narrow valleys, but destined eventually to turn feed into the Amazon Basin, in the jungles far away to the northeast, and to empty into the Atlantic Ocean. From the jungles of the valley floor, Bingham climbed up to these ruins on a ridge far above him. When he reached the ridge and saw the secret stones there, he was elated, and intrigued.

Many years later, comic books appeared with a dashing hero, "Indiana Jones", an archaeologist from an American University, who was in some ways rather like Bingham; and later, these comics were translated into a series of Hollywood movies. The comics and movies no doubt leave out many of the more tedious tasks required of

archaeologists in their daily work – but they do convey some giddy feelings, and wild fantasies, a little like those that might sometimes buzz about inside an explorer's head, when coming upon a mysterious site like Machu Picchu.

Before discovering these ruins, Bingham had sifted through written records, seeking clues to the locations of lost Incan cities, and found none mentioning this place. He had asked everyone he could if they had heard any rumours of Incan ruins, but no one seemed to know even what this place had been called before the Spanish conquest. The place was a riddle. He was puzzled to find very few artefacts, and no indications of who had once lived there, or why they had left. The mystery was palpable.

Almost a century after his discovery, some newspaper and magazine reports raised the suspicion that Bingham might not have been, after all, as he had thought, the very first explorer of European descent who had visited these ruins. And after all – why Bingham did immediately assume, when he first set sight on the place, that he was the *first* to have discovered this archaeological treasure? One should not forget the force of wishful thinking. He likely made the natural assumption that if there *had* been anyone else, at any earlier date, who had seen these ruins, then they surely would have told the world about it – wouldn't they? He himself was eager to tell the world what he had found – surely if anyone else had seen the place, they would be as keen as he was, wouldn't they?

Not necessarily. In fact, when you think about it, Bingham knew perfectly well that a number of other people had seen Machu Picchu before he did. Subsistence farmers, who lived nearby, certainly knew about the place – in fact, they took him there. Yet obviously *they* had never spread the word the world wide, the way Bingham did. It is important to remember that there may be many possible reasons why a person who makes a discovery of this kind might not even think of trying to publicize it, or might think of doing so but decide against it – or might try and not succeed. .

For instance, there was someone of European descent called Augusto Bern who, it seems, some decades earlier than Bingham, perhaps in about 1867, may have found this place. If Bern had made this discovery earlier, then one should be mindful of the possibility that he might have stripped it of all moveable, marketable artefacts. In that case one could imagine possible reasons why he might have kept the source of these artefacts secret. The more you think about it, the less confident we can be that Bingham was the first person to see the place since its abandonment.

Nevertheless, let us not take from Bingham the credit that is his due. Even if locals knew the place well, and even if someone else did discover and loot Machu Picchu before Bingham, nevertheless it was Bingham who first succeeded in telling the world about this place, with confidence that it would be, or should be, of interest to a wide public. On balance, I think that – if Bern did keep the site secret then he did the wrong thing; and – again on balance – Bingham did the right thing, in doing his best to share his discovery with the rest of the world.

Bingham's discovery of Machu Picchu demonstrates that it is possible for a man of moderate capacities, like a Bingham or a Bigelow, to strike it lucky and to stumble on something – of unusual value – whose existence has hitherto been known to at most a handful of people, even though it has been, in a manner of speaking, virtually under our noses for centuries. I have difficulty believing that I really have discovered what I think I have discovered: but I take heart from a comparison with Bingham's discovery of Machu Picchu.

In this book, I will describe something that I call the Platonic Table. This is not a pattern of interlocking stones, but of interlocking numbers, a little like a multiplication table. I found this Table in one of the most enigmatic of Plato's

dialogues, the *Timaeus*. I think it is worth a visit, for the same sorts of reasons that many people find it deeply rewarding to visit Machu Picchu. After I discovered this Table, hidden deep within one of Plato's dialogues, I underwent a kind of gradual conversion – to a species of Pythagoreanism. I began to feel more deeply the significance of the ways that many mathematical patterns, superimposed upon one another, underlie the diversity of appearances in the material world. I came to believe that when an artist embodies similar patterns within a work of art, this can subliminally nudge our souls back into harmony with the world around us – or, at least, that this talk of "souls" and "harmonies" can serve as a good metaphor for something that is important, and near the truth. I came to suspect that some significant artists, through history, have tried to embody mathematical patterns, like the Platonic Table, within their works of art.

Some Pythagoreans in the past have thought that this Table really does distil the mathematical pattern that underlies all the laws of nature, and the deep structures in the human soul – a kind of "GUT" (a "grand unified theory"), reminiscent of the sort of theory Einstein sought in physics – or a "TOE" (a "theory of everything"). I assume that this grandiose Pythagorean vision is misguided (and I have my doubts about the more recent cosmological incarnations too). Nevertheless, behind their exaggerations these Pythagorean enthusiasts were not entirely wrong. The Platonic Table is worth disclosing, for many reasons, even if some Pythagoreans overestimated its significance in delineating the Harmonies of the World.

In the first place, the mathematical patterns in the Platonic Table can be found in many salient patterns in nature – in the cycles of the seasons, life cycles of organisms, and so forth. And, even if the Platonic Table does not distil all the true laws of nature, it can be taken as a beautiful metaphor for those laws, whatever they may be. Furthermore, these Patterns can also be found, if not in nature, then at least in many deeply moving works of art – for instance in Homer's *Iliad*, in Michelangelo's *Last Judgment*, in legends of King Arthur retold by Malory, and in the music of Wagner. And finally, the Platonic Table is intrinsically beautiful in its own right.

One of my problems is similar to Bingham's. What I have discovered, like what Bingham discovered, is something beautiful – but it is (as it were) far off the beaten path, and it is hard to show it to people, because it is hard to persuade them to make their way to the remote location where it is situated. Furthermore, unlike Bingham's sacred, secret stones, the thing that I have discovered is invisible and intangible – and so alas, unlike Bingham, I cannot show you a photograph. In order to show how beautiful the Table is, I need to show how its salient and its subtle patterns can be embodied in beautiful works of art. It will take you considerable time and effort – not physical effort, but the kind of intense concentration required for solving mathematical puzzles – before you can get anything more than a misty, distant glimpse of the Platonic Table.

The ratios among the Pythagorean numbers, as distilled into the Platonic Table, generate musical harmonies and discords. They are also written into the motions of the stars and planets. If a work of art is truly to hold a mirror up to nature, it will need to embody the same patterns. In fact, the Table generates what might be called a "binding theory", which brings virtually everything into multiple and many-layered relationships with everything else.

The idea of a "binding theory", which connects everything to everything else, may be a delusion, but it is a powerful one. To convey the grip it can have on the imagination, I will quote some lines from Shakespeare's Sonnet 53:

What is your substance, whereof are you made,
That millions of strange shadows on you tend?
Since every one hath, every one, one shade,
And you, but one, can every shadow lend.

In the context of the published collection of *Shakespeare's Sonnets* in 1609 these lines are addressed to a young man; but I also invite you to think of this young man as a personification of a Platonic ideal. Think of the "shadows" as projections of perfect Platonic Forms onto imperfect matter – of a timeless Reality onto the ever-changing flow of Appearances in Time.

A Platonist, hearing this opening quatrain of Shakespeare's Sonnet 53, would likely be reminded of Plato's famous "myth of the cave". In this myth, beautiful creatures, bathed in the light of Reality, walk past the mouth of a cave. We prisoners are locked up in chains within the cave, and all we can see are Appearances, the shadows cast on the cave wall, as the divine creatures walk past the mouth of the cave.

The Platonic Table is a concise, highly condensed, ideal form and, against this perfect form, many other visible and tangible but imperfect patterns can be set into memorable correspondences. These corresponding, imperfect patterns are all "shadows" of the One Table. But the shadows are never as beautiful as the original – as Shakespeare goes on to explain in the rest of his Sonnet 53:

Describe Adonis and the counterfeit
Is poorly imitated after you,
On Helen's cheek all art of beauty set
And you in Grecian 'tires are painted new.

And it is not only beautiful ancient Greek men and women that are compared to the poet's Ideal, but also the cycles of the seasons ('foison' means something like 'rich harvest'):

Describe the spring and foison of the year:
The one doth shadow of your beauty show,
The other as your bounty doth appear,
And you in every blessed shape we know.

And Shakespeare's Sonnet 53 concludes by generalizing from these examples:

In all external grace you have some part,
But you like none, none you, for constant heart.

These lines suggest that, for the writer of these lines, nothing in this material world has grace unless it reminds him of the young man to whom the sonnet is addressed. But for a Pythagorean Shakespeare's lines also bring to mind the core Platonic notion that things in the material world have *grace* only when they embody, however imperfectly and incompletely, aspects of the perfect Platonic Forms.

It can be a deeply satisfying experience to see a work of art as embodying an ideal Platonic pattern. Most of the time, of course, neither the artist nor the admirer of the art will be able to verbalise what Pattern it is, to which they are responding. Recognition is often instinctive, subliminal, and visceral. Yet it can be powerful nevertheless.

It is virtually impossible for us mere humans to grasp an abstract Platonic Form as it is in itself, without any embodiment, except perhaps in pure mathematics. When Bingham found a lost city, it was not so difficult to give others an idea of what kind of thing he had found – we are familiar enough with examples of things of this kind: Venice, Edinburgh, Dunedin, and so on. What I need is an example of something else of broadly the same kind as the Platonic Table. One example might be: the underlying structure of, say, Shakespeare's sonnets.

In each of Shakespeare's sonnets the subject matter matters – and matters a lot – and yet he also manages, again and again, to fit whatever content he has chosen to express into the very same elegant mathematical pattern of fourteen lines – three quatrains and a rhyming couplet – in iambic pentameter (ten or eleven syllables in each line), with the line-ends almost always rhyming in the same pattern *abab cdcd efef gg*. This pattern is found in 151 of the 154 sonnets in his 1609 collection.

It is natural to wonder what motives there could be for embodying the same Platonic Table in many different works of art. But a similar question could be asked about the motives a poet might have for deliberately trying to massage each in a long sequence of poems into one and the same sonnet form. Shakespeare asks these questions in Sonnet 76:

> *Why is my verse so barren of new pride,*
> *So far from variation or quick change?*
> *Why with the time do I not glance aside*
> *To new-found methods and to compounds strange?*
>
> *Why write I still all one, ever the same,*
> *And keep invention in a noted weed,*
> *That every word doth almost tell my name,*
> *Showing their birth, and where they did proceed?*

This sonnet ends,

> *For as the sun is daily new and old,*
> *So is my love still telling what is told.*

This ending should remind us that the work of the Demiurge – the material world – is in a few important respects very like Shakespeare's sequence of sonnets: each day is both the same and different from the one before, each year is both the same and different from the one before, each human life is both the same and different from the one before – just as each sonnet is both the same and different from the one before. Shakespeare achieves some lastingly significant artistic effects by choosing to "keep invention in a noted weed". I suggest that guidance from the Platonic Table might enable artists to achieve effects of very much the same kind.

The Platonic Table is something of broadly the same kind as the abstract structure of a Shakespearean sonnet. And just as Machu Picchu is an especially moving lost city for people to visit, so is the Platonic Table an especially moving "guiding pattern" for us to contemplate.

I invite you to investigate, with me, the possibility that, over the centuries, there have been at least a few artists, here or there, now and then, who took guidance from one and the same Platonic Table in creating at least some of their most memorable works of art. I imagine that relatively few artists would have done this. Many artists

work, as you might say, *instinctively* – and so, for them, influences from the Platonic Table could be at work at most subliminally, if at all. For many artists, indeed, it may be a good thing that they did not take any conscious guidance from the Platonic Table, or from any other "recipes" of this kind. Their works of art may have been all the more successful because they worked intuitively rather than mechanically.

Yet it is also worth exploring the possibility that at least a handful of artists, over the centuries, may have taken guidance quite deliberately and self-consciously from the Platonic Table. If there were any such artists, who might they have been? (Was Shakespeare, for instance, one of them?) And, if we find a likely suspect, how could we confirm or falsify our suspicions? *What should we be looking for?*

In order to answer these questions, we will first need to study the Platonic Table closely, and to explore ways in which it would be at least conceivable for an artist to have taken creative guidance from it. Like walking the high trails from Cuzco to Machu Picchu, exploring the Platonic Table will require effort. But, as when you finally arrive on the slopes overlooking Machu Picchu, the visions you experience will reward you for that effort.

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Secrets Plato Nearly Kept *

Secrets nearly
Plato kept,
One to
3.

[*****Allusion:
Socrates: *One, two, three – but where, my dear Timaeus, is the fourth of our guests of yesterday, who were to be my entertainers today?*
– opening lines of Plato's dialogue, *Timaeus*.]

INTRODUCTION:

Artists who imitate the Demiurge

The mystery religions

The last thing we need, in the early years of the twenty-first century, is yet another World Religion.

I am deeply disillusioned about schemes for self-improvement. In the preceding century, the track record of World Religions has been disappointing. Centuries of cultivation of Catholicism in Austria, and Protestant Christianity in Prussia has preached the teachings of Jesus of Nazareth, who exhorted us to be kinder and more compassionate; and yet all these centuries of Christian teachings among the Germans seem to have done precious little to curb their savagery in the European Wars in the twentieth century. Centuries of cultivation of teachings of the compassionate Buddha in Japan did little to curb the cruelties of the Japanese war in Asia and the Pacific. Atheistic Marxism in the Soviet Union, and under Mao in China, were accompanied by some spectacularly large-scale atrocities. I express my disillusionment with World Religions not to persuade anyone of my own loosely anarchistic, atheistic, materialistic point of view, but rather to clarify the intention with which I have written

this book. The last thing I would want to do would be to try to launch a new World Religion.

And yet, as a result of studying Plato's *Timaeus*, I find myself perilously close to urging a species of New Age revival of something that is, I must confess, a little like a World Religion. What I find myself urging owes something to the "mystery cults" of ancient times, particularly the quasi-religion of the Pythagorean brotherhoods. As religions go, this one has some appealing features. It amounts to making something like a religion out of mathematics and the Arts and the Sciences. It distils a valuable precipitate that should (I hope) remain, even if you have otherwise given up on religion.

The central idea in Pythagorean Platonism is that there are beautiful mathematical patterns underlying the changing appearances of things in the material world, and that human life will go better if we bring ourselves into harmony with the harmonies of the world. This idea overlaps with pervasive ideas in many religions, in many different lands and at many distant times, which enjoin us to attend to the patterns we see in nature, particularly in the heavens, and to live in harmony with these patterns. The book I have written has a bias towards European arts, sciences and religions, because they are the ones most familiar to me; but it is worth entering a reminder that traditions lying largely outside Europe also register the importance of attending to patterns in nature, particularly in the heavens. Consider for instance this passage from the Qur'an, 55.6-10, translated by M.Z. Khan:

> *The sun and the moon move according to a fixed reckoning,*
> *and the stars and trees submit to Him.*
> *He has raised the heaven high and set up the measure,*
> *that you may not transgress the measure.*
> *So weigh all things in justice*
> *and fall not short of the measure.*

It is an important part of Islam that a number of rituals coincide with cycles of the heavenly bodies, bringing human lives into harmony with the heavens and with the cycles of the seasons. Consider also the following passage from the Qur'an, 65.13:

> *Allah is He Who created seven heavens and the earth the like thereof.*

This not only repeats the frequent emphatic references to "sevens" (as in the seven pillars of wisdom, the seven verses of the first chapter of the Qur'an, and so forth), it also echoes the ubiquitous notion of a harmony between the heavens and the earth – of the microcosm being a mirror of the macrocosm. This is something Islam shares with a great many of the religions of the world, past, present and future – and it is the very core of Pythagorean Platonism.

I hope we can study the Pythagorean, Platonist quasi-religion, without getting so caught up in our enthusiasm that we turn our sympathies violently against all its rivals. As long as we can keep our balance, this ancient quasi-religion of Platonist Pythagoreanism, or Pythagorean Platonism has much to offer us.

Some Platonists think each of us has a soul, which began its existence embodied within a star in heaven. Each of these stars is a sphere revolving on its own axis, a microcosm in harmony with the spherical cosmos in which it is embedded. In our first birth, we too were in harmony with the cosmos around us. We understood the revolutions of nature, because the inner courses of our souls revolved in exactly the

same patterns. But then we were transplanted into human bodies – and since then life, passions, and perceptions have screwed up the inner courses of our souls into all kinds of excruciating discords. We fell out of harmony with the cosmos, and out of harmony with one another. We are destined to be reborn repeatedly, transplanted from one human or animal body to another, until we can eventually bring our souls back into harmony with the cosmos: and when that happens, we will then be reborn one last time, into the same star in which we received our first birth, and we will then live there in eternal bliss, for ever more.

Here, then, might be one noble goal for someone to pursue, in the light of these teachings:

> ***The Pythagorean Project*:**
> *to try to nudge our souls back into harmony with the world around us.*

I assume that the Pythagorean stories about stars and "souls" are not literally true. For Christians, Jews and Muslims the Pythagorean doctrine of reincarnation would, of course, be a heresy. I try to think of nothing as a "heresy"; nevertheless, I don't believe in magic and I do believe that reincarnation, taken literally, would be magic, and so I am no more able than a faithful Christian to believe that the Pythagorean stories about the soul are literally true. And yet even a person like me might take the Pythagorean reincarnation story as a metaphor or parable for something significant, and relatively near the truth.

One way to set about nudging our souls back into harmony with the world might be by creating a work of art that holds, as it were, a mirror up to nature – a visible, audible, or tangible work that embodies those same timeless mathematical harmonies of the heavens that we once knew, before our bodily birth – patterns to which we will subliminally respond, when we apprehend them embodied in a work of art. Alternatively, a Platonist who is not talented in the arts, but who is rich, might try to patronize some talented artists and encourage them to create works of that kind, and by this patronage might hope to contribute indirectly to the gradual betterment of mankind. Over the thousands of years since Pythagoras and Plato, it is reasonable to suspect that there may have been some private Platonists, who might have aspired to be, or to patronize, artists of that kind.

Music is at the heart of this project. The reason why music is so powerful is that it embodies mathematical harmonies and discords in a very pure form. Our feelings, our souls, and our bodies resonate to these harmonies and discords. We do not have to grasp the mathematics of music, explicitly, in order to respond to music, at a physiological level, and at the level of feelings. Indeed it is not a good idea to be thinking all the time about musical theory, when listening to music. Nevertheless it is also possible to appreciate music at the intellectual, as well as the more instinctual, levels of our being. Some people may profit from engaging in some occasional "theory-driven-listening", alongside the more natural, intuitive appreciation of music on most other occasions. In that way, Pythagorean Platonists take many of their lessons from music. One of the lessons they take concerns the inescapability of discords, and indeed the undesirability of a complete elimination of all discords.

We human souls are all part of this one world. It is a wicked conceit, taught in many religions (and, alas, taught even by some misguided Platonists) that we stand somehow, essentially, outside the material world, and that we should try to escape from this world and enter into another plane of existence. No – there is no better world for us to seek, except by improving this one. Or so I firmly presuppose.

Nevertheless, if an artist can embody, in works of art, some of the mathematical harmonies underlying the world around us, then it might be hoped that these works of art could help to bring us back into a closer harmony with this world we live in, and hence into a closer harmony with one another. This would not help us to escape to another world, but it might help to make this world a better one.

Part of the harmony a Pythagorean seeks will be intellectual – the attainment of a knowledge and understanding of the world we live in. Part of that harmony, however, will involve layers of our being other than the intellect. For instance, it will involve an aptness of our feelings towards the world around us – so that not only will we believe what is true, but in addition we will fear what is dangerous, love what is good, admire what is beautiful, and so on. *If only we could achieve all those harmonies*, in both our intellects and our passions – then, it might be hoped, perhaps each of us would attain some sort of "salvation", or "bliss", or "release" – or whatever nameless thing it is that many of us are persistently and achingly yearning for, in both body and soul, during our brief lives on earth.

Optimistic artists might aspire, in some small way, to nudge our souls just a little closer to harmony with the world around us, hoping thereby to play their own small part in the human search for both individual salvation and world peace. Optimistic Platonists might think of mankind as aiming towards an ideal future state of pure harmony, free from all discords. At an individual level, such an optimist will aim for a state of bliss, free from all inner conflicts. At a political level, such an optimist will aim for an Ideal Republic. I am not an optimist of that kind. I think the world will forever contain, of a hard mathematical necessity, discords as well as harmonies. Every time you light a candle, you cast a shadow.

There is, however, another way, a deeper way, of understanding the Pythagorean and Platonic theories. On this rival understanding, it is misguided to aim to achieve a perfect harmony with the world around us. We may aptly aim to achieve a new and better mix of harmonies and discords: but on this understanding of Platonism we should not aim for either personal salvation or world peace – rather, we should aim for, at best, a somewhat richer, imperfect life.

That is the kind of Platonism I would advocate. There are two kinds of Platonism. There is what I call *wrong-headed* Platonism, which is "other-worldly" and aims for human perfectibility, world peace, personal salvation, bliss and perfect harmony. This kind of Platonism might also be called Idealism. But there is also *right-minded* Platonism, which is "this-worldly" and aspires only to nudge us, where possible, towards a somewhat better balance between harmonies and discords. This alternative kind of Platonism might also be called Realism. It is against a presupposed background of right-minded, Realist, this-worldly Platonism that I am urging the study of the Platonic Table.

In the prelude to this book, I have quoted from Shakespeare in introducing the Platonic idea of perfect forms that are embodied imperfectly in material bodies. I hope this reinforces a brand of Platonism that does not seek ideal forms in another world, but rather cherishes the imperfect approximations of these forms that are rooted in the concrete particularities of life within this world. You can catch Platonic echoes in Shakespeare's works; and in his sonnets he sticks remarkably strictly (though not absolutely without exceptions) to a fixed abstract form: yet this did not prevent him from being as this-worldly as any artist you can find.

Mnemonics and numerology

Many people will harbour a natural antipathy to mnemonics and numerology, for many good reasons. When I talk about such things, people regularly respond with a kind of mantra – "But you can fit anything at all into any pattern you choose to name!" I know all too well what they are getting at. This mantra is partly true. Yet it is also partly false. I will say more about it later, after I have given some examples of what Platonic mnemonics involves. But first, hold back any ambient scepticism you may harbour about mnemonics and numerology, until after you have had a taste of the Platonic Table.

My project would be doomed, if you were to think I was urging you to approach all works of art merely by searching for "the" secret, hidden Platonic patterns within them. Right-minded Platonism, however, is the theory that there is no one "right answer"; but rather, that there are many different patterns all overlaid on top of one another – and that there are many, many different ways of responding in harmony with each of these patterns. Consciously delineating Platonic patterns is one thing you could do, but it would be perverse to insist on *everyone* doing this, or even for *anyone* to insist on doing this all the time.

Nevertheless, it is also perverse to insist that no one should *ever* look for Platonic patterns in works of art. There is nothing wrong with some people choosing, on some occasions, to take a work of art as a kind of puzzle, in which it may be possible to find beautiful Platonic patterns. The Platonic patterns are very beautiful, at least to those who are not tone deaf to its abstract harmonies. There is nothing wrong with enhancing your appreciation of its mathematical harmonies, by seeing them as embodied in works of art. It may not be everybody's cup of tea, but those who do not enjoy such pursuits should not think there is anything wrongheaded about those who do. It takes all kinds to make a world.

What applies to the appreciation of works of art also applies to the creation of works of art. There is no one right way for an artist to proceed – no one way in which every artist should go about the business of creating a work of art. It would be a Platonic mistake to say that every artist should take guidance from the Platonic Table.

Furthermore, even if an artist were to take guidance from the Platonic Table, there are two very different ways in which this could be done. One method is, as you might say, intuitive, instinctive, or subliminal – though it is hard to find quite the right words for methods that avoid conscious articulation of either goals or methods. A Pythagorean will assume that the patterns encoded in the Table are, as it says in Plato's *Timaeus*, also written into the deep structures of our souls. As they say, *the microcosm mirrors the macrocosm*. Hence, if artists are lucky, then inspiration will come to them, and something from those deep structures in their souls will find its way, of its own accord – without any need for any conscious control – into their works of art. Indeed, on this Platonic ideology, the original harmonies of the soul have been screwed up by the experiences life throws at you. Hence if you consciously follow any intellectualised planning, then your works of art will almost inevitably be distorted by misguided theories and perverted passions – and will fail to tap into the original, deep structures of your soul. It is only by you tapping into subliminal depths that you can best hope to produce truly original works that really sing to our souls. I think of this as the Bacchic method for artists to use.

However, there is also another path, which might also work – at least sometimes, and for at least for some artists. (I think of this as the method of Apollo, rather than Bacchus.) This other path requires an artist to study the Table, and to study the ways in which other artists may have embodied the harmonies of this Table in their works

of art. There may have been a handful of artists like this, over the course of history. These artists, if there were any, would have imitated the creative activity of the Demiurge, as described in Plato's *Timaeus*, who took deliberate guidance from what Plato calls an "intelligible design", when creating the material world. Some of these may have managed to blend an intellectual guidance with intuitive depths, and produced works of art that embody Platonic patterns, in subtle ways, without being mechanical or didactic.

The intelligent design that guided the Demiurge begins with a patterned arrangement of *seven* seminal numbers. To generate this pattern, we begin with the number 1, and then we double successively to get 2, 4 and 8; and then we triple 1 successively to get 3, 9 and 27. In the "double and triple intervals" between these seven numbers, further numbers are placed as "means". Then each of these numbers is then pared into two parts, thereby creating one string that is destined to form "the circle of the Same", and another that is destined to form "the circle of the Different". The resulting Table contains 37 pairs of numbers, or 74 numbers altogether. It is this array of numbers that, Plato says, guided the Demiurge in the creation of the material world.

Many people, perhaps most, are not in love with numbers. As an array of numbers, therefore, to many people the Platonic Table will look forbidding. For many people, however, it will become easier to absorb if you turn all these numbers into musical notes. If you take each of the Platonic numbers as a measure of the wavelength of a sound wave, then the Platonic Table turns into a picture of musical scales (in the Dorian mode). According to the story, the Demiurge used this musical-mathematical pattern in designing the many overlayed patterns within the material world, both in setting out the courses of the heavenly bodies, and in laying down the courses of the passions within our souls.

Plato's magical lambda

How, then, did the seven initial numbers of the Platonic Table influence the Demiurge in its creative work, according to Plato's *Timaeus*? Here is one vivid example: the Demiurge created seven easily visible, wandering heavenly bodies that move in cycles though the Signs of the Zodiac – namely: the Sun, Mercury and Venus, the Moon, Mars, Jupiter and Saturn.

Furthermore, the division of the numbers into odds and evens corresponds to a significant astronomical division among the seven wandering heavenly bodies, one that was well known in ancient times. According to Plato's *Timaeus* the evens correspond to the Sun, Venus and Mercury, and the "odds" to the Moon, Mars, Jupiter and Saturn.

		1	Saturn
Mercury	2	3	Jupiter
Venus	4	9	Mars
Sun	8	27	Moon

The Sun, Venus and Mercury always travel in one another's company, so that each of these three is frequently in conjunction, and never in opposition, with respect to any of the other members of this trio. That is, you never see Mercury or Venus in the West except when the Sun has just set, and you never see either of them in the East

except just before the sun rises. The *evenness* of these three seminal even numbers mirrors the astronomical and astrological *interdependence* of the motions of the corresponding heavenly bodies.

Furthermore, the relative *magnitudes* of each of the three even numbers, 8, 4, 2, mirrors the relative *brightness* (and size) of the corresponding heavenly bodies: 8 corresponds to the Sun, 4 to Venus and 2 to Mercury.

The other four wandering heavenly bodies are the Moon, Mars, Jupiter and Saturn (*odds*: 27, 9, 3, 1). These four travel independently of the Sun, Venus and Mercury, and independently of each other, so that each of them is sometimes in conjunction, and sometimes in opposition, with respect to each of the others. The *oddness* of these four seminal odd numbers mirrors an astronomical and astrological *independence* of the corresponding heavenly bodies, in their motions through the signs of the Zodiac.

According to Plato's *Timaeus*, this structure in the heavens should be mirrored in the underlying courses within each enlightened, individual soul. Thus, for instance, everyone should have a feminine side, and a masculine side; everyone should have some fire in their nature (some on the surface, some more deeply buried); and so on.

A parallel structure should also be mirrored, Plato says, in the structure of the Ideal Republic. For one example of a way in which the astronomical structure of the seven planets has been mirrored in robust social arrangements, consider the conventional division of time into *seven-day* weeks. Furthermore, in many languages the days of the week are mostly named after the heavenly bodies. There are exceptions: in French Friday is "Vendredi", or "market-day". But in English we have "the Sun's day", "the Moon's day", and so on. Patterns in the Platonic Table map neatly onto corresponding patterns in a number of resilient cultural artefacts. Thus, although there are good reasons for being suspicious of numerological mnemonics, there are also good reasons for making an exception in the case of the Platonic Table.

To persuade readers that the Platonic Table can serve as a remarkable mnemonic, well worth studying, I will begin by illustrating ways in which you could use this Table to memorize a variety of lists of important and interrelated items: Greek gods, for instance, or Celtic heroes, musical modes, and so forth.

For a start, I recommend that you take guidance from tradition, and that you mnemonically associate *even* numbers with *femininity* and *odd* numbers with *masculinity*, thereby establishing a link between the abstract numbers in the Platonic Table, and one of the most fundamental of biological categories – gender. The Pythagoreans said that even numbers are 'female' and odd numbers are 'male'. The Pythagorean notion that one is 'both odd and even' might be taken as meaning either that the number one represents something that is *both* male and female (like a hermaphrodite or homosexual), or else something that is neither male nor female (like a mountain peak, the Holy Grail, or a lighthouse).

Then I recommend that you overlay this biological correspondence with a cross-categorizing correspondence between these numbers and the ancient chemistry of *fire*, *air*, *water* and *earth*, yielding the following pattern:

females		*males*
	fire	1
2	*air*	3
4	*water*	9
8	*earth*	27

The numbers 8 and 27 are, as they say, "cubes", because 8 = (2×2×2) and 27 = (3×3×3). So these numbers 8 and 27 aptly correspond to the element *earth*. In Plato's *Timaeus* there are various ways in which the numbers 4 and 9 ("square" numbers) correspond appropriately to *water*. There are also ways in which in which the numbers 2 and 3 appropriately correspond to *air*, and 1 to *fire*.

Now try to reconcile this assignment of the four elements to the Table, with the earlier Platonic assignment of the planets to this same Table. The numbers 8 and 27 are *earth* numbers, and yet I earlier aligned these numbers with the Sun and Moon. But wouldn't it be odd for Plato to assign the Sun and Moon to *earth* numbers? This anomaly dissolves, however, when you get into the finer details in Plato's scheme. Further down the track, the planets will be re-assigned to numbers that lie in the intervals between the seven numbers on this initial Table. The *earth*-number 27 will then actually correspond to the Earth rather than the Moon. The Moon will still, however, be placed under the governance of the *earth*-number 27, because it will correspond to one of the means between 9 and 27. The Moon's number will then, in fact, be a *water*-number. Likewise the Sun's number will not be the number 8 itself. Nevertheless, the Sun's number will remain under the governance of the *earth*-number 8, because it will correspond to one of the means between 8 and 4, and this will in fact be a *fire*-number. When details fall into place, there are close correspondences between the chemical and astronomical correspondences set up by the Table.

Furthermore, as set out in Plato's *Timaeus*, chemical relationships among the four elements also harmonize well with purely *arithmetical* relationships among the seven numbers on the Table. For example, *fire* will not mix with *water* and so these elements are not placed *next* to one another on the Table, but have another element placed between them. However, these elements can be combined chemically provided the element *air* "mediates" between *fire* and *water*. This chemistry is then mirrored in the arithmetical relations among the corresponding numbers. Chemical affinities of different kinds are aligned with different kinds of numerical means. The Platonic Table is, in fact built around three kinds of numerical means: *geometric*, *arithmetic* and *harmonic* means. These mathematical patterns are aligned with musical harmonies (the geometric means generate musical octaves and the "cycle of fifths"; and the arithmetic and harmonic means divide the octave into fourths and fifths). But these same numerical means are also aligned with chemical affinities.

Thus, for instance, in a chemical compound of *fire-air-water*, the middle term mediates chemically between the extremes. The corresponding number sequences, 1-2-4 or 1-3-9, mirror this pattern of chemical mediation by the construction of numerical means. You double 1 to get 2, and then *double again* to get 4. This entails that 2 is the geometric mean between 1 and 4. Likewise, you triple 1 to get 3, and then *triple again* to get 9: which means that 3 is the geometric mean between 1 and 9. Thus, the pattern of *ratios* among the numbers on the Table mirrors the pattern of chemical affinities among the corresponding elements.

Thus, the Table sets up neat correspondences across the categories of *chemistry*, *biological gender*, and *arithmetic*. If you now memorize some other collection of things by aligning them with the numbers on the Table, you will then automatically align each of these things both with a *gender*, and with a chemical *element*.

To illustrate, imagine aligning the canonical list of Seven Virtues with the numbers in the Platonic Table. Plato gave us four Pagan Virtues, from which descend the canonical list of: Justice, Fortitude, Prudence and Temperance. Christians added to these three more: Faith, Hope and Charity. This is the traditional story of the origin of

the canonical list of Seven Virtues. Align these Virtues with the Platonic Table in the following pattern:

Virtues

females				*males*
		fire	1	Justice
Charity	2	*air*	3	Temperance
Hope	4	*water*	9	Fortitude
Faith	8	*earth*	27	Prudence

Notice that this then links the Christian virtues with the gender of *femininity*, and the Pagan virtues with *masculinity*.

For each of these Virtues there is a corresponding Vice. Hence we get a Table for the Vices:

Vices

females				*males*
		fire	1	Pride
Envy	2	*air*	3	Lust
Avarice	4	*water*	9	Wrath
Sloth	8	*earth*	27	Gluttony

This sets up other associations. For instance, it associates Pride with the element *fire*: and this neatly links both Pride and *fire* with Lucifer, the angel of light, whose pride leads to the Fall which transforms him into Satan.

I recommend associating these same numbers with ancient Greek gods, and with characters from Celtic legends, according to the following patterns:

Greeks

		1	Olympus
Hera	2	3	Zeus
Demeter	4	9	Poseidon
Histia	8	27	Hades

Celts

		1	Holy Grail
Guinevere	2	3	King Arthur
Isolde	4	9	King Marke
Morgan le Fey	8	27	Merlin

Embodied in these Tables, there are multiply-layered correspondences. Females are on the left, males on the right. For the most part, elders are lower down, their juniors are higher up. For instance, it is of crucial importance in several of the Greek myths that Poseidon and Hades are older than Zeus: and so on the above Table they are assigned larger numbers than Zeus.

It is worth checking whether these arrangements of gods and heroes match up in useful ways with the mnemonics, suggested above, for virtues and vices. Some of the correspondences are indeed useful – helping you to recall either of these Tables by recalling its memorable echoes in the other one.

For instance, consider ways in which the above Platonic alignments of the Greek gods harmonize with the above Platonic alignment of the Seven Deadly Sins. In the patterns above, Zeus is aligned with the number 3, and so is the vice of *lust*. This correspondence between these two Tables calls to mind the many, many stories about the amorous exploits of Zeus, and the ways they have led him into conflicts with his wife (and sister) Hera.

An association between Poseidon and *wrath* also calls to mind some of the most memorable stories about the "earth-shaker", as for instance in Homer's *Iliad* and *Odyssey*, and Virgil's *Aeneid*. Poseidon's role in the stories usually features his anger, embodied in storms at sea.

An association between Hera and *envy* also sits well with her role in the central story-lines in Homer and Virgil. Hera loses a beauty contest, because Paris, a Trojan, gives the prize to Aphrodite. In consequence Hera prompts the Greeks to destroy Troy, and then she hounds the Trojan survivors, lead by Aeneas, for year after year, as they flee from their homeland in search of their new home in Rome.

Within ancient Greek myths and legends there are many patterns like these, which match surprisingly neatly against patterns within the Platonic Table. This shows ways in which the Platonic Table could be useful to us. It also suggests ways in which other people, in the past, might conceivably have made use of this Table, or other mnemonic patterns much like it, in creating works of art.

Romance*: *sexual chemistry and emotional harmony

On top of various arithmetical, biological and chemical correspondences, as sketched above, we can also overlay musical correspondences. That is, if you associate, say, ancient Greek gods with numbers on the Platonic Table, then this can not only set up correspondences between these gods and the four elements, but it will also automatically set up correspondences between these gods and musical harmonies and discords. These musical correspondences emerge inevitably, because the various numbers, on the Table, when taken as ratios between wavelengths or frequencies of sounds, will automatically generate musical harmonies and discords.

Pythagorean musical theory identifies a powerful musical harmony corresponding to the ratio of 3 to 2. This harmony is called the musical "fifth". Hence, if we place Zeus and Hera in the way I have done on the Table above, aligning Zeus with the number 3 and Hera with 2, then this will automatically set in place a correspondence between the conjugal relationship between Zeus and Hera, and the musical relationship between notes separated by the interval of a musical fifth. It is then a happy fact that traditional stories do tell us that these two divinities coupled and had children together. There will also be the same harmony between Arthur and Guinevere: and the stories tell us that these two also fell in love and entered into lasting wedlock.

The stories also recount that Zeus fell into harmonies with others, besides Hera: and some of these others stood in discordant relationships with Hera. This, too, will automatically translate into musical relationships, if you map the gods onto the numbers on the Platonic Table. Thus for instance there is a harmony between Zeus and Poseidon, and a discord between Poseidon and Hera. These musical relationships

are powerfully reflected in the dramatic relationships among these three divinities in Homer's *Iliad*, in the Trojan War. If Zeus corresponds to the note A, then Hera will correspond to the note E, and Poseidon to the note D. Zeus's note is then in just as close a harmony with the note for his brother Poseidon as with the note for his wife Hera. But Poseidon's note and Hera's, D and E, are separated by one whole-tone, and they sound discordant when played at the same time.

The numbers on the Table above also entail that there will be no harmony, but a discord, between Poseidon and all three of his sisters, Hera, Histia or Demeter: and there are no memorable ancient stories about any romantic attachments between Poseidon and any of these three. On the contrary, Poseidon married someone of a very much lower rank, a kind of mermaid, called Amphitrite. This is a little like a liaison between a King and a barmaid.

The romantic discord between Poseidon and his sisters, and his tag of "Earth-shaker" resonates well with the fact that his number, 9, and the number 8, for the element *earth*, stand musically in a discord. The note for 9 (D, or *re*) will "shake" the note 8 (E, or *mi*). Discords display what are called "beats". So playing Poseidon's D (9) against Histia's E (8) will produce beats; and this fragment of musical theory resonates very well with Poseidon's tag as "Earth-shaker".

The tag "Earth-shaker" also has a further mnemonic resonance, not of a musical but of a chemical kind, within the sets of associations established in Plato's *Timaeus*. For Pythagoreans, all the various kinds of metals are different species under the genus *water*. In Plato's *Timaeus*, atoms of *water* all share the same shape, and that is the common property in virtue of which they are all brought under the genus *water*. But atoms of *water* may nevertheless differ in size. Because of their shared shape, they all "flow" if warm enough. But because *water*-atoms in the various metals differ in size from those in ice/water, metals will therefore differ from ice/water in many of their other properties. If magma, under the Earths' crust, is seen as predominantly comprising various metals, hence species of *water*, then *water* is indeed an "Earth-shaker".

Thus, it is possible to see a variety of ways in which an artist, in telling stories about these Greek or Celtic characters, could take guidance from many different kinds of correspondences that are set up when you place these characters mnemonically on the Platonic Table.

Seven days of the week

When I begin to talk about these sorts of mnemonic games, people regularly beat me about the head with the following, false mantra, which I call:

> ***The Gorgon's Head*:**
> *"You can fit anything at all into any pattern you choose to name, if you try hard enough."*

In ancient times images of the Gorgon's Head were brandished at curious venturers, to deter them from inquiring into The Mysteries. Nowadays, the platitude about "any pattern you choose" is brandished for a similar purpose, to deter anyone from even beginning on any misconceived "mnemonic pattern-hunts". In general, it is prudent to be wary of "pattern spotters". Nevertheless the Gorgon's Head is simply not true. You

cannot map any mnemonic pattern you like onto any subject matter you choose. Not, at any rate, if you require the mapping to be an elegant and memorable one.

To ward off the paralysis induced by the Gorgon's Gaze, I urge you to wield what we might call:

> ***The Shield of Perseus*:**
> *"You cannot square the circle – no, no matter how hard you try."*

A unit of measurement that exactly measures the circumference of a circle cannot possibly measure exactly the diameter of that circle: and *vice versa*. Likewise in musical theory, a tuning system that works really harmoniously in one respect will unavoidably create discords in other respects. Likewise, in mnemonic investigations: fitting a pattern elegantly in one respect may inevitably create inelegancies in other respects.

On reflection, it is manifestly false that you can fit any pattern you choose to anything you meet. If it were so, then we could never understand anything that any other person was saying to us. Whatever noises they might make with their faces, we could project any interpretation we chose onto those noises, and so they could be "heard as" saying whatever we would like to hear. If it were so, then it would be impossible for anyone ever to break a military code. It would be impossible for anyone ever to decipher hieroglyphics. And it would be impossible for scientists ever to work out the laws of nature: any experimental results at all could be fitted into any proposed laws of nature you may choose to name. It would be possible to reconcile any data whatever with Aristotle's laws of motion, just as easily as with Newton's or Einstein's. This is simply not so. Of course science can be practiced *badly*, and you can con people into thinking that you can fit data into some outdated theory, or mad theory of your own choosing – provided you are willing to lie and cheat, or fall into self-deception. Likewise in mnemonics, it is easy to make mistakes, and it is tempting to cheat. But the fact that such things can be done badly is no reason for giving up on them altogether.

It is simply not true that you can fit anything at all into the Platonic Table *as neatly* as you can fit the ancient Greek gods into the Platonic Table. Take for instance the names of the seven days of the week, in English. There is no truly satisfactory way of mapping the English names of the days of the week onto the Platonic Table.

By mixing the French and the English names of days of the week, I can produce an alignment that comes close to matching Platonic patterns involving the Planets and Greek, Roman, or Nordic gods. Here is the best way I can find to assign the English names of days of the week to positions on the Platonic Table:

		1	"Saturday"
"Friday"	2	3	"Thursday"
"Wednesday"	4	9	"Tuesday"
"Monday"	8	27	"Sunday"

Recall Plato's alignment of the planets with the Table:

		1	Saturn
Mercury	2	3	Jupiter
Venus	4	9	Mars
Sun	8	27	Moon

In order to find correspondence between the English names of days of the week and the Planets, we need to assign each planet to a god or goddess, and then we need to work our way through the names of these divinities in Greek, Roman, or Norse mythology:

		1	Saturn's day
Freya's day (Friday↔Freia↔Venus?)	2	3	Thor's day (Thundergod Thor↔Zeus↔Jupiter?)
French: "Mercredi" (Wednesday↔Wotan↔Mercury?)	4	9	French: "Mardi" (Tuesday↔Tiw↔Mars?)
Moon's day	8	27	Sun's day

This is not entirely satisfying as a mnemonic, even though it is the best I could find. You might almost say it is a dog's breakfast. In the first place, this scheme reverses the positions the Sun and Moon occupy in Plato's scheme; and it also reverses the positions of Mercury and Venus. These are mnemonic blemishes that cannot be mended without creating worse blemishes elsewhere. It is also unsatisfactory having two traditionally feminine figures on the left-hand side of the Table (Freya, and the Moon), but nevertheless having the masculine figure of Mercury/Wotan between them. It would be better if we had masculine figures all on the right, and feminine figures all on the left.

