

The Structure of Matter

Was Isidore of Seville an Atomist?

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Introduction

It is not customary to devote much attention to the atomistic approach to the structure of matter during the early Middle Ages. Nevertheless a very important and influential work of the period, the *Etymologiarum sive Originum Libri XX* of St. Isidore, bishop of Seville written in the first decades of the seventh century contains an entire chapter about the atoms. The *Etymologies* may not be an ingenious work about cosmology or any other issue but it is my firm belief that the things described there are much more than randomly selected information taken from ancient authorities and thus the appearance of atoms in it is also something else than random selection from previous works.

It is disappointing how little attention is paid to Isidore's works in modern research. Far too often he is dismissed in a few sentences as a transmitter of information and not a very accurate one at that. Or with he is briefly praised for disliking astrology¹, while in reality his significance is much bigger. It is time that we wake up to the fact that by studying his writings we can gain significant insight into what kind of world the early medieval educated men and women of the sixth, seventh and eighth centuries believed themselves to be living in. Naturally there are other authors from the same period worth of study but the *Etymologies* is a monumental work on cosmology unparalleled in the period and is not only meant to explain the origin of things, as the title states, but it also describes more or less the entire universe from the stars (let us not forget the atoms) to the human body and agricultural equipment. It may sound unusual to describe the *Etymologies* or *Origins* as a work on cosmology. Given, however, the interests of the bishop, it is easy to accept its cosmological emphasis as

¹ Olaf Pedersen, „Astronomy in C. Lindberg (ed.), *Science in the Middle Ages*, Chicago University Press 1978, 1978, 304.

fact. Isidore wrote extensively and in most of his writings the interest in cosmology is apparent. Always ready to embrace the most fitting theory, he does not, like so many of his contemporaries, offer merely a theological explanation for most of the appearances in the universe -he compares and accepts or dismisses 'scientific' theories. A good example of his use of this method is his treatment of tides. According to some, tides occur because some underwater vents alternately suck in and release water while others claim that they are due to the attraction of the moon.² Hopefully an examination of the atomistic concept of matter can begin an understanding of the cosmology of the early Middle Ages. This cosmology was not necessarily based on original assumptions or theories; nevertheless, it was genuinely the framework of living and thinking of at least the educated of the period.

In my examination of the subject as it is expressed mainly (although not exclusively) in one chapter of the Book 13, I hope to prove that the bishop of Seville considered the atomic structure of matter to be the best theory both from a natural-philosophical and a Christian point of view. I will also attempt to identify as accurately as possible the sources Isidore used when writing about Atoms and identify his reason for preferring a kind of atomism to other possible explanations. I will first describe Isidore's chapter on the atoms, then I will identify his sources, and I will conclude by presenting my arguments.

1. The Atoms in the Etymologies

As far as it can be established from available sources the only place where Isidore of Seville³ mentions atoms more than in a cursory way is the thirteenth book of the *Etymologies*.⁴ The only other note on atoms is a very short passage in book eight of the same work, where they are mentioned in passing in a discussion of different philosophies.⁵ No other work, not even the one meant to describe the physical universe, *De Natura Rerum*, makes mention of the indivisible particles.

² *Sancti Isidori Hispalensis Episcopi De Natura Rerum ad Sisebutum Regem Liber 55*. Migne, *Patrologia Latina*, Vol. 83.

³ C. 560–635

⁴ *Isidori Hispalensis Episcopi Etymologiarum sive Originum Libri XX, XIII, 2*. Oxford University Press 1911. Hereafter: *Etymologies*

⁵ *Etymologies* VIII, 6, 16.

The thirteenth book of the *Etymologies*, *Of the World and its Parts* begins with a short discussion of the world in general, which moves to a discussion of atoms in its second part. As Isidore describes how the atoms behave:

These are said to be carried and fly through the void of the entire world and fro with restless motion from here to there from here to there like the finest dust that can be seen in the light of the sun pouring in through windows.⁶

These tiny indivisible particles make up the universe and produce the elements and everything – the ‘woods and herbs’ according to some pagan philosophers. They are the very basic building blocks of nature. The point of the geometer is clearly an atom which cannot be divided further, but according to the bishop there are also atoms of bodies, of time and of numbers: Isidore of Seville took the stone as an example to explain what he understood by atoms of physical bodies. Ordinarily a stone can be divided into parts and these parts into grains (just like grains of sand) and even further into the finest possible dust until one arrives to minute, indivisible particles which are the atoms of bodies.