Furthermore, the above Platonic mnemonic for the English names for the days of the week requires some very specific correspondences among planets and Greek, Roman, and Nordic gods, and not all of these correspondences are entirely satisfying. Admittedly, the alignment of the Roman god Mars (and the Greek god Ares) with the Nordic god Tiw is relatively convincing (although even this correspondence is a little unsettling, when you hear that *etymologically* "Tiw" or "Tiu" is linked to the name of the Greek god "Zeus" and "Deus", rather than to "Ares" or "Mercury".) However, some of the other mythological correspondences are less satisfactory than this one.

The alignment of the Roman god Mercury with the Nordic god Wotan is surprising, to say the least. Evidently this mythological correspondence does have some historical support because, during his conquest of Gaul, Julius Caesar picked up the notion that his enemies were using the name "Wotan" to refer to the Roman god Mercury. Nevertheless, despite the prestige of Julius Caesar, this correspondence between Mercury and Wotan is not altogether satisfying.

Furthermore, it is very unsatisfying to replace the Greek divinities Zeus and Hera (or their Roman counterparts Jupiter and Juno) by the Nordic divinities Thor and Freya. It would be much more satisfactory to offer Wotan and his sister-wife Fricka as the natural counterparts for Zeus and his sister-wife Hera. This furnishes yet another reason why the above mnemonic falls short of being as helpful and memorable as might be desired.

You might try rearranging the English names of the days of the week on the Platonic Table, to see if you can find a better mnemonic arrangement. For instance, it would be tempting to try placing "Sunday" (and the Sun) alongside the number 1 at the top of the Table, thus aligning the Sun with the element of *fire*. Yet (trust me)

improvements in one respect are always purchased at the cost of worse blemishes elsewhere.

This demonstrates something of some importance for my Pythagorean project. The English names of the days of the week do not match up with the patterns in the Platonic Table anywhere near as neatly as the Greek gods do. This provides an illustrative counterargument against those who chant the mantra against my Pythagorean project, that "you can fit anything at all into any pattern you choose to name". Yes, you can find *some* pleasing correspondences with any pattern you choose to name, but sometimes achieving a harmonious correspondence of one kind will inescapably create several discords of another kind. It is very rare to find *as many* overlaid harmonies as you can find between the Greek gods and the patterns in the Platonic Table.

Demeter, earth, and water

To further elaborate on the ubiquitous *risk of error* in mnemonics, I will give a cautionary tale concerning two rival theories about where the goddess Demeter "should" be placed on the Platonic Table.

For many years, I used a mnemonic that aligned Demeter with the number 8 and Histia with the number 4. For years, I felt completely comfortable with that mnemonic. There were many apt harmonies that reinforced me in my conviction that I had "got it right". Yet eventually I came to think that by reversing these numerical correspondences, I could obtain a much "better" mnemonic.

I now align Histia with the number 8, and Demeter with the number 4. Yet how could I know whether this is "the right" alignment for these goddesses? Why should I not, say, continue with my former alignment of Histia with the number 4, and Demeter with the number 8? Does it matter?

"Histia" is often rendered "Hestia", and she was attended by the "Vestal virgins" of the Roman Empire. In ancient Greek mythology, there are few memorable myths starring Histia. Her younger sister Demeter is better known.

For a long time, I thought that Demeter must have been traditionally associated with the element *earth*, so I worked with a pattern in which Demeter alongside the number 8. For many years I found this mnemonic extremely satisfying. On deeper reflection, however, I have decided that it is better to associate Demeter with the number 4, and hence with the element *water*.

Why did I initially associate Demeter with *earth*? There are very memorable stories about a conflict between Demeter and Hades. Hence, for a long time it seemed to me to be apt to place these two divinities alongside each other on the Table. Clearly Hades is to be associated with *earth*. So placing Demeter alongside Hades would thereby associate Demeter with *earth*. And stories about Demeter often did evoke memorable images associated with *earth* (it is said that she lay with Iason in a "thrice-plowed field", for example). In many respects this mnemonic arrangement worked out very well indeed. I became so used to it that I found myself very reluctant even to experiment with any alternatives.

Nevertheless, one day I noticed that some of the earliest and most authentic ancient Greek myths do clearly say that Histia was born before Demeter. To keep in step with other patterns on the Table above, therefore, this should lead us to expect Histia to be associated with the larger number 8, and her younger sister Demeter to be associated with the smaller number 4. Hence it is worth at least experimenting with an

alternative mnemonic scheme in which Histia is associated with *earth*, and Demeter with *water*.

When you do try this rearrangement, it is natural then to place more weight on the fact that Histia is traditionally associated with the *hearth*, which calls to mind either *fire* or *earth* rather than *water*, and so in at least this respect Histia might rest more comfortably, as it were, if she were placed in association with the "cubic" number 8 and the element *earth*. But if we move Histia to the number 8, we will have to move Demeter to the number 4. That will change the chemical associations for Demeter, so that now she will correspond to the element *water*.

Under this new arrangement, it is then natural to rethink one of the most salient of the stories about Demeter and Hades. The daughter of Demeter was abducted by Hades, and taken to the underworld. Demeter grieved for her daughter and vowed that, until her daughter was returned to her, no plants would grow upon the earth. This caused a cosmic crisis and Zeus was asked to intervene. Yet there were limits on what Zeus could demand of his elder brother, Hades. Eventually a compromise was reached, in which Demeter's daughter spends the winter in the underworld. While her daughter is in the underworld, Demeter permits nothing to grow upon the earth; but every spring her daughter returns and then plants begin to grow again upon the earth.

This story works well if you think of both Hades and Demeter as associated with the element *earth*; but perhaps it works even better if you think of Demeter as associated primarily with *water* – and only secondarily with *earth* (because water flows down into the earth).

Turn now from the Greeks to the Romans. I worked out the above mnemonics when relying entirely on Greek sources. I had not read Roman writers like Virgil, Horace, or Ovid. But eventually I got around to reading Ovid's *Metamorphoses*. I found that, in at least some of the Roman versions of the story of Demeter, we find reinforcement of the mnemonic association between Demeter and the element *water*, rather than *earth*.

Ovid's *Metamorphoses* retells the story of Demeter, with Demeter renamed. In the earliest English translation, by Golding, she is called "Dame *Ceres*", or "Dame *Cyan*". In Book V, line 529, we find that she was "sore to heart" – not only at the ravishment of her daughter *Proserpine* "against hir will", but also for a second reason. She was also grieved at an act showing "contempt against her fountains priviledge". Indeed, as Ovid tells the story, she seems to be at least as aggrieved over the fountain as over the abduction of her daughter.

When *Dis* (aka Hades) abducted her daughter *Proserpine*, he destroyed a holy fountain and pool with his mace, thereby creating a cavern through which he drove his chariot down to the underworld. Dame *Ceres* was deeply aggrieved at this destruction of her holy fountain. Hence for Ovid Dame *Ceres* is associated with a fountain: and this is a salient water-association that I had not expected, from my limited acquaintance with ancient Greek sources of the legend. Furthermore, in her grief, according to Ovid, we find her "melting into tears" and turning *entirely* to water – after which, she sets out searching over all the earth to find her daughter. This Roman text thus further encourages me in my earlier suspicions, from Greek sources, that perhaps Demeter should be associated primarily with *water*, rather than *earth*.

Hence, in the Table above I have associated Demeter with *water* and with the number 4, and Histia with *earth* and the number 8. And yet – my previous mnemonic was very effective in many ways. It many not harmonize well with Ovid, but it might harmonize well with some other ancient authors: maybe Virgil for instance? Or Horace? (After all, the ancients might not have agreed among themselves, on all such

details.) I emphasize that you should not think that there is one right answer in these mnemonic games.

There are several morals to be drawn from this short exploration of two rival mnemonics for Demeter and her sister Histia. One moral is, that it is easy to make mistakes (though "mistakes" is not quite the right word). But another is, that some of these mistakes can be well worth making. An imperfect mnemonic can be much better than no mnemonic at all. In fact, all mnemonics will probably be imperfect. Even though some patterns will be much better, overall, than others, each pattern is interesting in its own right. It may be worth learning several alternatives, utilizing different patterns for different purposes. To fix this in mind, it is good to remember the analogous case of tuning systems in music, from which Pythagoreans draw so much of their inspiration. Different tuning systems, and different modes or keys, are all worth learning. It is a mistake to think that there must be just one that is best, discarding all the rest.

A moving image of eternity

The motions of the heavens, however, do not *always*, or *exactly*, match the simplest and most salient patterns on the Platonic Table. For instance, cycles of the Moon would match salient mathematical patterns in the Table extremely neatly, memorably, and precisely if each cycle were to take *exactly* 28 days. Years would match the Table more precisely if they were to take exactly thirteen 28-day months (which would add up to 364 days). Alternatively, astronomical observations would pan out neatly if each year lasted for precisely twelve 30-day months. Yet lunar cycles take somewhere between 29 and 30 days, and the number of days in a year is 365 plus an awkward fraction.

Plato gives a deep reason why patterns in the material world will match patterns in the Table approximately, but only approximately – and never exactly (or hardly ever). Matter, Plato says, resists the imposition of perfect mathematical forms. A string of finitely many atoms, for instance, can never mark out a mathematically perfect circle in such a way as to distinguish it from the vertices of a many-sided polygon. And that is why, although the material world echoes the intellectual patterns that guided the Demiurge during the process of creation, it echoes those patterns only approximately and never exactly.

Artists should imitate the Demiurge – and so, an artist should always be mindful of the need to respect the integrity of the materials with which he or she is working. Works of art should not embody simplistic mathematical patterns with mechanical exactness: things should be "smudged" – like lunar cycles of *just over* 29 days overlaid on solar cycles of *just over* 365 days.

For that reason, I predict that if artists like Raphael and Michelangelo, Thomas Malory, Wagner, and so on, were to have been secret Platonists (as I believe they were), then there would be hidden patterns in their works – but, if they were doing their job properly, these patterns would correspond only approximately, and never exactly, to some of the patterns that are embedded within the Platonic Table. Artists should respect the integrity of the materials they are working with, and this often entails subtle deviations from ideal mathematical forms. As Iris Murdoch says, where there's people, there's mess. This almost inevitably entails that there can never be any conclusive proof that my theory is right – or conclusive proof that it is wrong. But do not despair. Truth is over-rated, and probability is the guide of life.

I propose this investigation of the Platonic Table for three related purposes. I intend to provide evidence for a speculative historical hypothesis concerning the development of the arts and sciences: the hypothesis that a handful of artists, over the centuries, may have taken guidance from the Platonic Table in at least some of their creative works. Although this theory can never be proved with certainty, I think its probability can be ratcheted up until it comes to be as likely a story as a great many of the historical narratives we all take for granted, without question.

Along with that speculative contribution to history, this investigation of mine is intended to deepen our appreciation of a number of selected works of art, all of which embody salient patterns that are also embedded in the Platonic Table. And in addition to all that, this theory of mine is also intended to help people to appreciate the Platonic Table, the Model that guided Plato's Demiurge, as a work of art in its own right.

This third purpose is the one nearest to my heart. The aesthetic appreciation of the Platonic, abstract object I am describing, when you see it from the right angle, and under the right light, is a breathtaking experience, which rivals those which sometimes can be achieved when attentively surveying Michelangelo's *Last Judgment*, or listening to Wagner's *Tristan and Isolde*, or reading Homer's *Iliad* – or when resting on a grassy terrace and watching a llama as she grazes along a high ridge, periodically gazing out over the dumb stones at Machu Picchu.

Light fires (fire lights)

O
to say
what bloodoath
silenced: &
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up
!

CHAPTER 1:

Raphael's painting of Plato pointing upwards

Over the centuries, a handful of artists have imitated Plato's Demiurge, and created works of art while taking guidance from the Table described in Plato's *Timaeus*. Or so I say. It seems very unlikely that I would be the very first person, in over two thousand years, ever to have thought of "imitating Plato's Demiurge". Yet if there were a handful of such artists, who were they? And how might the Platonic Table have influenced their creative works? If we are to look for signs of Platonic patterns in works of art, what should we be looking for?

To prepare ourselves for such a search we need to begin by searching for possible ways in which we could at least *imagine* an artist taking guidance from this Table. How could we imagine someone taking guidance from this Table in the composition of music? or in the writing of a narrative? or in the painting of a picture? To explore an example of Platonic patterns in music I will investigate Richard Wagner's memorable *leitmotiv* of "the ride of the Valkyries"; to take an example from narratives I will investigate the legends of King Arthur as retold by Sir Thomas Malory; and to take an example from the visual arts I will investigate the Renaissance Italian painter Raphael. I will run through these case studies in reverse order.

If you were to set out to produce a painting, under the guidance of the Platonic Table, what might you do? There are various and subtle ways in which you could embody Platonic patterns in a painting, but here is one relatively flat-footed strategy

that you might use. For each *number* on the Table, you could place a corresponding *person* in your painting. You could then try to ensure that arithmetical relationships among the numbers correspond to visual relationships among the images of the corresponding people. For example, you might assign larger numbers to older people. Or: you might assign even numbers to females, odd numbers to males. Or there might be some other correspondences that could serve your purposes. And you might also try to ensure that various other Platonic correspondences for these numbers are also echoed, in some way or other, in your painting. For instance, you might ensure that numbers corresponding to *earth*, on the Table, would correspond to people who are somehow portrayed as "earthy", in your painting. You might therefore paint person corresponding to an "earthy" number as (say) leaning on a block of marble.

Has anyone ever painted a picture in this way, taking guidance from the Platonic Table in this fairly flatfooted way, by painting one person for each number on the Table? Yes, I think Raphael did exactly this, in at least one group of famous frescoes he painted in the Vatican, during the Italian Renaissance.

The Platonic Table begins with seven numbers. These seven numbers are used to generate the division of the musical scale into the seven notes of the *sol-fa*, Pythagorean division of the octave, and to explain the division of the heavens into the seven spheres for the seven planets. If Raphael were taking guidance from this Table, one of the sorts of things you might expect to find in his paintings might be *groupings of sevens*. Take for instance Raphael's paintings in the *Stanza della Segnatura*.

One of these paintings is known as *The School of Athens*. This painting features a gathering of fifty-six ancient philosophers. Plato is at the visual hub of the entire painting, and we know this is Plato because he is holding a copy of the *Timaeus*: you can see "TIMEO" written on its spine. The painting also features Pythagoras, who is looking at a slate, and on that slate you can see the key numbers that generate the Pythagorean theory of the musical harmonies. This slate distils some of the details in one of the key passages in Plato's *Timaeus*.

For these reasons you might be led to expect that, if any paintings in history have ever been constructed under guidance from the Platonic Table, then *The School of Athens* is surely a prime candidate. Does a closer look reveal any signs of that kind of guidance? For instance, does this painting feature significant groupings of *sevens* within it? And is it possible to identify *one* philosopher in the painting corresponding to each *number* on the Platonic Table?

The patterns in the painting are suggestive of some sort of Platonic influence. The total number of figures in the painting, 56, is a multiple of 7. These then fall naturally into two groups, with twenty-eight in one group and twenty-eight in the other. (I use Arabic numerals for vividness, when these numbers are especially pertinent to the overall line of argument; but sometimes I revert to referring to the numbers in words, because if I use numerals too often the visual effect turns out to be confusing.)

Furthermore, salient multiples of *sevens* can also be found in other paintings in the *Stanza della Segnatura*. The painting of ancient Greek philosophers in *The School of Athens* stands alongside a painting of 28 poets in *Parnassus*; and these are grouped into fourteen on the left and fourteen on the right. These two paintings are also accompanied by a painting called the *Disputation*, which features a group of seven figures floating high in the air (God and six angels). Below this, there are fifty-six human beings (not counting Jesus, who is really identical with the God we have already counted, above). The human figures divide into two groups. Floating in the clouds there are seven Saints to the left of Jesus, and seven to his right. And on the ground below them, at the bottom of the painting, there are forty-two illustrious

figures from the history of Christianity. The total number of salient figures in the painting is probably 63 (depending on how you count them, and provided for instance that you count the Father, Son and Holy Ghost as *one*). Thus there are many groupings of *sevens* or multiples of seven in these paintings, and this does harmonize well with the notion that they may have been planned with some guidance from the Platonic Table.

The presence of Plato's *Timaeus* itself within *The School of Athens*, along with quite a few salient groupings into multiples of *sevens*, does furnish some at least moderate support the possibility that Raphael might have been taking guidance from the Platonic Table. Yet there is a problem. On my interpretation of Plato's *Timaeus*, the Platonic Table contains 74 numbers altogether. This does not match the number of philosophers within *The School of Athens* – which is just 56. Nor does it match the twenty-eight poets in *Parnassus*, or the sixty-three figures in the *Disputation*. So this evidence moderately undermines the theory that Raphael was taking guidance from the Platonic Table of seventy-four numbers, when painting *The School of Athens*. If he were painting one philosopher for each of the numbers on the Platonic Table, then surely he would have painted seventy-four philosophers altogether in *The School of Athens*, not fifty-six, wouldn't he?

One possible conclusion to draw might be that my Platonic theories are on the wrong track. It is possible that Raphael did not take any guidance from the Platonic Table after all. It is perfectly possible that there happen to be many groupings in multiples of seven just by chance, or for some reason that has no connection with the Platonic Table. Groupings of sevens might have seemed to support the theory for a time, but then when we look at total numbers of figures in Raphael's paintings, this initial theory is decisively refuted.

However, there are also other possibilities worth considering. For instance, it is possible that I have misinterpreted Plato's *Timaeus*. On my understanding of Plato's *Timaeus* the Platonic Table contains 74 numbers altogether. But it is possible that I have misinterpreted Plato's text. Before I arrived at my understanding of the Platonic Table, I made a series of wrong guesses and ventured up a number of alleyways, which eventually turned out, in my own estimation, to be dead-ends. But there were two of these rival interpretations of the Table that are especially neat, and that sometimes turn out to be mnemonically very useful, for various different purposes, as *supplements* to the Table that I think falls out as the best interpretation. One of these supplementary interpretations expands the Table, so that it comprises 146 numbers altogether. The other interpretation trims the Table down to a smaller pattern, which contains only 56 numbers altogether. The details will emerge later.

For reasons that emerge later, we might aptly think of the smallest of these three Platonic patterns (comprising fifty-six numbers altogether) as a *Purist Pythagorean* Table. It is a "minimalist" Table, excluding "impurities". It is a cut-down version of what I will call the *Exoteric* Table (which comprises seventy-four numbers altogether). And I will call the larger pattern (comprising one hundred and forty-six numbers altogether) the *Esoteric* Table.

The number of numbers in the smallest, Purist Pythagorean Table exactly matches the number of philosophers in *The School of Athens*. So it is worth exploring this mnemonic pattern further. However, when we view this painting in its context, we find that the fifty-six philosophers in *The School of Athens* also fit into a larger pattern within the whole of the *Stanza della Segnatura*. This larger pattern contains one hundred and forty-six historical figures altogether (plus or minus one or two). This larger visual pattern within the paintings in the *Stanza della Segnatura* will map

extremely neatly onto the Esoteric Platonic Table. When we take this wider view, it becomes apparent that Raphael might very well have been taking guidance from the Esoteric Platonic Table, when painting these frescoes in the Vatican.

A Tale of Three Tables

Let us explore the Exoteric Table and the Esoteric Platonic Tables further. The Exoteric Table is the one explicitly described in Plato's *Timaeus*. It is built around seven initial numbers:

	fire	1
2	*air*	3
4	*water*	9
8	*earth*	27

Further numbers are placed as "means" in the "double and triple intervals" of this Table. These further numbers effectively fill in musical scales, and the result depicts the core of ancient Pythagorean musical theory. This entire Exoteric Table contains 74 numbers altogether, on my interpretation of Plato's *Timaeus*, as we shall see later in this book.

There is a mismatch between the 56 figures in *The School of Athens*, and 74 numbers on my version of the Table. However, other Platonists have advanced other interpretations of the *Timaeus*. Here is how one of those rival interpretations arises. In my preferred interpretation there are some numbers occurring on the left-hand side of the Table, which are simply *repeated* on the right-hand side of the Table. Thus, for instance, there is a number 2 on the left-hand side of the Table. But when we fill in the Platonic "means" between 1 and 3, on the right-hand side of the Table, one of the first means we place in this gap is called the arithmetic mean (or "average") – and the arithmetic mean between 1 and 3 is 2. Hence although the number 2 already occurs on the left-hand side of the Table, this very same number also turns up again on the right-hand side of the Table. Many philosophers (including me) might well be happy with this, because we could think of the same number as being clothed in different *material embodiments*. Likewise, we could think of the same musical note as being played on different instruments. But Pythagorean purists held that "*all is number*", and in their search for purity they would eschew the body. Hence they would bridle at any scheme which tries to draw any kind of distinction between one "2" on the left of the Table, and another "2" on the right. A 2 is a 2. So on one plausible, purist interpretation of the cryptic text of Plato's *Timaeus*, some might well wish to *delete repetitions*.

The ancient Platonic commentator Proclus, for instance, notes that one of his predecessors, Adrastus, "who is a lover of the arts", preferred to display the Platonic numbers in the form of a "lambda": but Proclus himself takes another path and proceeds to "delete repetitions", and to re-align the Platonic numbers into a linear sequence, like a single musical scale without repetitions. So we should check whether Raphael might have taken guidance from the Purist Table, rather than from the Exoteric Table.

In shifting from one Table to another like this, I am not "cheating". This is not an arbitrary, *ad hoc* manoeuvre. Begin with the theory that some artists may have taken guidance from the Platonic Table – meaning by this the "74-Table", which I have called the Exoteric Table. Under any careful appraisal of this theory, one would be led

to predict that, if any artists in history ever did take guidance from this Table, then there would very likely have been at least some other artists who interpreted Plato in the way Proclus did, and who took guidance from the Purist Table, rather than the Exoteric Table. So it follows from our initial theory that we need to check whether Raphael might have taken guidance from the Purist Table, rather than the Exoteric Table. I am not just grasping at straws, trying to save my initial theory by cooking up some *ad hoc* revisions tailored specifically to the need to save my theory from a particular problem.

When you check the details (as we shall see later in this book), you will find that, of the 74 numbers on the Table as I have laid it out in the form of a "lambda", there are exactly 18 on the right-hand side that simply repeat numbers which are also found on the left-hand side of the Table.

If you follow the ancient commentator Proclus, therefore, you will conclude that the total number of numbers on the Platonic Table will be (74 – 18), which equals 56. If Raphael were taking guidance from the Platonic Table, he is fairly likely to have taken guidance from the interpretation of Proclus, rather than from Adrastus and the interpretation I prefer. The Platonic commentaries by Proclus were very influential. Even if Raphael did not read Proclus himself, he may have been influenced indirectly by those who did.

Thus the number of people depicted in *The School of Athens* does match, very precisely, the number of numbers on the Purist Pythagorean's Platonic Table. I think it is possible, even quite likely, that Raphael and his minders noticed that *The School of Athens* could be aligned with this Purist Table in this manner. This would furnish one interpretation of this painting. And I think this interpretation is not to be sneezed at. It is *one* good mnemonic reading of the painting. But I have come to think it is not the only one, or the best.

On deeper reflection on the entire *Stanza della Segnatura*, I have come to the conclusion that Raphael and his minders were probably also aware of a deeper pattern, which we might think of as an "esoteric interpretation" of the painting. Just as the *Stanza della Segnatura* has *The School of Athens* embedded within it, so too the Esoteric Platonic Table has the Exoteric Platonic Table embedded within it (and the Purist Table embedded within that).

The Esoteric Table begins with a backbone that looks like this:

	fire	1	E
2	*air*	3	A
4	*water*	9	D
8	*earth*	27	G
16	*water*	81	C
32	*air*	243	F
64	*fire*	729	B-flat

In this Table, there is an *underworld* – a Dark Side – which lies beneath the *earth*, and which provides a kind of mirror-image of the world above. Musically, the right-hand column of this Table completes what is known as the "cycle of fifths" – and the seven numbers down the right-hand side catalogue the seven notes in the Pythagorean *sol-fa* division of the octave. I have included these notes, in the order generated by the "cycle of fifths", within the above sketch of the Table.

In shifting ground like this, from the Exoteric and the Purist Tables to yet a *third* Platonic Table, I am not "cheating". This is not an arbitrary, *ad hoc* manoeuvre. Begin

with the theory that some artists may have taken guidance from the Platonic Table – meaning by this the "74-Table", which I have called the Exoteric Table. Under any careful appraisal of this theory, one would be led to predict that, if any artists in history ever did take guidance from this Table, then there would very likely have been at least some other artists who took guidance from the Purist Table, rather than the Exoteric Table – *and* there would just as likely have been at least some other artists who took guidance from the Esoteric Table instead of either of the other two. So it follows from our initial theory that we need to check whether Raphael might have taken guidance from the Esoteric Table, rather than (or in addition to) either the Exoteric or the Purist Tables.

The Gorgon's Head rises up again, in the wake of this introduction of a *third* Platonic Table that might or might not have guided Raphael in the planning of the paintings in the *Stanza della Segnatura*. "Surely", you might protest, "it will be no surprise if Raphael's paintings can be mapped onto *one or another* of *three* possible Platonic Tables! Surely just about *anything* could be mapped onto one or other of these *three* patterns, if you try hard enough!" Yet this is simply not true. It is rare to find patterns that map onto any of these three Tables as neatly as do the visual patterns in Raphael's *Stanza della Segnatura*. The devil is in the details. I urge sceptical readers to be sceptical of their scepticism, and to follow through with some of the details to follow.

To complete this Table, each of the thirteen numbers on the Table above have to be divided into two parts; and further numbers also have to be inserted as "means" within the "double and triple intervals" of this Table. When we fill in the numerical means within the double and triple intervals, we obtain a Table that comprises 146 numbers altogether. (Trust me for the present: the details will emerge later.)

On this Esoteric Platonic Table, the fifty-six philosophers in *The School of Athens* fit neatly into just the first four "octaves" down the left-hand column. The poets of *Parnassus* then fit neatly into the last two "octaves" at the bottom of the left-hand column. And the Christians in the *Disputation* then neatly fill the right-hand side. This Esoteric Table then fits the iconography in Raphael's entire *Stanza della Segnatura* very snugly indeed, as we shall see.

Standing in the middle of the Stanza della Segnatura

As you stand facing the 56 philosophers in *The School of Athens*, you will find, on the wall to your left, a painting of Apollo, and Homer, Sappho, and the poets on *Mount Parnassus*, 28 poets altogether. On the wall to your right, you will find *Jurisprudence*, depicting great legislators in history. And behind you will be a painting often called the *Disputation*. Altogether there are 63 or 64 figures in the *Disputation* – depending on how you count them.

I suggest that the numbers of figures in each of these paintings is significant. We will return to these numbers shortly. But first, we should note that there are many other layers of signification that are at work, within the images in this room in the Vatican. One of the most important messages conveyed by the iconography in this room is that much of the ancient wisdom of Plato, Aristotle, and the Greeks, has been absorbed into the Christian world.

As you stand looking at *The School of Athens*, it appears as though Plato and Aristotle are walking towards you, deep in conversation. If they keep walking towards you, it appears as if they will come out of the painting and join you in the room in the

Vatican where you are standing. Raphael is bringing ancient Pagan wisdom into Christendom. It is of considerable historical importance that figures like Raphael portrayed pre-Christian thinkers with the degree of respect that is so very apparent in *The School of Athens*.

If you then turn around and look at the painting on the other wall, towards which Plato and Aristotle are walking, you will find that many of the figures there are turning their attention away from you, and looking and pointing towards the figures of God, Jesus, angels and saints, who are floating in the sky beyond. Thus, Raphael's overall narrative in this *Stanza* brings the Greeks into the room, where they join with us and then we will all progress together, out of the Pagan past and towards a future Christian salvation.

Under this overarching iconographic narrative, there are two walls that *mediate* between the past Pagan world of *The School of Athens*, and the Christian present and future salvation in the *Disputation*. These mediating walls present two very different ways in which Christian Europe has been indebted to the ancient Greeks. One deep debt lay in the Arts; another lay in the Law.

On one of these mediating walls, connecting the Pagan *School of Athens* to the Christian *Disputation*, we find poets assembled on Mount *Parnassus*. These poets are clustered around the Pagan god Apollo and the nine Muses. This image provides one significant link between the Pagan past and the Christian future.

The theme for this wall, picturing *Parnassus*, which lies to the left of *The School of Athens*, is intricately linked to the imagery we find on left-hand side of *The School of Athens*. On the left-hand side of *The School of Athens* ("our" left, as we face the painting), we find Plato, holding a copy of his dialogue, the *Timaeus*. We also find Pythagoras on this left-hand side, attending to a slate on which there are numerals, like "VI" and "XII", and musical terms, like the Greek lettering for "DIAPAISON" (which refers to the musical *octave*). This slate, in front of Pythagoras, contains a condensed summary of the Pythagorean theory of musical harmonies. Thus for instance, if the numbers "VI" and "XII" measure the *wavelengths* of two sounds, then those two sounds are separated by the musical interval of an octave. Overlooking Plato and Pythagoras is a statue of naked Apollo with his lyre. Furthermore, above the left-hand side of *The School of Athens*, on a rondel covering the corner where the walls and ceiling meet, there is a representation of the Muse Urania, and astrological star-signs. This rondel mediates between the wall with *The School of Athens* and the wall with *Parnassus*.

On the wall facing the poets of *Parnassus*, we find a representation of Christian *Jurisprudence*. This wall depicts Christian lawgivers who formulated both civil and ecclesiastical legislation. On this side of the room, there is a window dividing the wall into two separate panels. On the portion of the wall to the left of the window, next to *The School of Athens*, we find a depiction of illustrious Christian legislators of Civil Law; and we find illustrious legislators of Ecclesiastical Law on the portion of the wall to the right of the window.

The images on the wall representing *Jurisprudence* are thematically linked with the right-hand side of *The School of Athens*. Close to Plato's left hand we find Aristotle, holding a copy of his book on *Nichomachian Ethics*. Overlooking the philosophers on this side of the image we find a statue of clothed Athene with her shield. And on a rondel, covering the corner where walls and ceiling meet, there is a representation of *The Judgment of Solomon*. Manifestly, Aristotle's *Ethics*, Athene, and the Judgment of Solomon, are all thematically linked with *Jurisprudence* much more closely than they are with the themes on the opposite wall, depicting the poets of *Parnassus*.

Raphael's knowledge of Plato's Timaeus

It could be objected that the mere existence of *sevens* in *The School of Athens* does not establish that the creator of this work took any guidance from the patterns described in Plato's *Timaeus*. If Raphael were like most of the rest of us, he would not know, and would care less, about Plato's *Timaeus*. Furthermore, there are plenty of other, much less arcane, sources from which he could have derived salient patterns of *sevens*. Or else of course these patterns could have arisen subliminally, without any need for conscious forethought.

Yet in the case of Raphael's *The School of Athens*, it is apparent even within the work itself that the artist who created it was mindful of the historical importance of Plato's *Timaeus*. Manifestly, Raphael not only knew about this Platonic dialogue, he also thought about it at the very same time that he was creating this very work of art. Hence it is much less improbable for this work, which actually depicts Plato's *Timaeus*, than it is for other works by other artists, that the artist who created it took guidance from the very same abstract pattern that is said there to have guided the Demiurge during the creation of the heavens and the earth and the deep structures in the human soul.

There is unlikely ever to be any conclusive evidence that Raphael ever read Plato's *Timaeus* – and, if he did, it will always be uncertain how much he would have understood. There is a range of bookish skills that do not always correlate closely with the kind of visual, artistic talent that Raphael was cultivating. Nevertheless, in the case of Raphael it is worth being mindful of the possibility, voiced by several scholars in art history, that at least some of Raphael's paintings were planned under fairly close guidance from some of the very bookish scholars at the Vatican.

For instance, Raphael painted a magnificent portrait of one of these scholars: Cardinal Tommaso ("Fedra") Inghirami. Clearly Raphael had personal contact with Inghirami, who was deeply versed in Platonic texts. Another possible influence on Raphael might have come from Cardinal Egidio da Viterbo (Giles of Viterbo). Pope Julius, too, might have made suggestions to Raphael about such things as the overall numbers of figures to be placed in the paintings.

It is hard to be certain about the kind of guidance Raphael might have received from the Pope Julius himself, or Egidio, or Inghirami. There is no known written program setting out Raphael's commission; but this is to be expected for Renaissance commissions to artists. An exhaustive search by Creighton-Gilbert (1991) turned up only six written programs for artists working under commission in the Renaissance. It appears that any guidance the Vatican gave to Raphael was verbal, and the details will be forever uncertain.

Nevertheless, it is worth keeping in mind the possibility that Raphael might have received guidance from scholars like Inghirami and Egidio. Egidio, in particular, wrote a lot about Platonic, numerological and other mnemonic patterns, in an unpublished work "Sententiae ad mentem Platonis", preserved in the Vatican Library. It is possible that Raphael might have taken guidance from someone like this who, in turn, may well have taken guidance from Plato's *Timaeus*, even if Raphael had not studied Plato's text in detail for himself.

Patterns in The School of Athens

At the visual hub of *The School of Athens* is a figure that is widely taken to be a portrait of Leonardo da Vinci in old age. This portrait of Leonardo, if that is what it is, also clearly represents the ancient Athenian philosopher Plato, because he is holding a book with the letters TIMEO written on the spine. In Latin, "Timeo" means "I fear": but in this context it is clear that this book is Plato's dialogue, the *Timaeus*.

The philosophers in *The School of Athens* fall into two chains. There are 28 (=7×4) in a right-hand chain — starting with the Leonardo-Plato-figure at the top, moving from there to an image of Aristotle, who is gesturing downwards towards the other figures on the right-hand side of the painting, who straggle in a loose chain down the right-hand side of the painting, ending with a "beggarly" figure representing the cynic, Diogenes, sprawled on the steps in front of Plato and Aristotle. This first chain contains, I say:

firstly, seven philosophers corresponding to *fire*;
secondly, seven corresponding to *air*;
thirdly, seven corresponding to *water*;
fourthly, seven corresponding to *earth*.

The figures at the bottom of the painting, near Diogenes, just right of centre, are working on *geometry*, which stands in an appropriately natural association with the element *earth*.

Following on from this chain there are another 28 (=7×4) philosophers in another chain that starts with a figure resembling one of Raphael's colleagues, the sculptor Michelangelo, who is leaning on a block of marble at the bottom of the painting, just left of centre. This chain of figures runs back up the left-hand side of the painting, until it completes a cycle by returning again to the Leonardo figure at the top. This second chain contains:

and lastly, seven corresponding to *fire* (and *light* and *enlightenment*).
seventhly, seven corresponding to *air*;
sixthly, seven corresponding to *water*;
fifthly, seven philosophers corresponding to *earth*;

The figures in the painting are jumbled in fairly natural groupings, and not mechanically lined up in eight obvious groups with seven in each group. Nevertheless, the more you study the painting, the more natural it becomes to see it as an approximation towards a sequence of 56, divided into eight groups of seven.

Adding up to 146

As you face this cycle of 56 Pagan philosophers in *The School of Athens* on one wall of the room, there is a painting immediately behind you, on the opposite wall, which is sometimes called the *Disputation*. There are 63 Christian figures in this painting . These are grouped into *seven* above Christ, *seven* to his left, *seven* to his right, and 42 (=7×6) on the ground below*.

(**Or are there really 43 in the bottom grouping? – there is one extra, shadowy figure at the bottom right, who will not fit comfortably into the otherwise rigorous pattern of multiples of seven.***)

(***So does the existence of this shadowy 43rd figure refute my theories? Perhaps; but I am not convinced that it does.*)

Now turn your mind away from the *Disputation*, which is on the wall behind you; and turn your eyes away from *The School of Athens*, which is on the wall in front of you, and look over your left shoulder to the *Parnassus* on the wall beside you. This painting features 28 (= 7×4), some being poets and others Muses: with 14 (= 7×2) in one chain, which begins with Apollo at the top and runs down on the right-hand side of the painting. There are various subtle gestures and other visual devices that lead the attention, from Apollo, *downwards* on the right-hand side, in the first half of a *clockwise* cycle. Then there are 14 (=7×2) in another chain that begins with Sappho at the bottom centre, below Apollo, and runs up the left-hand side of the painting, completing a cycle that leads back to Apollo again at the top.

Now add up the total number of figures on the three walls, including *The School of Athens*, *Parnassus* and *The Disputation*. The total number is 56 + 28 + 63 = 147. This is almost exactly the number of numbers on the "full Platonic Table", which will be introduced a little later in the book. The full Platonic Table contains 146 numbers altogether.

You cannot perfectly map Raphael's 147 painted figures onto the Platonic Table's 146 numbers – not without some sort of "smudging". Raphael might for instance be imagined to have tried to brought the numbers into alignment by ensuring that the figures painted on the walls include *one repetition*. And indeed there is one very salient repetition, since the poet Dante is clearly identifiable not only in the *Parnassus* but also in the *Disputation*. In fact, Dante is the only figure to appear twice in this room. Thus, there are 147 painted figures, but they represent altogether just 146 people. Thus, although the 147 figures painted on the three walls do not map "perfectly", nevertheless they do map very neatly, onto the 146 numbers on the Platonic Table.

This completes an initial search for Platonic patterns in Raphael's *Stanza della Segnatura*. Later in the book I will return to this room in the Vatican, to examine it still more closely. But for the present, I have given an initial indication of at least one way in which an artist could take guidance from the Platonic Table in the construction of a visual work of art.

It has been a bumpy ride. I have led you through three Tables. In the first leg of the journey I looked for Platonic patterns in Raphael's *The School of Athens*. This painting did display some patterns that would fit neatly into the Platonic Table, as I think Plato described it in the *Timaeus* – this being the "74-pattern" that I call the Exoteric Table. However, there were some things about the painting that did not fit harmoniously into that Table. This was bad news for the initial theory. But instead of giving up the quest, I embarked on the second leg of my journey.

I then checked whether we could find a better match if we fitted things into another pattern, the "56-pattern" that I call the Purist Table. Things did fit better into this second Table. Yet, not satisfied with this, I then embarked on the third leg of the quest.

I turned to yet a third Table, a "146-pattern", the Esoteric Table. This last pattern fits Raphael's *The School of Athens* even more neatly than the Purist Table does – and

it also fits patterns in other paintings within the same room. This overarching pattern subsumes both of the others. And it does so so neatly that it is hard to resist the suspicion that Raphael might have taken guidance from this overarching pattern, when painting the frescoes on the walls of this room. It is impossible to know for certain. It is possible that some of these coincidences in patterns arise just by chance alone, and not by design. But it is worth at least asking the question of whether they might have arisen by design, and not just by chance.

Yet this is not the only question you should ask. You should also ask whether these patterns, if noticed by someone else – like, say, George Eliot, or Virginia Woolf, or Iris Murdoch – might have led them to suspect that Raphael might have taken guidance from Plato's *Timaeus*. If they had formed that suspicion, then it would not in that case be terribly far-fetched to suppose that they might have made the experiment of searching for ways of taking guidance, themselves, from the same source, in some of their own creative works. I think they did. For instance, Iris Murdoch's *seventh* novel, *The Unicorn*, is divided into *seven* Parts, with *seven* chapters in the first Part, and with *seven* characters introduced by name in the first Chapter, … and so on. Furthermore, one of the characters in this novel said to be studying Plato's *Timaeus*. But that is another story.

Yet as far as I know, Raphael never told anyone explicitly that he was taking guidance from the Platonic Table in the process of planning his work of art. Why is this? I am disturbed by the following thought:

> *If an artist were to take guidance from the Platonic Table – and yet to give no due acknowledgment of this guidance – then wouldn't that be a misdemeanor in the same broad family as plagiarism? Wouldn't it be tantamount to claiming something to be your own work, which in fact you have taken partly from another source?*

At least, that is a view that might be held, and that might have been held by the ancients – as, for instance, by the ancient Greek poet Hesiod.

At the opening of Hesiod's extremely influential epic, the *Theogony*, we are told that the Muses revealed themselves to Hesiod on Mount Helikon and taught him fine singing – and he testifies that they instructed him *always* to place themselves at the beginnings and endings, in all his singing. This might mean, I suggest, that if you have taken guidance from a mnemonic device like the Platonic Table (personified as one of the Muses) then you fall under an obligation to give that guidance due acknowledgment.

Did Raphael give due acknowledgment to his Muse? Yes, I think he did – though not in a manner that would be easily understood by everyone, but rather, in allusions that can be understood only by lovers of the Table, who know what to look for. Morally, is that sufficient acknowledgment? I am not convinced that it is. I wish he had been more explicit in his acknowledgements. Yet he is not alone.

Art is theft. Artists often borrow from many sources without acknowledgement. It would detract from our appreciation of their art, if they festooned their works with footnotes. So perhaps Raphael did give an appropriate kind of acknowledgment to Plato's *Timaeus*, even though precious few would recognize it for what it is, simply by placing Plato's *Timaeus* at the visual hub of *The School of Athens*.

Air

In
even flight,
two swans pierce the silent fog.
Words can't catch 'em – Finnegan!

CHAPTER 2:

Adultery in Camelot

Over the centuries, a handful of artists have imitated Plato's Demiurge, and created works of art while taking guidance from the Table described in Plato's *Timaeus*. But who were these artists? Was Malory one of them? And if so, how did the Platonic Table influence his creative work, as he recounted the tales of King Arthur of Camelot, and his Knights of the Round Table?

Perhaps I am wrong about Malory. Yet he may be useful to me as an illustration, even if he did not consciously take any guidance from the Platonic Table. He provides an illustration of some conceivable ways in which an artist *could* take guidance from the Platonic Table. Seeing some examples might fire the imagination, and suggest alternative ways in which an artist could take guidance from this Table. This might suggest further, more fruitful hypotheses about which other artists, over the centuries, might have taken guidance from this Table.

In the first chapter, I looked into an example from the visual arts: in this next chapter I turn to the narrative arts. Raphael's paintings in the *Stanza della Segnatura*, in the Vatican in Rome, furnish an illustration of ways in which the patterns in Plato's *Timaeus* could conceivably give guidance to a painter. Now I look for an illustration of ways in which these patterns could conceivably guide a story-teller.

If you were wishing to take guidance from the Platonic Table, when weaving a story, what might you do? There are many, very subtle ways that you could weave Platonic patterns into a story. But let us begin with the most obvious ways in which you could take guidance from the Table that is described in Plato's *Timaeus*. You could echo the way Raphael wove these patterns into his painting of *The School of Athens*, and the other paintings in the *Stanza della Segnatura*, in the Vatican. You could introduce into your stories one character for each of the numbers on the Platonic Table. And you could make sure that the characters and actions of each character echo the mnemonic associations of that character's corresponding number.

For instance, suppose two numbers correspond to musical notes that sound discordant, when played together. You could then ensure that there is some sort of

discord between the two characters that correspond to these two numbers. Or suppose one of the numbers on the Platonic Table corresponds to the ancient element *air*, and another corresponds to *water*. You might then be reminded of the fact that *water* has a propensity to evaporate into the air: there is a chemical affinity between these elements. In your story, therefore, you might try to ensure that the corresponding fictional characters experience a compelling attraction to one another.

Why would anyone want to do this? Perhaps because they thought that other authors had tried this out, in the past – and that these techniques do seem to have worked very well for them: Homer, perhaps, and Virgil, and Dante, say. If someone thought that these past writers had taken guidance from the Platonic Table, then that would give them a possible added motive for doing the same. If new writers were to take guidance from the same Table that guided those past writers, then their stories would thereby contain multiple layers of correspondences to a series of great works from the past. Some might like that kind of thing.

You might think these notions to be misguided. Yet that does not mean that no one has ever entertained notions like these. On the contrary, it is relatively probable that, over many centuries, there would have been at least a handful of artists who did think that the Table described in Plato's *Timaeus* had guided at least a handful of artists who had come before them. Of these, it is relatively likely that some would thereby be motivated to try for themselves these techniques, which they thought, seemed to have worked quite well for at least some of their famous predecessors.