With regards to time the atomic particle is the moment at what time stands still. This is practically the point of time, comparable to the geometrical point. The year can be divided into months; months can be divided into days, days into hours and hours can be broken down further, but according to Isidore there will be a unit that cannot be divided further by any means.⁷ What Isidore means is most likely that there is a basic, indivisible unit of time which is not yet the past and not yet the future but the unit is the present in the strictest sense of the word. In the case of numbers the concept of atom is even more complicated. Isidore gives the example of number eight divided in two to get four and then four divided in two to arrive at two. If two is divided the result will be one – the atom of numbers. At first sight this seems naïve since the number one can be further divided but it seems that the bishop understood this semantically: the number one is the smallest unit that will appear in a natural or fracture number. It is easy for a modern person to grasp this by the help of binaries: The zero signifies empty value and thus the one is the smallest unit available since basically all numbers can be expressed as binaries. The case is similar with letters; one will by division eventually arrive at the indivisible. Speech

⁶ ‘Hi per inane totius mundi inquietis motibus volitare et huc atque illuc ferri dicuntur, sicut tenuissimi pulveres qui infuse per fenestras radii solis videntur.’ *Etymologies* XIII,2,1.

⁷ *Etymologies* XIII,2,3.

can be divided into words and these into letters but letters, according to Isidore cannot be further dissected. In the end of the chapter the bishop of Seville, who was very fond of using Greek words, stated:

For in Greek it is said τομος for divisible and ατομος for indivisible.⁸

At 26 lines in the Oxford edition, the entire chapter is not very long. It is still remarkably substantial if compared to some other chapters in the same book. The first chapter, *De Mundo*, takes up 23 lines, while the next chapter, on the elements has only 20. While one is not entitled to draw conclusions merely based on the chapter length, I believe that the author's interest is demonstrated in how much space he devotes to certain subjects.

2. The Sources of the Atomic Theory

For information about the atoms, as with everything else he discusses, Isidore of Seville was dependent on Roman, Patristic and other Christian writings. Although, as noted above, he liked to use Greek words, his knowledge of the language was utterly insufficient to read Greek works written in original language. Beside the fact that his era witnessed a rapid decline in the knowledge of the language of the Hellenistic culture, there is no quotation in *Etymologies* or any other work by Isidore straight from a Greek source. The vast majority of his quotations are from classical Latin writers, and even Homer is quoted from the Latin translation⁹.

In the chapter on the atoms there is no reference to any authors nor are there any quotations from previous works. In the chapter about the 'philosophers of the pagans' Epicurus is briefly mentioned by name and in connection with atoms¹⁰. Given Isidore's ignorance of Greek and the fact that the Epicurus' writings are lost with the exception of some fragments and two authentic letters,¹¹ it is rather clear that one has to look for sources elsewhere.

The *De Natura Rerum* of Isidore clearly relies on the *Hexaemeron* of St. Ambrose, as can be seen from even a cursory reading of the book. Ambrose is mentioned several times by name and quoted as an authority, such as in

⁸ 'Nam τομος divisio dicitur Graece, ατομος indivisio.' *Etymologies* XIII,2,4.

⁹ *Etymologies* XIV, 3, 41.

¹⁰ *Etymologies* VII, 6, 16.

¹¹ Frederick Copleston, *A History of Philosophy*, Vol I: *Greece and Rome*, Doubleday, New York 1993, 401.