In order to illustrate the kind of guidance a story-teller might take from the Platonic Table, I will now outline some mnemonic correspondences that can be set up between, on the one hand, patterns embodied on the Platonic Table and, on the other hand, patterns to be found in the stories of King Arthur of Camelot, and the Knights of the Round Table.

I focus on the Arthurian stories as collected and translated from the French by Thomas Malory, and published by Caxton in 1485.

The Arthurian legends are useful for my purposes, because they are familiar to many people and, more particularly, they are familiar to many people who have almost no knowledge of Plato, or the Greek myths, or the other classics that I will be investigating. Key elements in the Arthurian stories, as recounted by Sir Thomas Malory *Le Morte D'Arthur*, are as follows.

Once upon a time there were some brave men, called the Knights of the Round Table. In the last sentence of *Le Morte D'Arthur* it says that King Arthur's Knights, when they were all complete, ever numbered 140. Many of these brave men set out in quest of the Holy Grail. One among them, Sir Galahad, the virgin son of the sinfully promiscuous Sir Lancelot, is the one who finally finds the Holy Grail, and then is immediately transported up to heaven.

In addition to these numerous Knights, there are six key figures who are not Knights: King Arthur and his Queen Guinevere, King Marke and his Queen Isolde, a Queen and sorceress Morgan le Fay, and Merlin the magician.

Most important of all is King Arthur, who draws a sword from a stone. His right-hand man is one of the Knights, Sir Lancelot du Lac, who falls in love with Arthur's Queen, Guinevere. Yet Arthur does not kill Lancelot, and Lancelot does not kill Arthur, and Guinevere does not kill herself. In the end, Arthur dies at the hand of his own son, Sir Mordred.

In the stories, there are two key figures who are especially associated with magic. There is a wicked woman named Morgan le Fay; and there is Merlin, who has an affair with Morgan le Fay. These two are associated with thaumaturgy, and with the

element *earth*. To evade capture, in one episode, Morgan turns herself to stone; and in the end Morgan buries Merlin alive, in a cavern.

The stories also recount a third disastrous heterosexual liaison. King Marke of Cornwall marries the Princess Isolde, from Ireland; but Isolde falls in love with one of King Marke's trusted knights, Tristan. This extra-marital affair ends in death for both Tristan and Isolde.

These elements of the Arthurian stories will be enough to get us started in an investigation of ways in which these stories can be placed into memorable correspondences with patterns that are concisely captured on the Platonic Table.

I will also need to draw upon some key features of this Platonic Table. Imagine the Platonic Table as starting from the following array of seven numbers:

	1
2	**3**
4	**9**
8	**27**

This Table is then supplemented with further numbers, which are placed as "means" within the "double and triple intervals".

Imagine that Homer and Hesiod and Plato may have – as it were – imaginatively "painted" the first six of the gods of Mount Olympus, the children of Kronos and Rhea, on these numbers in the following pattern:

		1	**Olympus**
Hera	**2**	**3**	**Zeus**
Demeter	**4**	**9**	**Poseidon**
Histia	**8**	**27**	**Hades**

– with females on the evens and males on the odds, elders on larger numbers and younger ones on smaller numbers. At the top we have something that is neither male nor female: corresponding to the Pythagorean notion that one is not really a number, and is both odd and even.

Consider next the Celtic stories of King Arthur and the Knights of the Round Table at Camelot, as recounted for instance by Malory in *Le Morte D'Arthur*. One might begin by arranging the six leading characters in Malory's epic (more particularly, the most salient characters that are *not* Knights) in the following pattern:

		1	**Holy Grail**
Guinevere	**2**	**3**	**King Arthur**
Isolde	**4**	**9**	**King Marke**
Morgan le Fay	**8**	**27**	**Merlin**

Here we again have females on the evens and males on the odds, and (at least approximately) elders on larger numbers and younger ones on smaller numbers, and something at the top that is neither male nor female.

The musical completion of the Platonic Table

There is a natural correspondence between the numbers on this Table and musical notes. If you *double* the length of the string on your lyre, then it plays a note an *octave* lower. If you *triple* the length of the string, then it plays a note that is lower by an octave *plus a fifth*.

Imagine that the number 1 at the top of the Table measures the length of a string that plays a musical note: E, say. (It turns out that, if you start with E at the top of the Table, then you can restrict attention to the "white notes" on the piano, and can minimize the number of "sharps or flats".) It then follows that the numbers 2, 4 and 8 will take us musically down in octaves, always remaining on the note E. The odd numbers 1, 3, 9 and 27 will, however, take us down through what is known as the "cycle of fifths", or at least through the first half of this cycle, namely (if you start with E at the top), the notes E, A, D and G.

		1	**E**
E	**2**	**3**	**A**
E	**4**	**9**	**D**
E	**8**	**27**	**G**

If you scrupulously follow the instructions given in Plato's *Timaeus*, then you will insert further numbers in the gaps between these initial numbers, and each of these further numbers will correspond to a musical note. I will save the detailed derivation of this pattern, from the difficult text of Plato's *Timaeus*, until later: for the present, just trust me. The emerging musical pattern will be as follows:

			1	**E (*mi*)**
	re	**#**		
	doh	**#**	**#**	***la***
	ti	**#**	**#**	***sol***
	la	**#**	**#**	***fa***
	sol	**#**	**2**	***mi* (E) Sir Lancelot**
	fa	**#**		
Guinevere	**E (*mi*)**	**2**	**3**	**A (*la*) King Arthur**
	re	**#**		
	doh	**#**	**#**	***re***
	ti	**#**	**#**	***doh***
	la	**#**	**#**	***ti***
	sol	**#**	**6**	***la***
	fa	**#**		
Isolde	**E (*mi*)**	**4**	**9**	**D (*re*) King Marke**
	re	**#**		
	doh	**#**	**#**	***sol***
	ti	**#**	**#**	***fa***
	la	**#**	**16**	***mi* (E) Sir Tristan**
	sol	**#**	**18**	***re***
	fa	**#**		
Morgan le Fay	**E (*mi*)**	**8**	**27**	**G (*sol*) Merlin**

This Table displays a number of musical patterns that could have been mnemonically useful to travelling musicians, like the Troubadours or the Minnesingers, if they had been initiated into trade secrets inherited from the Pythagorean brotherhoods and Plato's *Timaeus*. If you read notes upwards, from the bottom on the left-hand side, you find the musical scale: *mi fa sol la ti doh re mi*. Taking the notes within the gaps on the right-hand side, and reading them upwards, from the bottom, you find the notes of a different musical scale: *re mi fa sol la ti doh re*.

In early Pythagorean musical theory, music was founded on a scale of seven notes within the octave, with the sequence of intervals between the notes that is familiar from the *sol-fa* scale: *doh, re, mi, fa, sol, la, ti doh*.

In this sequence, while keeping the intervals between these notes fixed, instead of taking *doh* as the keynote you could take *re* as a keynote instead: *re mi fa sol la ti doh re*. This is called a *mode*. Since there are seven notes in the octave, in Pythagorean theory, it follows that there are seven possible notes you could take as the keynote in a musical mode. Thus the very first step in Pythagorean musical theory begins with seven modes: one for each of the notes in the *sol-fa* division of the octave.

On the Table sketched above, aligned with the Greek gods of Olympus, we find several memorable musical correspondences. For instance, the musical notes corresponding to Zeus and Hera stand in a musical harmony: and Zeus and Hera are not only brother and sister but also husband and wife. A musical harmony on the Platonic Table is echoed in a sexual coupling in the narratives involving these two Olympian divinities.

By contrast, the musical note corresponding to Poseidon stands in a discordant relation with the notes for Hera, Histia and Demeter: and Poseidon does not marry one of his own rank, but a much more junior divinity, a kind of mermaid. Again,

musical relations, within the Platonic Table, are reflected in corresponding narratives surrounding the Olympian gods.

Patterns very like these Greek ones are also echoed in the Arthurian legends.

On the Table sketched above it turns out that Guinevere and King Arthur are associated with numbers (2 and 3), whose corresponding notes make a powerful harmony together. The notes *mi* and *la*, as for instance E and A, are separated by a musical *fifth*, which is the most fundamental musical relationship after the octave. Arthur and Guinevere make fine music together. Yet Guinevere and Lancelot are even more musically compatible than that: since they are playing exactly the same note.

Morgan le Fay and Merlin correspond to notes *mi* and *sol*, E and G, which are separated by a harmonious (though somewhat sad) *minor third*: and they have an affair.

However, Isolde and King Marke correspond to the notes *re* and *mi*, and these notes sound discordant when played at the same time. Their marriage is a disaster (like the political relations between Ireland and England). The interval between Isolde's note and King Marke's is, in fact, a *ninth*: an octave plus one whole-tone. Marke is on the note *re*, and Isolde stands above him by an octave plus one whole-tone, on *mi*. The musical interval between them is not a restful one: play it on an instrument, listen to it, and you will see what I mean.

On the Table, however, the interval between Tristan and Isolde is, in contrast, two octaves. Unlike Lancelot and Guinevere, Tristan and Isolde are not playing exactly the same note: but they are playing the same note transposed by two octaves.

Several years before I looked into Malory's *Morte D'Arthur*, while I was working on Plato's *Timaeus*, I had been experimenting with a larger Table than the one sketched above. I had been experimenting with a Table that supplemented the initial pattern of numbers, sketched above, with many more numbers.

On this expanded Table there were 146 numbers altogether. I had found that this 146-number Table harmonized well with some hints in Plato's *Republic* and with key passages in Homer's *Iliad* and *Odyssey* and with the genealogy of Greek divinities in Hesiod's *Theogony*.

The core reason, however, for working with this extended Table was a purely musical one. Instead of setting out just *four* steps down the right-hand side of the Table, laying out the numbers 1, 3, 9 and 27, as described in Plato's *Timaeus*, I had considered the possibility of setting out *seven* steps down the right-hand side, laying out the numbers 1, 3, 9, 27, 81, 243 and 729. If you set out these seven steps, starting with 1 and *tripling* six times, you then complete what is known as the "cycle of fifths". The *seven* steps down the right-hand side will then correspond to the seven notes of the Pythagorean *sol-fa* division of the octave into a musical scale.

I suggest that the Short Table, generated by the *seven* initial numbers described in Plato's *Timaeus*, is ideal for representations of the "everyday" world; but a Long Table, generated by *thirteen* initial numbers, is better for works that venture into the dreamworlds of mythology. This 146-number Long Table best fits, I maintain, the patterns in the ancient Greek epics by Homer and Hesiod.

This Long Table begins with the following backbone of numbers, which are derived by successive *doubling* down one column, and *tripling* down the other column:

		1	**E**
E	**2**	**3**	**A**
E	**4**	**9**	**D**
E	**8**	**27**	**G**
E	**2**	**81**	**C**
E	**4**	**243**	**F**
E	**8**	**729**	**B-*flat***

This Table not only has the merit of mnemonically fitting neatly onto the epics of Homer and Hesiod, it also completes what is known in musical theory as the *cycle of fifths*, and it neatly catalogues all the musical modes of the ancient Pythagorean theory. Notice that by the time you reach the bottom of *this* Table, you have filled in all the letters of the alphabet from A to G, making a full octave: A, B(flat), C, D, E, F, G (and A again); *la ti doh re me fa sol* (and *la* again).

By "falling" *down* the right-hand side of the Table, through the musical "cycle of fifths", then "rising" back *up* the left-hand side, transposing upward in octaves, you complete a musical cycle that is used in tuning instruments to the Pythagorean musical scale.

So: visualize the two columns of the Table as being bent around into a circle. Assign a Knight to each number in this cycle, and you can visualize these Knights seated at a Round Table of Camelot.

When you fill in all the "means" on this extended Table, and split the two columns to form a "Circle of the Same" and a "Circle of the Different", as indicated in Plato's *Timaeus*, the resulting Table contains 146 numbers altogether.

Imagine you map six of these numbers onto the six key characters, Arthur and Guinevere, Isolde and Marke, Morgan le Fey and Merlin. This leaves 140 numbers to be assigned to the Knights of the Round Table.

So it is very striking to find that Malory's *Le Morte D'Arthur* ends with the claim, in the very last sentence, that the Knights of the Round Table, when they were entire, ever numbered 140.

When looking for correspondences between the Platonic Table and Malory's narrative, I also noticed that the Extended Table correlated the most prominent three "upper-class" ladies in the narrative with the musical note E. Musically, they will be vibrating in unison with any male characters that are to be found associated with the musical note E on the right-hand side of the Table.

On the right-hand side of the Platonic Table, among the numbers that are placed *between* the initial odd numbers 1, 3, 9, 27 and so on, you might look for numbers that would correspond to the note E. (The numbers we will be seeking will be *powers of 2*: namely, 1, 2, 4, 8, 16 and so on.) It turns out that, on the Platonic Table, in the right-hand column, there are *four*, and *only four*, of these numbers altogether: 1, 2, 16 and 128.

Hence my Platonic theory leads to the prediction that we should expect that the highest-ranking female characters (Guenevere, Isolde, and Morgan le Fay, corresponding to the numbers 2, 4 and 8) might well fall into especially torrid love-affairs with *four* males. And that is exactly what they do.

Guinevere and Launcelot

On the right-hand side of the Table, in the "triple interval" between 1 and 3, right beside the number 3 that can be memorably correlated with King Arthur, we find the number 2. This number 2 is the "arithmetic mean" between 1 and 3. This number on the masculine side of the Table is exactly the same as the number corresponding to Queen Guinevere on the feminine side of the Table.

For a long list of reasons, which will emerge later, this number on the male side will correspond to the chemical element of *water*, whereas Guinevere's number 2 on the female side will correspond to the chemical element of *air*.

You could therefore memorably correlate the number 2 on the male side with Sir Launcelot du Lake, who is King Arthur's right-hand man. It is a tragedy, but Laucelot and Guinevere cannot help themselves. Their notes are playing in unison. Their souls are one. And, in the heat of passion, water evaporates into the air.

For Pythagoreans and Platonists our essences lie in mathematical harmonies, corresponding to the number to which each of us corresponds on the Platonic Table. Thus, standing in mnemonic correspondence with the same *number* entails having the same *essence*; and so Launcelot and Guinevere share the same soul. Their souls are in different bodies, but they are as one. Love conquers the contrary demands of friendship, honour, promises, moral and social obligations.

Not only do musical correspondences draw them together, but their chemistry, too, draws them together. Correspondences with the Table draw Lancelot into an association with *water*, and draw Guinevere into an association with *air*. In the process of evaporation, *water* is drawn into the *air,* and so in a parallel way Lancelot is drawn into a life-long affinity with Guinevere, the boss's wife.

Isolde and Tristan

Isolde's number 4 and note E makes a *discord* with King Marke's number 9 and note D. However, King Marke's number 9, on the masculine right-hand side of the Table, lies near to the number 16. (Take my word for this, at this stage: the details will emerge later.)

This number 16 on the masculine side of the Table corresponds musically to the note E that lies two octaves below Isolde's note E. For reasons that emerge gradually, Isolde's number 4 is aptly correlated with the chemical element of *water*, and the number 16 on the right-hand side of the Table will be aptly correlated with the chemical element of *air*. (Again, take my word for this at this stage: the details will emerge later.)

If you were to think of the knight Tristan as correlated with the number 16 on the right-hand side of the Table then this could remind you of the way that Tristan is drawn to Isolde and Isolde to Tristan: musically, they are in harmony; and chemically, she is drawn to him as water is drawn into the air in the natural process evaporation.

Morgan le Fay and Accolon

Having noticed these Platonic correspondences for Malory's two extremely famous tragic love-triangles, I was led to wonder if Morgan le Fay had been drawn into any hopeless love with a Knight whose social position was below hers.

On the Platonic Table there will be one more number on the right-hand side that is correlated with the note E, namely the number 128. So just as we can pair both Guinevere and Isolde with two Knights on the note E, so too can we pair Morgan le Fay with a third Knight who is situated on the note E.

Hence I searched the text, and I found the following (4.14):

> Then came tidings unto Morgan le Fay that Accolon was dead, and his body brought unto the church, and how King Arthur had his sword again. But when Queen Morgan wist that Accolon was dead, she was so sorrowful that near her heart to-brast. But because she would not it were known, outward she kept her countenance, and made no semblant of sorrow.

Queen Morgan had been in love with Accolon. And Accolon was in love with her: "She loveth me out of measure, and I her again" (4.11).

The tragic tale of Accolon and Morgan le Fay has salient similarities to the tragedies of Guinevere and Sir Launcelot, and of Tristan and Isolde. You can remember the story of Accolon by associating him with the number 128 on the right-hand side of the Platonic Table.

There is, in fact, also a musical harmony not only between Morgan le Fay and Accolon, but also between Morgan le Fey and both Launcelot and Tristan. Do we find any sexual attractions described in the text, corresponding to these two further musical harmonies that are suggested by correspondences with the Platonic Table?

In Book IX Chapter XLI we find Queen Morgan is indeed attracted to Tristan:

> Fair knight, said the queen, ye shall abide with me till that I wit what ye are and from whence ye come. And ever the queen would set Sir Tristram on her own side, and her paramour on the other side. And ever Queen Morgan would behold Sir Tristram, and therat the knight was jealous, and was in will to have run upon Sir Tristram with a sword, but he left it for shame.

In Book VI Chapter III we find Queen Morgan is attracted not only to Tristram but also to Launcelot:

> We shall not strive, said Morgan le Fay, that was King Arthur's sister, I shall put an enchantment upon him that he shall not awake in six hours, and then I will lead him away into my castle, and when he is surely within my hold, I shall take the enchantment from him, and then let him choose which of us he will have unto paramour.

But Launcelot chooses to remain faithful to Guinevere.

Mordred and Guinevere

There is just one more number on the Platonic Table that corresponds to the same note E that is correlated with the upper-class ladies Guinevere, Isolde and Morgan le Fay: namely, the number 1 at the very top of the Table. This number 1 will be correlated with the element of *fire*, which has a natural affinity with the element of *air*. Any character associated with the number 1 at the top of the Table might

therefore be expected to experience both a musical and a chemical attraction to Guinevere on the number 2.

Hence I wondered if there was, in Malory's text, any other romantic liaison involving Guinevere, or the other Queens. When you search the text, you find that there is a wicked Knight called Mordred, a son of King Arthur, whom you could perhaps correlate with the number 1 at the top of the Table.

In some contexts, I suggest that the number 1 at the top of the Table should be mnemonically associated with the Sangreal or Holy Grail – or "enlightenment" or "salvation". Nevertheless, in other contexts the number 1 may be assigned mnemonic uses that are diametrically opposed to this association with enlightenment.

More generally, in these mnemonic games, there is a natural tendency to construe each number on the Table with *two*, diametrically opposed, families of associations: each number has, as it were, its "dark side". Thus for instance the seven initial numbers on the Table can code for not only the Seven Cardinal Virtues, but also for the Seven Deadly Sins. A similar thing happens in Tarot reading. You would have thought the "Death" card was a "bad thing": but in some contexts it is taken that death means the end of something – but hence also a "new beginning", which of course can be a "good thing".

If you were to draw correspondences between the Platonic Table and Milton's *Paradise Lost*, for instance, then the optimal way of doing this would link the number 1 at the top of the Table with Lucifer, the angel of light, whose pride leads to a Fall, after which he becomes Satan at the very bottom of the Table. This places the number 1 in an indirect correspondence with evil.

Hence there are fruitful correspondences that arise, if we visualize Arthur's son Mordred as associated with the number 1 at the top of the Table. This would place him on the same musical note as Arthur's wife, Queen Guinevere.

Every other male associated with the note E, on the right-hand side of the Table, is sexually attracted to one of the salient women on notes E on the left-hand side of the Table. Furthermore, Mordred and Guinevere correspond chemically to the elements *fire* and *air*: and there is a natural chemical affinity between these elements. Hence my theory leads to the prediction that Mordred should be sexually attracted to Guinevere. And indeed, Mordred tries his hardest to ravish Guinevere; and she seeks asylum in a monastery. Mordred is an octave away from Guinevere, whereas Lancelot is on the very same note as Guinevere. Hence Guinevere should be expected to remain faithful to Lancelot, and to resist Mordred's attentions. And so she does.

Three more lusting Queens

The correspondences with the Platonic Table run even deeper yet. The 146-number Table that most neatly fits Hesiod's *Theogony* is one that has *three more* salient "powers of 2" on the feminine side, lying below the number 8 that I have correlated with Queen Morgan le Fay.

The extra numbers 16, 32 and 64 on the feminine side of the Table correspond to the same note E with which I have correlated Morgan le Fay and Sir Launcelot. These numbers, formed by the operation of *doubling*, should correspond to upper-class characters like Queens; whereas the *means* within double or triple intervals should correspond to middle or lower class characters.

Hence the Platonic Table invites us to contemplate the prospect of there being *three more* noblewomen, down below Morgan le Fay, who might all be attracted to Sir

Launcelot. That is exactly what we find in Book VI, Chapter III of Malory's *Morte D'Arthur*, where Morgan le Fay says to Sir Launcelot:

> I am Queen Morgan le Fay, queen of the land of Gore, and here is the queen of Northgalis, and the queen of Eastland, and the queen of the Out Isles; now choose one of us which thou wilt have to thy paramour, for thou mayest not choose or else in this prison to die.

A Troubadour could remember this part of the story by associating the queens of Northgalis, Eastland and the Out Isles with the numbers 16, 32 and 64 on the Platonic Table:

		1	
		(2)	(Sir Launcelot)
Guinevere	**2**	**3**	**King Arthur**
Isolde	**4**	**9**	**King Marke**
		(16)	(Sir Tristan)
Morgan le Fay	**8**	**27**	**Merlin**
Northgalis	**16**	**81**	
		(128)	(Sir Accolon)
Eastland	**32**	**243**	
Out Isles	**64**	**729**	

Morgan le Fay and the three other Queens below her all lust after Sir Lancelot, but he resists their advances.

> *Aside*: The numbers 2, 16 and 128 emerge on the right-hand side of the Platonic Table, if you faithfully follow the instructions given in Plato's *Timaeus*. Furthermore, these are the *only* "powers of 2" that appear on the right-hand side of the Platonic Table.
>
> First, for those who are curious, 2 is included in the "triple interval" between 1 and 3, on the right-hand side of the Table, because it is the "arithmetic mean" between 1 and 3.
>
> Secondly, 16 is included because it is eight-ninths of – that is, a musical whole-tone above – the arithmetic mean between 9 and 27.
>
> Lastly, 128 is included because it is two musical whole-tones above the arithmetic mean between 81 and 243.
>
> No other "powers of 2" appear on the right-hand side of the Table. Hence no other Knights on the right-hand side of the Table will be assigned to the note E. The note E is the note assigned to all the Queens on the left-hand side of the Table. So the theory predicts that Malory should recount no more fatal attractions for the Queens in the Arthurian legends. I think this prediction is vindicated by a reading of the text.

This list of Platonic correspondences is sufficiently lengthy to corroborate a theory: namely the theory that the stories of King Arthur evolved under some sort of guidance from the Platonic Table. Even if this theory were false, it is possible that some Platonists, over the centuries, might have believed it to be true. It is possible that there may have been some artists, musicians, and writers who might have been drawn, by similar evidence, to conclusions similar to the ones I have outlined above.

In any case, these Arthurian legends demonstrate that there are rich and varied ways in which the Platonic Table *could* serve a variety of useful mnemonic purposes for story-tellers. This gives us the kind of practice we need, if we are to try to find any examples of artists, in the course of history, who have tried to imitate the Demiurge, described in Plato's *Timaeus*.

Water

One does
say even this aloud:
Y'can't write, sometimes,
some things poems catch.

CHAPTER 3:

Wagner's *Ride of the Valkyries*

If I were right – that there have been Pythagorean artists over the centuries who took guidance from the Platonic Table – then *surely* some of those artists would have been composers of music. Nothing is more central to the Pythagorean world-view than music (except perhaps mathematics). So, to sustain my theory, I need to find an example of some music that was informed by the Platonic Table – or at least to find an illustration of some possible ways in which that Table *could* influence a musical composer.

I choose Wagner, to furnish such an illustration. This is partly because Wagner chooses themes that overlap the Arthurian legends, like *Tristan and Isolde*, which embody Platonic patterns. It is also because I think I can find Platonic patterns in Wagner's music.

Nevertheless, there are a number of ways in which Wagner seems an unfortunate choice to offer as a candidate for a secret Pythagorean. I would prefer to have started with Bach or, say, Mozart's *The Magic Flute*. Furthermore, as an evangelist for the Platonic Table I regret choosing an illustration that will alienate much of my potential audience. I admire Wagner, but I have no wish to foist his music onto those who do not, and I know that many understandably hate him and his music: some because his repulsive anti-Semitism poisons everything; and some just because he is so relentlessly Wagnerian.

Yet I need an example of Platonic patterns in music; and alas my materials just took control, and I had to follow.

Wagner and mnemonics

It would be perverse to advise people to seek Platonic patterns when they are listening to Wagner's operas. There is more than one way of appreciating Wagner's operas, and many of the most important ways are antithetical to any search for "hidden patterns". Wagner said his aim was to influence our feelings, not our intellect:

> Nothing should remain for the synthesising intellect to do in the face of a performance of a dramatic work of art; everything presented in it must be so conclusive that our feeling about it is brought to rest; for in the bringing to rest of this feeling, after its highest arousal in sympathy with it, lies that very peace which leads us to the instinctive understanding of life. In drama we must become *knowers* through *feeling*.
>
> Richard Wagner, *Opera and Drama*, passage quoted by Tanner (1996, p.9).

So it seems that the deepest, or at least the intended, appreciation of Wagner's operas will emphatically *not* be achieved exclusively through any kind of intellectual "decoding" of hidden Platonic patterns behind the music.

Wagner wants those who see his dramas and hear his music to be swept away by emotions, leaving the intellect stranded far behind on the distant shore. Yet that does not mean that there are no Platonic patterns in his operas. Perhaps nothing "remains for the synthesising intellect to do" precisely because so much intellectual work has been done already, by the composer. Besides, even if Wagner had composed his music in a whirlwind of emotion, without any conscious planning at all, it would nevertheless be possible that Platonic patterns should find their own subliminal pathways, from the deepest levels of his soul, and into his musical works. It is possible that it moves us emotionally in part because of the subliminal effect of the mathematical patterns it contains. Indeed, it is obvious that it does so at least in this respect: that the Pythagorean, numerical relationships among frequencies of notes create the harmonies and discords that, manifestly, do move us. It is not absurd to suppose that such Platonic patterns might subliminally affect both Wagner and his audience in other ways, as well. And besides, Wagner was not one who shunned the intellect when planning his creative works. He thought very long and very hard about what he was doing. He studied the ancient Greeks, and their legacy within the traditions of the Italian and French troubadours, and the Germanic Minnesingers and Meistersingers.

It is a serious mistake to think there is only one "right" way to appreciate Wagner's operas. It is perfectly possible to listen to *Tristan und Isolde* on Sunday, leaving your intellect far behind: but then on Monday to reflect on the experiences of the previous day, to wonder what was going on – both in the music, and in you – yesterday, and to open up the complete orchestral scores and look for Platonic patterns. Some people seem to look down their noses at anyone who begins to treat any great work of art as a "puzzle" that needs "solving". And – granted – it would be a tragedy if we were *always* to treat great works of art *merely* as puzzles. Yet it is unpleasantly totalitarian and monotheistic to insist that there is only *one* right way to approach a work of art, on *every* occasion. There is, on the contrary, nothing wrong with appreciating a work of art in several different ways – and then *also* treating it as a puzzle.

I am happy for people to appreciate or depreciate Wagner's operas in any way they like: but then I ask them to also use these same operas, not just as an end in itself, but

also as a means by which we can enhance our appreciation of another work of art: namely, the Platonic Table.

I take it as relatively obvious that there can be no one "key" that would unlock all "the secrets" of Wagner's operas. Wagner is, I assume, not the sort of artist who would mechanically follow any one, tidy, predetermined Plan. My aim is only to supplement, not to supplant, the scholarship that has been directed at Wagner's works. I have no illusion that the Platonic Table will furnish a Key that will "explain all". That might be an illusion of some kinds of Platonists, but not of right-minded Platonism as I conceive it.

Wagner's "synthesising intellect"

In one of his operas, *Die Meistersinger von Nürnberg*, Wagner expresses respect for the sources and the early traditions of the guilds of Meistersingers; but he also endorses the more romantic "inspiration" that is given voice by the romantic hero of the opera – who breaks the rules, and wins a singing contest, and defeats the more doctrinaire among the Meistersingers. In *Opera and Drama* (1900, p.239), for instance, Wagner speaks of the "slavish pedantry" into which the guilds of the Meistersingers descended. In his opera, when the romantic hero sings his song, one of the Masters sits *behind a curtain*, applies the rules of the guild, and marks all the "mistakes" the singer makes. Wagner is well aware that the guild had "trade secrets", which were taught to initiates and he mocked those who followed these rules too slavishly, without inspiration; yet nevertheless, the opera makes it clear that Wagner did *know* those very rules. Furthermore, the opera also makes it clear that Wagner respects the rules of the traditional guilds, even though he does not want us to be bound by them when our instincts lead us another way.

On balance, therefore, it is not (on reflection) so very far-fetched to suppose that Wagner had at least conceived of the notion that some artists in history might, as it were, have imitated Plato's Demiurge, and might have taken guidance from something like a Platonic Table in their creative work as artists. It is even possible that Wagner, too, might sometimes have taken *some* guidance from such a Platonic Table, in at least some aspects of some of his works, and even if he felt moved to break the rules when the spirit took him.

Perhaps I am wrong about Wagner. Yet he may nevertheless be useful to me as an illustration, even if he did not ever consciously take any guidance from the Platonic Table. His operas provide illustrations of some conceivable ways in which a composer conceivably *could* take guidance from this Table. Working through some examples, as thought-experiments, might fire the imagination, and suggest various alternative ways in which an artist could take guidance from this Table when composing music. This might suggest further, more fruitful hypotheses about which artists, either instead or in addition to Wagner, over the centuries, might have taken guidance from this Table.

The Valkyries are air-divinities

If a composer set out to take guidance from the Platonic Table, in composing a passage of music, what might he or she do? There are many very subtle ways that Platonic patterns could conceivably be written into musical compositions. But for the

sake of illustration, let me describe one fairly flatfooted and straightforward way that someone could write Platonic patterns into musical compositions.

Imagine you were setting out to write a musical passage to evoke the "Ride of the Valkyries". Suppose you think of the Valkyries as "*air*-divinities", who ride on horses, and carry dead heroes from battlefields up to the palace of the gods, Valhalla, which stands above the clouds, at the end of the rainbow.

You might check the Platonic Table, therefore, for numbers that are associated with the element *air*. You will find that there are *nine* of them: one for each of the ancient Greek Muses. There are nine Muses, and with their help a poet may hope to become one among the immortals of Olympus; likewise there are nine Valkyries, and they convey military heroes to a life among the immortals in Valhalla. Hence you might take there to be nine Valkyries, one for each of the *air*-numbers on the Table. On that Table, each of the *air*-numbers will correspond to a musical note. So, taking guidance from this Table, you might see whether you could use precisely those notes, in constructing a musical passage evoking the Ride of the Valkyries.

When you look for the *air*-notes on the Platonic Table, suppose you find that each is separated from the next by either a musical *third* or a musical *fifth*. You might arrange these to evoke the image of a horse riding up to Valhalla, as for instance in a galloping pattern like this:

up
up up up down …
up up down down
down down

This could make a very memorable musical sequence. It closely matches the exceptionally memorable "Ride of the Valkyries" in Wagner's opera *Die Walküre*.

You cannot mechanically "read off" Wagner's *Ride of the Valkyries* from the Platonic Table, just by playing out the rising sequence of *air*-notes exactly as they appear on the Table. You would need to transpose some *air*-notes down an octave or more. And, of course, if you allow yourself the liberty to transpose notes like this, then you could use the *air*-notes on the Table to write *almost* any melody you might fancy. So rational people might have doubts about the utility of the Platonic Table, in generating memorable melodies and harmonies.

Nevertheless, the example does suggest one way in which a Platonist *could* use the Platonic Table to suggest the beginnings of a musical theme. The *air*-notes on the Platonic Table are strung out in a pattern of rising *thirds* or *fifths*. When visualizing the Valkyries riding up to Valhalla, the Table might prompt you to think of a melodic line featuring rising *thirds* and *fifths* – and that is exactly what you do find in Wagner's *Ride of the Valkyries*.

In Act 1 of this opera, a man called Siegmund rescues his sister Sieglinde from an unhappy marriage, and together they conceive a child. This first Act is set in the house where Sieglinde lives with her husband Hunding.

In Act 2 we find ourselves out in the forests, near the place where a battle is to take place. Siegmund will have to face Hunding in battle.

We first hear the *Ride of the Valkyries* in Act 2, Scene 1 (starting at bar 66). It is in the rollicking time signature of 9:8 ("*Dum-di-di-Dum-di-di-Dum-di-di / Dum-di-di-Dum-di-di-Dum-di-di / ...*"), with a rising sequence of notes on the trombones ***ff*** (very loudly): G-C-G-C-E--C--E-C-E-G--E--G-E-G-B-- … .

We first meet this memorable *leitmotif* here, in Act 2, Scene 1, in the key of C major (without any sharps or flats). It heralds the arrival of the first of the Valkyries, Brünhilde, who comes to receive instructions from her father, Wotan. Of all the Valkyries, Brünhilde is Wotan's favourite. The first *Ride* is Brünnhilde's, as she comes to meet Wotan – not in Valhalla, but down on Earth, in the key of C major, on a battlefield just before a battle.

Later in Act 2 – in Scene 5 (starting at bar 130) – the same melody reappears, but transposed into the key signature of D (with two sharps). But this key signature, in this instance, marks not the key of D major, but of B minor. On the piano keyboard, the home-note has slipped just a semitone below C, to B. Unlike C major, B minor introduces a few of the black notes. This second *Ride* is in a minor key: more fraught than the first *Ride* in C major.

Act 3, Scene 1, then opens with the *Ride* again – and again in B minor (starting at bar 12), a key signature with just two sharps. Under this minor-key version of the *Ride*, we have the battle. But later in this Scene (starting at bar 58), when the Valkyries have left the scene of battle and are briefly gathering together on the mountain-tops, to take stock before finally ascending to Valhalla, the *Ride* is then transposed into the key signature of B (with *five* sharps – *all* the "black notes") – and this time it is in the key not of B minor but of B major. This major key version of the *leitmotif* accompanies the triumphal reassembly of the Valkyries on their horses, bearing the dead heroes they have picked up from the battlefield.

There are interesting ways in which these shifts of key, as well as the melody itself, could be correlated with salient patterns in the Platonic Table. Think of the white notes on the piano as the *human* realm. (Wagner's opera *Die Meistersinger* is, of all his operas, the one most rooted in the everyday human world – and it opens emphatically in the key of C major.) Think of the black notes, by contrast, as mountains, rising up to the gods of Walhalla. The Valkyries begin down here on a human battlefield, and take fallen heroes up to the mountain tops: and so their *leitmotiv* begins in a key with no black notes, shifts to one with two black notes, and rises up to a key that is almost entirely black notes.

Hence, if a composer *were* taking guidance from the Platonic Table, one of the things that *could* conceivably emerge from such guidance could be something like the three most salient versions of Wagner's memorable *Ride of the Valkyries*. This illustrates at least one possible way in which Platonic patterns in the narrative could conceivably be echoed in the music itself.

It is of course impossible to achieve any certainty, concerning what went on in Wagner's mind as he composed, say, *The Ride of the Valkyries*. Nevertheless, the impossibility of securing any conclusive proof does not deter me from taking liberties with Wagner – just to illustrate some of the conceivable, and distinctively *musical*, creative potential of the Platonic patterns, as described in Plato's *Timaeus*. I will now follow up this illustration from *The Ride of the Valkyries* with a second illustration, this time from *Tristan and Isolde*.

Isolde's discordant marriage to King Marke

Wagner's opera *Tristan and Isolde* begins in the key of A minor, with a leitmotif that begins on A and rises upwards just a little more than an octave, and ends on a B an octave plus a whole tone (a ninth) above the initial A. Think of rising up the *sol-fa* scale, but starting from *la*, rising up an octave to *la* again – and then "over-reaching",

to *ti* (to get a feel for it, sing: *la-ti-doh-re-mi-fa-sol-la-ti*, and then hold the last note *ti*...) The notes in the melodic line of this leitmotif, the first three bars of the opera, are: A-F-E-G#-A-A#-B.

As orchestrated at the opening of *Tristan and Isolde*, this rising motif evokes a sense of something like strain and foreboding, or unfulfilled longing, or something like that. The final note over-reaches the octave – and, as a consequence of this over-reaching, the initial and final notes A and B, when heard together, are discordant – and this contributes to a sense of strain evoked by the music.

The musical interval of a ninth, which evokes this foreboding, corresponds precisely to the interval between Princess Isolde's and King Marke's mnemonically optimal positions on the Platonic Table – as set out in the previous chapter on Malory's tales from *Le Morte D'Arthur*. This could of course be a mere coincidence. But as coincidences to, this one is sufficiently striking to prompt further investigation.

The opening bars of the opera are in the key of A minor, with the key signature registering no sharps or flats. The melodic line rises from the note A to the note B a ninth above. The whole opera ends with the note B, in the key signature for B major, with five sharps.

As the opera opens, the Irish princess Isolde is betrothed to King Marke, and is on a sailing vessel taking her to Cornwall, and to a doomed marriage. She is being escorted by one of King Marke's most trusted knights, Sir Tristan.

Let me recall: according to my Platonic investigations of Malory's *Le Morte D'Arthur*, each character was assigned a number on the Platonic Table. This indirectly associated that character with a chemical element, and with a musical note. This sets each character into a pattern of harmonies and discords with all the other characters in the narrative. Let me then recall: which numbers, and hence which musical notes, are best assigned to Isolde, King Marke, and Sir Tristan on the Platonic Table? Here is the core pattern, extracted from the Platonic Table, that was sketched in the last chapter.

			1	**E (*mi*)**
	re	*		
	doh	*	*	***la***
	ti	*	*	***sol***
	la	*	*	***fa***
	sol	*	**2**	***mi*** **Sir Lancelot**
	fa	*		
Guinevere	**E (*mi*)**	**2**	**3**	**A (*la*) King Arthur**
	re	*		
	doh	*	*	***re***
	ti	*	*	***doh***
	la	*	*	***ti***
	sol	*	**6**	***la***
	fa	*		
Isolde	**E (*mi*)**	**4**	**9**	**D (*re*) King Marke**
	re	*		
	doh	*	*	***sol***
	ti	*	*	***fa***
	la	*	**16**	***mi*** **(E) Sir Tristan**
	sol	*	**18**	***re***
	fa	*		
	E (*mi*)	**8**	**27**	**G (*sol*)**

The musical intervals between the notes for the three characters in Isolde's story run like this: From Isolde's note we descend by a discordant *ninth* to King Marke's note; then from King Marke's note we descend by another discordant interval (though a less discordant one), a *seventh*, to his knight, Sir Tristan. That entails that there is a harmonic musical interval of two clear octaves between Isolde and Sir Tristan. (What is a "ninth" plus a "seventh"? Well (9+7) equals 16; so a ninth plus a seventh yields two "eighths", or two octaves.)

Musically, these three intervals neatly mirror the dramatic relationships among these three characters. The opera opens with repeated evocations of unresolved discords of the *ninth* and *seventh*, as Isolde and Tristan sail from Ireland towards Cornwall, where Isolde is to marry King Marke. The relationship of Isolde to Marke is the discordant *ninth*; the relationship of Tristan to Marke is the less discordant *seventh*.

In the seventeenth full bar of the opera, we reach the leitmotif for the coming love between Tristan and Isolde. At the opening of this bar the previous preceding discordant intervals reach an excruciating intensity, very loud (***ff***), with both the *seventh* and *ninth* superimposed on each other – and we also have simultaneous discords of a semitone, a whole tone, and the tritone.

Then this resolves – briefly – into clean octaves, with the note F played on several instruments over several octaves, harmonised with the F-major triad in between.

Unresolved discords can evoke something like unfulfilled longing, as well as foreboding and strain. After sixteen bars of musical tension, clean octaves and the F-major triad come, at last, as an orgasmic release. This is the motif for the love between Tristan and Isolde.

Thus, Wagner's music reflects, surprisingly closely, some of the mythical and musical correspondences I have described above, between patterns in the stories, and

patterns embodied in the Platonic Table. And these musical patterns are not just entertaining to the intellect: they make deeply moving music. These coincidences are very striking, especially when the mnemonic arrangements of these characters were determined by investigations of Malory's *Le Morte D'Arthur*, well before any investigation was undertaken of Wagner's *Tristan und Isolde*.

Is it possible that Wagner noticed the ways in which both the story of Tristan and Isolde, and the music in his opera, can be drawn into harmonious correspondences with the Platonic Table that was described in Plato's *Timaeus*? I think it is possible. Even if it turns out not to be so, it may serve as an illustration of some of the mnemonic and aesthetic potential of the Platonic Table.

Wagner's career

Wagner wrote thirteen operas altogether. I will focus only on the last seven. Mnemonically, I recommend that you memorize all thirteen on the following Table:

		fire	**1**	*Das Rheingold*
Die Meistersinger	**2**	*air*	**3**	*Die Walküre*
Tristan und Isolde	**4**	*water*	**9**	*Siegfried*
Parsifal	**8**	*earth*	**27**	*Götterdämmerung*
Tannhäuser	**16**	*water*	**81**	*Lohengrin*
Rienzi	**32**	*air*	**243**	*Die Fliegende Hollander*
Die Feen	**64**	*fire*	**729**	*Die Liebesverbot*

The first six operas are arranged in chronological order of composition, reading left to right, and *upwards* from the bottom of the Table. That is, *Die Feen* was his first, and *Lohengrin* was his sixth. This pattern draws some happy correspondences that are useful in fixing the operas in your memory. For instance, the "*Flying* Dutchman" is associated with an "*air* number". Lohengrin makes his entrance to the stage on the back of a swan, so it helps if you remember his opera as linked to a number associated with *water*. And so on.

After the first six operas, there were five years during which Wagner wrote little music, apart from a few sketches towards the *Ring* cycle. He wrote the words for *Götterdämmerung*; then the words for *Seigfried*; then the words for *Die Walküre*; then the words for *Das Rheingold*. Thus, he set down the words for the entire *Ring* cycle before writing the music.

Then he began writing the music for the *Ring* cycle. He began with the music for *Das Rheingold*, followed by *Die Walküre*, followed by the first two Acts of *Seigfried*.

Then he interrupted composition for the *Ring* cycle for a period of twelve years, during which he wrote *Die Meistersinger* and *Tristan und Isolde*. After this interruption, he finished the *Ring* cycle; and then he wrote *Parsifal*, and then he died.

Scholars have felt the need for an explanation of the twelve-year gap between the composition of the first two Acts of *Siegfried*, and the composition of the remainder of this opera, and then of *Götterdämmerung*. None have thought that the reasons had anything to do with the Platonic Table. The reasons might have been financial: Wagner needed money, and the *Ring* cycle was going to take a lot of time, and was going to be hard to market, whereas self-contained operas like *Die Meistersinger* and *Tristan und Isolde* were more likely to bring in money in the short term.

There may also have been emotional reasons for the composition of *Tristan und Isolde*. Wagner fell passionately in love with a married woman, and this might have had something to do with his composition of an opera concerned with Sir Tristan's love for the wife of King Marke.

In setting out Wagner's operas mnemonically on the Platonic Table, I would not like to be misinterpreted. I aim only to supplement, not to supplant, the work of other scholars in deepening our understanding of Wagner's operas. I am not disputing with those who suggest Wagner may have had financial, or marital, motives determining the order in which the operas were composed. Furthermore, I am not even suggesting that this Table can *explain* anything of any significance about these operas. Nevertheless, the Platonic Table may furnish a useful device with which to think about these operas. This applies especially, I suggest, to the last seven operas. And – more importantly for my purposes – these operas can serve to illustrate some of the mnemonic potential of the Platonic Table.