Isidore's discussion of the four elements earth, water, air and fire.¹² Now there is no mention of atoms in this particular work of the bishop of Seville, but Ambrose, his main source, deals with the subject. Ambrose criticized the teachings of some pagans that the world came into existence by an accidental collision of atoms¹³ but was generally more tolerant and less absolute in dismissing the atoms altogether than Ambrose's chief source, St. Basil who also wrote a work with the same title. In fact St. Ambrose in a way authorized atoms in his (presumably own) translation of a Biblical verse;¹⁴ where the *Vulgata* translation gives *in a moment, in a blink of an eye*¹⁵ Ambrose writes *in an atom, a moment of an eye*¹⁶. Even if Isidore did not write about atoms in his earlier work the *De Natura Rerum*, through Ambrose he knew not only that some theories explain matter as being made of atoms, but also that in some context it is acceptable to utilize the term of the pagans.

As far as the *Etymologies* is concerned Isidore's sources are diverse. While it is almost certain that when Isidore writes about the atoms of time his speculations are based on Ambrose's idea, the rest of the chapter has more classical origins. Considering the bishop's attraction to poetry, it is hardly a surprise to discover Lucretius among his sources. The poem *De Rerum Natura* is the expression of Epicurean philosophy and thus atomistic in character. St Isidore quoted verbatim from the work fourteen times not including the paraphrases such as the likening of the motions of the atoms to dust in sunbeam. In the words of Lucretius:

An image, a type goes on before our eyes
Present each moment; for behold whenever
The sun's light and the rays, let in, pour down
Across dark halls of houses: thou wilt see
The many mites in many a manner mixed
Amid a void in the light of the rays...¹⁷

¹² *Sancti Isidori Hispalensis Episcopi De Natura Rerum ad Sisebutum Regem Liber 55*. Migne, Patrologia Latina, Vol.83, 11, 2.

¹³ *Sancti Ambrosii Mediolanensis Episcopi Hexaameron Libri Sex*. Migne, Patrologia Latina, Vol. 14, 2, 7.

¹⁴ 1 Corinthians 15: 52.

¹⁵ 'In momento, in ictu oculi.'

¹⁶ 'In atomo, in momento oculi.'

¹⁷ '[Cuius, uti memoro] rei simulacrum et imago
Ante oculos semper nobis versatur et instat.
Contemplator enim, cum solis lumina cumque
Inserti fundunt radii per opaca domorum:
Multa minuta modis multis per inane videbis
Corpora misceri radiorum lumine in ipso...'

Titus Lucretius Carus, *De Rerum Natura*, 2, 112–117. Translation by William Elley Leonard from <http://classics.mit.edu/Carus/nature/> The poem was written c. 50 BC.

The word *atom* does not appear even once in *De Rerum Natura*, yet nevertheless this poem describes the Epicurean standpoint clearly. It is from here that Isidore took the notion of the elements being built from the minute and indivisible particles. Generally speaking Lucretius did express the atomistic philosophy well, although in a poetic language. He was the best known disciple of the Epicurean school¹⁸ and precisely since he wrote in Latin he could be read in times when Greek philosophyc accounts were not intelligible.

The term atom and a description of it likely to be available to St. Isidore come from Cicero's *De Natura Deorum*.¹⁹ There are two verbatim quotations from Cicero's work in *Etymologies* but none are in chapter two of the Book Thirteen. It is still reasonable to suppose that the work was circulated in Spain in the early seventh century. As Cicero deals with the nature of gods there is no explicit expression of the doctrine of the physical world. However, in the form of a critique of the Epicurean theology it offers at the same time some information about the structure of matter. When Cotta sets out to demolish the theories of Velleius the Epicurean, he touches upon the subject of atoms several times as, for example, when he ridicules the origins of the universe²⁰ and man²¹ as represented by the atomists.

There are more or less extensive treatments of Epicurus and his views in Cicero's *De Fato* and *Academica*, but these works were probably not available to Isidore. On the other hand, he had most likely read the Tusculan disputations, but the atoms are mentioned in this work only twice and are rather quickly dismissed. In any case, it seems that the disputations did not affect the chapter in *Etymologies* anyhow. As for the short treatment of Epicurus in the *Etymologies*²² mentioned above, it is close to impossible to establish what exactly his sources were. Epicurus is called a lover of vanity rather than of wisdom and this attitude was common to Christian writers from Origen onward. For example, Tertulian and Lactantius both rejected all philosophy as incompatible with Christianity; of course, this included Epicureanism.²³ Interestingly, both authors were generally hostile to pagan learning (Lactantius was one of the last proponents of the flat earth theory)²⁴ and for this reason it is unlikely that they affected St. Isidore, who admired

¹⁸ Copleston 1993, 401.