Down on the right, up on the left

Wagner's last seven operas can be arranged mnemonically on the Platonic Table, in the following pattern:

		fire	**1**	*Rheingold*
Meistersinger	**2**	*air*	**3**	*Walküre*
Tristan und Isolde	**4**	*water*	**9**	*Siegfried*
Parsifal	**8**	*earth*	**27**	*Götterdämmerung*

This Wagner-mnemonic has so many virtues that I suspect that Wagner really did take guidance from it, or something very like it – and not just subliminally. Yet even if he didn't, it is instructive to review this "Wagner-mnemonic", to illustrate some of the tricks that this Platonic Table can turn.

Running down the right-hand ("masculine") side of the Table, we have a story, spread over four operas, about how (roughly) "pride leads to a fall". The pride of Wotan, chief of the gods, leads to the destruction of the gods. He gets his heavenly estate, Walhalla, built on credit: and when the time comes to pay his bills, he cannot meet his financial obligations. He tries several tricks for forestalling the inevitable, but in the end he loses everything in *Götterdämmerung*, the "twilight of the gods".

The story also tells of how the rule of "law", under the gods, is replaced by the rule of human "love", and of human "freedom". In particular, an "honour code", which makes marriage an inviolable sacrament, is replaced by "free love".

The story also tells how the love of money is the root of all evil. Alberich, a nasty Nibelung, renounces love, and steals gold from the Rhinemaidens. This gold is fashioned into a ring that is reputed to give immense power to anyone who possesses it, provided they are willing to renounce love. The Nibelung renounces love. But when Wotan, the king of the gods, steals the ring from Alberich, he is not willing to do the same. He then finds himself compelled, by his code of honour, to give this ring to the Giants, in payment for the work they have done for him in building Walhalla. The ring ends up in the possession of one of the Giants, who is transformed into a dragon guarding his treasure.

The Nibelungs, Alberich, Mime, and Alberich's son Hagen, then seek ways of stealing back the ring from this Giant. In the succeeding operas, *Die Walküre* and

Siegfried, Wotan is concerned to ensure that the ring does not fall back into the hands of the Nibelungs, but rather, that it will be returned at last to the Rhinemaidens. Having given the ring in lawful payment, he cannot *honourably* steal it back again himself. Nevertheless, he hopes to orchestrate a sequence of events in which someone else will, of his or her own free will, retrieve the ring and return it to the Rhinemaidens.

On a mortal woman, Wotan fathers twins, Siegmund and Sieglinde. These two siblings couple and bear a hero, Siegfried, who kills the dragon and recovers the ring – but alas he does not return it to the Rheinmaidens. In the end the whole tangled mess ends in "*Götterdämmerung*", the destruction of Walhalla and the end of the reign of the gods over creation.

I recommend that you read Wagner's narrative as running *down* the right-hand side of the Platonic Table – recounting the story of, amongst other things, the way that Pride leads to a Fall. Valhalla represents *fire* and light and Pride, at the top; then we pass the *air*-divinities, the Valkyries; then to *water* and Seigfried; and finally to *earth* and *Götterdämmerung*.

Running up the left-hand side of the Table, in contrast, we have stories of redemption, or something in that vicinity. *Parsifal* is a story of redemption through compassion, and death as a release from suffering; *Tristan und Isolde* is a story of unbridled romantic love as intrinsically aiming towards mutual death; and *Die Meistersinger von Nürnberg* is about a wise man who helps a pure-hearted youth to win a bride, by winning a singing contest.

Thus, in the Wagner-mnemonic sketched above, the right-hand side of the Table collects stories of masculine pride; the left-hand side collects more feminine stories of love and compassion.

Opening key-signatures

All four of the *Ring* operas are concerned with gods, and they begin with key signatures in *flats*. *Das Rheingold* begins in the key signature for E-flat, with three flats; *Die Walküre* begins in the key signature for F, with one flat; *Seigfreid* begins in the key signature for D-flat, with five flats; and *Götterdämmerung* begins in the key signature for G-flat, with *six* flats – which seems somehow appropriate if we are mnemonically placing this opera at the very bottom right-hand side of the Table.

The operas I have placed on the left-hand side of the Table display a contrasting pattern. *Tristan und Isolde* and *Die Meistersinger* both begin in the key signature for C, with no sharps or flats. *Die Meistersinger* begins in C major: *Tristan und Isolde* begins in A minor, with the same key signature. Hence Wagner's last seven operas do display patterns, in the initial key signatures, that reflect at least one of the salient patterns on the Platonic Table: "evens" (feminine) on the left, with no gods and no sharps or flats; and "odds" (masculine) on the right, with lots of gods and lots of sharps and flats.

However, *Parsifal* deviates from this otherwise very neat pattern. *Parsifal* differs from the other two of the three "feminine" operas, because it begins in the key signature for A-flat, with four flats. Therefore, since *Parsifal* is an exception, this boosts the likelihood that it was, after all, a mere coincidence that we have a predominance of "openings-in-flats" on the right-hand side of the Table, but not on the left-hand side. This weighs fairly heavily against the Platonic theory that Wagner

took guidance from the Platonic Table – but not so heavily, I think, as to furnish a conclusive refutation.

Looking more closely at the score for *Parsifal* we find that, although the orchestral opening is in the key signature for A-flat, with four flats, when Act 1 Scene 1 begins, the music modulates into the key signature for C major, with no sharps or flats. The scene begins with knights waking up in the morning and, as we get to the eighth line in the libretto, we lose all the sharps and flats. The first Act of the opera then wanders through many key signatures (and time-signatures): but it ends in the key signature of C major, with no sharps or flats.

Hence, on first blush it looks as though *Parsifal* deviates from the Platonic pattern instantiated by the other operas: *flats* for mythical stories on the "masculine" side of the Table; no sharps or flats for this-worldly stories on the "feminine" side of the Table. Nevertheless, on a closer look *Parsifal* fits the pattern much more nearly than first appears.

The key signatures in the scores for the operas cannot by themselves be expected to affect the audience who is seeing and hearing the opera, not even subliminally. Few people have "perfect pitch". Thus, one might think that this sort of pattern in opening key signatures could only serve as a kind of "private joke" for the composer himself. However, you should not be too sure about this. Key signatures can be expected to have both conscious and subliminal effects on the performers. Effects on the performers might then have effects, indirectly, on the audience. Hence reflections on these kinds of Platonic patterns in the music may not always, necessarily, be completely disconnected from aesthetic appreciation of the operas themselves.

Nevertheless, my goal is not to enhance appreciation of the operas. Rather, I use the operas to enhance appreciation of the Platonic Table. If you did want to memorize the opening key signatures for Wagner's operas, the Platonic Table could help you to do so.

Opening time-signatures

There is also a second pattern that holds, with one exception, and which also echoes one of the most salient patterns embodied in the Platonic Table. The Platonic Table is formed, numerically, by starting with an initial number, 1, and then imposing successive *doublings* down the "feminine" column, and *triplings* down the "masculine" column.

Hence there is a natural association between *tripling* and the right-hand, "masculine" column of the Table. In a corresponding way, the operas in the *Ring* cycle, on the right-hand side of the Table, all open with time signatures in *triple*-times. *Das Rheingold* opens with a 6:8 time-signature; *Die Walküre* opens with a 3:2 time-signature; *Seigfreid* opens with a 3:4 time-signature; *Götterdämmerung* opens with a 6:4 time-signature.

By contrast, the numbers on the left-hand side of the Platonic Table are generated by successive *doublings* and, correspondingly, two of the operas placed on this side of the Table open in *duple* time-signatures. *Parsifal* and *Die Meistersinger* open with a 4:4 time-signature.

Tristan und Isolde deviates from this pattern, because it opens with a 6:8 time-signature, for the orchestral prelude: although this exception to the rule is softened somewhat by the fact that the First Scene opens with a time-signature of 4:4.

The fact that *Tristan und Isolde* opens in a "triple" time-signature weighs very heavily against the theory that Wagner took guidance from the Platonic Table – but, nevertheless, it does not weigh so heavily as to furnish a conclusive refutation.

Thus, on the left-hand side of the Table there is a predominance of openings in *duple* times, in the key of C (all "white notes"); whereas on the right-hand side of the Table there is a predominance of openings in *triple* times, in key-signatures that include many "black-notes".

If Wagner had been taking guidance from the Platonic Table, under the Platonic ideology, then he would not aim to match the patterns on the Table exactly, mechanically, without deviations. Rather, he would aim to secure an approximate match between the Table and musical patterns in the operas: but he would respect the integrity of the materials he is working with, and he would deviate from Platonic patterns when needed. The result might well be just the kind of line-up of opening key-signatures and time-signatures that we do find in these operas.

Even if Wagner took no guidance at all from the Platonic Table, the patterns described above illustrate ways in which this Table could be useful to you, if you set out to memorize significant features of these operas. They also illustrate some possible ways in which the Table could *conceivably* provide specifically *musical* guidance to a creative artist. The exercise I am taking you through might suggest some of the things you could start by looking for, if you were looking through history to see if any musicians have ever imitated Plato's Demiurge in their creative work.

Rheingold = 1

Mnemonically, at the top of the Platonic Table we have a number associated with the element *fire* – or with *light* (which in Platonic chemistry is a species of *fire*).

The very top of the Table is an apt place to place *Das Rhiengold* – which is centrally concerned with the double theft of a golden ring. Gold glistens, as if *fire* were trapped inside it. In addition, the plot of *Das Rhiengold* concerns the construction of Valhalla, the palace of the gods; and this furnishes a second reason why is mnemonically apt to picture this opera at the top of the Platonic Table. Furthermore, this opera is the *only* one of Wagner's operas in which a key character is Loge, the trickster: a *fire* divinity, furnishing yet another way in which it is mnemonically apt to place this opera, in association with *fire* and *light,* at the top of the Platonic Table.

Das Rheingold is also *shorter* than the other operas in the *Ring* cycle. Wagner repeatedly treated the *Ring* cycle as a trilogy, with *Das Rheingold* as merely an introductory piece, setting the stage for the three operas that are to follow. It is mnemonically apt to associate the relative *shortness* of this opera with the *smallest* number on the Platonic Table.

Meistersinger = 2

Above *Tristan and Isolde* on the Table, we have *Der Meistersinger von Nürnberg*, mapped onto the number 2, and an *air*-note, on the Table.

This is an opera about marriage, and tells a story of matchmaking. This is a very appropriate theme for an opera associated with the number 2 – and with a position on the Platonic Table that in ancient times was associated with the Greek divinity Hera, the goddess of marriage. Greek myths memorably associate Hera with matchmaking.

In Nordic myths, Wotan's wife is the counterpart of Hera – and in Wagner's *Ring* she is the guardian of the sanctity of marriage.

The opera *Meistersinger* tells a story about how a marriage is contrived between a young woman, Eva, and the man she loves, and who passionately loves her, Sir Walther von Stolzing. They narrowly avoid several possible alternative, disastrous, outcomes. One possible disaster would be an arranged marriage of Eva to an older man Beckmesser. Another would be a cloistered life of unmarried celibacy. Another would be elopement with Walther. Happily, through assistance by one of the Masters of the guild of singers, the eminently prudent Hans Sachs, Walther wins a singing contest and thereby wins the hand of his beloved in marriage.

At the heart of the opera, therefore, is the story of a singing contest, and a story of the trade secrets of the Germanic troubadours or "Meistersingers". Among other things, the opera is about the artistic movement of Romanticism, which valued passion above hide-bound rule-worship, traditions, and conventions. Yet Wagner strikes a balance, a harmony, between the rules of tradition and the power of passion.

The young knight called Walther von Stolzing is a self-taught singer with powerful emotions – but he breaks the musical rules of composition, as they are taught in the guild of *Meistersingers*. Walther wishes to sing a Master-song in a public singing competition, at which the prize is to be Eva, daughter of the richest of the Masters in the guild of singers. However, to be eligible to compete in this singing context Walther must first be admitted as a member of the guild. To be admitted to the guild, he must sing a song, which will be examined by one of the Masters, who is chosen as "the Marker". The one selected as Marker is called Beckmesser. Beckmesser detects so many "errors" that Walther is refused membership. As a consequence of his failure to sing according to the rules, therefore, he seems destined to lose the woman he loves.

Walther then writes another song, a Master-song. This song is stolen by Beckmesser, who thinks it was written by Hans Sachs, the most respected of all the Meistersingers. Beckmesser hopes that this stolen song will win him the hand of Eva in marriage.

At the public singing competition, Beckmesser sings Walther's song – according to the formal rules of the guild. Yet although Beckmesser obeys the traditional rules of composition, both the Masters and the public (*der Volk*) unanimously reject his performance. Then Walther sings this song with passion – and even though Walther's performance breaks the guild's "rules of composition", Walther is acclaimed the winner – both by the Masters of the guild, and by the public.

There are many ways in which this opera is aptly placed in association with an *air*-note on the left-hand side of the Table. It is concerned with singing; and there are salient references to birds, and bird-names like "Vogel", running through the narrative. It is concerned with match-making and marriage, and that is an apt correspondence for the number 2. Are there, in addition to chemical associations, also some musical patterns in the opera that match patterns associated with this position on the Table? Yes, there are musical patterns that run deep within the opera, and which echo patterns on the Platonic Table much more closely than might first appear.

The opera opens in 4:4 time, in the key of C-major, with the major triad for C-major, C/E/G (*doh*, *mi*, *sol*). This is mnemonically appropriate for a placement of this opera on the Platonic Table alongside the number 2, at the top left-hand side of the Platonic Table.

This opera is of interest in another way, with regard to the Platonic theories I am exploring. The narrative speaks repeatedly about the transmission of what might be

called “trade secrets” among members of the guild of singers in ancient times. This helps to support the hypothesis that Wagner might have taken guidance from Pythagorean music-theory, of the kind that is embodied in the Platonic Table. Here is one example.

The Platonic Table embodies the Pythagorean division of the octave into a seven-note *sol-fa* scale. On this seven-note scale, ancient musical theory constructed what were called *modes*.

For each of the notes of the *sol-fa* scale, there are two modes that take this note as the “home note” or *finalis*: there is the “authentic” mode, and there is its “plagal” counterpart. In an “authentic” mode, the *finalis* is at the beginning of the scale, and is repeated an octave above at the top of the scale. In the corresponding “plagal” mode, the top three notes are transposed down an octave, so that the *finalis* is placed in the middle of the scale.

Here is one way of listing the fourteen possible modes, running around a “cycle of thirds” (the *finalis* is in **block** letters):

1. Hypomixolydian, or plagal **G**-mode:	DEF + **G**AB/BCD
2. Hypophrygian, or plagal **E**-mode:	BCD + **E**FG/GAB
3. Hypoionian, or plagal **C**-mode:	GAB + **C**DE/EFG
4. Hypoaeolian, or plagal **A**-mode:	EFG + **A**BC/CDE
5. Hypolydian, or plagal **F**-mode:	CDE + **F**GA/ABC
6. Hypodorian, or plagal **D**-mode:	ABC + **D**EF/FGA
* Hypolocrian, or plagal **B**-mode	FGA + **B**CD/DEF
	(*finalis* **B**: & no note is a 5th above B).
7. Dorian, or **D**-mode:	**D**EF/FGA/ABC
8. Lydian, or **F**-mode:	**F**GA/ABC/CDE
9. Aeolian, or **A**-mode:	**A**BC/CDE/EFG
10. Ionian, or **C**-mode:	**C**DE/EFG/GAB
11. Phrygian, or **E**-mode:	**E**FG/GAB/BCD
12. Mixolydian, or **G**-mode:	**G**AB/BCD/DEF
* Locrian, or **B**-mode::	**B**CD/DEF/FGA
	(*finalis* **B**: & no note is a 5th above B).

In this Pythagorean musical theory, since there are *seven* notes in the *sol-fa* division of the octave, there are therefore *fourteen* mathematically possible modes. However, two of these modes were, for centuries, considered to be musically unusable. It was thought that only twelve of these fourteen "mathematical" possibilities constituted "musical" possibilities. Two modes were rejected because, where you expect and have a deep musical need for the fundamentally important interval of the *fifth* above the *finalis*, what you find instead is the discordant interval of a *diminished fifth*, or an *augmented fourth*, or the "tritone", called the "devil's interval", the *diabolis in musica*.

Hence the fourteen possible modes were cut down to twelve "usable" modes.

The two "unusable" possible modes were called the Locrian and Hypo-Locrian modes. One of these is even more unusable than the other. The Locrian mode contains the notes (going upwards): (***ti***-*doh-re-mi-fa-sol-la* + *ti*), and the interval from the home note *ti* to the fifth note above it, namely *fa*, is a tritone. Using the "white notes" on the piano: if the *finalis* is B, then the ear wants to hear F#, but the mode gives you F-natural instead.

The Hypo-Locrian mode has home note *ti*, but comprises the notes (*fa-sol-la-**ti**-doh-re-mi* + *fa*). This mode shares the key defect of the Locrian mode. It does, nevertheless, have the compensation that it does include a usable interval of a *fifth*, between the bottom note *fa* and the *doh* above it. In fact, it contains the very same notes as the (usable) Lydian, or F-mode – just with a different *finalis*, and divided into *thirds* in a different way. Hence the Hypo-Locrian mode is not quite as unusable as the Locrian mode is.

This historical background in musical theory is echoed, in considerable detail, within Wagner's *Die Meistersinger von Nürnberg*.

When we are given a roll call for the Masters, *thirteen* names are called: but one of these Masters, Vogel, does not appear, and an apprentice says he "is sick" (*Ist krank!*). Note that the name *Vogel* means "bird". I conjecture that Vogel can be taken to correspond mnemonically to the "not-quite-unusable", *plagal* version of the Locrian mode. The name "Vogel" suggests, I suggest, that this mode is there in nature, but is not fit for human consumption.

The young protagonist, Walther von Stolzing, says that he learned musical theory from a book by Walther von der Vogelweide (the surname means “bird meadow”). This Master, I conjecture, can be taken to correspond mnemonically to the “virtually-unusable” Locrian mode, the mode on B (*ti-doh-re-mi-fa-sol-la*). This mode is, as it were, “there in nature”, where Walther von Stolzing learned it, in the forest meadows, from the birds. The wise Hans Sachs says this was a “good Master”: but the antagonistic Beckmesser adds, “But long since dead” (*Doch lang schon tot* – that is, “*good* and dead”).

This leaves *twelve* Masters who answer the roll call; and when the twelve are all seated the one reading the roll says, “For our session the number is good and full” (*Zur Sitzung gut und voll die Zahl*). This corresponds to the full quota of “usable” musical modes, which was established at the end of the Middle Ages by Henricus Glareanus in the *Dodecachordon*, published in Basel, Switzerland, 1547.

Fritz Kothner gives the roll call for the Mastersingers, so his name comes first in the libretto; but he says that he was the last to be admitted as a Master. If we put Kothner’s name last on our list, and if we otherwise follow the order that Wagner gives us in the libretto for the opera, then we obtain a list of Masters that can be aligned in the following way with the above list of musical modes, running through the list as a “cycle of thirds”:

1. Veit Pogner	plagal G-mode
2. Kurt Vogelgesang	plagal E-mode
3. Hermann Ortel	plagal C-mode
4. Balthazar Zorn	plagal A-mode
5. Konrad Nachtigall	plagal F-mode
6. Augustin Moser	plagal D-mode
* (Niklaus Vogel: *sick*)	* plagal B-mode
7. Hans Sachs	D-mode
8. Sixtus Beckmesser	F-mode
9. Ulrich Eisslinger	A-mode
10. Hans Foltz	C-mode
11. Hans Schwartz	E-mode
12. Fritz Kothner	G-mode
* (Walther von der Vogelweide: *long dead*)	* B-mode

This list aligns Hans Sachs with the D-mode; and this is mnemonically apt: because the D-mode was traditionally taken as the hub of the whole Medieval system of modes – and the corresponding character in the opera, Hans Sachs, is the hub around which the entire guild of Meistersingers revolves, and on whom the entire narrative of the opera turns.

The above set of correspondences aligns two of the “bird names”, Vogel and Vogelweide, with the B-modes. It also aligns one of the other “bird names”, Vogelgesang, with the plagal E-mode, which contains the same series of notes as the B-mode.

I offer the conjecture that the opera’s romantic lead, Walther von Stolzing – who learned from a book by Walther von der Vogelweide, and from the birds in the meadows – is to be associated with the B-mode.

It might perhaps be doubted whether Wagner himself ever noticed the possibility of any word-plays on the name “Vogel”. Yet this is unlikely, given that in the opera libretto the Masters themselves are constantly making word-plays on each other’s

names. For instance, when Walther von Stolzing sings, Master Vogelgesang is intrigued, but the hostile Master Beckmesser teases him:

> You praise him, Master Vogelgesang, because he has learnt song from the birds (… *von Vogel er lernt den Gesang*)?

It is abundantly clear that Wagner did take note of the similarity between the names of Vogel and Vogelweide and Vogelgesang.

It might be doubted whether Wagner noticed correspondences between his twelve (or fourteen) Masters, and the medieval twelve (or fourteen) musical modes, or between the "bird" Masters and the problematic B-modes. Wagner used the system of major and minor *scales*, rather than *modes*.

Yet one should not be too hasty in dismissing the relevance of the modes to Wagner's music. Each of the modes emphasizes certain *intervals*, which are much less salient in the other modes. Most notably, the *tritone* is emphasized in the Locrian modes, and not in the other modes. Wagner could well have linked the modes with some of the distinctive musical intervals, and *harmonies*, within his own music, even if he did not explicitly write his music in any of those modes.

One especially illuminating way to generate the modes is by following the "cycle of fifths", starting with the mode on F. Following the "cycle of fifths" means that, after the mode on F, we move to the mode on the note that is separated from F by the musical interval of a fifth. The "white notes" do not include any note a musical fifth below F: the note a musical fifth below F is B-flat, not B. Hence we cannot proceed *downwards* from F by a fifth. Therefore we need to progress from F *upwards* by a musical fifth to C.

Continuing in this way, we obtain the following sequence of modes, which the cycle of fifths generates, in the following order:

1. F-modes;	2. C-modes;	3. G-modes;	("major modes")
4. D-modes;	5. A-modes;	6. E-modes;	("minor modes")
7. B-modes			("tritone modes").

As we progress through these modes, in this order, take note of the intervals *above* the *finalis* that are available within these modes.

(1) In the F-mode there is a note that is a *fifth* above the *finalis*: but there is no note a *fourth* above F.
(2) In the C-mode there is a fifth and a fourth above the *finalis*: but there is no note that is a *diminished seventh* above C (and a diminished seventh is very useful, as memorably embodied in the "A-" of the "Amen" cadence in Church music).
(3) The third mode in this sequence, the G-mode, supplies this crucial interval of a diminished seventh: the G-mode includes, above the G, a major third, and a fifth, and a fourth, and a diminished seventh.
(4) The next in the sequence is the D-mode: and this is the first to include a note that is a *minor third* above the *finalis*.
(5) The next in the sequence is the A-mode, and this is the first in the sequence to include a note that is a *diminished sixth* above the *finalis*.
(6) The E-mode is the first in the sequence to include a note that is a *semitone* above the *finalis*. And finally,

(7) the B-mode is the first in the sequence to include a note that is a *tritone* above the *finalis*.

Are there any salient and memorable patterns within the music itself, in the opera *Die Meistersinger*, that reflect any correspondences with the mnemonics of the medieval system of modes? Yes, there are.

The rules of the guild of *Meistersingers* would have forbidden a singer to sing, in immediate succession, two notes separated by a tritone. Indeed, even if there is *one* other note between them, it is forbidden to sing in succession two notes separated by a tritone – unless one of the notes separated by a tritone is just a transitional note, immediately resolved into a note that is separated from surrounding notes by a more acceptable interval.

In his other operas, Wagner does not avoid tritones. For instance, the first chord in *Tristan and Isolde*, called the "Tristan chord", consists of the notes F, B, D# and G#: and the notes F and B are separated by a tritone. In *Die Meistersinger*, however, tritones are rare. When singers do sing notes separated by a tritone, either in immediate succession or else with only one note between them, there is a good reason for it. For instance, when it is suggested that the common people be given a vote on which song will win in the public competition, some of the Masters are horrified, and Foltz and Schwartz say, "*Das Volk?*" to the notes G and C-sharp, and these notes have a tritone between them. This expresses their horror at the thought.

Since tritones are not very frequent in *Die Meistersinger*, it is significant that in the roll call for the Masters the name "Niklaus Vogel" is sung to the notes: D, B-flat, E, C, and the interval between B-flat and E is a tritone.

When Walther von Soltzing tells the name of his Master, Walther von der Vogelweide, when he sings *mein Meister* he sings to the notes A-sharp-B-E; the interval between A-sharp and E is a tritone, and the note B is just a transitional note connecting the A-sharp to E.

When Walther sings in Act 1, in hopes of admission to the guild of singers, his relatively short song contains *eleven* transitions of a tritone.

(For instance, the word *Stimmen* is sung to the notes E and B-flat; *wie wächst* to the notes B-flat and E; *lauert* to the notes D-flat and G; *neuen* to the notes E and B-flat. There are also tritones with only one transition note between, as for instance *antwortet* sung to the notes G-F-C-sharp; *Busens Raum* to the notes F-A-B-natural; and so on.)

Beckmesser interrupts, "Have you finished?" (*Seid ihr nun fertig?*), sung to the notes B-B-B-F-B, a very emphatic use of the tritone; and it is echoed by Walther, *Wie fraget ihr* ("What's the problem?") sung to the notes B-F-B-C, this being a less discordant use of the tritone than Beckmesser's.

In Act 3, Beckmesser gives a disastrous rendition of a song he has stolen from Hans Sachs, and which he hopes will enable him to win the competition. He thinks the song is by Sachs, but it is in fact by his rival, Walther.

When Beckmesser sings Walther's song, he begins with a chord on the lute – and this chord consists of the notes F-sharp and B, spread over several octaves. This is obviously a pointed display that he is using F-*sharp* and B, and is *not* using the notes F and B, which are separated by a tritone.

In his rendition of Walther's song, Beckmesser avoids ever singing two successive notes separated by a tritone; and only once does he sing two notes separated by a tritone, with only one note between. The words *wie ein Kraut* are sung to the notes C-E-F-sharp-G-A, and the notes C and F-sharp are a tritone apart. Yet the F-sharp is just a transitional note on the way from C and E to G and A, so it is not an exception to the

rules of the guild. Beckmesser has avoided using any inadmissible tritones. Beckmesser has played strictly by the rules. Yet his performance is rejected – by both the public and the Masters.

When Walther then gives his own rendition of his own song, he does not avoid tritones. For instance, *Liebestraum was* is sung to the notes E-F-D-B, and there is a tritone between the F and the B. In the second verse, *Quelle reiner* is sung to the notes G-F-sharp-C-E, and there is a tritone between F-sharp and C. In the third verse *Tag der* is sung to the notes F-B; *Sieg gewannen* is sung to the notes F-B-C-E-G. There is a clutch of tritones when the words:

Erde lieblichstes Bild, als Muse mir geweiht

are sung to the sequence of notes:

C-E-G-F-sharp-F-natural-B-C-E-G-F-sharp-F-natural-B-C.

In this sequence we find a tritone between C and F-sharp (twice) and between F-natural and B (twice).

Walther ostentatiously breaks the rules of the guild of *Meistersingers*: and yet he wins the competition to the acclaim of both the common people and the Masters.

Thus, there is a possible Pythagorean reading of the fact that the opera ends with the addition of the young Walther von Stolzing to the list of Masters. This young Walther, remember, was the pupil of the "long dead" Master, Walther von der Vogelweide – whom I take to correspond mnemonically to the Locrian mode. Wagner's opera, therefore, can be taken symbolically to represent the reintroduction of the Locrian mode into the family of musical modes that a musician should feel free to draw upon, in composing new music for the future. (Or at least, if not reintroducing the Locrian mode, Wagner is at least urging the readmission of the tritone, which had been rejected along with the associated Locrian mode.) If so, this message of Wagner's would be prophetic. The discord of the tritone, in the Locrian mode, became musically ubiquitous in the century that followed Wagner: in jazz.

And so, to conclude this excursion through Wagner's *Die Meistersinger*:

The mathematical and musical patterns embodied in the system of modes are extremely beautiful: and Wagner was the kind of composer that would have appreciated patterns of this kind. It is not so very improbable that, in his roll call for the Mastersingers, he might have noticed ways in which these Masters could be aligned with musical modes. It is not terribly improbable that he aligned them in the way I sketched above, so that the "bird names" coincide with the B-modes.

Thus there are good reasons for concluding that, in *Die Meistersinger*, Wagner is echoing musical theories that have at least some of their most significant roots in the Pythagorean musical theory that is embodied in Plato's *Timaeus*.

Die Walküre = 3

Mnemonically "below" *Das Rheingold*, on the Platonic Table, we have *Die Walküre*, assigned to an *air*-number on the Table. There are many ways in which this mnemonic placement of this opera is apt. The opera is concerned with Wotan's favourite daughter, the Valkyrie Brunhilde, and her eight sisters, who transport dying heroes from battlefields up to Walhalla. These nine Valkyries can be assigned to the

nine *air*-numbers on the Platonic Table (yes, there *are* just nine *air*-numbers altogether on the half-Table, which runs from 1 down to 27). It is appropriate to associate *air* with the divinities who transport heroes from *earth* to Walhalla.

The opera is also concerned with a sexual coupling between a brother and a sister: between Siegmund and Sieglinde. It is also concerned with a tension between the chief of the gods, Wotan, and his wife (and sister), Fricka. These Nordic stories run parallel, in many ways, to ancient Greek myths about the chief of the gods of Olympus, Zeus, and his wife (and sister) Hera.

In many ways the relationship between Wotan and his war-hungry, illegitimate, chaste daughter Brünnhilde is like that between Zeus and his war-hungry, illegitimate, chaste daughter Athene. The close relationship between father and his favourite daughter gives rise to a tension between Wotan and his wife Fricka – very like that between Zeus and his wife Hera (which is played out, in Homer's *Iliad*, in the tragedy of the Trojan War).

By aligning both Wagner's Nordic stories and ancient Greek myths with one and the same Platonic Table, we thereby highlight parallels between Nordic and Greek narratives. There may be many imaginable Nordic-Greek parallels that turn out to be merely coincidental, and gratuitous distractions from what is most enjoyable in the stories. Yet some of these Nordic-Greek parallels seem not to be adventitious distractions at all, but rather, noticing these parallels often enhances appreciation of these mythologies. These parallels furnish another reason why it may turn out to be a valuable exercise to align Wagner's operas with the Platonic Table.

In addition to the musical correspondences described above, there are also some very significant chemical patterns that mesh strikingly well:

					fire		**Loke**
	Gerhilde	***air***	*				
		water	*	*	***air***	[= *Helmwige*]	
		earth	*	*	*water*		
		water	*	*	*earth*		
	Ortlinde	***air***	*	**2**	*water*		
		fire	*				
Fricke	*Waltraute*	***air***	**2**	**3**	***air***	[= *Br.*]	**Wotan**
		water	*				
		earth	*	*	*fire*		
		water	*	*	***air***	**[**= *Gerhilde*]	
	Brünnhilde	***air***	**3**	*	*water*		
		fire	*	**6**	*earth*		
	Schwertleite	***air***	*				
Freia		*water*	**4**	**9**	*water*		**Froh**
		earth	*				
		water	*	*	***air***	*Grimgerde*	
	Helmwige	***air***	*	*	*fire*		
		fire	*	**16**	***air***	*Rossweisse*	
	Siegrune	***air***	*	**18**	*water*		
		water	*				
Erde		*earth*	**8**	**27**	*earth*		**Donner**

On this Table, we have 12 positions associated with *air*; but three of the *air*-numbers on the right-hand column are just repetitions of numbers on the left-hand column. For instance, the number 3, Wotan's number on the right-hand side, also occurs in the left-hand column. Thus, the upper three *air*-numbers on the right-hand side are just repetition of numbers on the left-hand side. In the right-hand column, only the lowest two *air*-numbers are *additional* numbers from those on the left-hand side.

Note that Brünnhilde's number is exactly the same as Wotan's. In Pythagorean terms this means that their *souls* are in fact identical. And this closely matches some of the things Wotan says in the opera.

It was an executive decision, on my part, to assign Brünnhilde to the number 3, matching the number for Wotan. But in listing the names of the other Valkyries, I have simply followed the order in which they are given in the original German publication, starting at the top and working my way down. It then turns out that the Valkyrie closest to Brünhilde, on the Table, is Schwertleite. But almost as close is Waltraute; and Waltraute is placed on the same number as Fricke, the number 2.

Thus, Waltraute is placed on one of the most salient numbers on the Table. Her number, Fricke's number, is almost as salient as Brünnhilde's own number, the number for Wotan. Fricke's number is much the most appropriate source for stern counsel against Brünnhilde's flagrant breach of the divine protocols. It is therefore a relatively nice mnemonic coincidence that, in the later opera *Götterdämmerung*, it is Waltraute that comes to plead with Brünnhilde to come to her senses, to abandon Siegfried, and to return to Valhalla.

This mnemonically fortunate coincidence could of course be a mere coincidence. Yet it might not be.

Tristan and Isolde = 4

Above *Parsifal* on the Table, we have *Tristan und Isolde*: and, as I have suggested above, this is a musically apt placement of this opera on the Platonic Table. The story recounts a tragic love-triangle involving King Marke of Cornwall, his bride from Ireland, Isolde, and his trusted knight Sir Tristan. There is discord between Marke and Isolde, and between Marke and Tristan: but there is unrestrained love between Tristan and Isolde.

Recall: the opening theme of the opera rises by the interval of a ninth, and this is mirrored by a musical interval of a ninth separating the two *water*-notes on the Platonic Table, the notes for King Marke and his bride Isolde. The notes for Tristan and Isolde, in contrast, are separated by two octaves.

This musical harmony between Tristan and Isolde is bolstered by the chemistry of the Platonic Table: Isolde's note is associated with *water* and Tristan's with *air*, and *water* is attracted into the *air* in evaporation. And it all ends in tears.

Again, these mnemonically happy coincidences could of course be mere coincidences. Yet it is at least possible that they are not.

Parsifal = 8

At the bottom left-hand side of the Table, we have the opera *Parsifal*. This mnemonic positioning thereby associates this opera with the element *earth* – and death, and resurrection or rebirth. This placement of *Parsifal* is both "chemically" and "mythologically" apt. More than one character in this opera is yearning for death, as a release from suffering.

In this opera, there are knights who are guarding the Holy Grail – the cup that caught the blood of Christ, which was shed as he hung on the Cross, when his side was pierced by a spear. The knights of the Order are also sworn to preserve that Spear, as well as the Grail.

When Christ was crucified, there was a woman who took pleasure in Christ's pain, and who laughed at his suffering. She has been reincarnated to torment, in generation after generation, and tries, again and again, to redeem herself. As Kundry, she ministers to the knights who guard the Holy Grail.

But there is also a knight, Klingsor, who had wanted to be initiated into the holy Order of the celibate knights of the Grail, but who was turned away. To demonstrate his eagerness to be initiated into the Order, he castrated himself; but he was still refused initiation. In resentment, he set up something like a brothel, in which women seduce knights of the Order of the Grail. Kundry leads a double life, sometimes working for the Knights, but sometimes working for Klingsor.

While working for Klingsor, she assisted in the theft of the holy spear, when it was in the care of one of the knights, Amfortas: and ever since that time Amfortas has had a wound that will not heal.

It has been prophesied that the Grail will only be reclaimed by the Knights when a "holy fool" appears – Parsifal is a "holy fool". Kundry tries to seduce him; but Parsifal remembers the pain of others, and his compassion breaks Klingsor's evil spell.

The opera ends with Parsifal using the spear to cure the wound of Amfortas, who dies – this being a welcome release from suffering. Kundry dies too, also a welcome

release from suffering, and from the cycle of rebirth. Parsifal then takes over the role of leader of the Knights of the Holy Grail.

This opera begins with a rising motif not altogether unlike the one that opens *Tristan und Isolde*. The opening to *Parsifal* evokes something like a longing for release from suffering but, unlike *Tristan und Isolde*, it does so without over-reaching the octave: it reaches to the top of the octave, but then it emphasises the interval of a *seventh*, rather than the ninth. This musical seventh is the "A-" in "Amen": but it is not resolved into the "-men" until the end of the opera.

However, the most distinctive thing about this opening motif in *Parsifal* is the use of rhythm, rather than harmony, in creating a sense of the longing for a release from suffering. Notes in the rising, opening sequence are often held for a long interval, and the next note often comes not on the beat, when you would expect it, but a significant interval after the beat. I think this pattern fits mnemonically, with relative comfort, at the bottom of the Table, just below *Tristan und Isolde*. Long and slow notes seem apt correspondents for the *larger* number at the *bottom* of the Table.

These musical patterns mesh well with the way I have mnemonically assigned this opera to the Platonic Table, as evoking a kind of *rebirth* – taking us from the death of the gods in *Götterdämmerung*, on the masculine right-hand side of the Table, to the left-hand side of the Table, where the themes will involve love and compassion.

Siegfried = 9

So far, I have been citing mainly patterns in Wagner's operas that harmonize well with patterns embodied in the Platonic Table. I have cited just a few patterns that jar. It is time, however, to face one more pattern that, on the face of things, seems to seriously reduce the usefulness of the Platonic Table as a mnemonic for patterns in Wagner's, and to undermine the plausibility of the theory that Wagner himself might have taken guidance from the Platonic Table when planning his operas.

By a process of elimination I was drawn to the conclusion that *Siegfried* would have to be assigned to the number 9, a *water*-number, on the right-hand side of the Table. I hoped, therefore, that there would be salient respects in which this would be a mnemonically apt place to place this opera. Yet, at first, it was hard to see any salient respects in which *Siegfried* would be aptly placed at this position on the Table.

At first, *Siegfried* might not seem aptly associated with *water*. The memorable music for Seigfried's "journey down the Rhine" comes at the beginning of the next opera, not *Siegfried*. The opera is set in a forest, with no mention of rivers or lakes. Siegfried is a fiery, not a watery, character. He forges a sword in a fire. And he slays a fire-breathing dragon. It is hard to see *water*-associations in this opera. The dragon is a Giant, and there are *air*-associations for giants – but not *water*-associations. It is hard, at first, to see any salient respects in which *Siegfried* should be aptly placed in association with a *water*-number on the Platonic Table.

Yet this problem diminishes under further consideration. For those who delve into Platonic traditions, there is a deeper link than you might expect between *Siegfried* and *water*, provided we take care to conceive *water* not just as the hydrogen hydroxide that we drink, but as the element *water* in the ancient chemistry of Plato's *Timaeus*.

According to Plato's *Timaeus* all the metals are species of the element *water*. Metals flow, when warm enough (as does water); and they harden, when cool enough (as does water when it freezes). In ancient chemistry, the similarities among species of *water* are explained by the theory that they are all composed of atoms with exactly the

same *shape* (the very *round* shape of the regular dodecahedron). Differences arise between different species of *water*, because they are composed of atoms of the same shape but of different *sizes*.

The opera *Siegfried* is centrally concerned with the forging of steel for a sword. The opera teaches the lesson that you need to get carbon into the mixture, if you are to make a sword that will not shatter.

The theme of metallurgy links *Seigfried* with other stories in the legends of King Arthur. King Arthur, memorably, becomes king because he can "draw a sword from a stone". This is code for the techniques for extracting metal from stones.

There is more than one story in Malory's *Le Morte D'Arthur* that relates to this theme of extracting a sword from a stone. Quite independently of the story of Arthur drawing a sword from a stone, there is another story that involves finding reddish stones in a stream: the colour comes from rust, which indicates iron content. These are the stones from which you can extract a sword. Among other things, these stories carry cultural wisdom concerning the crafting of iron swords.

However, iron shatters – unless it is infused with carbon content – which turns it into steel. This fact is integrally woven into the Arthurian stories in Malory's *Le Morte D'Arthur*.

Thus for instance the sword of Tristan shatters, and leaves a splinter in his enemy's skull. Much is made of this splinter, in the stories. Thus, the fragility of iron swords is memorably woven into the stories around King Arthur and the Knights of the Round Table.

Likewise, the shattering of an iron sword is a very salient element in Wagner's opera *Die Walküre*. Siegfried's father Siegmund drew a sword, not from a stone, but from the World Oak. But it shattered. The nasty gnome Mime tries to reforge it, but every time Siegfried tests it, it shatters again. But Siegfried finds the technique for reforging his father's sword, and turning its iron into steel. He shaves the sword fragments down into tiny filings, mixes them with charcoal from the brown ash tree, melts the mixture down, and re-forges the sword. This gets carbon locked into the iron, and turns the sword into steel.

These features of Wagner's narrative resonate remarkably well with mnemonic features of the Platonic Table. In particular, the forging of a steel sword in *Siegfried* matches well against the association of this opera with the element *water*, on the Platonic Table. Thus for instance in Act I Scene 3, we find Siegfried singing *In der Wasser flossein Feuer fluss …* :

> In the water flowed a fiery flood: anger and hate hissed from there! Though scorching it flowed, in the water stream no more it flows, stark it lies and stiff, stubborn and hard the steel. Ardent blood soon from thee shall flow. Now sweat once again so I can shape thee! *Nothung*, conquering sword!

This is heavily laden with *water* imagery: and this is mnemonically apt for an association between this opera and a *water* position on the Platonic Table.

Thus, there are mythological and "chemical" reasons why it is mnemonically appropriate to place *Siegfried* on the Platonic Table in association with the number 9. It is also worth exploring *musical* patterns that might link this opera mnemonically with this position on the Platonic Table.

The opera opens in the key of D-flat, with a key signature marking five flats, and with the nasty character Mime and his kind. When Siegfried appears, the key signature shifts to G major. The musical interval between D-flat and G is as

discordant as the relationship between Mime and Siegfried. It is an interval of three whole tones, the "tritone", or "the devil's interval", like the interval between *fa* and *ti* in the *sol-fa* scale. This musically aligns Mime with the Devil.

The most memorable leitmotif for Siegfried, in the opera *Siegfried*, rises upwards and over-reaches an octave, evoking the fearlessness and adventurousness of this Nordic hero. This motif not only features in the opera *Siegfried* itself, it is also foreshadowed in the preceding opera *Die Walküre*, and is re-echoed in the succeeding opera *Götterdämmerung*.

In *Die Walküre* we heard the Siegfried motif in Act 3 Scene 1, when Siegfried's mother was told that she is to bear a hero who will be

> *… den hehosten Helden der Welt*
> ("… the noblest hero in the world").

This is sung to the rising sequence of notes: G, C, C, E-flat, D, C, A-flat, where the final A-flat ("der Welt!") is a semitone more than an octave above the initial G. (Transposing to the "white notes", in the *sol-fa* scale, the sequence is: *mi-la-la-doh-ti-la-fa*.)

In this incarnation, the interval between first and last notes is technically a "diminished ninth": a "ninth" would raise an initial G to final A, but if you lower the final high-note A to A-flat then you have "diminished" the ninth.

This theme makes a moving re-appearance in *Siegfried*, when Brünnhilde is reawakening and asks,

> *Wer is der Held, der mich erweckt?*
> ("Where is the hero, who awakens me?").

She sings this to the rising sequence of notes D-sharp, G-sharp, G-sharp, B, A-sharp, G-sharp, E: the Siegfried motif again, rising up an octave plus a semitone.

In *Götterdämmerung* the Siegfried theme reappears yet again just a few bars from the very end. The notes rise in the sequence: D-flat, G-flat, G-flat, B-flat-flat (approximately A), A-flat, G-flat, D-natural. This is the Siegfried motif again.

In my Platonic mnemonic, I have assigned both of the operas *Tristan und Isolde* and *Siegfried* to an association with the element *water*. The opening theme for *Tristan und Isolde* rises by the interval of a ninth: and the Siegfried-motif rises by the interval of a *diminished* ninth. It is mnemonically felicitous that the two *water*-operas both feature this rising musical interval "over-reaching" the octave. In *Tristan und Isolde* the upward ninth evokes something like the strain of unfulfilled longing: whereas in *Siegfried* the diminished ninth evokes bold, over-reaching heroism.

There is a further musical parallel, to follow this one between the upward "ninths" in *Tristan und Isolde* and in *Siegfried*. In *Tristan und Isolde* the upward interval of a ninth is resolved by a love-motif around open octaves. In *Siegfried*, the heroic Siegfried-motif is accompanied by a motif for Siegfried's sword, *Nothung* (meaning "needy"): and the motif for "*No – thung! No – thung!*" is sung to descending open octaves.

Hence, there is at least a handful of close, salient, musical correspondences between both of Wagner's "*water*-operas", and the musical patterns associated with the "*water*-numbers" 4 and 9 on the Platonic Table.

Taking stock, then, there are many salient and memorable musical correspondences between Wagner's operas and mythological, chemical, and musical patterns on the Platonic Table.

Are these correspondences striking enough to suggest that Wagner took guidance from the Platonic Table, or from some other mnemonic pattern of a similar kind, when composing his operas? Yes, I think so. Yet in any case these Platonic exercises illustrate that there are at least some ways, in principle, in which Platonic patterns could be woven – not only into narratives, like Malory's *Le Morte D'Arthur* – and into paintings, like Raphael's *School of Athens* – but also into the melodies, harmonies and rhythms of musical compositions. In addition, these exercises might help us to appreciate the Platonic Table, even if they do not help us to appreciate Wagner.

Earth

Things some poems catch,
sometimes, y'can't say
out loud: even this
one does.

CHAPTER 4:

An obstacle: Raphael's fourth wall

Contra "no-theory" theories

My Platonic theories about Raphael have several serious competitors. One rival theory holds that there is something wrong with people like me, who look for mathematical patterns in Raphael's paintings. On this rival theory, it is obvious that Raphael did not take guidance from any abstract Pattern of any kind at all, but worked (as you might say) instinctively.

Why should someone think this to be obvious? It might be because they are personally repelled by pattern-hunting, and they assume that Raphael would be more like them than he was like me.

Alternatively, some might think that, even if an artist might perhaps have used some private mnemonics or other, there is something wrong with my curiosity about what those private mnemonics might have been. Some might find it crass and offensive – and futile – to try to work out what those mnemonics might have been. They are sure that thinking about such things will only detract from aesthetic appreciation of works of art. They know for a fact that it would certainly drive *them* to distraction.

I will not address these "no-theory" theories directly. But I will address another rival theory. According to this rival theory, Raphael did take guidance from one or more abstract patterns – but not from the Platonic Table, as I have described it.

One rival theory might hold that Raphael took guidance from some source other than Plato's *Timaeus*: or from that source mixed in with many others. Another rival theory might hold that Raphael did take guidance from the pattern described in Plato's *Timaeus*: but, it might be held, I have radically misunderstood Plato's text. The Table that emerges from a correct reading of Plato's *Timeaus* might be substantially different from the one that I have extracted from that notoriously opaque text.

I will now address the possibility that Raphael might have taken guidance from some source *other than* the Platonic Table, as I have construed it. There is some evidence, I fear, that might support this rival theory, and undermine my theories.

Falsifiability of the theory

I am not by any means supposing that *everything* in Raphael's paintings comes from Plato's *Timaeus*. But I do conjecture that Plato's *Timaeus* is the source of the *numbers* of figures in at least three of the paintings in the *Stanza della Segnatura*, namely: the 56 in *The School of Athens*, the 28 in *Parnassus*, and the 63 (plus or minus one) in the *Disputa*. This theory needs to be confronted with evidence concerning the paintings on the fourth wall: the representation of *Jurisprudence*, and the number of figures depicted on this fourth wall.

In the twentieth century, the most influential philosopher of science was Karl Popper. He taught that science progresses by a process of "conjectures and refutations". It is important for a scientific theory to be "testable". Conjectures are a good thing, provided they make predictions that can be tested. If a theory makes mistaken predictions, then the theory must be rejected as false; if its predictions match observations, then that does not prove the theory to be true, but it is rational to trust that working with this theory will be the best way of taking ourselves closer to the truth. If, however, there is no imaginable way of refuting the theory, then there is no reason to think it takes us any closer to the truth.

To convey the import of Popper's notion of scientific method, I will quote from a novel: *Middlemarch*, by George Eliot. In this novel a young woman, Dorothea, has married a scholar, Casaubon, who is seeking for what he calls a Key to all Mythologies. By the middle of the novel, Chapter 48, we find Dorothea disenchanted with her husband's methodology:

> Doubtless a vigorous error vigorously pursued has kept the embryos of truth a-breathing: the quest of gold being at the same time a questioning of substances, the body of chemistry is prepared for its soul, and Lavoisier is born. But Mr Casaubon's theory of the elements which made the seed of all tradition was not likely to bruise itself unawares against discoveries: it floated among flexible conjectures no more solid than those etymologies which seemed strong because of likeness in sound, until it was shown that likeness in sound made them impossible: it was a method of interpretation which was not tested by the necessity of forming anything which had sharper collisions than an elaborate notion of Gog and Magog: it was as free from interruption as a plan for threading the stars together.

I am mindful of the kind of methodological error that George Eliot sees in Casaubon. So I wish to test my theory about Raphael by a collision with the fourth wall in the *Stanza della Segnatura*.

So, consider my Platonic conjectures about Raphael. Are they testable?

Yes, I think they are. They entail the prediction that the *fourth wall* in Raphael's room should contain numerical patterns that are salient within the Table described in Plato's *Timaeus*.

The numbers of human and divine figures depicted on the other three walls are all multiples of *seven*. This could be a coincidence: but my conjecture is that these

multiples of seven arise, on three of the walls in this room, because Raphael was taking guidance from the Platonic Table. This conjecture leads us to expect that the fourth wall, too will feature multiples of seven. Alas, it does not: it features 17 painted, human figures. There are, no doubt, various ways of fitting 17 figures onto the Platonic Table – but none of these ways will be anything like as salient or memorable as the patterns of *sevens* found on the other three walls.

Thus, finding these 17 figures painted on the fourth wall of Raphael's room therefore boosts the likelihood that the patterns of *sevens* on the other three walls are merely coincidental, and not driven by any significant correspondences to the Table described in Plato's *Timaeus*.

The fresco on the fourth wall is divided into two halves, with a large gap (a window) between them. The window leaves insufficient space on this wall for an expansive painting, like the ones on the other three walls.

The pair of smallish paintings on this wall are sometimes jointly called *Jurisprudence*, one half depicting secular legislation, the other half depicting ecclesiastical legislation. The numbers of figures in these paintings does not echo any of the patterns of "sevens" that we find on the other three walls. There are 8 figures in the depiction of secular legislation, and 9 in the depiction of ecclesiastical legislation.

Yet it might be asked, am I being overly dramatic, worrying about the fourth wall? Is it not possible that Raphael might have worked Platonic patterns into three of the four walls, but then deviated from that plan when he came to the fourth wall?

Yes, it is possible; but not likely, according to my Platonic theory. The more you study the room, the less believable it becomes that Raphael might have had some integrated plan for only three of the four walls in the room.

How then can I save my Platonic conjectures from the apparent Popperian refutation that Raphael hs painted on the fourth wall? I will argue that, despite initial appearances, there are Platonic patterns on the fourth wall. I will argue that these Platonic patterns are not just "far-fetched" and *ad hoc* ones, but very salient and memorable ones. They are also well integrated into the iconography of the room as a whole.

In order to show this, I need to review the iconography of the other three walls again, in more detail. And this exercise will also help to deepen aesthetic appreciation – both Raphael's works, and of the Platonic Table.

Raphael, the Pope, and the librarians

Yet: how well did Raphael understand the contents of Plato's *Timaeus*? It is not easy to understand the *Timaeus*. It was written in Greek.

Nevertheless, a Latin translation by Calcidius had been widely available for over a thousand years, by the time of Raphael. This Latin translation (of the first part of Plato's *Timaeus*, which includes the story of the Demiurge) was widely available even through the Dark Ages, when most of the other works by Plato, and most of the works of Aristotle, were unavailable in Europe. Furthermore, among the standard texts in the Middle Ages and Renaissance Italy, there were works by Boethius, which repeated many of the key ideas from Plato's *Timaeus*. Raphael would certainly have picked up some of these Platonic ideas, either directly or indirectly.

Yet this would not be enough to ensure that he had grasped the mathematical plan that guided the Demiurge, according to Plato's *Timaeus*. There is room for doubt whether Raphael would have read Plato's *Timaeus* that closely. Even if Raphael read

this difficult text, he would be unlikely to have spent an enormous amount of time puzzling away about the numerological patterns it contains – he was, presumably, too busy painting.

Nevertheless, there are other, more indirect, ways in which the contents of Plato's *Timaeus* could have influenced Raphael's creative works in the Vatican.

There were several scholars in the Vatican who could have had an influence on Raphael. For instance, there was Egidio da Viterbo (Giles of Viterbo), who wrote an influential manuscript on Plato, "Sententiae ad mentem Platonis". A recent scholar, Rowland (in Hall, 1997, p.143), comments on this Renaissance scholar:

> Egidio's remarkable visual sense was largely bound up in mnemonic techniques that went out of use in the eighteenth century. Ironically, therefore, the great universalist of Julian Rome turned out to be uniquely the creature of a single generation. It was Raphael, who knew Egidio's ideas only at second hand, who was able to create of them a universal statement.

But Rowland draws on evidence that Egidio da Viterbo had a very crowded schedule, travelling on the Pope's errands of various sorts, and so concludes Egidio probably did not have time to provide detailed guidance to Raphael, during the painting of the frescos in the *Stanza della Segnatura*.

Rowland argues that Raphael probably received close guidance, not directly from Egidio, but from the Vatican Librarian, 'Fedra' Inghirami, whose portrait Raphael painted.

Inghirami could read Plato's *Timaeus* in Greek; and he was in close contact with Pope Julius II, and with Egidio da Viterbo, and others. He is a likely candidate for an intermediary, who could have provided guidance to Raphael during the planning of the frescos in the *Stanza della Segnatura*. He shared with Egidio the Pythagorean, Platonic idea that there is a unifying Plan behind the diversity of material things, and that all the arts are enriched by tracing their roots to "philosophy":

> … every reserve, every supply of things to say comes from philosophy, which is the mother of all things well done and well said, without which we can define and evaluate nothing, nor speak with feeling and breadth about a variety of lofty subjects, like religion, death, piety, charity and especially the virtues and vices, and the soul's perturbations.
>
> Inghirami, Tommasso (Fedra),
> Commentary on *Ars poetica* of Horace,
> quotation and translation by Ingrid Rowland, p.159 in Marcia Hall (1977).

We know that Inghirami shared Egidio's enthusiasm for Plato, including Plato's *Timaeus*, and we know that he had close contact with Raphael. It is therefore not far-fetched to suppose that there might be a conduit through which notions in Plato's *Timaeus* found their way into the design of Raphael's paintings in the *Stanza della Segnatura*.

It is worth noting also that Egidio and Inghirami espoused a reconciliation between Plato and Aristotle. Rowland (1977), and other scholars that she cites, argued persuasively that this doctrine of a "harmony between Plato and Aristotle" is visually embodied in the figures of Plato and Aristotle in Raphael's *School of Athens*.

Thus, Egidio and Inghirami (and hence also Raphael) probably did not endorse any of the more "otherworldly" brands of Platonism that stand in energetic opposition to Aristotle's emphasis on the *embodiment* of forms in the material world. On the contrary, they saw the divine patterns as intrinsically embodied in the material world. Here, for instance, is a quote from Egidio, stressing the importance of embodiment, as contrasted with mere abstractions:

> The spirit will not settle for images; it yearns to pursue reality. The picture of a fountain does not quench thirst; it only stimulates it, and, if anything, sets it on fire.
>
> Egidio da Viterbo, "Sententiae ad mentem Platonis";
> quoted by Ingrid Rowland, p.131 in Marcia Hall (1997).

Thus, the Platonism lying behind Raphael is not an otherworldly denial of the body and a search for salvation in another world. It is, rather, a Platonism that endorses the cultivation of the Arts and Sciences in search of divine patterns within, not beyond, the material world.

Who's who?

Begin again with *The School of Athens*, on one of the four walls in the *Stanza della Segnatura*. Right at the visual centre of this painting you can see a book with "TIMEO" written on its spine, held in the hand of a figure that presumably represents the ancient Greek philosopher, Plato. I say "presumably" as a warning: although it is virtually certain that this figure represents Plato, there is very little we can truly know "for certain" about what represents what in this painting. Raphael left no "key" to this painting, and nor did anyone else. Well after Raphael's death, a series of scholars have tried to identify "who's who" in *The School of Athens* – starting with Vasari's *Lives of the Painters, Sculptors and Architects* (1568). But sometimes these scholars disagree, even about very central figures in the painting. And sometimes they make palpable errors.

Vasari was a contemporary of Raphael, but Raphael died young, and Vasari did not write his *Lives* until after Raphael's death. Vasari's *Lives* is a key source, but unreliable.

Vasari tells us, for instance, that a figure with his back turned to us, and holding a globe of the heavens, represents Zoroaster, and that beside him we find Raphael himself, "in a self-portrait drawn with the help of a mirror". This seems to be an accurate interpretation. Vasari offers just a handful of other useful identifications of this kind, either of which ancient figure is being represented, or else of which contemporary of Raphael had served as the model. Sometimes Vasari is convincing.

However, Vasari also manifestly misidentifies one key figure – who is copying from a slate that is held in front of him by an angel. Vasari says this figure represents the Biblical St. Matthew – whereas there is a broad consensus that, for many reasons, this must surely be Pythagoras.

Scholars of past generations used to try hard to identify the figures in Raphael's painting. Vasari identified (or misidentified) only 8 of the figures. Bellori (1695) corrected Vasari's mistake about Pythagoras (and explained how he had come to make this mistake), and identified altogether 18 of the figures. Passavant (1839)

identified 50. Lloyd (1864) identified 50, not always agreeing with Passavant. Springer (1883) identified 52.

Then this whole project went out of fashion. Wölfflin (1899) was one of the critics who pushed the pendulum towards the other extreme. The twentieth century has been full of critics who abhor the project of trying to identify the figures in Raphael's painting. In response, I make a plea for tolerance. Many critics do not find it profitable to reflect on which ancient Greek thinkers are represented by which of the figures in Raphael's painting. Wölfflin and others are probably quite right to turn their backs on this "identification project", given their own goals. Yet they should not sneer at those who have different goals.

There is nothing so very wrong with the project of trying to fix in your mind a clear catalogue of the great thinkers from the ancient world, and the ways they are related to one another. There is nothing so very wrong with using Raphael's painting as a tool, in pursuing this memory-task. Admittedly, this may distract us from other aesthetic merits of the painting. But it is possible to pursue this memory-task, not *instead* of other projects, but *as well*. Sometimes this way of using the painting might yield aesthetic rewards of a different kind. And besides, it is obvious that Raphael himself encouraged his public to ask who the different figures in the painting represent.

Returning to the figure holding the *Timaeus* in Raphael's painting: he clearly represents Plato, but his features are very similar to those seen in a memorable work by Leonardo da Vinci, which is widely thought to have been a self-portrait of Leonardo in old age.

The figure representing Plato is standing with one foot advanced a little in front of the other, and holding a book in one hand down by his side. This posture matches that of many statues from ancient Egypt, in which one foot is advanced a little in front of the other and a papyrus *scroll* is held in one hand. This is also the posture of an Angel described in the book of *Revelation* 10.1-2. This is a famous passage in which St. John hears "seven thunders" and is instructed *not to write* what the seven thunders have spoken.

The figure representing Plato is also *pointing upwards*. This is a gesture that is often associated with the biblical figure of St. John the Baptist. For instance, we find John the Baptist in Raphael's painting of *The Disputation*, on the wall facing *The School of Athens*. John the Baptist is sitting a little below Jesus, to his left-hand side, and is pointing upwards towards Jesus. We know that this is John the Baptist – not only by the pointing gesture but also by the fact that he holds a long staff with a small cross at the top, and he is dressed in the skins of wild animals. The gesture and the staff and animal skins are also very salient in a famous painting of *St. John the Baptist* by Leonardo da Vinci.

An association between Plato and John the Baptist is intriguing in this context, because the Biblical stories around John the Baptist suggest that many of his followers thought that he was a *reincarnation* of Elijah. One of the heresies circulating at the time of John the Baptist and Jesus clearly involved the doctrine of reincarnation, as is evident in various passages in the Gospels of the *New Testament*. A heresy of this same kind was reborn and then ruthlessly suppressed, particularly in the South of France, in the generations preceding Raphael and Leonardo da Vinci. The first of the Crusades was directed, in fact, not at the Holy Land but at the south of France. It was directed against the Albigensian and Cathar heresies, which toyed with the ancient heretical notion of reincarnation.

In this context it is a striking fact that the most significant Western source for the doctrine of reincarnation is Plato's *Timaeus* – and this is the book that is held in the hand of Plato – who is making the John the Baptist gesture.

According to the Bible, John the Baptist preached the coming of the Messiah; and when Jesus of Nazareth came to him to be baptised he proclaimed that Jesus was the Messiah. If the figure representing Plato, in the painting by Raphael, is a counterpart of John the Baptist, then it follows that the painting suggests that Plato was paving the way for Aristotle, in the way that John the Baptist paved the way for Jesus. This echoes the exalted position that Aristotle had come to hold in Christian theology, in the years between the Medieval rediscovery of Aristotle, which was cemented by St. Thomas Aquinas in the thirteenth century, and the time of Raphael, several centuries later.

Thus, there are many memorable correspondences surrounding the image of Plato in Raphael's *School of Athens*. The image sets up associations connecting Plato with Leonardo da Vinci and John the Baptist and the doctrine of reincarnation – and Plato's *Timaeus*.

Past scholars may have overdone their attempts to identify the figures in Raphael's painting: but they were, after all, only following encouragements that Raphael himself planted in the painting. Identifying Plato is manifestly relevant to a full appreciation of the painting. It is not at all absurd to infer that it might enhance appreciation to identify some of the others as well. And indeed, we find that identification of Aristotle, and Pythagoras, and Diogenes, and various others does indeed enhance appreciation of the painting. It is hard to know where to draw the line, and abandon this project, when Raphael so very obviously did encourage us at least to *embark* on such an enterprise.

Thus I argue that Wölfflin, and twentieth-century critics who followed, were mistaken in their diametric opposition to scholarly attempts to identify the figures in Raphael's painting of *The School of Athens*. They were also mistaken, more broadly, in their fervent opposition to anyone's treating the painting as "a puzzle".

To reinforce my argument, consider a parallel case from astronomy. Astronomers had early successes in figuring out the motions of the Sun and Moon. They succeeded so well that they were able to make very accurate predictions of such things as when the first full moon would fall after the equinox, and of solar and lunar eclipses. Think of these successes in understanding the Sun and Moon as like early successes in identifying Plato and Aristotle in *The School of Athens*.

These early successes were followed, however, by centuries of unsuccessful efforts to extend these accurate predictions, from the Sun and Moon, to other planets, as for instance Mars, which proved to be especially difficult. After centuries of fruitless effort many might prudently have counselled despair. For instance, in the 1600s Kepler set to work to try to find the secret pattern guiding the motions of Mars. Some might have suggested that this could well prove to be a waste of time: there might be no secret pattern, and even if there is one, there is no guarantee that it is one that the human mind is capable of discovering. The ancients thought that Mars and the other planets were conscious agents, like we are, and Kepler agreed. So he might well have thought that Mars might occasionally exercise his free will, and might deliberately break all the rules. Hence there is no guarantee that there is any mathematical pattern there waiting to be discovered.

Yet Kepler had faith. We had made ravishingly beautiful progress in understanding the motions of the Sun and Moon, and God knew that this would encourage astronomers to try to find comparable mathematical patterns guiding the motions of

the other planets. God surely would not tease us in this way, if he knew that all these attempts were completely futile. So Kepler persisted. And eventually he did make a breakthrough, comparable to the early Greek breakthroughs for the Sun and Moon. I suggest that the divine Raphael, like God, would not be so cruel as to first encourage us to try to identify figures in his painting, starting with Plato and Aristotle, but then to frustrate us by ensuring that for the other figures in the painting our efforts at identification would be doomed to eternal frustration.

Drawing a moral for the interpretation of Raphael's paintings, we should be grateful if a few Keplers keep puzzling away at the secret identities of figures in Raphael's paintings. It would be a pity of too many people wasted too much of their lives in fruitless attempts to figure out "who's who" in Raphael's painting. And critics like Wöllflin may not wish to be "puzzle solvers" themselves: but there is no need for them to condemn others who do.

Starting with the figure of Plato, we find one chain of twenty-eight thinkers running down the right-hand side of the painting. It is fairly natural to see the figures as forming a loose chain of 28. Hall (1997), for instance, convincingly presents this reading of the picture. On this way of grouping the figures, Plato and Aristotle belong to the same group. This signals a harmony between Plato and Aristotle: and Rowland (1997) convincingly argues that this way of seeing Plato and Aristotle was deeply held by figures in the Vatican at the time Raphael was painting the library. This notion of a harmony between Plato and Aristotle has been seen as early as Naumann (1879).

This chain of figures ends with Diogenes in the centre of the painting, sprawled on the steps like a beggar at everyone else's feet. It is clear which to figures represent Plato and Aristotle, and it is also clear that the figure of the "beggar" represents Diogenes. It is also clear that figures just below the beggarly Diogenes, and slightly to his left, are investigating *geometry*, and drawing figures on the earth. One of them is obviously Euclid. So this chain, which begins with Plato, with *fire*, and *light*, and *enlightenment*, progresses down to *earth*, geometry, and finally, Diogenes the cynic.

This visual pattern closely matches the pattern of the Platonic Table in a number of distinctive ways. As I will explain later, the last of the numbers in the series that generates the Platonic Table, the number 27, lies a little *apart* from the rest. In Raphael's painting the corresponding figure of Diogenes, too, lies a little *apart* from the other figures in the chain.

The second chain of twenty-eight figures in Raphael's painting can be seen as running up the left-hand side of the painting. This chain starts with a figure that is said (by some) to represent Heraclitus, and is also said (by some, and much more persuasively) to be a portrait of Raphael's contemporary, Michelangelo. Thus, the first chain starts with a portrait of Leonardo da Vinci, and the second chain starts with a portrait of Michelangelo.

Heraclitus was the ancient Pre-Socratic philosopher who taught, like the Buddhists, that "nothing is permanent" – and that you cannot step into the same river twice. This doctrine is diametrically opposed to the central idea of Plato, who is pointing upwards, and who taught that apart from the ever-changing world of appearances there are pure, ideal, abstract, mathematical patterns, which never change. The world of appearances, Plato taught, is a "moving image of eternity".

It would be a very moving, instructive, and appealing feature of the painting, therefore, if one chain of twenty-eight were to begin with Plato, and the other chain were to begin with Heraclitus.

The features of the figure that represents Plato have been generally assumed to resemble those of Leonardo da Vinci in old age. Correspondingly, the figure that is said to represent Heraclitus is said by many to have been painted in a distinctive, "muscular" style that imitates the style pioneered by Raphael's contemporary fellow-painter, Michelangelo. Furthermore, in Raphael's *School of Athens*, the features of this purportedly "Heraclitus-figure" are said to have resembled those of Michelangelo himself.

The interpretation of these correspondences is, however, tricky. I used to assume that the painting should be seen as dividing into a "rationalist" side headed by Plato, and an "empiricist" side headed by Aristotle. I still think it is relatively likely that some of Raphael's contemporaries might well have noticed (and valued) the possibility of interpreting the painting in that way, and that Raphael might have been aware of this ambiguity in the painting. The ambiguity might be deliberate.

Nevertheless, I now think that there is more depth in an interpretation that construes Aristotle as merely *applying* the philosophy of Plato. Visually, Aristotle is best seen as the second in the sequence of twenty-eight figures, winding its way down the right-hand side of the painting. The natural movement of attention progresses from Plato to Aristotle, and then further down this chain of twenty-eight.

Thus, on this reading, Aristotle does not head a rival school to Plato's, but rather, Plato and Aristotle are presented, visually, as part of the same school of 28 figures, on the right-hand side of the painting. If anything, Plato is John the Baptist to Aristotle's Jesus.

Michelangelo, Heraclitus, and Democritus

The second "school", which contrasts deeply and significantly with Plato's, is constituted by the other sequence twenty-eight figures, which begins with the Michelangelo-figure, leaning on a block of marble at the lower middle of the painting, and winds its way back up the left-hand side until the figures converge again towards the image of Plato/Leonardo at the hub of the painting.

Raphael could not have failed to be aware that some might wonder which ancient Greek philosopher is represented by the figure, front and centre, whose features resemble those of Michelangelo. There are no records, however, suggesting that Raphael expected anyone to think of this figure as representing Heraclitus. Nor are there any surviving hints about who else this figure might represent among the ancient philosophers. But it may be worth exploring a few salient, alternative possibilities here.

Indeed, there may be better candidates than Heraclitus, to set in correspondence with an image evoking Michelangelo, leaning on a block of marble. This figure is, for several reasons, apt for correspondence with the element *earth*. This harmonizes well with an association with the sculptor, Michelangelo. However, it does not harmonize well with an association between this figure and Heraclitus.

Heraclitus is traditionally associated with the element *fire*, not *earth*. And his memorable saying (that you cannot step into the same river twice) evokes *water*. In contrast, Democritus, the *materialist* of the ancient world, might more naturally be associated with *earth*. Hence it might be better to associate the Michelangelo-figure with Democritas rather than Heraclitus. Yet choices of this kind quickly descend into matters of personal taste, "intuitions", unsupported by any compelling "reasons".

Nevertheless, there are obvious features in Raphael's *The School of Athens* that will encourage some people to look for correspondences between figures in the painting and various people who served as "models" from among Raphael's circle of acquaintances. There are also obvious features that will encourage people to look for correspondences between figures in the painting and great thinkers from the ancient world.

These two different kinds of correspondences, taken together, will then set up many correspondences between ancient thinkers and Raphael's contemporaries, and this could furnish yet further food for thought. In what respects, for instance, was the role of Leonardo da Vinci in the Italian Renaissance like the role of Plato during the Golden Age in ancient Athens? Was Michelangelo, correspondingly, in some significant respect like Heraclitus, or more like Democritas? Did Leonardo correspond to *light* and *enlightenment*, and was Michelangelo more *earthy*?

Yet once you have passed beyond the dozen or so most salient figures in the painting, there are very few clues to guide the process of speculation about whom the figures might secretly be signifying. Furthermore, it is a highly significant fact that there is no surviving Reference Book to which you can turn in order to look up the answers, nor any record of anyone suggesting that there was once some written guide, now lost, which explained all the significant correspondences behind Raphael's painting. When you ask about some of the *least* prominent figures in the painting, there is such a striking absence of clues that you might well wonder whether there are any right answers to be found.

Perhaps Raphael's painting is teasing people who are too curious for their own good – seducing them into an expectation that each figure will represent an ancient thinker, and then leaving them cruelly adrift when they pursue this inquiry past the point where a man of good judgment would be content to rest in ignorance.

The thought might also occur to some, that there may actually have been "right answers", correspondences that were consciously articulated in private by Raphael and his close associates, but perhaps these were kept secret and judiciously revealed only to an elect few.

Alternatively, perhaps the point of the exercise Raphael has encouraged us to embark upon is that, beyond a certain point, each person is left free to use the painting to complete his or her own *personalized* mnemonic for the great thinkers of the past.

Thus, Raphael's painting is a little like the Sphinx in ancient Greek myths. The painting prompts many questions, but offers few answers. This indirectly supports the theory that Raphael might have been embodying Platonic patterns, within his paintings.

Embedding the School in the Stanza

The overall structure of the Platonic Table begins with a series of numbers formed by *doubling*, and a series of numbers formed by *tripling*. In Plato's *Timaeus* this "lambda-shaped" structure is bent into a circular shape and then is set into a complicated pattern of cyclic motions, one for each of the planets, set against the backdrop of a perfectly regular circular motion of the fixed stars. In a corresponding way, I encourage you visually and mnemonically to order the figures in Raphael's *School of Athens* against the backdrop of an overall *clockwise* cycle.

This Platonic clockwise cyclic ordering is reinforced by the upward, pointing gesture of the right hand of the figure of Plato at the hub of the painting, a gesture

which draws attention up to an arch in the background; and this arch curves over Plato and Aristotle and takes the eye back down to a memorable downward gesture of the outstretched hand of Aristotle. This cyclic order is echoed in many other works, both ones that influenced Raphael and ones that were influenced by him.

The pattern of numbers described in Plato's *Timaeus* and embodied in *The School of Athens* is built around Pythagorean musical theory. Pythagoras is represented in the lower left-hand side of *The School of Athens* with a slate being held up for him to study. On this slate are summarized the numerical ratios that underlie the construction of the Pythagorean musical scale, and that also form the backbone of the Platonic Table.

The cycle of fifty-six philosophers in Raphael's painting is a mathematical pattern that has a number of significant resonances. For instance, in a deck of Tarot Cards, alongside the Major Arcana there are *fourteen* cards in each of *four* suits, making a total of fifty-six suit-cards altogether.

The arrangement of figures within *The School of Athens* is intimately interlocked with the layout of the whole room.

On the left-hand side within the image of *The School of Athens* (the viewers' left), we have Pythagoras and arithmetic and music, overseen by a large statue of naked Apollo holding a lyre. On the right-hand side we have Euclid and geometry and astronomy and Aristotle's *Ethics*, overseen by a large statue of clothed Athena.

On the ceiling above Athena, the side on which we find Aristotle holding his *Ethics*, there is a panel representing the *Judgement of Solomon*. This mediates between Athena's side of the painting and the wall that represents the *Jurisprudence*. Then an image of the Forbidden Fruit of *The Tree of the Knowledge of Good and Evil* mediates between *Jurisprudence*, on the side-wall, and the theologians in the *Disputation*, on the wall that faces *The School of Athens* from the opposite side of the room.

On the ceiling above Apollo, in contrast, on the left-hand side of *The School of Athens*, we have a panel representing *Astrology* (or, some sources say, *Astronomy*; or alternatively, the Muse *Urania*). This mediates between Apollo's side of the painting and the wall that represents the poets on *Mount Parnassus*. Then an image of *The Flaying of Marsyas* mediates between the poets of *Parnassus* and the theologians in the *Disputation*.

The story of Marsyas is a cautionary tale, warning artists to sustain an appropriate degree of humility. There is also an image of the skin of Marsyas near the centre of Michelangelo's painting of *The Last Judgment*, and it is said that in this image, the features of Marsyas serve as a portrait of Michelangelo. Both Michelangelo and Raphael are deeply concerned about the danger of hubris, of pride. An artist in possession of "divine secrets", like the secret mnemonics in Plato's *Timaeus*, might be especially in need of warnings against the dangers of hubris.

All these intricate patterns strengthen the expectation that the patterns on three of the four walls of this room should be integrated in some deep way with the patterns on the fourth wall. This leads to the expectation that, if the patterns of *sevens* on three of the four walls were deliberate, then related patterns should be found on the fourth wall as well. So you would expect the fourth wall, with its depiction of *Jurisprudence*, to feature similar groupings of *sevens*. Yet it does not, as I will explain below.

It is also worthy of note that below *Parnassus*, at knee-level, is a representation of a story about Virgil. It is said that Virgil was setting out to Greece to take part in secret meetings of one of the mystery cults, "the Eleussinian Mysteries", and he died in Brindisi before he could take the boat to Greece. He is said to have expressed a dying

wish that his epic poem the *Aeneid* should be destroyed. It is also said that Caesar Augustus commanded that this dying wish should not be carried out. On the wall below *Parnassus* is an image of a book about to be cast on a fire, and Caesar Augustus commanding that it be withheld from the flames.

In the painting of *Parnassus* we find, flanking the image of the blind poet Homer, images of Dante and Virgil, exchanging glances behind Homer's back.

These images all reinforce the theory that the ancient Greeks possessed "trade secrets" that can be useful to artists, and that Dante learned from Virgil, and Raphael learned from Dante.

If you study the *Parnassus*, you find that there are *twenty-eight* figures altogether. It is unlikely to be a mere coincidence that there is this correspondence of *twenty-eight* poets with *twenty-eight* philosophers on the left-hand side of *The School of Athens*.

If I were right about the significance of the number twenty-eight in *The School of Athens* and *Parnassus*, on two of the walls of the *Stanza della Segnatura*, then it would be natural to wonder whether there are any similar number-patterns in the paintings on the remaining two walls of that room. Indeed, the theory that the number patterns on these two walls were intentional leads to a prediction: that it is very likely that there should be similar patterns on the other walls of this same room.

The Pagan philosophers in the *School of Athens* are facing the Christian theologians in the so-called *Disputation*. In that painting we find Christ floating in the sky, with *seven* figures above him, *seven* on his left, and *seven* on his right. There are *forty-two* figures on the earth below. The number forty-two is equal to six times seven. This matches the number of generations between Abraham and Christ, according to the genealogy recited at the beginning of the *Gospel according to St Matthew* (where the number is explicitly divided into three groupings with fourteen in each). The number forty-two also neatly matches very salient patterns on the Platonic Table: there are forty-two numbers down the series of "double intervals" on the left-hand side of the Table. Hence the number of figures in the bottom grouping in the *Disuptation* has both Biblical and Platonic resonances. It is unlikely that these numbers are purely coincidental.

Having found these numerical patterns on three of the four walls in the *Stanza della Segnatura*, my theory leads to a further prediction: that it is highly likely that there should be related numerical patterns on the fourth wall of this room. That is, the theory entails the prediction that it is highly likely that there should be similar groupings of sevens in the painting called *Jurisprudence*, on the fourth wall of the *Stanza della Segnatura*. Are there? No, there are not. My theories dramatically lead to a false prediction.

The problem of Jurisprudence

Jurisprudence divides into two separate panels. On the side closest to the philosophers in *The School of Athens* we have a depiction of Justinian delivering the "Pandects" of secular law. In the second panel of *Jurisprudence*, which lies on the side closest to the theologians in *The Disputation*, we find Pope Gregory IX delivering the "Decretals" of canon law. It is appropriate to place the Pandects of secular law nearer to the Pagans in *The School of Athens*, and the Decretals of canon law nearer to the Christians in *The Disputation*.

In the panel featuring the Pandects of secular law, we find Justinian represented along with *seven* other figures. This means that this panel contains *eight* figures all

together. This is not a multiple of seven, which is what my Platonic theory would have predicted to be most probable.

In the panel featuring the Decetals we find Gregory IX along with *eight* other figures. This makes *nine* figures altogether in this panel. That could be mnemonically associated with the fact that this Pope is Gregory the *ninth*. However, the number of figures is not a multiple of seven, as my theory would have predicted to be most probable.

This generates powerful reasons for doubt about my Platonic mnemonics. Perhaps I have not quite got the Platonic Table quite right? (Or perhaps I have got Plato's Table right but Raphael has not?) Or perhaps the correspondences I have been drawing arose merely by coincidence – and not through any guidance whatever, whether direct or indirect, from either the Platonic Table or anything remotely like it?

Here is yet another possibility. The eight and nine figures on the two panels of *Jurisprudence* do correspond to the numbers 8 and 9 on the slate that is held up for Pythagoras in *The School of Athens*.

The 8 figures in one panel of *Jurisprudence* stand alongside 56 figures in *The School of Athens*, and 56 = 8 *times* 7. The 9 figures in the other panel of *Jurisprudence* stand alongside 63 figures in *The Disputation*, and 63 = 9 *times* 7.

So there is, after all, at least one way to see the 17 figures in *Jurisprudence* as fitting neatly into the patterns embodied in the Platonic Table. This use of the numbers 9 and 8 is much less *ad hoc* than you might at first suspect. The numbers 8 and 9 are very salient in Plato's *Timaeus*. These numbers are on the slate held up before Pythagoras in *The School of Athens*. The ratio between 8 and 9 is significant in Plato's *Timaeus*, and for Pythagoreans more generally, because it is the ratio of the *whole tone*, in the *sol-fa* division of the musical scale. In Pythagorean musical theory, the frequencies (or wavelengths) of the notes *fa* and *sol* stand in the ratio of 8 to 9.

Two notes separated by a whole-tone can combine beautifully in a melody, if they are played in sequence. For instance, consider the cadence of "Ah-men", as for instance accompanied by the chords G 7^{th} (the notes G, B, D, F) followed by the C major triad (C, E, G). The highest notes in this progression are F followed by G, *fa* then *sol*, a progression up by a whole-tone. This is very satisfying.

Yet if you play two notes, separated by an interval of a whole-tone, *at the same time*, the result is a nasty discord.

In Raphael's *Stanza*, therefore, the ancient Pagan world in *The School of Athens* and the Christian world in *The Disputation* are portrayed as standing to one another in the musical ratio of a whole-tone. They combine together beautifully if taken in sequence: but they stand in a nasty discord if they coexist at the same time. This echoes the religious and political tensions in Renaissance Italy remarkably accurately.

I suggest, therefore, that either Raphael or else some of his advisors might have taken some guidance from the conception that two civilisations might be represented as standing in the musical ratio of the whole-tone, the ratio of 8 to 9, or of 9 to 8.

How *ad hoc* and tenuous is this speculation? It becomes a little less tenuous if you look back, again, to Plato's *Timaeus*. In that text, not only do we find the salient musical ratio of 9 to 8, in its own terms, we also find evidence that this could be taken as symbolic of the relationship between two civilisations: namely, the Greek and Egyptian civilisations.

Plato's *Timaeus* begins with an account of a visit the great ancient Greek sage Solon made to Egypt, where he heard the legend of Atlantis. Further details then emerge in Plato's uncompleted dialogue, the *Critias*, which follows as a sequel to the *Timaeus*.

In Plato's text, we find a priest in Egypt telling Solon that the civilisation in Athens was founded *nine thousand* years before the time of Solon. We are told that this civilisation was constructed on the site of present-day Athens, and that it featured impressive monumental architecture, in stone. This civilisation fought and won a war against the civilisation of Atlantis, and then both civilisations were destroyed by a great flood. We are also told that the civilisation in Egypt imitated that of Athens in many respects, and it was founded *eight thousand* years before the time of Solon.

No archeological finds have uncovered monumental stone architecture in Athens, dating back anywhere near as far as *nine thousand years* before the time of Solon. This number is not recorded in the text merely because it is an accurate historical fact. It is much more likely that the ratio of *nine thousand* to *eight thousand* years appears in the text at least in part for numerological reasons. In context, it is not improbable that these figures are intended to suggest that these two civilisations stand in a "fraternal" relation that is significantly analogous to the musical interval of the *whole-tone*.

There is a consilience between my hypothesis that Raphael's room suggests a "whole-tone relationship" between the Greeks and the Christians, and my hypothesis that Plato's *Timaeus* suggests a similar "whole-tone relationship" between the Greeks and the Egyptians. A consilience of this kind can boost the rational degree of confidence in both of these hypotheses, taken jointly.

I conclude that my Platonic theory about Raphael does make a risky prediction. It predicts that there will be some salient and memorable and instructive numerical pattern displayed in the *numbers* of figures in Raphael's painting of *Jurisprudence*, and that these patterns will have roots in Plato's *Timaeus*. I have shown that Raphael's painting of *Jurisprudence* does display exactly the kind of patterns that my theory predicts it should. This, I submit, helps to boost the likelihood that my Platonic theory may be drawing us closer to the truth: and that this theory may at least deserve further investigation. What began as an apparent falsification has been transformed into a substantial corroboration of the theory.

One
thought not true yet truly thought, this
truth not new yet newly taught on
Sappho's lyre is not forgotten.

CHAPTER 9:

A threatening apparition: Michelangelo's ferryman

My theory is threatened – indirectly – by the presence of a demonic ferryman at the bottom right-hand side of one of Michelangelo's paintings: *The Last Judgment*, in the Sistine Chapel.

My theory predicts that there should be *fire* (or perhaps possibly *earthy* imagery) at the bottom right-hand side of this painting – surely, at any rate, not the *watery* the imagery of a ferryman carrying condemned souls across a river to the underworld.

My reasoning is indirect. If I am right, Raphael's imagery in the Stanza della Segnatura was guided by the mathematical "world-plan" described in Plato's *Timaeus*. But if Raphael were party to a "trade secret" of this kind, then surely Leonardo da Vinci and Michelangelo would be too.

Raphael, at least, certainly seems to think that Leonardo and Michelangelo were his seniors within the "guild" of painters. Evidence of this is apparent within Raphael's painting of *The School of Athens*: Raphael includes a portrait of himself, assigned to a humble position in this assembly – whereas his *homages* to Leonardo and Michelangelo are associated with two of the three most salient of all the figures in this painting. Raphael must have assumed that Leonardo and Michelangelo knew all the "trade secrets" that Raphael himself, much their junior, would have known. If those secrets included the Platonic Table, then surely Leonardo and Michelangelo would have known all about it.

Hence I am led to predict that there should be Platonic structures woven into Leonardo da Vinci's works. Alas, Leonardo is so subtle that I find it difficult to find any evidence that carries much weight in support of my Platonic theory. But at least I find in Leonardo's works no patterns that weigh heavily *against* my theory. In Michelangelo's works, in contrast, I do find some patterns that seem to be completely contrary to what my theory would lead me to expect.

Thus, if were right in thinking that Raphael's room in the Vatican deliberately embodied some very salient Platonic patterns, then the Sistine Chapel should probably be expected to do so too. Perhaps this does not *necessarily* follow; but we should at least expect that Michelangelo's key works for the Vatican were *probably* created against a background knowledge that included familiarity with the Platonic Table. Michelangelo was working on the ceiling of the Sistine Chapel at the same time that Raphael was painting the Stanza della Segnatura. Michelangelo was secretive about what he was painting on the ceiling of the Chapel, not wanting anyone to see it until it was finished. It is possible that at this time he did not know about the way Raphael was taking guidance from the Platonic Table. But Michelangelo's *Last Judgment*, on the far wall, behind the altar, was painted long after the ceiling, and after Raphael's *School of Athens*. And so my theory leads me to expect, with relatively high likelihood, to find evidence of Platonic patterns guiding the structure of Michelangelo's *The Last Judgment*. Or at least, my theory leads me to expect that Michelangelo knew about the Platonic Table, when he painted *The Last Judgment*.

Now the Platonic Table has either *earth* (on one version of the Table), or else *fire* (on another version), at the bottom right-hand side. Furthermore, over several centuries before Michelangelo there were thousands of Renaissance images painted of *The Last Judgment*, all of which featured images of the *fires* of Hell at the bottom right-hand side. Anyone who knew about both the Platonic Table and these numerous images of *The Last Judgment* could not fail to be struck by the way in which both feature a progression *down* the right-hand side to *fire* at the bottom.

Yet Michelangelo deviates very strikingly from tradition, and places overwhelmingly *watery* imagery precisely where others had placed *fire*. If Michelangelo had been working with any background knowledge of the Platonic Table, when painting *The Last Judgment*, then it is (at least initially) *very* hard to see any way that he would have placed overwhelmingly *watery* imagery at the bottom right-hand side. He might have been deliberately thumbing his nose at the Platonic Table. But more likely, this *watery* evidence does threaten to sink my theory. It does appear to suggest, at least initially, and quite forcefully, that I must be wrong all round, about my theory that Raphael took guidance from the Platonic Table when painting *The School of Athens*, and the rest of the *Stanza della Segnatura*.

Michelangelo was not like Raphael

I fear to tread into scholarship on the works of Michelangelo. It seems perverse to suggest that Michelangelo took guidance from a Platonic plan, when creating his paintings on the ceiling, and on the wall behind the altar, in the *Sistine Chapel*. To me, he does not seem to be that kind of an artist.