¹⁹ Marcus Tullius Cicero, 106–43 BC.

²⁰ Cicero, *De Natura Deorum* 1, 65–68 [<http://www.thelatinlibrary.com/>].

²¹ *De Natura Deorum* 1, 90.

²² *Etymologies* VIII, 6, 16.

²³ For Tertulian: Copleston 1993, 23.

²⁴ *Divine Institutes* (English translation) III, 24 [<http://www.ccel.org/ccel/schaff/anf07.toc.html>].

the Greek and Roman achievements. In fact, Tertulian and the 'Tertulianites' were rejected as heretics²⁵ while Lactantius is not even mentioned.

The description of Isidore that atoms produce the elements is not exactly in accordance with Epicurean atomism. It seems that somehow the theory of Empedocles of Acragas had some influence, most likely through Lucretius. In the first book of *De Rerum Natura*, Lucretius criticised Empedocles and his theory of elements and thus provided a description of the theory as well. It seems that the philosopher and poet from Acragas did have an important effect on the cosmological poem of Lucretius.²⁶ According to Empedocles, the physical reality consists of ultimate material particles of the four elements,²⁷ and it seemst that the bishop of Seville somehow connected this theory to his own on atoms. This is perhaps the best example of Isidore's thinking: He offers no original theory, only an independet evaluation of existing ones.²⁸

It would be futile to claim that the abovementioned authors were Isidore's exclusive sources for his chapter on atoms. The number of lost works from antiquity is great and some works now lost were possibly available in the libraries of seventh century. We do not know, for example, whether Isidore had access to some sort of translation of all or some of *The Life of Philosophers* by Diogenes Laertius or at least some excerpts. He was certainly familiar with some details about ancient philosophers – he knew, for example, that the Sophists were only wise according to themselves and that Aristotle taught while walking, hence the term peripatetic.²⁹

3. Why Atomism?

At this point it is rather clear which authors affected the bishop of Seville when he was writing about the atoms and we have good ground to suppose that he really was convinced or at least inclined to think that all nature was made of basic indivisible particles. First of all there is no other chapter in any of his works about any other possible candidate for the primary building blocks of nature. As we have seen, he was familiar with Cicero's *De Natura Deorum*, where there is an extensive description of theories from Thales to

²⁵ *Etymologies* VIII, 5, 60.

²⁶ David Sedley, *Lucretius and the New Empedocles*, Leeds International Classical Studies 2003, 2 [<http://www.leeds.ac.uk/classics/lics>].

²⁷ Copleston 1993, 62.

²⁸ Those who wish to blame the Early medievals for not being original should remember that most of us form our opinions in very similar way to Isidore.

²⁹ *Etymologies* VIII, 6, 2 and 13.

Epicurus on the origin and nature of gods. In his description of different theories, Cicero may not be entirely satisfactory by modern standards, but he did give an overview of the history of how philosophers explained the supernatural. Inevitably, in connection to the gods, he also mentioned the first principles of different philosophers. The water of Thales as the origin of everything and Anaximenes' theory of air are shortly touched upon, and according to Cicero, their authors held the first principles divine.³⁰ Moreover, Isidore seems to be familiar with Varro who is quoted in *Etymologies* some twenty times. While one quotation is from the extant work *De Lingua Latina*, the others are from mostly unidentified fragments. From our point of view two of the lost works are interesting, the *De Disciplinarum Libri IX* and the *Antiquatatum Rerum Humanorum et Divinorum*. In fact, the quotation in the beginning of the chapter about the world is most likely from one of those works.³¹ As these works deal with the liberal arts and things humane and divine, it is reasonable to suppose that Varro did have in them some kind of cosmological overview of ancient theories, among them theories of matter and first principles. These works had to be extant in Isidore's time, if not in their entirety than at least in fuller form than survive today, and thus the bishop of Seville was able to get some information out of them. In the *Etymologies* alone there are at least twenty quotations from so far unidentified fragments of the works of Varro, which means that Isidore had access to larger a corpus than we have today.³² As we know very little about these writings, it is not possible to say how much they influenced Isidore. On the other hand, we can attempt to discern why in Cicero's *De Natura Deorum* atomism was not ignored, while other theories of prime matter were.