It is one thing to suggest that Raphael might have been compliant, when directed by scholars like Egidio da Viterbo and Fedra Inghirami, and told how many figures to place on the left-hand side of the painting, how many on the right-hand side, and so on. It is quite another matter to imagine that Michelangelo would have taken directions of that kind, when painting, say, the *Last Judgment* on the wall behind the altar in the *Sistine Chapel*. We know quite a lot about Michelangelo's character, and what we know makes it seem extremely unlikely that he would have followed a mathematical "program" laid out for him by Platonic scholars.

Thus, I feel the force of comments by art critics like Andrew Graham-Dixon (2008, p.179):

> There is little point in debating the respective merits of different attempts to find a key to the Sistine ceiling, precisely because it is the very idea of a complete explanation, in the form of an underlying text that might magically explain all, that is itself at fault.

I agree. In looking for influences from the Platonic Table, I am seeking only to supplement, not to supplant, the many other sources of insight into Michelangelo's works. I am not looking for a key that will "explain all".

Critics like Graham-Dixon are right to reject the notion that seeking a "secret meaning" is the "right" way to approach paintings like Michelangelo's. They are right to endorse what we might call a more "intuitive" way of appreciating works of art. Yet they go too far if they maintain that this "intuitive" way is "the right" way to appreciate a work of art. Thus for instance Graham-Dixon says (p.2008, p.184):

> To approach the Sistine Chapel ceiling as if it were an iconographical picture puzzle, to go to it in quest of secret meanings and veiled correspondences, seems fundamentally perverse – like going to the music of Bach, not to be moved, but to hunt out the mathematical principles that might underlie its harmonies.

It is laudable to go to Bach "to be moved" – but it is unpleasantly totalitaritarian to sneer at those who might *also* go to Bach, on *other* occasions, to hunt out the mathematical principles that underlie its harmonies.

Likewise, it is laudable to go to the Sistine Chapel in the spirit that Graham-Dixon displays in the very next paragraph – where he says, for instance, that the "figures of the ancestors" are the lowest of the images, bridging the transition from the walls to the ceiling, "because they represent the lowest of the several spheres of human existence". This, I take it, is enhancing our appreciation of the work by pointing out "correspondences" (in a broad sense) – but these are not "veiled" correspondences, and Graham-Dixon is not treating the work as a "puzzle" to be "solved".

It is right to resist the notion that *all* viewers should *always* be looking for "veiled correspondences", *whenever* they are looking at Michelangelo's paintings. Judging by Graham-Dixon's own practice, however, it is all right to look for *some* correspondences, as for instance Biblical or mythological ones, so long as they are not so arcane as to require extensive specialist knowledge, as for instance they would if they required knowledge of Plato's *Timaeus*.

Yet it is unpleasantly hegemonic for Graham-Dixon to insist that anyone who also, on at least some occasions, starts looking for "veiled correspondences" is thereby *fundamentally perverse*. It is, surely, possible to appreciate music, or paintings, in one way at one time, and in another way at another time – responding "instinctively" one time, and seeking Platonic correspondences another time.

Thus for instance, to recur to Graham-Dixon's concise expression of a widespread aversion to arcane "pattern-spotting", we may agree with him that those who go to the music of Bach to hunt out the mathematical principles that might underlie its harmonies may, indeed, be swimming into waters that are out of most people's depth. So we should not insist that a "proper" appreciation of Bach should *always* involve those sorts of musicological investigations. Yet it is surely wrong of Graham-Dixon to suggest that anyone who delves into mathematical patterns embodied in Bach's music is thereby *fundamentally perverse* for doing so.

Hence I propose that we should at least investigate the hypothesis that Michelangelo was aware of, and perhaps sometimes took at least some guidance from, the Platonic Table. It is hard, perhaps impossible, to confirm a hypothesis like this with certainty. Yet it may be worth checking to see if there are salient and memorable Platonic patterns in Michelangelo's works.

There is a further difference between Michelangelo's *Sistine Chapel* and Raphael's *Stanza della Segnatura*. Raphael's paintings make extensive and explicit reference to the Greeks. Michelangelo's imagery, in contrast, is much more pervasively rooted in the Bible. This creates a further obstacle to the search for Platonic patterns in Michelangelo's paintings in the *Sistine Chapel*. If it seems unlikely that Michelangelo would have taken an interest in Platonic, Greek correspondences, we are left with reduced motivation to seek for Platonic patterns in his paintings. We might find some, but they are likely to be there merely by coincidence, and they are unlikely to deepen our appreciation of those paintings.

In the *Sistine Chapel*, it must be noted, Michelangelo has included a few unmistakable Greek references. The largest figures of all, on the ceiling, are seven Prophets and five Sibyls. The five Sibyls are very striking, and clearly labelled. They represent the ancient guardians, in the Greek world, of secret knowledge.

Nevertheless, for Michelangelo the impulse leading to the inclusion of these Sibyls might be coming primarily from a Christian, rather than a Pagan, source. Their inclusion might be registering merely their supposed role in predicting the coming of Christ. Furthermore, the five Sibyls that Michelangelo has selected come from geographically diverse locations: from Italy, Greece, Ionia, Persia, and Africa. This, too, might have had Christian rather than Pagan significance for Michelangelo.

Hence it is not certain that Michelangelo's Sibyls signal any genuine interest, on Michelangelo's part, in the "mysteries" of the ancient Greeks.

Michelangelo was deeply interested in Dante, who refers to the Greeks, and so there are inevitably fairly numerous indirect links to the Greeks, in Michelangelo's images. Yet, in his paintings, there is little evidence that he was directly interested in the ancient Greeks in general, let alone Plato's *Timaeus* in particular. In this respect, his images in the *Sistine Chapel* are very different from Raphael's images in the *Stanza della Segnatura*.

I remark, however, that it is possible for someone to take an interest in the abstract mathematical and musical patterns that are embodied in the Platonic Table, without being interested in the ancient Greek sources of these patterns. Indeed, it is possible to take an interest in these patterns without believing the Greeks to lie at the original source of these mnemonics. Milton, for instance, in *Paradise Regained*, speaks of the wisdom of the Greeks as being merely mangled and watered down, later distortions of earlier traditions.

Milton thinks of the Wisdom of Solomon as having come (with the Hebrews) "out of Egypt" – and before that, having come directly from God. The Greeks, he thinks, got hold of some of these ideas, and so we can indeed learn from the Greeks. But we should remember, Milton urges, that the original source was Hebrew – and before that, the source was the One God, not the many gods of the Greeks.

In support of Milton, we might also notice that Plato's *Timaeus* begins with a story of how Solon, the wisest of the Seven Sages of the ancient Greeks, went to Egypt and learned things there that the Greeks had forgotten. He brought Egyptian wisdom back from Egypt to Greece.

Thus, it is possible that Michelangelo avoided using any Greek sources, like Plato's *Timaeus*, and concentrated almost exclusively on Dante and the *Bible*. Yet that does

not necessarily entail that he took no interest in fairly abstract, mathematical, mnemonics. He could have learned some of these mnemonic patterns, for instance, in learning musical theory – whether or not he knew they traced back to Plato's *Timaeus*. It is also possible that he found, or thought he had found, these same mnemonics as embodied, in various ways, in Dante or in the *Bible*.

It is often remarked that the Biblical book of *Genesis* has many similarities to the creation myths of the Greeks, as for instance in Hesiod's *Theogony*. Indeed, there is reason to think that all these traditions may trace back to a common source, in oral traditions – long before either the Hebrews or the Greeks committed them to writing. This may not be true, but many people have thought this to be so. There were certainly many such ideas in circulation, concerning the antiquity and divine origin of "the mysteries". Michelangelo might have thought such things to be so, even if they turn out not to be historically accurate after all.

It must be admitted that, at first sight, it seems almost perverse to expect to find any salient, memorable, interesting correspondences between Michelangelo's paintings and the mathematical patterns that guided the Demiurge, according to Plato's *Timaeus*. Yet, on closer reflection, it is not so terribly far-fetched to suspect that there might be Platonic correspondences of this kind, not only in the works of Raphael, but also even in the works of Michelangelo.

I leave aside Michelangelo's other images in the *Sistine Chapel* and focus on just one: *The Last Judgment*. Are there any salient patterns in this painting, matching salient patterns that are embodied in the Platonic Table? The answer is, that there are indeed some ways in which Michelangelo's *Last Judgment* closely matches extremely salient, musical, patterns in the Platonic Table.

These Platonic patterns are demonstrably *there*, in the paintings – whether by design or by mere coincidence. And they are worth seeing – not just for the things they may perhaps help us to see in Michelangelo's works, but also because they can reveal still more to us of the rich mnemonic potential of the Platonic Table.

Clockwise patterns in Michelangelo, Raphael, and Plato

In Michelangelo's *Last Judgment*, there is a significant overall *downward* movement on the (spectator's) right-hand side of the painting, as souls fall downwards to Hell; and there is an overall *upward* movement on the (spectator's) left-hand side of the painting, as souls are resurrected from the dead and ascend upwards, to redemption in Heaven. That is, those descending to Hell, on the viewer's right, are below the *left* hand of the Risen Christ, and those being redeemed are to his *right*.

This "clockwise" visual pattern is reinforced in many subtle ways. For instance it is vividly reinforced in the gestures of the Risen Christ at the focus of the entire painting, standing right in front of the Sun. The right arm of Jesus is raised, with hand above his head, fingers extended, pointing further towards his left. This gesture beckons the souls on the right-hand side upwards to salvation. His left forearm, in contrast, is held in front of his torso, with fingers pointing towards his right arm. The gestures with his two arms embody a clockwise, circular motion at the very centre of the image, and this same circular motion is reinforced in many, many ways throughout the rest of the painting.

The same pattern (movements downward on the right, upwards on the left) is found in Michelangelo's painting of *The Brazen Serpent*, which is in the triangular area, the spandrel, above and to the right of *The Last Judgment*.

This “clockwise”, cyclic pattern closely matches patterns in Raphael’s *School of Athens*. In Raphael’s painting, too, there is an ambient visual movement of the attention in a roughly *clockwise* pattern: predominantly downward on the right-hand side of the painting, and upwards on the left-hand side. This cyclic visual pattern, in Raphael’s case, is subtle, and less insistent than in Michelangelo’s painting. Yet it is effective, nevertheless.

At the visual centre of Raphael’s image in *The School of Athens*, Plato is pointing upwards with his right hand. This leads the attention upwards, where we find the curvature of an arch. This arch draws your attention over towards the right, and then back downwards again, towards the right-hand side of the painting, where you find the image of Aristotle. This natural motion downwards on the right-hand side is then reinforced by the gesture of Aristotle: his hand extended in front of him, palm downwards and fingers apart. This suggests the grounding, or the application, of Platonic ideals within the material realm below. It also leads the attention to the other figures, predominantly on the right-hand side of the painting.

Thus, the gestures of Plato and Aristotle nudge the viewer’s attention into a clockwise progression, mainly downward on the right, and mainly upwards on the left. This pattern is reinforced by various gestures and postures of the figures throughout the painting. The same “clockwise” pattern can also be found in Raphael’s painting of *Parnassus* on the adjacent wall.

This pattern, “downwards on the right, upwards on the left”, stands in a deep, musical, mnemonic relationship with the Platonic Table. There are reasons for thinking that Raphael probably was aware of these harmonies between his images and the deep, musical patterns of the Platonic Table – and that these Platonic correspondences mattered to him (or, if not to him then at least to some of the scholars who probably advised him).

It would be distinctly odd if Raphael were aware of Platonic correspondences of this kind, and yet Michelangelo was not. If Raphael were conscious of these Platonic correspondences, then surely Michelangelo would have been aware of them too.

That is to say, even if Michelangelo did not care about such patterns himself, he would probably have known that Raphael was aware of them, and that other Platonists at the time would have been aware of them as well. In particular, Michelangelo might well have been conscious that his patrons, the Popes Julius II and Leo X, might have been looking for Platonic patterns of this kind. He might have been conscious that influential scholars at the Vatican, close to the Pope, like Egidio da Viterbo and Fedra Inghirami, might also have been looking for Platonic patterns of this kind.

This might not necessarily have moved Michelangelo to comply, slavishly, with their Platonic inclinations. Yet, when patterns in his *The Last Judgment* did echo, very closely, many of the patterns that Platonists would be looking for, then this fact – probably – would not be lost on Michelangelo. He would have seen these Platonic correspondences. He might then have either enhanced them, or subverted them, in various ways.

Hence, even if Michelangelo’s original inspiration came from sources completely disconnected with the Platonic Table, nevertheless, as his plans evolved he might well have noticed the times when his patterns did happen to coincide neatly with Platonic patterns. He would surely have noticed, for instance, that the “clockwise” pattern emerging in *The Last Judgment*, downwards on the right, upwards on the left, echoed similar patterns in numerous previous versions of *The Last Judgment*, and in Raphael’s paintings. If Raphael (or his advisors) had noticed that this “clockwise”

pattern echoed mnemonic musical patterns in the Platonic Table, then Michelangelo probably would have known this.

Other Last Judgments

Over several centuries before Michelangelo's time, there were many, many paintings that fitted the Short Table fairly closely: with three panels on the left, three on the right, and Jesus or Mary top centre. In some of these patterns, we have three or four panels on the right-hand side representing Hell, frequently with the *fire* at the bottom right; and three or four panels on the left-hand side representing resurrection and redemption, with souls rising up to Jesus. The number of instances of such paintings that map approximately, and sometimes remarkably closely, onto the Platonic Table is extremely large.

When I found these close correspondences between *Last Judgments* and the Platonic Table, a number of hypotheses came to mind. I wondered whether all these images were painted under the guidance of "trade secrets", which included initiation into the mnemonic patterns of the Platonic Table. But on reflection, this seems unlikely. If so many people knew "the secret", then it would surely have leaked out and become public knowledge.

As an alternative hypothesis, I wondered whether knowledge of the Platonic Table might have guided one or two of the earliest examples of these *Last Judgments*, as for instance the one on the west wall of the Torcello Cathedral near Venice. This image dates back to the late 1100s, almost four centuries before Michelangelo's *Last Judgment* in 1534. This early image is divided into five clearly demarcated layers. At the bottom on the right-hand side are the flames of hell. In the panel above that we have more flames – but also the winds of a furnace: there are angels with wings, holding back flying demons. And above that is a panel with angels blowing horns and recoiling with horror from a near-naked pagan woman, with man-eating fishes, in the middle of a lake. Above that is a row of seated saints. These four lower panels on the right-hand side (*fire*, *air*, *water*, *earth*) correspond very closely to patterns on the Platonic Table. It is possible that this image was constructed under guidance from the Platonic Table, or from some other mnemonic somewhat like it.

Then later versions might all be copied from the earlier versions, without knowledge of any Platonic source for the originals. This is, I think, a possibility; but I am still sceptical. The correspondences of pattern are very striking, but they could have arisen by coincidence, or from some other source than Plato's *Timaeus*. They could, for instance, have had a Biblical source. So I have tried to keep my focus on Raphael and Michelangelo, and not to be drawn too far into speculations about the anonymous artists who painted the walls of the Torcello Cathedral more than three centuries earlier.

As a third hypothesis, I wondered what someone like Raphael, and his Platonist advisors in the Vatican, might have wondered (as I have) about the visual patterns in traditional *Last Judgments*, as they had been painted over the previous few centuries in Italy. If I am right, Raphael and a few of his associates knew of the creation myth in Plato's *Timaeus*, and knew of the mathematical pattern that was said there to have guided the creative work of the Demiurge. They would have noticed close correspondences between traditional *Last Judgments* and the Platonic Table. They might well have at least toyed with the hypothesis that the Platonic Table (or some

earlier Hebrew or Egyptian version of this) might have guided the composition of these *Last Judgments*.

More generally, I suggest that it is possible – and indeed it is not improbable – that over the centuries there would have been several artists who were deeply influenced by a Pythagorean or Platonist ideology, and who knew of the creation myth in Plato's *Timaeus* as a touchstone for this tradition. From time to time, some of these artists might have noticed an approximate match between some of the best paintings of their predecessors, and patterns in Plato's *Timaeus*. Thus, the Platonic Table may well have been woven into the evolution of this artistic pattern, over the centuries – whether or not the Platonic Table played any role in the initial appearance of this pattern, or in the minds of the vast majority of the artists involved in the painting of these images.

Many, many earlier European depictions of the *Last Judgement* do feature the *fires* of Hell at the bottom right-hand side of the image. There were images with this pattern in the *Campo Santo* in Pisa, many of which have been largely lost, but some of which were copied by Lasinio (1828) (whose engravings prompted the formation of the "Pre-Raphaelite brotherhood" of painters in England, many centuries later). This pattern is also like Giotto's *Last Judgment* in the Arena Chapel in Padua. There is another, anonymous, image of this kind on the ceiling of the Baptistry at Florence – with sinners falling down to fiery damnation at the bottom right, and being resurrected and redeemed, rising upwards on the left-hand side of the painting.

The general pattern of a *fall* down the right-hand side and *resurrection* on the left-hand side recurs, not just in Italian models that could have influenced Michelangelo, but all over Europe. For instance, around the time of Shakespeare the same pattern was depicted in a wall painting of *Doomsday* in the Guild Chapel at Stratford-upon-Avon (see for instance Davidson, 1988). It is comical to compare the child-like figures in these English pictures with the muscular figures painted by Michelangelo. Nevertheless, the overall structure is the same – figures falling down to Hell on the right-hand side, and being resurrected and rising up to Heaven on the left-hand side.

The structure of all these images of the *Last Judgment* or *Doomsday* reflects a biblical text, *Matthew* 25, which describes the Day of Judgment, when Jesus will divide the sheep (on his right) from the goats (on his left). The relevant passage is fairly short, and comes after the parable of the "talents":

> 30. And cast ye the unprofitable servant into outer darkness: there shall be weeping and gnashing of teeth.
> 31. When the Son of man shall come in his glory, and all the holy angels with him, then shall he sit upon the throne of his glory:
> 32. And before him shall be gathered all nations: and he shall separate them one from another, as a shepherd divideth his sheep from the goats:
> 33. And he shall set the sheep on his right hand, but the goats on the left.
> 34. Then shall the King say unto them on his right hand, Come, ye blessed of my Father, inherit the kingdom prepared for you from the foundation of the world:
> …
> 41. Then shall he say also unto them on the left hand, Depart from me, ye cursed, into everlasting fire, prepared for the devil and his angels:

This text therefore places the "goats" on our right, as we view the paintings in which sinners are falling down to Hell on the right-hand side of the painting, and the "sheep", who are being resurrected and redeemed, on our left.

It would not be unreasonable to hypothesize that this biblical text, from *Matthew* 25, might be the sole explanation of the prevalence of this visual pattern: souls falling down to Hell at the bottom right of the painting, and being resurrected at the bottom left and rising up to Heaven.

Yet indirect evidence suggests that at least some of these artists, over the centuries, could also have been influenced by the fact that the biblical source can be reinforced by an alternative source, in the Pythagorean tradition of the "music of the spheres", and more specifically in Plato's *Timaeus*.

When a pattern like this is found in so many places and across so many years, it is overwhelmingly likely that many instances of the pattern were straightforwardly copied from earlier models, without any knowledge or conjectures about what mathematical models, if any, might have guided the construction of earlier instances of this pattern. Thus, for instance, it would not be at all unreasonable to suppose that Michelangelo might have seen earlier instances of the widespread pattern of earlier paintings of *The Last Judgment*, and might have copied them, adding variations of his own – and he might have done this without any notion that any of the earlier models might have been guided by mathematical patterns extracted from any Pythagorean source, like Plato's *Timaeus*.

Yet it is also possible that some of the early instances of this pattern were guided by Pythagorean sources like that of the Platonic Table, or something close to it. Furthermore, this is a notion that might well have occurred to a handful of Platonist artists over the centuries, in Europe, and might have had an influence on the evolution of this pattern – even if it were false as a straightforwardly historical account of Platonic "first origins" of the canonical pattern for *Last Judgments* in Europe.

In the Cathedral at Orvietto (San Brizzio Chapel, south altar wall), there is an image with the same structure by Luca Signorelli, of *Heaven and Hell*: again with souls rising up towards Heaven on the left-hand side, and souls descending to Hell on the right-hand side. Orvietto is located roughly midway on the main route between Florence and Rome, so Michelangelo would certainly have been there. Signorelli was doing his painting around the time when Raphael was painting the *Stanza della Segnatura* and Michelangelo was painting the ceiling of the *Sistine Chapel*. This was more than a decade before Michelangelo painting the *Last Judgment*.

Signorelli's *Last Judgment* in Orvietto is of special interest because it includes some details that closely match Michelangelo's image. In particular, it includes the ferryman Charon conveying souls across water, and serpent-tailed Minos judging them on the other side. In addition, Signorelli's visual vocabulary also prefigures Michelangelo's anatomical, muscular style.

However, in this image by Signorelli there is a significant section of the painting set *below* the image of the ferry crossing water. In contrast, Michelangelo's *Last Judgement* depicts the element of *water*, and not *fire*, prominently at the *bottom* right-hand side of the image. This is a significant deviation from the pattern found in earlier models: and it is a deviation that would seem, on the face of it, to take Michelangelo's painting *further away* from the pattern that is embodied in the Platonic Table – where we have the elements of *air* and *fire* at the bottom-right of the Table, situated *below* the element of *water*.

If Platonic influences had filtered into the evolution of this canonical pattern, then at least some artists might have been aware of this. Would Michelangelo have been one of them? It is possible that Michelangelo did not notice any of these Platonic influences, or noticed yet took no interest in them, and was completely uninfluenced by any such notions. That, however, seems less likely than the alternative hypothesis.

The ferryman

Michelangelo's *Last Judgment* is a huge painting on the wall behind the altar in the Sistine Chapel, the very heart of Christendom. As you come through the door of the chapel, the altar is at the far end. The *Last Judgment* is behind and above the altar. High up on this wall, well above the altar, Christ is returning to the earth, to judge all souls. At the bottom left of the painting, we see the dead rising out of their graves and ascending upwards towards Christ. On the right-hand side of the painting (on Christ's left-hand side), however, we see sinners tumbling downwards towards Hell.

At the very bottom on the right-hand side, we see a demonic figure of a ferryman with a boat-load of souls who are being cast onto the far shore. The painting echoes images from Dante's *Divine Comedy*, in the passages from *The Inferno*. The ferryman is Charon; and the souls are unloaded at the feet of the grotesque figure of Minos, who judges the dead. In Dante's narrative Minos wraps his long tail in many coils around himself, and the number of times the tail encircles him determines the circle of Hell to which a sinner will be consigned. In Michelangelo's painting this tail is a snake, with its mouth fastened on the phallus of Midas. The nudity, crudity, and the Pagan imagery are very surprising, in an image at the heart of Christendom, and prompted much controversy. Some rude bits in this painting were painted over with random bits of drapery – but, amazingly, most of these images have survived.

I will investigate patterns within Michelangelo's *Last Judgment*, to see if they match patterns you might predict if he were taking guidance from the Platonic Table. My Platonic theory leads me to expect that the images in Michelangelo's *Last Judgment* should depict figures falling *down* the right-hand side of the painting, and then ascending *upwards* on the left-hand: and that is exactly what we do find in the painting. However, we would also expect the figures on the right-hand side to be falling towards a fiery Hell at the bottom right. Yet what we find is not a *fiery* but a *watery* image at the bottom right of this painting. So, as I have argued, this undermines the theory that Michelangelo was taking guidance from the Platonic Table, when he painted *The Last Judgment*.

There is a suggestion of *fire*, in a distant glow behind the cluster of figures in the foreground, in Michelangelo's painting. Yet the fire is distant, and is left outside the scene, as depicted. This reinforces reasons for thinking that this painting undermines my Platonic theories about Raphael. Hence it is in my interests to find ways of reconciling Michelangelo's *Last Judgment* more closely with salient and memorable patterns embodied in the Platonic Table.

Musical and celestial cycles, and the Platonic Table

Arithmetically, you generate notes down the right-hand side of the Platonic Table by repeated operations of *tripling*. This yields a mnemonic for the tuning of an instrument. The generation of notes, through the cycle of fifths, can be followed by transposition upward in octaves, which corresponds arithmetically to operations of repeated *halving*, up the left-hand side of the Table.

It does not matter how many times you *triple* a number, no amount of *halving* could ever bring you back to *exactly* the same number as the one you started with. Hence the so-called cycle of fifths is not a perfect "cycle" after all. It is more like a spiral.

This corresponds to the idea that after each cycle of nature, you begin again in a *slightly* different state from the starting-point of the previous cycle. Hence each cycle will be slightly different from the ones before. Each year is a little different from the ones before. Each generation is a little different from the ones before. Each work of art is a little different from the ones before. Each artist is a little different from the ones that came before.

When we look closely and critically, the image we find in Michelangelo's *Last Judgement* is different from earlier prototypes, in which the damned souls are depicted as falling directly down to the fires of Hell. There is, however, a cave at the midpoint at the bottom of the painting, and through this cave we can see a figure falling towards what one guesses to be fires, out of sight, far below. Hence the image we are given, on the wall, ends with *water*: and it only refers indirectly to *air* and *fire*, as extending *beyond* the image we are given to see. It is as though God's harmonious creation, as a sphere, has an anus, through which the damned are excreted and fall down to be incinerated below.

Excluding discords: musical theory calls the tune

Michelangelo's image of the *Last Judgement* does depict figures corresponding to the numbers on the Platonic Table, but only to numbers *smaller* than the 81, at the right-hand side. Numbers below 81 are consigned to the Christian Hell (or the Greek Tartaros). This lies *outside* the harmonious cosmos within which we live. This realm, *outside* "our" world, is implied but not directly depicted in Michelangelo's version of *The Last Judgment*.

Here is a quick sketch of one way in which you could imaginatively construe the Platonic Table.

	1	*fire*	Heaven
2	**3**	*air*	
4	**9**	*water*	
8	**27**	*earth*	
16	**81**	*water*	Firmament enclosing system of spheres
32	**243**	*air*	Gates of Hell
64	**729**	*fire*	Bottom of the Fiery Pit

The number 81, on the Platonic Table, corresponds to the element *water*: and that is why Michelangelo has presented *water* at the bottom right-hand side of the *Last Judgement*. He has chosen to depict only the harmonious spherical cosmos that God created, and merely to imply but not depict the realms beyond.

Below the number 81, on the Platonic Table, we have the elements of *air* (241) and *fire* (729): and that is why Michelangelo has presented a small image, at the midpoint of the bottom of his painting, which depicts someone passing through a cave and falling through *air* towards *fires* below.

If he were taking guidance from the Platonic Table, then what reason might Michelangelo have had, as a Platonist, for his deviation from the traditional pattern, which features *fire* at the bottom right-hand side of a *Last Judgement*?

He could have been driven by the demands of musical theory, embodied in the Platonic Table.

The number 81 is the first one, on the Platonic Table, that registers a painful musical *discord* with the notes corresponding to the smaller numbers, which lie above 81 on the Table. As the "cycle of fifths" proceeds further down the right-hand side, to the numbers 243 and 729, the discords become even worse.

Why does the number 81 register a *discord* with the other numbers on the Table? Here is why. Imagine that you arrive at the number 81 by a process of *tripling* the length of the string of a lyre. Start with a string of unit length, which plays (say) the note E. Then triple the length repeatedly until you reach the number 81: this will be the note C, many octaves below. Transpose this note C upwards in octaves. That will require repeatedly *halving* of the length of the string.

You will eventually reach a string playing a note C, whose length stands to the string playing the original note E in the ratio 81:64. These two strings, standing in the ratio of 81:64, will stand in the Pythagorean musical ratio of a "major third", the ratio between C and E, or between *doh* and *mi*.

Yet this Pythagorean ratio of 8164 will sound discordant: it will produce "beats", perceived as a kind of "roughness" in the sound. A ratio of 80:64, by contrast, will sound "sweet", and more harmonious than one of 81:64. Why? Because the ratio (80:64) = (5:4). For deep reasons in the physics of musical harmonies, the ratios of *small whole numbers* yield the sweetest harmonies. So the ratio of 5 to 4 will be a sweet harmony. A ratio that is *near* but *not quite* equal to a ratio like that of 5:4 will sound either a little "sharp", or a little "flat".

Hence the ratio of 81:64 yields a discordant result. The "cycle of fifths", as embodied in the Platonic Table, can be used to tune instruments. Yet you should only use the cycle down as far as the number 27 – or perhaps even to 81 – but definitely no farther, or else you will fall into worse and worse discords.

This furnishes a deeply Platonic reason for segregating the Platonic Table into a harmonious "top half", down to the number 80 or 81, and setting it apart from

"Tartaros", which extends from 81 down to 729 at the very bottom right-hand side of the Table.

Thus, there are deep musicological reasons for dividing the Platonic Table into two parts. The musically harmonious part of the Table embraces the entire left-hand side all the way down to the number 64 at the bottom left, together with the upper portion of the right-hand side, extending from the number 1 at the top down as far as the number 81: and that is where the musically harmonious part of the Table ends. The excluded part of the Table will then comprise "Tartaros" or "Hell", and will extend from the number 81 all the way down to the number 729 at the bottom right-hand side.

Musically, the interval between the number 1 at the top (God) and the number 729 at the bottom (Satan) is a discord that is known as the *tritone*, or the *diabolus in musica*, "the Devil's interval". There are musical reasons for dividing the Table into two parts, one being harmonious and excluding the discord of "the Devil's interval".

This musical pattern can be linked to Christian imagery, linking the "excluded" numbers to Satan and Hell. Yet there are also links to more ancient Greek imagery. For instance, in Hesiod's *Theogony* there is an account of how the "Titans" were defeated by the "Olympian" gods, and were cast down to misty "Tartaros", where they were imprisoned behind impenetrable walls. This Greek mythology also reflects a musical division of the Platonic Table into a harmonious upper part, and a discordant "tail".

This musical division of the Platonic Table on the right-hand side, setting apart the number 81 (and the element *water*) and the numbers 243 (*air*) and 729 (*water*), corresponds very neatly to the imagery in the *Last Judgment* in the Torcello Cathedral. In the third panel up from the bottom, on the right-hand side, we have an image of *water*, and we also have angels recoiling in horror from that *water*: and as they recoil they are blowing forcefully on horns. There is thus, at this point, a pointed reference not only to *water*, and to discord, but also to music.

Michelangelo's *Last Judgment* reflects both Christian and ancient Greek mythological patterns that fit neatly against a Platonic Table that "cuts out" with the number 80 or 81 at the bottom right-hand side. The painting then does not include "Hell" or "Tartaros" itself, but merely refers to it indirectly, by representing a kind of "anus" through which damned souls can be "excreted" from the harmonious sphere of God's creation.

Milton's outer sphere of water, fires of Hell beyond

Following Michelangelo, there were probably some in Italy who came to the same conjecture that I have: namely, the conjecture that Michelangelo may have been taking guidance from the Platonic Table. Some of these might have passed on their theories to others. For instance, when the English poet John Milton visited Italy, he made some fast friends there, and they may well have conveyed to him some of their theories about the Platonic patterns that may have been guiding Michelangelo's depiction of *The Last Judgment*.

Milton certainly did – somehow – acquire an image of a harmonious, spherical cosmos, with Hell extending outside that sphere. In Milton's *Paradise Lost*, Lucifer is cast down from the highest heaven to the flames of Hell below. When you trace Milton's narrative attentively, you find it matches Michelangelo's imagery more

closely than it matches the earlier imagery of other depictions of the *Last Judgment*, and more closely than it matches Dante's imagery in *The Divine Comedy*.

When Milton describes his cosmology in *Paradise Lost*, the numbers he gives correspond very closely to the numbers on the Platonic Table. Here, for instance, is an early example from Book I, lines 50-52:

> *Paradise Lost* I.50-52
> Nine times the space that measures day and night
> To mortal men, he with his horrid crew
> Lay vanquished, rolling in the fiery gulf

Imagine that "the space that measures day and night" corresponds to the outermost of the heavenly spheres, at number 81 on the Table, and Satan has been cast down to the very bottom, at the number 729. In that case, Satan is indeed "nine times" further than the outermost sphere, because 729 is nine times 81.

Imagine, then, that the Gates of Hell are located at the number 243 on the Table, and that Satan and his partner Beelzebub are lying in the fires at 729. God has prepared a prison for the fallen angels, enclosed by impenetrable metal walls: imagine these walls are located at the number 243 on the Table. Heaven is the number 1 at the top of the Table. This is where the angel Lucifer began, before pride led to his fall and he was cast down to become the fallen angel, Satan. The gap between Heaven and the walls of Hell is given by the number 243. When lying in the midst of the fires at the number 729, Satan is *three times as far* from Heaven, as the walls of Hell. This matches Milton's text quite closely:

> I.723-74
> In utter darkness, and their portion set
> As far removed from God and light of heaven
> As from the centre thrice to the utmost pole.

Satan and Beelzebub then raise themselves from the fires at 729, and fly up to the numbers, on the Platonic Table, that form "means" between 729 and 243. There they muster all the fallen angels and make plans. Satan proposes to escape from Hell and find his way into the harmonious cosmos above them, to sow the seeds of discord.

Musically, it is striking that, that if Satan's number is now 729, and the number for Heaven is 1, then Pythagorean musical theory entails that there is a deep discord between the musical notes corresponding to these numbers. In fact, this discord is the "tritone", an interval of three whole-tones, as the interval between F (*fa*) and B (*ti*): the so-called *diabolus in musica*. Satan's note can form harmonies with some of the notes within God's realm, but on balance it creates too many discords, undermines Order, and threatens a return to Chaos.

Satan then flies up towards the walls that enclose Hell. This, I suggest, occurs at the number 243:

> II.630-635
> Satan with thoughts inflamed of highest design,
> Puts on swift wings, and towards the gates of hell
> Explores his solitary flight; sometimes
> He scours the right hand coast, sometimes the left,
> Now shaves with level wing the deep, then sours

Up to the fiery concave towering high.

Satan then finds the Gate and persuades the Gate-Keeper to let him pass through. On the other side of the Gate, he finds that there is another vast abyss he will have to cross:

II.917-920
Into this wild abyss the wary fiend
Stood on the brink of hell and looked a while,
Pondering his voyage; for no narrow frith
He had to cross.

This is the realm of the four elements and Chaos. I suggest that this occupies the gap between the number 243 and the number 81 on the Table.

Having crossed this gulf, Satan finds himself on the outer surface of an impenetrable sphere, a "firmament", and enclosed within this outermost firmament we find the stars and planets of God's creation. I suggest that this is found at or near the numbers 81 or 64 on the Table. Notice that the number 81 is associated with the element *water* on the Platonic Table: and this echoes a theory found in the Christian scriptures, according to which there is *water* outside the outermost firmament of the cosmos.

II.1027-1030
Over the dark abyss, whose boiling gulf
Tamely endured a bridge of wondrous length
From hell continued reaching the utmost orb
Of this frail world …

III.418-422
Meanwhile upon the firm opacous globe
Of this round world, whose first convex divides
The luminous inferior orbs, enclosed
Satan alighted walks …

I imagine the outer surface of this sphere as located either at the number 81 on the Table, or else (moving over to the other side of the Table), at the number 64.

Satan then finds a portal through which he can enter the harmonious sphere of God's creation, and he finds his way to the Garden of Eden, where he seduces Eve.

I may be wrong about Milton: he might not have been taking guidance from the Platonic Table. Yet then again, I might be right. Furthermore, even if Milton had not in fact taken guidance of this kind, I might be right in suspecting that some other artists, over the centuries, might have formed conjectures somewhat like mine, and might have *thought* that Milton took guidance from the Platonic Table, or something like it.

If Milton pictured God's creation as a sphere, ending with *water* at its outmost reaches – then, indirectly, this helps to confirm the theory that Michelangelo may have taken guidance from a similar cosmology, when painting *The Last Judgment* in the Sistine Chapel. This provides at least one possible explanation of why

Michelangelo placed prominent imagery of *water* at the bottom right-hand side of his painting. And furthermore, this explanation harmonizes very well with the theory that Michelangelo may have been taking guidance from the Platonic Table, when painting *The Last Judgment* in the Sistine Chapel.

If I am right, then Michelangelo (and some of the Vatican scholars who advised him) had recovered a deep understanding of the musical mathematics embodied in the Platonic Table. This depth of understanding of Plato's *Timaeus* had been possessed by some of the ancient Greeks, like Virgil, Plato, Homer and Hesiod. But it had been partially lost – across many of the Christian centuries that intervened between the Paganism of the Roman Empire, and the works of some of the greatest Renaissance artists, like Raphael and Michelangelo. By the time of Raphael and Michelangelo, a deep understanding of these Platonic patterns was being recovered by scholars; and there is reason to think that some of this new understanding percolated through to artists, like Raphael and Michelangelo.

The upshot is this. Michelangelo's ferryman initially appears to undermine my Platonic theories about Raphael. Nevertheless, this evidence that at first seems to falsify Platonic theories turns out, in the end, to boost their probability instead. And, whether or not these Platonic theories are historically accurate, they can at least serve a useful purpose, in further illustrating the astonishing mnemonic powers of the Platonic Table.

Why pry?

Be one
dying pirate t' hide her loot in
gilded chest then melt the key – we'd
force the hinges, wouldn't we?

CHAPTER 8:

In his *Timaeus*, Plato spills the beans

I think Plato used the Platonic Table to structure both his overall sequence of dialogues, and the internal structure of each dialogue, including the *Timaeus*. Yet in this book I will not trace the Platonic patterns within any of Plato's dialogues, or as embodied on an overarching scale in the sequence of dialogues taken as a whole.

In this book, I aim only to interpret the key passages in the *Timaeus*, in which Plato explicitly describes the mathematical pattern that guided the Demiurge when he created the heavens, and the earth and the souls of the creatures that live between the heavens and the earth, and the World-Soul that animates the world taken as a whole. But first, I will say just a very little about the context surrounding Plato's *Timaeus*.

Plato lived in Athens about twenty-four centuries ago. His influence on the arts and sciences and politics has been mind-boggling. He wrote at least 28 dialogues plus a collection of letters; and if he wrote anything else then it did not survive.

There are 28 dialogues that are undisputedly by Plato. A few centuries after Plato's death an ancient editor, Thrasyllus, collected Plato's surviving works. Since the time of Thrasyllus, all our editions of Plato's works have their source in that collection. That collection contained 36 dialogues, organised into 9 groups with 4 in each group. Eight of the dialogues in that collection, however, have each been thought, by some scholars, to have been written, at least partly, by Platonists after Plato's death.

One of Plato's dialogues was called *Timaeus*. It begins with Socrates saying, "One, two, three, but where my dear Timaeus is the fourth …?" This is not one of the dialogues that some scholars think to have been written by someone other than Plato. The *Timaeus* begins in dialogue form, and includes a short recitation of the history of a lost civilisation of Atlantis; but then one of the characters, Timaeus, begins a very long recitation from memory, which then continues uninterrupted to the end of the dialogue. The *Timaeus* has a sequel, the *Critias*, which continues on from where the *Timaeus* leaves off, and which gives more information about the story of Atlantis; but the surviving versions the *Critias* break off mid-sentence, and never complete the tale of the lost civilisation of Atlantis.

In Plato's *Timaeus* the extended recitation by Timaeus includes a creation story. In this story, the creator of the material world took guidance from a mathematical pattern that I call the Platonic Table. In my judgment, Plato did not invent the Platonic Table. He was just explaining things that had been orally transmitted through "the mysteries" of the Pythagorean brotherhoods, the Wisdom of Solomon, and the priesthoods of ancient Egypt. Plato was just *writing down* sacred secrets, and it had previously been forbidden for anyone to record any of these in writing, or to reveal them to the uninitiated.

However, Plato's dialogue cleverly manages to reveal many of its messages only to the few, while concealing them from the many. The dialogue describes the mathematical pattern of the Platonic Table very explicitly. Yet the description is difficult to grasp, and many different readers come up with many variations in the details of the Table. Furthermore, the dialogue nowhere says explicitly that this Table could provide a useful mnemonic for the divinities of ancient mythology. Nor does it say explicitly that an artist might find it useful to take guidance from this same mathematical pattern that guided the creator of the material world. Yet although Plato nowhere says these things explicitly, in my considered judgment these are the sorts of things that some of his readers might have guessed, and they are the sorts of things that Plato might well have expected that some of them might have guessed. Plato might reasonably have hoped that the few would understand, and that the many would not.

In Plato's *Timaeus* it is said that the creator of the physical world took two kinds of Sameness, two kinds of Difference and two kinds of Existence and:

> … he blended them all into a unity, forcing the nature of Difference, hard as it was to mingle, into union with Sameness, and mixing them together with Existence. And having made a unity of the three, again he divided this whole into as many parts as was fitting, each part being a blend of Sameness, Difference, and Existence.
>
> And he began the division in this way. First he took one portion (1) of 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; the fifth (9) three times the third; the sixth (8) eight times the first; and the seventh (27) twenty-seven times the first.
>
> Next, he went on to fill up both the double and the triple intervals, cutting off yet more 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

(arithmetic) exceeding the one extreme by the same number whereby it was exceeded by the other.

These links gave rise to intervals of (3:2) and (4:3) and (9:8) within the original intervals. And he went on to fill up all the intervals of (4:3) with the interval (9:8), leaving over in each a fraction. The remaining interval of the fraction had its terms in the numerical proportion of 256 to 243. And thus the whole mixture out of which he cut these portions was all exhausted by him.

The backbone of this mathematical structure can usefully be visualized as a column of even numbers alongside a column of odd numbers:

	1
2	**3**
4	**9**
8	**27**

Think of this as an inverted U; this is, shortly, to be made into a loop, an O, with 8 joining 27 to complete a circle.

The number 27 is interesting in several different ways, to Pythagoreans. One thing worth noting is that 27 falls *just short* of the number 28: which is what is known as a "perfect number". That is, 28 is the sum of its own factors: 28 is divisible by 1, 2, 4, 7 and 27, and 1+2+4+7+14 = 27. In addition, 28 = a+2+3+4+5+6+7. It is a very neat number. For Pythagoreans, it is a striking fact that, in creating the material world, the Demiurge drew a halt at a number, 27, which falls just short of "perfection".

A note of caution: Plato's text does not say that the number 1 is in any sense the best number to give the "measure" of the quantity that the creator took first from the bowl. The text just says that the creator took "a portion" from the bowl, and then that the creator took a second portion that was "double the first". The number 2 comes in not as the absolute size of the second portion, but as the *ratio* of the second to the first portion.

Thus, the first portion could have contained one unit, or two units, or any number of units, depending on what you choose as your units of measurement. The text then says that the creator took a second portion that was *double* the first. Yet this does not tie the second portion exclusively to the number 2. If the first portion measured, say, 6 units then the second would measure 12 units; if the first measured 384 units, then the second would measure 768 units; and so on.

Thus, for some purposes it would be convenient to choose the first "portion" as our fundamental unit of measurement; but there will also be other contexts in which this first portion needs to be subdivided into smaller units.

Hence I take the measure of the first portion to be some number *x*, whose identity is to be determined later in our investigations. Thus I will rewrite the backbone of the Platonic Table as follows:

	(1*x*)
(2*x*)	**(3*x*)**
(4*x*)	**(9*x*)**
(8*x*)	**(27*x*)**

When we place musical notes in the double and triple intervals, it will turn out that there are 32 notes that form a descending scale (it turns out to be convenient to set the note E as the number 1, at the top), descending down a musical scale, without any gaps, all the way to the number 9 (corresponding to the musical note D). Then there is a gap, and after this gap come four more notes followed by another gap and then the number 27, or note G, at the bottom.

You can visualize the notes that are found below 9 (there will be five of them altogether), disconnected from the rest, as the *kingdom of the dead*. The 32 above, which are musically adjacent, I submit, may be thought of as forming the *world of the living*.

Now think of the inverted U as being split in two lengthwise, as we are instructed to do by the text of Plato's *Timaeus*. This will create four columns of numbers: two columns on the left and two columns on the right. This requires us to split every one of the portions, so that one part of each portion contributes to the Circle of the Same and the other part contributes to the Circle of the Different.

Let $\boldsymbol{x = (y + z)}$

Circle of the Same	Circle of the Different		Circle of the Same
		(1*z*)	**(1*y*)**
(2*y*)	**(2*z*)**	**(3*z*)**	**(3*y*)**
(4*y*)	**(4*z*)**	**(9*z*)**	**(9*y*)**
(8*y*)	**(8*z*)**	**(27*z*)**	**(27*y*)**

The Circle of the Same will be formed from the multiples of ***y*,** and will carry the fixed stars. The Circle of the Different will be formed from the multiples of ***z*** and will carry the "wandering stars" or planets: the Sun, Venus, Mercury, the Moon, Mars, Jupiter and Saturn. This is the construction that is described in the creation story in Plato's *Timaeus*.

The simplest procedure would be to split each portion exactly *in half*, so that the first portion ($1x$) would be split into ($(1/2)x + (1/2)x$). Yet it would also be possible to make the split in other ways.

Musically, the most useful way to make the split would be by ensuring that each portion is split into sub-portions that are a *semitone apart*. The Circle of the Same would them comprise mostly the "black notes" on the piano keyboard; and the Circle of the Different would comprise only "white notes". This will set up a *discord* between the Circle of the Same and the Circle of the Different. Mnemonically and mythologically, this will correspond to a discord *between generations* as it were.

This musical discord will then mnemonically echo the story of the conflict between Ouranos and his children, the Titans. Kronos, the youngest of the children of Ouranos and Gaia (assisted by his mother), castrated his father. Then history repeats itself: Zeus is the youngest of the children of Kronos, and he rebels against his father, just as his father had rebelled against Ouranos. Again, history repeats itself, and the children of the Gods rebel against their parents. And each generation repeats the same story.

After the division of the circle of numbers into two, the Circle of the Same and the Circle of the Different, what follows in Plato's text is an account of the movements of the so-called "fixed stars", the ones that are carried by the Circle of the Same. There is also an account of the more complicated movements of the planets as they pass through the signs of the Zodiac, being carried around the line of the ecliptic by the

movement of the Circle of the Different. The planets are "visible gods" like Venus and Jupiter – these being the Latin names for the Roman counterparts of the Greek divinities like Aphrodite and Zeus.

After an account of the motions of "all that revolve before our eyes" – meaning the planets visible to the naked eye – we are then told of the "other gods" who "reveal themselves in so far as they will" (as Cornford translates the text), or "who are of a more retiring nature" (Jowett's translation):

> So this much shall suffice on this head, and here let our account of the nature of the visible and generated gods come to an end.
>
> As concerning the other divinities, to know and to declare their generation is too high a task for us; we must trust to those who have declared it in former times: being, as they said, descendants of gods, they must, no doubt, have had certain knowledge of their own ancestors. We cannot, then, mistrust the children of gods, though they speak without probable or necessary proofs; when they profess to report their family history, we must follow established custom and accept what they say. Let us, then, take on their word this account of the generation of these gods. As children of Earth and Heaven were born Okeanus and Tethys; and of these Phorkys and Kronos and Rhea and all their company; and of Kronos and Rhea, Zeus and Hera and all their brothers and sisters whose names we know; and of these yet other offspring.

In this passage there is a heavy dose of characteristically Platonic irony. On the surface there is a pious respect for traditional beliefs; yet it is hard to hear the passage without suspecting that it is intended to provoke, in at least some readers, a scepticism about the "family stories" of at least some of those who, when they "profess to report their family history", claim to be "children of the gods".

When I began to read about Hesiod's *Theogony* I discovered that the stories told by Hesiod himself had, by the time of Plato, probably been supplemented by a number of extra stories. Sometimes it is hard to tell which parts of the stories date back to Hesiod, and what parts were added later. The later accretions to Hesiod's texts often included accounts of the ways in which a number of royal families in ancient Greece could claim descent from various of the divinities that had been described in Homer's and Hesiod's epic poetry.

Stories of this kind, tracing the lineage of royal families back to the gods, have been echoed many centuries later. For instance, the poet Edmund Spenser, in *The Faerie Queene*, set out a genealogy of Queen Elizabeth I of England that traced her lineage all the way back to the very same gods that were described in Homer's *Iliad* and *Odyssey* and Hesiod's *Theogony*. Imagine that when Julius Caesar had invaded Britain, he left some bastard children behind, and from one of these came a lineage that led to Elizabeth Tudor. Then imagine also that the ancients had successfully traced Julius Caesar's lineage back to the Homeric heroes of the Trojan War, and hence right back to the ancient Greek gods. Then we would have found a *divine* lineage for the English Queen Elizabeth Tudor. I think we have reason to be sceptical of stories of this sort, which purport to support the divine right of kings and queens: and for the same reasons, Plato had reason to be sceptical of at least some of the stories, allegedly told by Homer and Hesiod themselves, that supported the divine right of many of the rulers in ancient Greece.

Yet there is also reason to suspect that Plato may have been deeply respectful of many of the myths that had been preserved by Homer and Hesiod, even though he was at the same time very scornful of the many misuses and abuses to which these myths are often put. Thus, it is possible to suspect that in his passage about the children of the gods there is a double irony. There is superficial respect for "family histories", overlayed by an implied scepticism about many of these self-serving stories; and yet this scepticism in turn also conceals a subtle yet sincere piety about stories concerning Okeanos and Tethys, Phorkys, Kronos, Rhea and the rest, provided they are properly understood.

It is interesting to see what happens if you match the divinities that Plato names in his brief genealogical sketch in the *Timaeus* against the major landmarks on the numerical structure that I am calling the Platonic Table. Here is a mapping that is worth thinking about.

DISTAFF SIDE			**SPEAR SIDE**		
Circle of the Same		**Circle of the Different**	**Circle of the Different**		**Circle of the Same**
				(1*x*)	**Phorkys**
Rhea	**(2*x*)**	**Hera**	**Zeus**	**(3*x*)**	**Kronos**
Tethys	**(4*x*)**	**Histia**	**Poseidon**	**(9*x*)**	**Okeanos**
Gaia	**(8*x*)**	**Demeter**	**Hades**	**(27*x*)**	**Ouranos**

In the above arrangement of the divinities, as recited in Plato's *Timaeus*, notice that females are associated with *even* numbers and males with *odd* numbers, an association that was commonly made by the Pythagorean cults.

Thus, the fundamental *biological* category of *gender* is registered by one of the most salient mathematical patterns on the Table, namely the distinction between *odd and even* numbers. I have labeled the columns so that the "Distaff Side" houses the females and the "Spear Side" houses the males.

The generation of the "Titans" is placed in the Circle of the Same, and the younger generation, that of the Olympian gods, is placed in the Circle of the Different. The six Olympians named above are children of the youngest of the Titans, namely Kronos and his sister Rhea. According to the myths, the younger generation is destined to rebel against their elders, to wage a war against them, to win that war, and to banish their elders to Tartaros, which lies far below Hades.

Notice also that *elder* divinities are associated with *larger* numbers, lower down the Table. Thus for instance, according to Hesiod, Gaia and Ouranos (Earth and Heaven) came before Tethys and Okeanos (the Great River and the Great Ocean that surrounds the world): and correspondingly, Gaia and Ouranos have been placed alongside larger

numbers than the numbers assigned to their children. Similarly the brothers Hades and Poseidon come lower down the Table, alongside larger numbers, than their younger brother, Zeus.

In Plato's creation story the numbers above, 8, 4, 2, 1, 3, 9 and 27, are described first and then the harmonic, arithmetic and other means are placed in the double intervals and the triple intervals that stand between these numbers. The initial list of odds and evens furnishes "addresses" for elder gods, who appear first according to Hesiod's *Theogony*. Then the children of these gods will be correlated with the numbers that appear as *means* between these initial odds and evens. The fundamental biological process of *generation* corresponds to the mathematical operation of finding the *means* between two numbers.

Having displayed the backbone of the Table, I will now describe what happens when Plato's *Timaeus* introduces "means" within the double and triple intervals on the Table above. In the double and triple intervals on the Table, we need to place the harmonic and arithmetic means.

The *arithmetic* mean between two numbers *a* and *c* is a number *b* that lies "mid-way between them". This means that the largest number *c* minus the middle number *b* is equal to the middle number *b* minus the smallest number *a*. For instance, the arithmetic mean between 2 and 1 is one-and-a-half, and this is because 2 minus one-and-a-half is equal to one-and-a-half minus 1.

The harmonic mean between two numbers *a* and *c* is a number *b* lying between them, such that in the series of numbers (*a*, *b*, *c*) *the ratio of the first to the second is the same as the ratio of the second to the third*. For instance, the harmonic mean between the numbers 1 and 2 is the number (4/3), one-and-a-third, because this number is *one-third of 1 greater than 1* and *one-third of 2 less than 2*.

Following the instructions in Plato's *Timaeus*, the next step in constructing the Table results in the following:

(1*x*)

((4/3)*x*) *harmonic mean*
((3/2)*x*) *arithmetic mean*

(2*x*)

((8/3)*x*) *harmonic mean*
(3*x*) *arithmetic mean*

(4*x*)

((16/3)*x*) *harmonic mean*
(6*x*) *arithmetic mean*

(8*x*)

((3/2)*x*) *harmonic mean*
(2*x*) *arithmetic mean*

(3*x*)

((9/2)*x*) *harmonic mean*
(6*x*) *arithmetic mean*

(9*x*)

((27/2)*x*) *harmonic mean*
(18*x*) *arithmetic mean*

(27*x*)

Following the instructions given in Plato's *Timaeus*, the next thing we need to do is to place further numbers in the resulting intervals of (4:3). These further numbers need to be ones that fill the intervals of (4:3) with two intervals of (9:8). Musically, this interval is the Pythagorean whole-tone, the interval between *sol* and *fa* in the *sol-fa* musical scale.

This division of an interval of (4/3) will leave one remaining interval in the ratio of (256:243), which is a Pythagorean musical semitone. The placing of the semitones within an interval of (4/3), especially on the Spear Side of the Table, is a little tricky and I will not explain the details. If you think you can find a neater arrangement you are welcome to try. Here is the pattern that emerges.

(1*x*)

((9/8) × 1*x*)
((81/64) × 1*x*)
((4/3)*x*) *harmonic mean*
((3/2)*x*) *arithmetic mean*
((9/8) × (3/2)*x*)
((81/64) × (3/2)*x*)
(2*x*)
((9/8) × 2*x*)
((81/64) × 2*x*)
((8/3)*x*) *harmonic mean*
(3*x*) *arithmetic mean*
((9/8) × 3*x*)
((81/64) × 3*x*)
(4*x*)
((9/8) × 4*x*)
((81/64) × 4*x*)
((16/3)*x*) *harmonic mean*
(6*x*) *arithmetic mean*
((9/8) × 6*x*)
((81/64) × 6*x*)
(8*x*)

((3/2)*x*) *harmonic mean*
((9/8) × (3/2)*x*)
((81/64) × (3/2)*x*)
(2*x*) *arithmetic mean*

(3*x*)

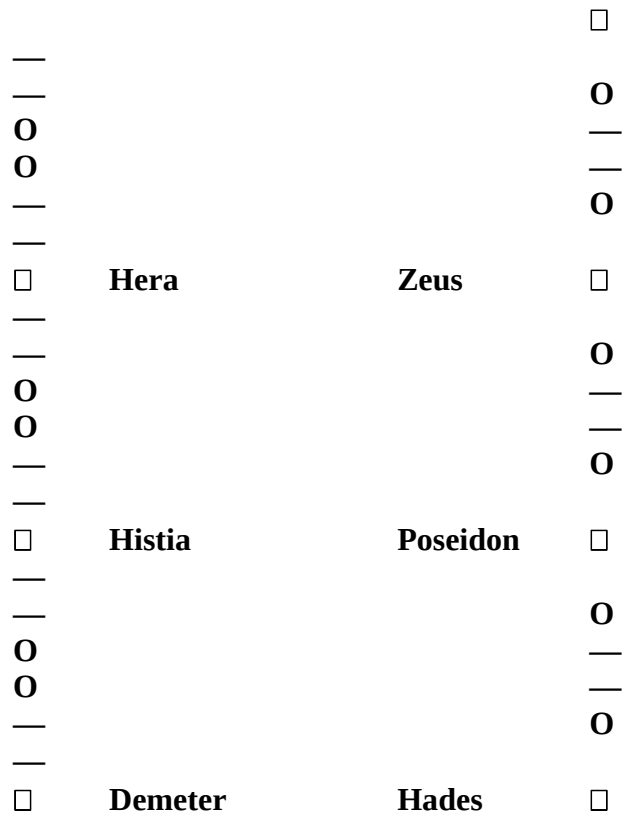
((9/2)*x*) *harmonic mean*
((9/8) × (9/2)*x*)
((8/9) × 6*x*)
(6*x*) *arithmetic mean*

(3*x*)

((27/2)*x*) *harmonic mean*
((9/8) × (27/2)*x*)
((8/9) × 18*x*)
(18*x*) *arithmetic mean*

(27*x*)

The numbers given above look untidy in standard notation, so I will replace many of the clumsiest fractions by a more concise notation of my own. In my visualizations I use "□" as a placeholder for the initial string of odds and evens, 1, 3, 9, 27 and 2, 4, 8. I will use "**O**" for arithmetic and harmonic means, and "**—**" for the further numbers that are placed in the intervals that stand in the ratio of (4:3). Call these three "boxes", "circles" and "dashes". The result will be the following pattern:



On this Table, there are “addresses” on which you can visualize the children of Zeus and his siblings, the children of his uncles and aunts and grandparents, and the whole of the family of the gods.

Years ago, I began experimenting with a variety of possible mnemonic arrangements. I first had to find a source for the siblings and children of the gods that were mentioned by Plato. I started with Dictionaries, the *Encyclopedia Britannica*, and *Brewer’s Dictionary of Phrase and Fable*, and so on. These contained all the material I needed to know. But I began to notice that these sources all referred back to the same source, Hesiod’s *Theogony*, and eventually I found that this source was much more convenient than any of the others.

When I placed Hesiod’s gods on Plato’s Table, the details worked out

so beautifully

that I could not help suspecting that this might not have escaped the notice of Plato and his friends in his Academy.

***"Schweigen?"* – "Nein, schreiben!"**

On
seven thunders echoes fly, yet
wise Ones warn us, "Write them not: with
death of authors secrets die **–** kept." Yet –
No: let's write, nor scorn nor lies,
but echoes for their thundered sevens;
to keep them secret authors death.

[Allusions:
(i) "schweigen" = "to consign to silence"; "schreiben" = "to write";
(ii) *Revelation* 10.4: "*And when the seven thunders had uttered their voices, I was about to write: and I heard a voice from heaven saying unto me, Seal up those things which the seven thunders uttered, and write them not*";
(iiI) Ludwig. Wittgenstein: "*Woven man nicht sprechen Kann, darüber muß man schweigen.*" ("What we cannot speak about we must pass over in silence.") *Tractatus Logico-Philosophicus*. , Proposition 7.]

CHAPTER 27:

Hidden mnemonics in Hesiod's *Theogony*

Plato didn't invent it

Plato, in my judgment, used the Platonic Table to structure his dialogues: but he also described this Table, in the *Timaeus*. That is why I call this structure the Platonic Table. I do not think Plato invented this Table, I think he was taught it. I think no one invented this Table. I think it evolved, through an oral tradition, over many centuries, perhaps over tens of thousands of years. Plato was the first one I know who described it explicitly.

Others, however, had used this Table long before it was passed down to Plato. I suspect that it was part of the Wisdom of Solomon, and that it came with the Hebrews out of Egypt to Jerusalem; and that it also came with Solon out of Egypt to Greece. However, I will not back up these suspicions with evidence. Instead, I will focus only on tracing Platonic patterns in one of the epic poems of ancient Greek mythology, Hesiod's *Theogony*.

Why do I select Hesiod's *Theogony* for extended discussion? Earlier in the book I included discussions of Raphael in part because he explicitly mention Plato's *Timaeus* – and likewise I include a discussion of Hesiod's *Theogony* partly because Hesiod is explicitly mentioned in Plato's *Timaeus*.

Furthermore, Hesiod's *Theogony* lends itself especially well to my project, of tracing possible mnemonic correspondences between structures in works of art, and structures in the Platonic Table. There are plenty of groupings into determinate *numbers* of divinities, in different categories, and these can be mapped onto the Platonic Table in memorable ways. There is also plenty of imagery that is redolent of the theory of the four elements, and these too generate memorable correspondences with patterns in the Platonic Table. And there are plenty of harmonies and discords in the narrative, and these too generate memorable correspondences with patterns in the Platonic Table.

Someone is reputed to have said in jest, of the music of Wagner, that it is not as bad as it sounds. This is true, though said in jest. Although I am one of those who think Wagner's music sounds terrific, I also believe that it is even better than it sounds. Something analogous holds for Hesiod's *Theogony*. To fully appreciate Hesiod's *Theogony*, it helps if you see some of the ways it can be structured within a mnemonic system like the one furnished by the Platonic Table.

Chemical and musical patterns are salient in Hesiod's Theogony

Salient patterns in the Platonic Table can be mapped onto salient patterns in Hesiod's *Theogony* in an astonishing number of memorable ways. I have tried to map Platonic patterns onto many works of art, with occasional successes – but no other work that I have yet found has ever matched these Platonic patterns as richly and memorably as Hesiod's *Theogony* does.

This neatness of match could be a mere coincidence. Nevertheless, whether it is mere coincidence or not, there is a very striking number of independent dimensions on which we find close matches of Platonic patterns. We can match Platonic patterns with respect to gender, and age or seniority, and with respect to the four elements, and to musical harmonies and discords, and to astronomical cycles, and to arithmetical numbers and ratios, and more. Nudging correspondences into alignment with respect to one of these dimensions runs the risk of knocking them out of alignment along contrasting dimensions.

Yet in the case of Hesiod's *Theogony*, there seem to be ways of optimizing alignments with respect to one of these dimensions, while at the same time improving, rather than dislocating, alignments with respect to all the other dimensions. Or so I have found, after much experience in working with this mnemonic system. Take my word for it.

In the first place, Hesiod recounts relations of parentage that can be mapped onto the Table in neat and memorable ways. We can align larger numbers to elder figures, smaller numbers to younger ones, for instance. Following this, we find that many of

these divinities align very neatly with one or another of the four elements (Poseidon with *water*, for instance, Hades with *earth*, and so on). Then personal and political relations among these divinities often match the standard chemical relations among the corresponding elements – *fire* not mixing with *water*, *water* evaporating into *air*, and so on.

Furthermore, having recounted the names of many generations of divinities, Hesiod then recounts a number of *wars*; and these wars can be aligned extremely neatly against musical *discords* among the musical notes that are distributed over the Platonic Table.

After Zeus wins the wars, he couples with a very long list of aunts, nieces, and sisters; and these couplings can be aligned extremely neatly against musical *harmonies* among the corresponding notes that are distributed over the Platonic Table. Zeus established a stable harmonic system among the gods, and he corresponds to a musical note that is taken as the hub of a harmonic system in Pythagorean musical theory. (Hence his note is taken as the "mese" in ancient Greek musical theory; and perhaps this is the one of the reasons why an orchestra tunes up by beginning with a clear note A on a wind instrument.)

Thus, there are numerous memorable correspondences between patterns in Hesiod's *Theogony* and patterns embodied on the Platonic Table. I will set out some of these correspondences below. It is possible that no one before me has ever noticed any of these correspondences; but it is also possible that there have been some who did. If Hesiod, or any of the people whose stories he was retelling, or any of those people who have studied these stories closely over the many centuries that have elapsed since the death of Hesiod, were to have noticed *any* of these neat correspondences to the Platonic Table, then they would have noticed *many* such correspondences.

Who was Hesiod? (and does it matter, anyway?)

It is widely thought that there was a Greek poet called Hesiod, who lived about twenty-seven or twenty-eight centuries ago – about three centuries before Plato, a little before 700 or 800 BCE. He lived around the time that (scholars say) *Genesis* and the other early books in the holy scriptures of the Jewish, Christian and Muslim faiths were being written, and also around the same time (give or take a century or so) as another Greek poet, Homer.

In my judgment Homer is a much the greater poet than Hesiod, but Hesiod's *Theogony* is more useful than anything in Homer if you want to find out quickly the kinship relations among the many divinities in ancient Greek mythology.

There are several surviving, and relatively complete, works attributed to Hesiod, including *Works and Days* and *Theogony*. There are similarities between these two works, but there are also differences. It is not certain that they were written by the same person. The evidence is strongest for the identity of the author of *Works and Days*: for many reasons it is apparent that this text does seem to have been written down or dictated by someone (one person) called "Hesiod", about whom some personal details can be determined with some degree of confidence. For instance, the author of *Works and Days* complains that his brother Perses has taken more than his share of the inheritance from their father.

The name "Hesiod" also occurs explicitly in the body of the text of the *Theogony*, early in the work, in a passage that says of the Muses, loosely translated, that they

"taught Hesiod fine singing" – following which it says immediately, "these are the things they taught to *me* …".

> And once they taught Hesiod fine singing, as he tended his lambs below holy Helikon. This is what the goddesses said to me first, the Olympian Muses, daughters of Zeus the aegis-bearer …
>
> [transl. M.L. West]

There are two ways of taking this: either as saying, "these are the things they taught to *me*, *Hesiod*"; or as "they taught *Hesiod* fine singing (perhaps some considerable time ago); and now, here are the things they taught (maybe a century or so later) to *me*".

It is possible that the author of the *Theogony* might have been working later than the author of *Works and Days*, and drawing heavily on one or more of the works of the earlier author. The later author might have been an amalgam of "author" and "editor". In that case, it could be deeply ambiguous who the "author" really was.

This would be apt, because works of this kind emerged from oral traditions in which works "evolved" so gradually that it is impossible to assign each work to an "author". In each generation, people copied from there predecessors, but also introduced variations. Variations that were more memorable were more often copied into the following generation. Over time, the stories changed by a long process of "descent with modifications". If such works evolved, in this way, through the operation of natural laws, and if you personify these laws as "gods", then you can say that the authors of these works are "the gods", and that men like Hesiod were merely instruments of the gods.

Hesiod and oral traditions

Having understood, as I thought, the basic structure of the mathematical Pattern that guided the creator of the material world, according to the creation story in Plato's *Timaeus*, I wondered whether any among Plato's illustrious predecessors might have taken guidance from that same Table in memorizing or creating their works of art. I wondered about Homer, for instance, the greatest of the ancient poets.

I also wondered about Hesiod. Hesiod was roughly a contemporary of the person or people who wrote down the works attributed to Homer.

Hesiod's *Theogony* is extraordinarily useful to scholars. If you look up sources on ancient Greek mythology, you will find that Hesiod's *Theogony* is cited as an authority more often than any other source. This is because the *Theogony* names an enormous number of ancient divinities (146 major divinities, say I, plus a string of "Okeanids", plus another string of "Nereids", and so on), and for each one of these, without a single exception (except for the first four, the "unbegotten") we are told clearly and explicitly precisely who were his or her parents.

Hesiod's *Theogony* is like "the begats" in the Hebrew Bible – the boring bits, the long passages that recite the complete patrilineages of key figures in Jewish history – as, for instance, the account of forty-two generations of male ancestors of Jesus of Nazareth, given at the opening of the *Gospel according to St. Matthew*. Hesiod's *Theogony* is, however, less patriarchal than the Judeo-Christian Bible, and tells about the complete maternal as well as the paternal lines for every one of the ancient Greek divinities, as far back as the "unbegotten ones".

The poems of Homer and Hesiod were written down: but they emerged from a long oral tradition in which these vast works were *memorized* and recited – or rather, *sung* – without the use of any written reminders. Legend has it that Homer was blind, and if so then he cannot have relied on any written text. I gather that it is possible for some gifted people nowadays to memorize these long works without the use of any mnemonic aids at all. It is possible that Homer and Hesiod did likewise. Yet it is also possible that they used mnemonic aids of some sort or other. It is possible that they used, as mnemonic aids, a variety of permutations of the Platonic Table – and called them their Muses.

Thumbnail sketch of the Theogony

Hesiod's *Theogony* begins with a long and seemingly rambling invocation of the Muses. He asks for the help of the Muses in telling the story of the genesis of all the gods of Greek mythology. After a series of appeals to the Muses for assistance in the task that lies ahead, and after singing the praises of the Muses, and saying how profoundly they can help not only singers but also kings, he then asks the Muses to tell of all the gods and to begin by saying which of them came *first*. Then he says that:

> First came Chaos … .

It is sometimes said that the word here should be "the Chasm", not meaning the name of a divinity but, rather, the absence of anything at all. The gender seems to be masculine in this occurrence, but it is feminine elsewhere in the *Theogony*. For instance, in a later war it is said that the clamour was so great that even Chaos trembled. For this reason, I side with those who take Chaos to be one of the Unbegotten divinities, who were there at the very beginning.

Hesiod then gives the names of three further divinities (Gaia, Eros and Tartaros) for whom no parents are mentioned. After this, he gives a very long list of gods for whom he explicitly tells us the names of both mother and father – or, if there is only one parent, then he explicitly says so and gives the name of that one parent.

The structure of the poem, then, falls initially into two parts. The first part is the fairly long "invocation of the Muses", which occurs before he actually "begins". How long is this invocation of the Muses? It took me about eight minutes to read this invocation aloud, in English translation; the rest of the poem took me about a further hour and a quarter to read aloud.

After the invocation of the Muses, the recitation of the genealogy of the Gods takes a considerable time before we reach the birth of Zeus. After the birth of Zeus, we then hear about *three* Titanic struggles that Zeus undertakes, from each of which he emerges victorious.

First war:
First there are conflicts between Zeus and four of his cousins: Atlas, Prometheus, Epimetheus and Menoitios.

These are four powerful sons of Iapetus, who was the brother of Kronos and Rhea, the mother and father of Zeus. Zeus is triumphant in this struggle against his cousins, and casts these four sons of Iapetus down into Tartaros. Atlas is cast outside the "world" and is given the task of holding up the Earth on his shoulders. Prometheus is chained to a rock, and an eagle eats his liver during the day, but his liver grows back

each night the same amount that the eagle ate during the day. (It is striking to note that the liver is the only major organ, apart from the skin, that regenerates if it is surgically removed. The lungs, for instance, do not grow back, the bowel does not grow back, and so on – but the liver does. Could the ancients have known this?)

Second war:
Next, there is a war fought by Zeus and his allies on Mount Olympus, who pitted themselves against the Titans and their allies on Mount Othrys – these opponents being the parents and uncles and aunts of Zeus. Again Zeus is triumphant, and he casts the Titans down into Tartaros.

Third war:
Lastly, Zeus fights against a terrible monster called Typhoeus, and casts him down into Tartaros. This last battle he fights on his own, without help from any allies. The conflict causes such a heat as to melt metals all over the surface of the Earth, and this heat is accompanied by terrible winds: the effects of their conflict are described in terms that call to mind the effects we would imagine from the impact of a sizeable comet on the surface of the planet.

After Zeus has imposed his kind of Order on the inhabitants of the Heavens and the Earth, Hesiod's *Theogony* recounts all the children he had by coupling with a relatively long list of female divinities, and then with several mortal women as well. Then the poet says, "Farewell, you Muses who dwell on Olympus …".

Addendum:
After a "farewell" to the Muses, there is a renewed invocation of the help of the Muses, and then there is a passage on the female divinities who coupled with mortal men, giving birth to heroes like Achilles and Aeneas. This passage contains a few repetitions of details that had already been given in the earlier narrative, as for instance the coupling of Chrysaör with Kallirhoë and the birth of Geryon, who was killed beside his own drag-footed cattle by fearless Herakles. This is a reason to think that the extra passage was tacked onto Hesiod's *Theogony*, and does not really belong with the body of the work.

After this point, the surviving poem peters out.

My conjecture is that, when reciting this genealogy of the gods, Hesiod and others like him would often have been using a mnemonic system of some kind; and in particular, I think they would at least sometimes have been visualizing the names of these gods on a version of the Platonic Table.

Here is how I hypothesize that the Platonic Table was set to work. First, it guided the presentation of a short sketch of 19 divinities. These fill the backbone of the initial Table described in Plato's *Timaeus*: the initial 7 numbers generated by doubling and tripling, followed by 12 "arithmetic and harmonic means" that fit in the "double and triple intervals".

Then there is a sketch of 18 more divinities (Muses, Hours and Graces), which complete the 37 numbers on the Table described in Plato's *Timaeus*. This all happens within the "invocation of the Muses", before the serious genealogy of the gods begins.

The genealogy of the gods is then mnemonically guided by an extended Table, on which there are 146 numbers altogether. That is the theory I will explain at greater length below.

The invocation of the Muses

Before Hesiod launches into his comprehensive list of divinities, there is a relatively long invocation of the Muses, and this invocation itself contains a considerable amount of structure. This invocation of the Muses also includes a few *abbreviated* lists of divinities. Very early in the invocation, for instance, he says that at night, veiled in thick mists, the Muses leave their homes on Helikon and travel around the countryside singing:

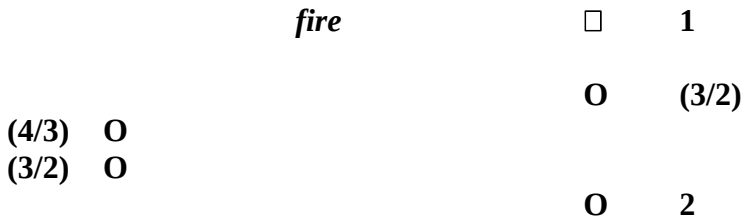
> … of Zeus, who wears the aegis, and the lady Hera of Argos, who walks in sandals of gold, and the daughter of aegis-wearing Zeus, grey-eyed Athena;
>
> … and Phoebus-Apollo and Artemis the archer; and Poseidon, earth-charioted shaker of the earth;
>
> … and beautiful Leto and Aphrodite of long eye-lashes;
>
> … and Hebe of gold diadem and fair Dione;
>
> … and Leto and Iapetus and crooked-schemer Kronos;
>
> … and Eos (the dawn) and great Helios (the Sun) and shining Selene (the Moon);
>
> … and Gaia (the Earth) and Okeanos (the encircling ocean) and dark Night;
>
> … and the rest of the holy family of immortals.

It is my theory that Hesiod recites this *abbreviated* list of *nineteen* names, under the guidance of an *abbreviated* version or the Platonic Table. His use of the Table, in this manner, could have assisted him in ensuring that his list embodied certain important features.

In Hesiod's list, there are *twelve* females and *seven* males. This matches a very salient structure on the Platonic Table: there are *seven* initial numbers generated by doubling and tripling; and there are *twelve* arithmetic or harmonic means placed in the double and triple intervals between those initial numbers.

Consider the Table of numbers that emerges from the narrative in Plato's *Timaeus*, if you begin from the series of even numbers 1, 2, 4, 8 and the series of odd numbers 1, 3, 9, 27. Then, following Plato's narrative, you add the *arithmetic and harmonic means* within each of the three "double intervals" and within each of the three "triple intervals".

The result is a Table containing *nineteen* numbers:



2	□	***air***	□	**3**
			O	**(9/2)**
(8/3)	**O**			
(6/2)	**O**			
			O	**6**
4	□	***water***	□	**9**
			O	**(27/2)**
(16/3)	**O**			
(12/2)	**O**			
			O	**18**
8	□	***earth***	□	**27**

To eliminate fractions, while preserving the *proportions* that are explicitly mentioned in Plato's *Timaeus*, you can multiply all the numbers on this Table by 6:

		fire	□	**6**
			O	**9**
8	**O**			
9	**O**			
			O	**12**
12	□	***air***	□	**18**
			O	**27**
16	**O**			
18	**O**			
			O	**36**
24	□	***water***	□	**54**
			O	**81**
32	**O**			
36	**O**			
			O	**108**
48	□	***earth***	□	**162**

This Table emerges from a very natural interpretation of Plato's *Timaeus*. I do not claim that this is provably the "correct" interpretation (whatever the word "correct" might mean in this context. Nevertheless, this is one relatively natural interpretation.

As evidence of the "naturalness" of this interpretation, I cite evidence. Raphael's painting of *The School of Athens* represents Plato's *Timaeus* in the hand of Plato at the visual center of the painting; and there is a figure generally taken to represent Pythagoras, and he is sitting in front of a slate on which we find the numbers 6, 8, 9, 12, along with hints about the ways these numbers relate to the harmonies of the *solf-fa* musical scale. These numbers 6, 8, 9, 12 are represented at the top left of the above "abbreviated version" of the Platonic Table.

Latin versions of Plato's *Timaeus*, translated by Calcidius during they hey-day of the Roman Empire, were widely available over the centuries before Raphael, and some of these Medieval manuscripts contained, in the margins, *precisely* the Table of numbers that I have sketched above, all the way down to 48 at the bottom left, and 162 at the bottom right. "Occult" texts from the same period also occasionally presented this same Table of numbers, even when they were not explicitly associated with any translation of Plato's *Timaeus*.

The numbers on the Table above also feature in a standard arithmetical textbook that was widely used through the Roman Empire and the Dark and Middle Ages, by Nicomachus of Gerasa. This was virtually plagiarised by Boethius, whose works were widely disseminated throughout Christendom.

Hence, I argue, the above "abbreviated Table" arises very naturally out of one very natural interpretation of Plato's *Timaeus*. It is also a mnemonically useful Table, even in abstraction from Plato's *Timaeus*.

I submit, for further investigation, the conjecture that, centuries before Plato, Hesiod had used the very same "abbreviated Table" to guide him, in reciting his *Theogony*, when he formulated an initial "abbreviated list" of divinities during his initial "invocation of the Muses".

A warm-up "19"

Here is one way in which Hesiod could have visualized his list of divinities, on this Table. First, he could have visualized the first three divinities in the following positions:

				fire	□	**6**	
		—					
		—		***air***	**O**	**9**	
	8	**O**	***earth***		**—**		
	9	**O**	***water***		**—**		
		—		***water***	**O**	**12**	
		—					
Hera	**12**	□	***air***	***air***	□	**18**	**Zeus**
		—					
		—		***fire***	**O**	**27**	
	16	**O**	***water***		**—**		
Athena	**18**	**O**	***air***		**—**		
		—		***earth***	**O**	**36**	
		—					
	24	□	***water***	***water***	□	**54**	
		—					
		—		***air***	**O**	**81**	
	32	**O**	***air***		**—**		
	36	**O**	***fire***		**—**		
		—		***water***	**O**	**108**	
		—					
	48	□	***earth***	***earth***	□	**162**	

This establishes the first step in a construction of the ancient Pythagorean musical theory. Zeus and Athena mark what is called the "mese", the note around which all the other notes are organized. (Athena is not born in the normal way, but springs directly from the head of Zeus: and this corresponds to the fact that Zeus and Athena are assigned to the very same number.)

The next three characters in Hesiod's recitation can be assigned to notes that make up a similar, but different, musical axis an octave lower; and at the same time, they can be associated with elements that are mnemonically suited to their characters.

			fire	□	**6**	
	—					
	—		***air***	**O**	**9**	
8	**O**	***earth***		**—**		
9	**O**	***water***		**—**		

		—		***water***	**O**	**12**	
		—					
Hera	**12**	□	***air***	***air***	□	**18**	Zeus
		—					
		—		***fire***	**O**	**27**	
	16	**O**	***water***		**—**		
Athena	**18**	**O**	***air***		**—**		
		—		***earth***	**O**	**36**	**Apollo**
		—					
	24	□	***water***	***water***	□	**54**	**Poseidon**
		—					
		—		***air***	**O**	**81**	
	32	**O**	***air***		**—**		
Artemis	**36**	**O**	***fire***		**—**		
		—		***water***	**O**	**108**	
		—					
	48	□	***earth***	***earth***	□	**162**	

This musical axis, around Artemis and Apollo, represents a note an octave below the "mese" marked by Zeus and Athena.

Zeus and Athena are accompanied by Hera on a note that is a musical fifth *above*: so that for instance if Zeus and Athena are on the noted called A, then Hera is on the note E a musical fifth above A.

The pattern represented by Apollo and Artemis is both the same as that represented by Zeus and Hera on the "mese", but it is also different. Apollo and Artemis are accompanied by Poseidon, who is on a note that is a musical fifth *below*: so that for instance if Apollo and Artemis are on the noted called A, then Poseidon is on the note D a musical fifth below A.

Note that the four divinities that are located on note A form a harmony with both D and E, but D and E form a discord with each other. This, mnemonically, is the root of the Trojan War in Homer's *Iliad* and *Odyssey*. Hera supports the Greeks against the Trojans; Poseidon supports the Trojans against the Greeks. The discord between the Greeks and Trojans is the discord between the musical notes D and E, and between the ancient Greek Dorian mode (*mi re, doh ti la sol fa mi*) and the ancient Greek Phrygian mode (*re doh ti la sol fa mi re*).

Continuing in this way, we can complete an assignment of the rest of Hesiod's "abbreviated list" of divinities, at the opening of his *Theogony*, onto the numbers on the above "abbreviated version" of the Platonic Table:

				fire	□	**6**	**Helios (Sun)**
		—					
		—		***air***	**O**	**9**	**Kronos**
Dione	**8**	**O**	***earth***		**—**		
Hebe	**9**	**O**	***water***		**—**		
		—		***water***	**O**	**12**	**Selene (Moon)**
		—					
Hera	**12**	□	***air***	***air***	□	**18**	**Zeus**
		—					
		—		***fire***	**O**	**27**	**Eos (dawn)**
Themis	**16**	**O**	***water***		**—**		

Athena	**18**	**O**	***air***		**—**		
		—		***earth***	**O**	**36**	**Apollo**
		—					
Leto	**24**	□	***water***	***water***	□	**54**	**Poseidon**
		—					
		—		***air***	**O**	**81**	**Iapetos**
Aphrodite	**32**	**O**	***air***		**—**		
Artemis	**36**	**O**	***fire***		**—**		
		—		***water***	**O**	**108**	**Okeanos**
		—					
Gaia	**48**	□	***earth***	***earth***	□	**162**	**Night**

This arrangement may not be mnemonically optimal, but I set it out as a starting-point for exploration. There may be various permutations that would be even better. Yet it is, I submit, sufficiently interesting to warrant further investigation.

Filling the gapswith 3 Hours, 3 Fates, 3 Graces, and 9 Muses

On the above Table, there are *nine* "intervals in the ratio of 4 to 3", as they are described in Plato's *Timaeus*. For example, at the bottom left we have the numbers 48 and 36: and these two numbers stand in the ratio of 4 to 3: 48 is *four* dozen and 36 is *three* dozen.

Musically, these are intervals of a "fourth", as for instance between *doh* and the nearest *fa* above it.

On the Platonic Table sketched above, there are *nine* "intervals in the ratio of 4 to 3", each to be filled with *two* numbers creating intervals in the ratios of 9 to 8. This means that there are *eighteen* numbers left to fill, on the Table, after Hesiod has visualized 19 divinities, displayed above, on the first 19 numbers.

In the invocation of the Muses, at the start of the *Theogony*, we do not find a tidy sequential list of 18 divinities to complete the filling-in of the Table. But we do find a mention of the Graces, followed by a list of the names of the nine Muses.

The Graces and the Muses are all daughters of Zeus. Towards the end of the *Theogony* we find a recitation of the children of Zeus, and when we do we find that there is a natural grouping of 18 daughters: the poem lists three "Hours", then three "Fates", then three "Graces", and then nine "Muses".

My theory is that, after sketching out (with his mind's eye) the 19 numbers displayed above, Hesiod then imagined filling in the remaining 18 positions, and he alluded to 18 corresponding divinities but did not name them all. The resulting Table contains 37 numbers. Here is what it looks like:

				fire	□	**6**	Helios (Sun)
Fate		**—**	***air***				
Muse		**—**	***water***	***air***	**O**	**9**	Kronos
Dione		**8**	**O**	***earth***	***water***	**—**	**Fate**
Hebe		**9**	**O**	***water***	***earth***	**—**	**Muse**
Fate		**—**	***air***	***water***	**O**	**12**	Selene (Moon)
Muse		**—**	***fire***				
Hera	**12**	□	***air***	***air***	□	**18**	Zeus

Hour		**—**	***water***				
Muse		**—**	***earth***	***fire***	**O**	**27**	Eos (dawn)
Themis	**16**	**O**	***water***	***air***	**—**		**Hour**
Athena	**18**	**O**	***air***	***water***	**—**		**Muse**
Hour		**—**	***fire***	***earth***	**O**	**36**	Apollo
Muse		**—**	***air***				
Leto	**24**	□	***water***	***water***	□	**54**	Poseidon
Grace		**—**	***earth***				
Muse		**—**	***water***	***air***	**O**	**81**	Iapetos
Aphrodite	**32**	**O**	***air***	***fire***	**—**		**Grace**
Artemis	**36**	**O**	***fire***	***air***	**—**		**Muse**
Grace		**—**	***air***	***water***	**O**	**108**	Okeanos
Muse		**—**	***water***				
Gaia	**48**	□	***earth***	***earth***	□	**162**	Night

Now the "half-length" Platonic Table, as described in Plato's *Timaeus*, is completely filled with divinities. Thus, this entire mnemonic Table has been neatly filled during the course of Hesiod's recitation of an invocation of the Muses – and prior to commencing his comprehensive recitation of the genealogy of all the gods in his *Theogony*, "from the beginning".

Thus, by the end of the invocation of the Muses, 37 numbers have been mnemonically assigned to divinities, in a harmonious and memorable pattern. 19 + 18 = 37.

Here is the order in which Hesiod recites these daughters of Zeus, the Hours, Fates, Graces and Muses, who are exactly as numerous as they need to be in order to complete the Table that guides his invocation of the Muses.

First there are three Hours (or "Horai", meaning roughly "Seasons", sometimes also called "the Watchers"), which I think Hesiod visualizes as filling in the gaps in "the intervals of 4 to 3" in the "middle panel" of the Table. The "Hours" are (*Theogony* 902):

> Eunomia (Lawfulness), Dike (Justice) and Eirene (Peace).

In the invocation of the Muses, there is no mention of these three "Horai" by name. Nevertheless, the very same *word* "horai" does occur, meaning "the seasons", in line 58. This is consistent with my theory that Hesiod was visualizing the Platonic Table, and was imaginatively filling in all the positions with successive divinities — and at this point in the recitation, around line 58, just before he recites the names of the nine Muses, he was mindful of the fact that the Horai will be placed on the intervening gaps on the Table.

Next, according to my theory, Hesiod visualized the Fates (or "Destinies", or "Moirai").

Into which of the three "panels" on the Table should we place these three Fates? The text of Hesiod's *Theogony* does provide, I believe, a clue. Among the more than eighteen daughters of Zeus that are recited, the Fates are are said to be the ones "to whom Zeus of the councils gave the highest position", according to Hesiod, *Theogony* 904. I think that this registers the fact that Hesiod is imagining the Fates as filling three positions, in "the intervals in the ratio of 4 to 3", in the "*highest* panel" of the Table. The three Fates are:

Klotho, Lachesis and Atropos.

Then in the “lowest panel” Hesiod visualizes the three Graces (*Theogony*, 909):

Aglaia, Euphrosyne and lovely Thalia.

Again, the text of Hesiod’s *Theogony* provides what is, I think, a clue that helps to fix *which* “panel” is the one where Hesiod was visualizing the Graces. At line 64, during the invocation of the Muses, we are told that the Muses are placed *alongside* the Graces and Hemeros.

Hence, according to my theory, by the time we reach the end of the invocation of the Muses, and the *Theogony* is about to begin in earnest, we have already been presented with an abbreviated Table, and an abbreviated list of divinities, and an instructive exercise in matching those divinities mnemonically against numbers on the abbreviated Table.

First came Chaos

When Hesiod begins his comprehensive recitation of the genealogy of the gods, after completing his invocation of the Muses, my theory is that he would then have visualized a double-sized Table. This double-sized Table is “musically complete”, in a sense in which the half-sized Table is not.

The double-sized Table highlights the musical “cycle of fifths”, mathematically represented by successive *tripling* of the numbers down the right-hand side of the Table, and extends this cycle just as far as is required to complete the *tuning* of all *seven* notes in the Pythagorean *sol-fa* division of the octave.

Here is a schematism for the Table on which I hypothesize that Hesiod may have memorized the genealogy of the gods of Greek mythology, which he chronicled in his *Theogony*:

		fire	□	**1**
	—			
	—		**O**	
	O		**—**	
	O		**—**	
	—		**O**	
	—			
2	□	***air***	□	**3**
	—			
	—		**O**	
	O		**—**	
	O		**—**	
	—		**O**	
	—			
4	□	***water***	□	**9**
	—			
	—		**O**	
	O		**—**	

	O **—** **—**		**—** **O**	
8	**□**	***earth***	**□**	**27**
	— **—** **O**		**O** **—**	
	O **—** **—**		**—** **O**	
16	**□**	***water***	**□**	**81**
	— **—** **O**		**O** **—**	
	O **—** **—**		**—** **O**	
32	**□**	***air***	**□**	**243**
	— **—** **O**		**O** **—**	
	O **—** **—**		**—** **O**	
64	**□**	***fire***	**□**	**729**

Guided by the creation-story that Plato recounts in the *Timaeus*, let us imagine Hesiod assigning divinities to each of the numbers, or "positions", on this Table.

Let us imagine that Hesiod assigns divinities to numbers on the Table in an *order* that is mirrored very closely by the order in which the numbers are set out in the story told in Plato's *Timaeus*.

In particular, imagine that Hesiod were to *begin* with the numbers marked by *boxes*;

> and imagine he were *next* to mention deities that are to be correlated with the harmonic and arithmetic means, which are marked by *circles* on the Table above;
>
> > and imagine he were *next* to mention deities that are to be correlated with *a first* member from each of the pairs of *dashes* that lie between two circles or between a circle and square;
> >
> > > and imagine he were then to mention deities to be correlated with *the second* member from each of the pairs of *dashes* that lie between two circles or between a circle and square.

Following this mnemonic pattern, here is how Hesiod's *Theogony* proceeds.

> First of all there came Chaos, and after him came
> Gaia of the broad breast, to be the unshakable foundation
> of all the immortals who keep the crests of snowy Olympos,

and Tartaros the foggy in the pit of the wide-wayed earth,
and Eros, who is love, handsome among all the immortals,
who breaks the limbs' strength, who in all gods, in all human beings
overpowers the intelligence in the breast, and all their shrewd planning.

After a lot of trial and error, I have found that the following arrangement constitutes a "good start", in the project of finding an optimally memorable arrangement of Hesiod's genealogies on Plato's Table:

Eros	**1**	□ — — **O** **O** — —	***fire***	□ **O** — — **O**	**1**
	2	□ — — **O** **O** — —	***air***	□ **O** — — **O**	**3**
	4	□ — — **O** **O** — —	***water***	□ **O** — — **O**	**9**
Gaia	**8**	□ — — **O** **O** — —	***earth***	□ **O** — — **O**	**27**
	16	□ — — **O** **O** — —	***water***	□ **O** — — **O**	**81**
	32	□ — — **O** **O** —	***air***	□ **O** — — **O**	**243**

		—				
Chaos	**64**	□	***fire***	□	**729**	**Tartaros**

The number 64 is the *smallest* whole number that is both a *cube* (4 times 4 times 4) and a *square* (8 times 8). This is the number I have assigned to Chaos.

The number 729 is the *smallest odd* whole number that is both a *cube* (9 times 9 times 9) and a *square* (27 times 27). This is the number I have assigned to Tartaros.

The number 8 is the *geometric mean* between 1 and 64. That is, the ratio between 1 and 8 is the same as the ratio between 8 and 64.

In Hesiod's construction, I submit, we begin with the series of numbers down the left-hand side of the Table, the "evens". The numbers down the right-hand side come later, and emerge out of the numbers on the left-hand side in a mathematical counterpart of the biological way that *females* give birth to *males*.

Next, in pursuing Hesiod's narrative, we might fill the remaining salient "*boxes*" on the left-hand column. Hesiod provides us with children, and then grandchildren of Chaos. First there are Erebos, and Nyx (or "night"); and then come their children, Aither (the "upper air") and Hemera (the "dawn"). These can fill the left-hand column of the Table in the following pattern:

Eros	**1**	□	***fire***	□	**1**
		—			
		—		**O**	
		O		**—**	
		O		**—**	
		—		**O**	
		—			
Aither	**2**	□	***air***	□	**3**
		—			
		—		**O**	
		O		**—**	
		O		**—**	
		—		**O**	
		—			
Hemera	**4**	□	***water***	□	**9**
		—			
		—		**O**	
		O		**—**	
		O		**—**	
		—		**O**	
		—			
Gaia	**8**	□	***earth***	□	**27**
		—			
		—		**O**	
		O		**—**	
		O		**—**	
		—		**O**	
		—			
Erebos	**16**	□	***water***	□	**81**
		—			

		— O O — —		**O — — O**		
Nyx	**32**	□	***air***	□	**243**	
		— — O O — —		**O — — O**		
Chaos	**64**	□	***fire***	□	**729**	Tartaros

The numbers that fall in the gap between 1 and 8 and the gap between 8 and 64 are called *mean proportionals*. (The ratio of 1 to 2 is the same as the ratio of 2 to 4, which is the same as the ratio of 4 to 8. Likewise for the numbers 16 and 32 that fall in the gap between 8 and 64.) The mathematical theory around "mean proportionals" is mentioned in Plato's *Timaeus* and is thoroughly explored in Euclid's *Elements*.

In due course, Hesiod will be assigning divinities to all the numbers that correspond to the notes in a musical scale running down *six octaves* on the left-hand side of the Table, from Eros at the top to Chaos at the bottom.

When all these numbers have been assigned to divinities it will turn out that, of the 42 numbers on the left-hand side of the Table, some will be whole numbers and some will be fractions. Of these 42 numbers altogether, there will be precisely *three* that are *odd whole numbers*.

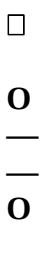
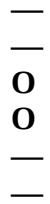
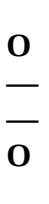
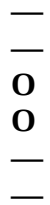
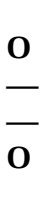
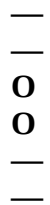
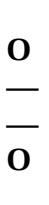
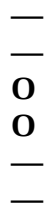
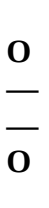
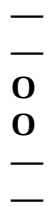
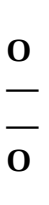
Thus the "feminine" column of *even* numbers gives birth to the first *three* "masculine" *odd* numbers. These will be the numbers 3, 9 and 27. And these will be the first three odd numbers to which we may assign the next three divinities that Hesiod recounts in his *Theogony*.

These are three children of Gaia. The first-born of Gaia is Ouranos, the starry sky.

I do not naturally think of the *sky* as associated with the element *earth*; nevertheless I will assign Ouranos to the number 27, which corresponds to the element *earth*. For Hesiod the starry sky was the *firmament*, "an unshakable standing-place for the blessed immortals".

Then after Ouranos, Gaia gives birth to Ourea, the "hills", and to Pontos, the "great ocean" or "the Deep".

These three children of Gaia can fill the "boxes" on the top-half of the right-hand column of the Table. A fourth son, Typhoeus, is not named at this stage of the narrative, but may be placed on the Table in anticipation of future developments:

Eros	**1**		***fire***		**1**	**Typhoeus**
Hemera	**2**		***air***		**3**	**Ourea**
Aither	**4**		***water***		**9**	**Pontos**
Gaia	**8**		***earth***		**27**	**Ouranos**
Nyx	**16**		***water***		**81**	
Erebos	**32**		***air***		**243**	
Chaos	**64**		***fire***		**729**	Tartaros

How is it that Gaia (number 8) gives birth to Ouranos (number 27)? Add up all the numbers that are less than (so contained within) the number 8:

(Gaia) 2 + 3 + 4 + 5 + 6 + 7 = 27 (Ouranos).

I exclude the number 1 from this sum, remembering that for the Pythagoreans 1 is not really "a number" but "the principle of number".

I note also that according to Hesiod, Gaia gives birth to Pontos "without any sweet act of love". So I imagine Gaia making Pontos by way of the addition (2 + 3 + 4) = 9 rather than by the sum: (8 + 1) = 9, which would have involved the number 1 – which would mean Eros and hence the "sweet act of love".

***The genesis of Tartaros*:**

I note in passing that this mathematical construction of the odd numbers 3, 9 and 27, on the right-hand side of the Platonic Table, might furnish a hint about the introduction of the odd number 729, for Tartaros, right at the very beginning of Hesiod's story.

The odd numbers 3, 9 and 27 emerge as the *only* quantities on the left-hand side of the Table that are *odd, whole-number multiples* of the smallest quantity, 1, at the top of the Table. The rest of the quantities in the left-hand column are either *even-number multiples* of the smallest quantity, or else they stand to the smallest quantity in ratios that are expressed using *fractions*.

Because later portions on the Table are fractions of the smallest quantity, at the top, this means that the quantity at the top must be divisible into smaller portions. Hence it is not an absolute unit, measured uniquely by the number 1, but rather a divisible portion, in principle measurable by a variety of different numbers, corresponding to all the different ways in which it could be subdivided into equal parts.

To eliminate all fractions from the Platonic Table, the number at the top of the Table will need to be, not the number 1, but either the number 384 or else some whole-number multiple of 384.

If you multiply all the numbers on the Platonic Table by 384 (which is 3×2^7) then the number 729 at the bottom of the right-hand side of the Table ($729 = 3^6$), then the new number at the bottom right-hand side of the Table will become the number $2^7 \times 3^7$, which is rather neat.

Thus, multiplying all the numbers in the Platonic Table by 384 is mnemonically much less arbitrary than it might at first appear to be. I have no proof that Hesiod, or any of his predecessors, had thought of any of these possibilities. Yet it might nevertheless be worth exploring what they might have found if they *had* done so.

If you multiply all the numbers on the left-hand column of the Table by the number 384, all the fractions will be converted into whole numbers. Having done this, you might check to see if there are any *odd* numbers in the left-hand column. The answer is memorable.

There will be one and only one odd number in the left-hand column.

That odd number will be 729. This is the number for Tartaros.

Thus, the feminine side of the Table arithmetically generates the backbone of the masculine side of the Table: 3, 9, 27 and 729:

3:	Ourea	(*air*, the Hills),
9:	Pontos	(*water*, the Seas),
27:	Ouranos	(*earth*, the Firmament)
729:	Tartaros	(*fire*, the Abyss).

The correspondences that are emerging could have arisen by coincidence, without Hesiod or any of his predecessors having had thoughts anywhere near those that I have been spinning out above. Call this a "no-theory theory". The no-theory theory might be true. Yet it is far from certain that it is true. It is also possible that the Platonic Table evolved out of ancient explorations into the sort of mathematical patterns that I have been describing above.

The next stage of Plato's construction in the *Timaeus* consists in the interpollation of *arithmetic and harmonic means* within the "double" and the "triple" intervals. This corresponds neatly with the next stage in Hesiod's *Theogony*.

After Gaia has given birth, without any sweet act of love, to Ouranos, Pontos and Ourea, those who come next in Hesiod's narrative are the twelve Titans, who can fit neatly on the "circles" on the top half of the Table. Along with these come the three Kyklopes (Brontes, Steropes and Arges), each with a single "wheel-eye" in the centre of his face, and three giants (Kottos, Briareos and Gyges), each with fifty heads and a hundred arms. These last six can fit on the "circles" that represent the *harmonic and arithmetic means* in the bottom-left quarter of the Table.

Eros	**1**	□		***fire***	□	**1**	Typhoeus
		—					
		—			**O**		**Kronos**
Theia		**O**			—		
Rhea		**O**			—		
		—			**O**		**Iapetos**
		—					
Hemera	**2**	□		***air***	□	**3**	Ourea
		—					
		—			**O**		**Hyperion**
Themis		**O**			—		
Mnemosyne		**O**			—		
		—			**O**		**Krios**
		—					
Aither	**4**	□		***water***	□	**9**	Pontos
		—					
		—			**O**		**Koios**
Phoibe			**O**			**—**	
Tethys		**O**			—		
		—			**O**		**Okeanos**
		—					
Gaia	**8**	□		***earth***	□	**27**	Ouranos
		—					
		—			**O**		
Brontes		**O**			—		
Kottos			**O**			**—**	
		—			**O**		
		—					
Nyx	**16**	□		***water***	□	**81**	
		—					
		—			**O**		
Steropes		**O**			—		
Briareos		**O**			—		
		—			**O**		
		—					
Erebos		**32**	□	***air***		□	**243**
		—					
		—			**O**		
Arges		**O**			—		
Gyges		**O**			—		
		—			**O**		
		—					
Chaos	**64**	□		***fire***	□	**729**	Tartaros

This arrangement has the virtue that the Kyklopes and the hundred-handed Giants are placed *below* the Earth (Gaia), and the hundred-handed Giants are on *the very same note* that will eventually be assigned to Zeus.

This pattern will correlate memorably with an episode from later in Hesiod's narrative in his *Theogony*. There will be a war of Zeus and the rest of the Olympians against the Titans.

In this war the two sides will be evenly matched. Yet Zeus is cunning. He notices that the Giants have resented the way that the twelve Titans have kept them in the dark uncomfortable depths below the earth. So Zeus bribes them to change sides in the conflict. They fight for Zeus and turn the tide in the battle.

Aside from the Giants, the other Titans are then cast down into Tartaros, and various of the victors are rewarded by being permitted to take the "stations" that the Titans formerly held.

A blind poet like Homer, in memorizing this battle of the Titans against the Olympians, might have been assisted by a process of *visualizing* an initial mnemonic arrangement of divinities on the Table being *transformed* into a different, subsequent arrangement of those divinities on the same Table.

In the arrangement I have sketched above, Zeus will be on the note A, and the three Giants Kottos, Briareos and Gyges will also be on the same note A, though many octaves lower. This makes it more memorable that it should be *these* three, rather than say the Kyklopes, that Hesiod cites as changing sides to enable the Olympians to prevail against the Titans.

Next in Hesiod's singing comes the castration of Ouranos by his youngest son, Kronos, and from the blood that falls on the earth come the Erinyes (or the "Furies"), more Giants, and the Nymphs of the Ash Trees. From the semen that falls in the sea comes Aphrodite.

It is not altogether clear where to place these products of the castration of Ouranos, according to Hesiod's *Theogony*. The Erinyes are especially puzzling, as they are referred to elsewhere in the narrative, and these separate references are inconsistent with one another. One mnemonic course to take is to assign the very prominent figure of Aphrodite, child of the sea-foam, to the number 81, which is mnemonically associated with the sea, and to assign the Giants and Nymphs to the arithmetic and harmonic means between 27 and 81. The relevant harmonic mean corresponds to the element *water*, which aptly matches the Nymphs; the arithmetic mean corresponds to the element *air*, which aptly matches frequent mythological associations with Giants.

Now the children of Ouranos have filled the arithmetic and harmonic means over the whole Table, except for Tartaros. There is a total, altogether, of twenty "empty spaces" in Tartaros, twenty unassigned numbers altogether between Aphrodite at 81 and Tartaros at 729.

This prepares the way for a later stage of the narrative. According to Hesiod's narrative, Zeus casts down a total of 20 enemies to Tartaros: and there are 20 unassigned numbers there, waiting to receive them.

Eros	**1**	□		***fire***	□	**1**	Typhoeus
		—					
		—			**O**		Kronos
Rhea		**O**			**—**		
Themis		**O**			**—**		
		—			**O**		Iapetos
		—					
Hemera	**2**	□		***air***	□	**3**	Ourea
		—					
		—			**O**		Hyperion
Theia		**O**			**—**		
Mnemosyne		**O**			**—**		
		—			**O**		Krios
		—					
Aither	**4**	□		***water***	□	**9**	Pontos
		—					
		—			**O**		Koios
Phoibe			**O**			**—**	
Tethys		**O**			**—**		
		—			**O**		Okeanos
		—					
Gaia	**8**	□		***earth***	□	**27**	Ouranos
		—					
		—			**O**		**Nymphs**
Brontes		**O**			**—**		
Kottos		**O**			**—**		
		—			**O**		**Giants**
		—					
Nyx	**16**	□		***water***	□	**81**	**Aphrodite**
		—					
		—			**O**		
Steropes		**O**			**—**		
Briareos		**O**			**—**		
		—			**O**		
		—					
Erebos	**32**	□		***air***	□	**243**	
		—					
		—			**O**		
Arges		**O**			**—**		
Gyges		**O**			**—**		
		—			**O**		
		—					
Chaos	**64**	□		***fire***	□	**729**	Tartaros

After the last children of Ouranos come the Children of Night. These can be left for another time, or as an exercise for the interested reader.

Then come the descendants of Pontos, namely:

Nereus (“the Old Gentleman”),
great Thaumas,
haughty Phorkys,
Keto and
Eurybia, who had a heart of stone.

Here is a conjecture. It is at this stage in the narrative we are to begin filling the “dashes” on the Table. (This is the stage described in Plato’s *Timaeus* as the filling in of the “intervals in the ratio of 4 to 3” to create “intervals in the ratio of 9 to 8”.)

I postulate that Hesiod begins to do this by starting with the number 9 on the right-hand column, where we have placed Pontos.

He then notes that this very same number 9 also appears as one of the “dashes” in the left-hand column. So we begin filling these “dashes”. In particular, the sea-divinity Pontos, on the number 9 on the right-hand side of the Table, gives birth to another sea-divinity, Nereus, on the same number 9 but on the left-hand side of the Table. Here is one memorable way to begin:

Eros	**1**	□		***fire***	□	**1**	Typhoeus
Thaumas		**—**					
		—			**O**		Kronos
Rhea		**O**			**—**		
Themis		**O**			**—**		
		—			**O**		Iapetos
		—					
Hemera	**2**	□		***air***	□	**3**	Ourea
Eurybia		**—**					
		—			**O**		Hyperion
Theia		**O**			**—**		
Mnemosyne		**O**			**—**		
		—			**O**		Krios
		—					
Aither	**4**	□		***water***	□	**9**	**Pontos**
Phorkys		**—**					
		—			**O**		Koios
Phoibe			**O**			**—**	
Tethys		**O**			**—**		
		—			**O**		Okeanos
		—					
Gaia	8	□		*earth*	□	27	Ouranos
Nereus	9	—					
		—			**O**		Nymphs
Brontes		**O**			**—**		
Kottos		**O**			**—**		
		—			**O**		Aphrodite
		—					
Nyx	**16**	□		***water***	□	**81**	
Keto		**—**					
		—			**O**		Giants
Steropes		**O**			**—**		
Briareos		**O**			**—**		
		—			**O**		Erinyes
		—					
Erebos	**32**	□	***air***	□	**243**		
		—					
		—			**O**		
Arges		**O**			**—**		
Gyges		**O**			**—**		
		—			**O**		
		—					
Chaos	**64**	□		***fire***	□	**729**	Tartaros

Hesiod's narrative also recounts a long list of "children of Night", and a long list of "daughters of Nereus", and a list of the twenty-five sons and forty-one daughters of Okeanos and Tethys.

I will briefly sketch *one* possible way of mnemonically assigning the sons and daughters of Okeanos and Tethys to numbers on the Platonic Table. This assignment places all the sons on the right, and all the daughters on the left; and it fills the numbers by starting at the bottom and working gradually upwards to the top.

				fire	□	**1**	
		Scamander					
Styx		**—**					
Ocyrhoe		**—**			**O**		**Ardescus**
Amphirho		**O**			**—**		**Euenus**
Tyche		**O**			**—**		
	Parthenius						
Eudora		**—**			**O**		**Ladon**
Calypso		**—**					
Asia	**2**	□		***air***	□	**3**	**Sangarius**
Chryseïs		**—**					
Telesto		**—**			**O**		**Caïcus**
Eurynome		**O**			**—**		**Hermus**
Metis	**3**	**O**			**—**		**Peneus**
Europa		**—**			**O**		**Simois**
Menestho		**—**					
Petraea	**4**	□		***water***	□	**9**	**Aesepos**
Xanthe		**—**					
Acaste			**—**			**O**	
	Granicos						
Ianeira		**O**			**—**		**Heptapo's**
Tethys	**O**				**—**		**Haliacmon**
Perseïs		**—**			**O**		**Okeanos**
Pluto		**—**					
Cerceïs	8	□		*earth*	□	27	**Rhodius**
Polydora		—					
Thoe		**—**			**O**		**Nessus**
Melobosis		**O**			**—**		**Achelos**
Dione		**O**			**—**		**Rhesus**
Galaxaura		**—**			**O**		**Phasis**
Plexaura		**—**					
Pasithoe	**16**	□		***water***	□	**81**	**Danube**
Idyia		**—**					
Clytia		**—**			**O**		**Meander**
Zeuxo		**O**			**—**		**Strymon**
Callirhoe		**O**			**—**		**Eridanus**
Rhodea		**—**			**O**		**Alpheus**
Clymene		**—**					
Hippo	**32**	□		***air***	□	**243**	**Nile**
Urania			**—**				
Prymno		**—**			**O**		
Doris		**O**			**—**		
Electra		**O**			**—**		
Vianthe		**—**			**O**		
Admete		**—**					
Peitho	**64**	□		***fire***	□	**729**	

This arrangement is only one of many mnemonic possibilities. It is, however, strikingly neat in one respect in particular.

The name of *Metis* lands on the number 3, which is exactly the same number that is best associated with Zeus. Metis was the first wife of Zeus, and she was the only wife whom he swallowed alive. It seems mnemonically appropriate for Zeus and Metis to be assigned to the very same number on the Table.

This coincidence is tempting: it has a tendency to generate a high degree of confidence that we have stumbled on "the right" theory. It is important to resist leaping to conclusions, and to remember that coincidences like this one (finding that, on our mnemonic hypothesis, Metis lands on the very same number as Zeus) could arise by sheer coincidence. Such coincidences do not prove that Hesiod was taking guidance from the Platonic Table in reciting his *Theogony*.

Nevertheless, it is also unreasonable to swing to an opposite extreme, and to dismiss such salient and memorable correspondences as if they had no significance at all. Correspondences of this kind can boost probabilities, even if they never furnish absolute proofs.

Return now to the Table that I sketched just before the exercise of reciting the sons and daughters of Okeanos and Tethys. That Table was filled with names corresponding to the "odds" and "evens" (represented by boxes) and the arithmetic and harmonic means (represented by circles).

There were also a few divinities that were assigned to the numbers associated with "dashes" on the Platonic Table (these being the numbers that fill the "intervals in the ratio of 4 to 3"). These divinities, who are assigned to "dashes", are Thaumas, Phorkys and Keto, and Eurybia. Apart from these, however, all the other "dashes" on the Table are as yet set into no correspondences with any divinities.

Many of the as yet vacant "dashes", however, can be correlated with divinities if we assign to them the descendents of Thaumas, Phorkys and Keto, and Eurybia. And this procedure will correlate numbers with divinities in a pattern that is salient and memorable.

The descendants of the *first five* that are to be correlated with the "dashes" are as follows.

Thaumas is the father of Iris, "the rainbow", and the Harpies (Okypete and Aëllo).

The children of **Phorkys** and **Keto** are: the Graia, or "gray sisters" (Pemphredo and Enyo); the Gorgons (Sthenno, Euryale and Medusa); and the snake (or dragon) at the limits of the Earth, who guards the all-golden apples. Hesiod does not give the snake's name, but others have suggested that it may be "Ladon" so I will use this name just for brevity.

The further descendants in this line, from Phorkys and Keto, also include Pegasus and Chrisaör (children of Medusa), and various monsters like Geryoneus, Orthos, the Hydra of Lerna, Chimera, the Sphinx, and the Nemean Lion.

The descendants of **Eurybia** are: Astraios, Pallas and Perses.

These can neatly fill in salient gaps in the following pattern:

Eros	**1**	□	***fire***	□	**1**	Typhoeus
Thaumas		**—**				
Iris		**—**		**O**		Kronos
Rhea		**O**		**—**		
Themis		**O**		**—**		
Okypete		**—**		**O**		Iapetos
Aëllo		**—**				
Hemera	**2**	□	***air***	□	**3**	Ourea
Eurybia		**—**				

Astraios		**—**			**O**		Hyperion
Theia		**O**			**—**		
Mnemosyne		**O**			**—**		
Pallas		**—**			**O**		Krios
Perses		**—**					
Aither	**4**	□		***water***	□	**9**	**Pontos**
Phorkys		**—**					
Pemphredo		**—**			**O**		Koios
Phoibe			**O**			**—**	
Tethys		**O**			**—**		
Medusa		**—**			**O**		Okeanos
Enyo		**—**					
Gaia	**8**	□		***earth***	□	**27**	Ouranos
Nereus	**9**	**—**					
Sthenno		**—**			**O**		Nymphs
Brontes		**O**			**—**		
Kottos		**O**			**—**		
Euryale		**—**			**O**		Giants
Ladon		—					
Nyx	**16**	□		***water***	□	**81**	Aphrodite
Keto		**—**					
Pegasos		**—**			**O**		
Steropes		**O**			**—**		
Briareos		**O**			**—**		
Chrisaör		**—**			**O**		
Geryoneus		**—**					
Erebos	**32**	□		***air***	□	**243**	
Orthos		**—**					
Hydra of Lerna		**—**			**O**		
Arges		**O**			**—**		
Gyges		**O**			**—**		
Sphinx			**—**			**O**	
Nemean Lion		**—**					
Chaos	**64**	□		***fire***	□	**729**	Tartaros

This fills the outside column of the left-hand side of the Table.

Twenty cast down to Tartaros

As Hesiod's *Theogony* proceeds, more names appear. Some of these new names can fill the remaining gaps on the outside column of the right-hand side of the Table. After this, still further names appear, including later generations that include the Olympian gods: Zeus, Hera, Hephaestus, Hermes, and so forth. These can neatly fill two *inside* columns, standing alongside the two columns displayed above. Following the terminology of Plato's *Timaeus*, the outside columns can be visualized as joined together to form a "circle of the Same"; and the two inside columns can be visualized as joined together to form a "circle of the Different".

Note that, as the Table is filling up, the bottom right-hand side of the Table is left empty – leaving 20 empty spaces. These are to be the final destinations for the 20 divinities that are cast down to Tartaros, according to Hesiod's narrative.

What are the 20 who are cast down into Tartaros? They are divinities who fought against the might of Zeus. These include the parents of Zeus, and his uncles and aunts, plus some of his cousins, and one second cousin.

Those who fought against Zeus initially included Zeus's mother and father, who were children of Ouranos and Gaia (Heaven and Earth), plus sixteen other children of Ouranos and Gaia. There were twelve Titans (Theia and Rhea and Kronos and Iapetos, and so forth) – plus 3 Cyclopes, and 3 Giants called Kottos, Briarios and Gyges. This made an initial army consisting of 18 opponents of Zeus and his allies.

However, three of these opponents of Zeus, namely Kottos, Briarios and Gyges, are mnemonically assigned, musically, to the very same note as Zeus, transposed down several octaves. Hesiod's narrative tells us that these 3 changed sides and fought with Zeus against their brothers. That left 15 against Zeus, who were cast down to Tartaros when they lost this war.

In addition, Zeus fought in separate struggles against four sons of Iapetos: Prometheus, Epimetheus, Menoitios and Atlas; and Hesiod's narrative explicitly says that these four, like the Titans, were cast down to Tartaros. Finally, the text also says that Zeus fought in a spectacular battle against Typhoeus, a monstrous son of Gaia and Tartaros, and cast him down to Tartaros.

Hence, altogether, there were 20 cast down to Tartaros, according to Hesiod's *Theogony*.

In addition, there were some divinities who were killed, but were not said to have been cast down to Tartaros. Consider Medusa, for example, who was explicitly said to have been mortal, not immortal, and who was not said by Hesiod to have been cast down to Tartaros. Others like her include Geryoneus and his dog Orthos, and the Hydra of Lerna, the Chimera, the Sphinx, and the Nemean Lion. The text also says that Pegasus left his station and flew up to the heavens, and lives evermore in the house of Zeus and has no dwelling place of his own.

In total, therefore, in addition to the 20 who were cast down to Tartaros, there are 8 who are explicitly said by Hesiod to have vacated their stations. Mnemonically, we can imagine a total of 28 numbers that are initially assigned a divinity each, but then these divinities are taken away in the course of the narrative, leaving these numbers temporarily unassigned.

Following war, a baby-boom

After a war comes a spate of reproductive activity, in which the victors produce offspring that take the place of the casualties of war – replacing, in particular the numerous casualties on the losing side.

Thus, after his victories in his wars, Zeus couples with a string of different females – and Hesiod's narrative lists 28 children of Zeus. This is exactly the right number to fill all the stations on the Table that were explicitly said by Hesiod to have been vacated, either casualties of disputes with Zeus, or else slain by one of Zeus's illegitimate sons, Herakles.

Furthermore, Zeus couples with females who are assigned to musical notes that harmonize with the note A, which is associated with Zeus. For instance, he couples with Metis, who has been assigned to the note A on the Table sketched out above, listing the Okeanids and Rivers. He also couples with Themis and Mnemosyne, who have been assigned to the same note A.

Zeus also couples with two of his sisters, Hera and Demeter. They have been assigned to the note E. Hera's note E is a harmonious musical fifth above the note A of Zeus. Demeter is also associated with the note E, like the note of Hera, but transposed down by two octaves. Zeus does not, however, couple with the third of his sisters, Histia. This third sister is also associated with the note E, but with the note E that is a musical *fourth below* the note A of Zeus: and this interval of a fourth is less harmonious than the intervals that separate Zeus from the other two sisters.

There are a few more females with whom Zeus couples, Eurynome and Leto, Maia and Alcmene; but they have not yet been placed on the Table. It would be a good test of the theory to see whether these further partners of Zeus can all be mapped onto musical notes that harmonize with the note associated with Zeus. It would also be a good test of the theory to see whether these *nine* sexual partners of Zeus, as cited by Hesiod, taken all together, are numerous enough to fill *all* the notes, on the left-hand side of the Platonic Table, that harmonize most fundamentally with the note of Zeus, A, on the right-hand side of the Table.

Questions of this kind seem to arise again and again, seemingly without end. So far, I have always found that there were interesting answers to be found: memorable correspondences between patterns in Hesiod's narrative, and patterns embodied in the Platonic Table.

Yet another plea for the Platonic Table

I conclude that mnemonic matches between Hesiod's text and the Platonic Table are numerous enough to boost, very significantly, the credibility of the initially far-fetched – indeed, the spectacularly improbable – hypothesis that Hesiod's *Theogony* was created under guidance from the Platonic Table.

Even if I were wrong about this, I might be right in a subsidiary hypothesis – that I am not the first one in history to have thought that Hesiod might have taken guidance from the Platonic Table, or something very like it. The Platonic Table might have been woven into the evolution of the arts, even if only a few artists have taken guidance from it, over the centuries – provided those few were influential artists, like Raphael.

And even if I were wrong about that subsidiary hypothesis, the exercise I have engaged in above can serve to illustrate a variety of ways in which a work *like*

Hesiod's *Theogony* could be created under guidance from a hidden mnemonic pattern like the Platonic Table.

Then on the ladder of the earth I climbed
through atrocious brambles of lost thickets
up to you, Machu Picchu.

Entonces en la escala de la tierra he subido
entre la atroz maraña do las selvas perdidas
hasta ti, Macchu Picchu.

Pablo Neruda,
The Heights of Macchu Picchu,
September, 1945

Postscript:

The scaffolds of Machu Picchu

Once there was an American tourist, of European ancestry, an engineer by training and employment, who was admiring the ruins of the temples of Machu Picchu, high in the Andes. Let us call him Walter Gibb. I sometimes worry that I might be a little like Wally – but there is I think a crucial difference between us.

Wally had been, for several hours, variously exploring the ruins at Machu Picchu on his own, or else attaching himself to one or another of several miscellaneous clusters of other tourists who were listening to one or another tour-guide, in one or another of various languages. After a time, his mind began to cramp and his muscles began aching. The day was very hot, and very bright.

There were lots of people wandering among the stone slabs and over the grasses, including a fair number from his own tour group, with whom he now had a nodding acquaintance. Every time he crossed paths with any of these tour-mates he had to nod, smile and exchange at least a few words. By now he was tired of making conversation.

So he found an obscure place to sit, out of the sun, somewhere he thought others would seldom come. People would be unlikely to come to this spot, he thought, because from here you could see none of the wonderful, panoramic vistas that this tourist destination had to offer its international visitors. As he settled his tired body down onto a stone step, and surveyed the scene around him, he found that he could

see only a few candy-wrappers, five cigarette butts, shady damp stone walls with patches of moss and lichen, and a small approximately rhombic expanse of blue sky through a window diagonally above him. In his current mood, these tawdry surroundings gave him welcome relief from aesthetic overload.

As he rested one weary shoulder against a cool, hard, stone wall, which abutted so precisely the smooth stone step on which he was sitting, he noticed some subtle, scarcely visible irregularities in the stonework, and he idly began to wonder what they were. It looked as though, he thought, someone had first chipped some deep holes into the rock, and then filled them in again. He puzzled for a while – but then he pulled himself up short. He needed to relax, and give his brain a rest. He gave himself a good talking to. "Not that thought, not that thought, … ", he rehearsed like a mantra. And yet, his brain had a mind of its own.

Then a conjecture came to him unbidden. "Perhaps these puzzling irregularities in the stonework are traces of the places where ancient scaffolding had once gripped securely onto the stonework, during the construction of the temple?" He tried saying "Not that thought", but the thought did not slip away.

Wally then became curious about how these stone edifices could have been constructed, given the technology and raw materials available to the builders at that time, and he wondered what the scaffolding might have looked like while the builders were still at work. He then spent the rest of the day searching for any other traces of places where the scaffolding might once have been attached to the fabric of the various larger stone buildings in the neighbourhood.

After he left this site in the remote Andes, and returned to his home in remote Idaho, he went to his local library to acquire some basic engineering knowledge, which might delimit the possible kinds of scaffolding that could conceivably have assisted builders who were setting out to build temples of that kind, in that location. He even tried to reconstruct a model of the scaffolding that, he reckoned, might most likely have been used by the builders of this temple in the Andes. In time, he came to think that this scaffolding, and the story about how the temple must have been constructed, is just as beautiful as the temple itself – though in a different way. He became, as we might say, a scaffoldologist.

Yet as far as Wally knew, he was the only scaffoldologist in the world, and this became a source of considerable concern to him. He thought he might be the first; and he began to fear that he might also be the last. No one else, it seemed, was as fascinated as he was by the possible configurations of scaffolding that may once have covered these temples, before their completion. Wally felt as isolated as Prospero, in Shakespeare's play *The Tempest* – who, "rapt in secret studies", had been marooned on an island, where there were only two other fellow creatures made of flesh and blood, with neither of whom he could share his raptures in his studies.

To shake off the urgency of his desire to share his vision, Wally would tell himself (quoting lines from *Gray's Elegy*, memorized at school): Full many a flower is born to bloom unseen and waste its fragrance on the desert air. This is the way of the world. No matter how beautiful this scaffolding had been, he must let it go. Yet whenever he re-immersed himself in his vision of this ancient scaffolding, which he had reconstructed in his imagination, he was yet again gripped afresh by the thought that these structures were so beautiful that it would be a pity if no one else were ever to see them, even with their minds' eyes.

It is a delicate balance to decide what things are worth recovering and preserving and what things are best forgotten. The lost scaffolds of Machu Picchu might indeed be of some interest if you could work out what they were like. Yet, if there really

were any such scaffolds, then their purpose was – really – (I assume) only to facilitate the construction of temples of worship. And so presumably when the building was done the builders did the best they could to remove the scaffolding and all traces of where it had been. The temples remained. We should appreciate the temples. It were too curious to inquire into the scaffolding too.

If the Platonic Table were merely scaffolding, which a handful of artists may have used, over the centuries, in construction of a handful of works of art – then I would be a Wally, on a fool's errand, trying to reconstruct this scaffolding and show it to the world. We have insufficient time, in our brief lives, to appreciate the many great works of art that history has passed down to us. We cannot spare the time to reconstruct and marvel over all the various discarded scaffoldings too. Wally was misguided in his enthusiasm for the scaffolding of Machu Picchu.

It was not the purpose of the Incan buildings to inspire the construction of scaffolding. It is otherwise, however, with the Platonic Table, at least according to the Pythagorean Platonist. The Pythagorean Platonist does not think of the Platonic Table as mere scaffolding whose only purpose is to assist artists in creating works of art. No: this Table is a thing of beauty in its own right. Indeed, the shoe is if anything on the other foot. The Table is not there merely to serve the Arts: rather, the Arts are there to serve the Table.

According to a Platonist the primary purpose of works of art is to embody the multilayered, interconnected, abstract patterns that have been distilled into the Platonic Table and – by such particularizing embodiments – to assist our poor embodied souls in grasping, through the senses, what we are too weak-minded to grasp through the intellect alone. We cannot look directly at the sun, and so we must look instead at shadows that it casts on our cave walls. By means of such sensory contacts with artistic embodiments of the Platonic Table, we can thereby subliminally nudge our souls back into harmony with the cosmos. But the ultimate purpose of the Table, for a Platonist, is not to serve the Arts; but rather, the ultimate purpose for the Arts is to nudge us back into harmony with the Table.

Thus, for the Platonist, the Platonic Table is like the site of Machu Picchu itself – and not merely like the long discarded scaffolding that the builders had once used during its construction. Instead, when an artist takes guidance from the Table the works that are created will be more like a scaffolding that might be constructed at Machu Picchu, decades after Bingham's discovery of these ruins, to enable us better to see the site itself, from new vantage points. For a Pythagorean Platonist, the ultimate purpose of the many and superficially very different works of art is, that they should all nudge us, each by its own different means, towards one and the same Table of Harmonies. For an *extremist* Platonist, the Platonic Table is "the thing itself" and works of art, like Michelangelo's *Last Judgment*, are "merely scaffolding".

In this Pythagorean Platonists are all too likely to go too far. In this, they are like the adherents of most religions or quasi-religions and cults throughout the world. The core doctrines in most religions include a fair number of falsehoods. Some of these falsehoods can, of course, be taken as parables or metaphors. It is important to remember, however, that although false religious doctrines can sometimes be taken as metaphors for important truths, sometimes they can also be taken as metaphors for things that are false, mean-spirited, and cruel.

In the lost myths and stories of the Incas of Machu Picchu, for instance, there were no doubt many falsehoods, and some of those falsehoods gave metaphorical voice to deep truths, but some others may have been metaphors for further falsehoods, and for unhealthy emotions that supported cruel social structures. The left-wing poet Pablo

Neruda was painfully aware of this when he visited Machu Picchu, and when he wrote about the experience later:

> Machu Picchu, did you lift
> stone upon stone, and at the base, tatters?
> Coal over coal, and at the bottom tears?
> Fire in the gold, and on that, trembling of the red
> globs of blood?
>
> Restore to me the slave you entombed!
>
> [*Macchu Piccu, pusiste*
> *piedras en la piedra, y en la base, harapo?*
> *Carbón sobre carbon, y en la fondo la lágrima?*
> *Fuego en el oro, y en él, temblando el rojo*
> *goterón de la sangre?*
>
> *Devuélveme el esclavo que enterraste!*]
>
> Pablo Neruda,
> *The Heights of Macchu Picchu*,
> September, 1945

Demons lurk in the interstices of even the finest of our inheritances from the past. Workers may well have suffered during the construction of the temples of Machu Picchu. Some of the stones may have been used for rituals of human sacrifice. It is equally unnerving, for priests like Martin Luther, to contemplate some of the ways funds were raised for the construction of the great buildings of the Vatican, housing the wonderful paintings by Raphael and Michelangelo in the *Stanza della Segnatura* and the *Sistine Chapel*.

Yet we should not throw out beautiful babies with all the bathwater beliefs of our all too human ancestors. We should remember that there are truths among those falsehoods from the past. Indeed, there will also be important truths even about the worst of the falsehoods from the past. We should study the falsehoods as well as the truths.

The same is true of the quasi-religion of Pythagorean Platonism. It is worth our attention, and not only because it contains truths, but also because it contains interesting falsehoods. Some of the falsehoods concerning the Pythagorean Harmonies of the World can be taken as metaphors for truths – but some can also be taken as metaphors for falsehoods. For instance, the notion that the Demiurge took guidance from the Platonic Table, when creating the material world, can be taken as a metaphor guiding the search for the underlying mathematical laws of nature – and this search, manifestly, has not been misguided. Yet the same story of the Demiurge can also be taken as a metaphor guiding, for instance, the practice of astrology and other systems of divination – which surely can be, quite often, misguided (at least when they are taken too seriously, and not just playfully).

Likewise, the Platonic story of the Demiurge could be used to nurture the misguided notion that the purpose of the Arts is *merely* to nudge our souls back into harmony with the Platonic Table. A “fundamentalist” Platonist might take works of art to be “merely scaffolding”, which can help us to see the Platonic Table. That would be

going too far. Even when a work of art does help us to appreciate beautiful patterns that are neatly distilled within the Platonic Table, these works of art may be of just as much value in themselves, and for reasons that have no connection with the Platonic Table. Furthermore, many great works of art are surely created without any guidance whatsoever (certainly without any *conscious* guidance) from any of the patterns of the Platonic Table. This Table is not the *only* thing that (as it were) can nudge our souls back into harmony with the cosmos. And besides, there are other things worth doing in life apart from nudging our souls back into harmony with the cosmos.

And yet, the Platonist is not completely misguided. The Platonic Table *is* an aesthetic object that is an end in itself – even if it is not the *only* thing that is an end in itself. This Table is not merely like Wally Gibb's lost scaffolding of Machu Picchu. It is rather, perhaps, more like the central dome in a cathedral, which both supports and is supported by a circle of other structures that surround it. The relationship between the Table and works of art is best seen as one of mutual reinforcement. We can deepen our aesthetic appreciation not only of the Platonic Table but also of at least some other great works of art, by seeing memorable correspondences between each of these superficially very different works of art and the one mediating and unifying Platonic Table.

Appreciation of the Platonic Table was much more widespread during various epochs in the relatively distant past than it has been in recent times. Like the city at Machu Picchu, which was abandoned by its inhabitants centuries ago, the Platonic Table too was once admired by more than a mere handful of people, but then disappeared from public awareness, known only to at most a very few. There is reason to think that study of this Table, and other mnemonic patterns like it, was fairly fashionable in, for instance, Plato's ancient Greece, and Raphael's Renaissance Italy. But interest in mnemonics of this kind has cycled in and out of fashion, over the millennia – and it has been widely neglected over the last few centuries. It is time for the Platonic Table to be restored to the attention of a wider public.

On balance, Hiram Bingham did the right thing I think in bringing the ruins of Machu Picchu to the attention of a wider world. In that same spirit therefore – despite recurrent misgivings – I have set out to tell others of some of the paths which lead to the Platonic Table. I recommend these paths to such others as would, I trust, appreciate the beauties this Table holds in store, and the new lights it can cast over a handful of great works of art that have been created under its guidance. My personal *daimon* tells me not to hold my tongue.

And these were the first words of all the goddesses spoke to me,
The Muses of Olympus, daughters of Zeus who wears the aegis:

"You shepherds of the wilderness, poor fools, nothing but bellies,
We know how to tell many lies that seem like true sayings,

Yet we know also how to sing reality when we will."

Hesiod,
Theogony: 24–28
(ca 8th century BCE).