Skepticism naturally cannot appeal to a bishop of the holy Catholic Church in possession of certain revelation given to mankind through the Bible. The private interest of Isidore in the nature of things would also conflict with a doctrine advocating the suspension of judgment no matter how much Cicero himself was inclined to skepticism. In fact, he did refer to skepticism as a school of philosophy in the chapter *De Philosophis gentium*³³ called *Academici* but it is likely that he did not even consider the approach real philosophy. He quickly pointed out that although in the world there are uncertain and hidden things that according to the will of God exceed human understanding, but there are many more which are perceptible by the senses

³⁰ *De Natura Deorum* 1, 25, 26.

³¹ *Etymologies* XIII, 1, 2.

³² For example *Etymologies* VIII, 6, 21.

³³ *Etymologies* VIII, 6.

and are intelligible to reason.³⁴ According to the definition given by the bishop of Seville, the philosopher is the person who has knowledge of things divine and humane³⁵ and knowledge is in turn (according to the bishop) when a perception of the thing is certain, in other cases it is only a personal opinion.³⁶ Suspended judgment from uncertainty thus does not qualify as philosophy. Naturally the conviction that definite judgment is impossible can also qualify as certain, as sometimes critics of skepticism point out, but even in this case the perception is not about things but relations between different theories and does not qualify by the standards of Isidore. To argue that after all relation is also a thing, *res*, is to attribute too much sophistication to the philosophical discussion in St. Isidore.

As to other possible candidates for prime matter Isidore noted that often heresies and heretics introduced the various erroneous opinions of philosophers into the Church.³⁷ Thus different first principles presented as the original stuff of the universe can lead to an error in theology, while if these first principles of matter are held divine error will necessarily follow. All philosophers err in some points, only the true Church has the answers to everything. Isidore gave as two examples the material principle equated with God by Zeno and the divine fire of Heraclitus. He was also aware of the Pythagorean principle that everything is based on numbers, but for some reason, despite the bishop's affinity to numeral mysticism,³⁸ it did not satisfy him.

The Stoic philosophy could not provide the bishop with the necessary scientific foundation, either. From Cicero's *De Natura Deorum* it is clear that at least the illustrious Roman attributed pantheism to the Stoics. Balbus, who represents the Stoic doctrine, was given the line which is a statement of pantheism:

And indeed the divinity of this world is clearly perceived one must attribute to the heavenly bodies this same divinity.³⁹

Such clear pantheism would have been unacceptable and completely contrary to the tenets of the Christian faith. All these philosophies, Platonism, Stoicism and Heraclitus, are dismissed because their influence on

³⁴ *Etymologies* VIII, 6, 11.

³⁵ *Etymologies* VIII, 6, 1.

³⁶ *Etymologies* II, 24, 2.

³⁷ *Etymologies* VIII, 6, 22.

³⁸ Copleston called this affinity 'fanciful in the extreme' (Copleston, vol. 2, 105).

³⁹ 'Atque hac mundi divinitate perspecta tribuenda est sideribus eadem divinitas.' *De Natura Deorum* 2, 37.

the ideas of God. The Epicurean atomistic philosophy as error is mentioned twice by Isidore, once when the immoral nature of their ethics is discussed as one that authorizes only pleasure as the aim of human life⁴⁰ and another when Epicurus is claimed as a source for the idea of material nature of the soul.⁴¹ Interestingly the view of the material substance and human likeness of gods is not connected to the name of the atomist philosopher. Obviously, St. Isidore did not consider this idea dangerous altogether and dismissed it by claiming that it is 'rustic simplicity' to claim that God is made of matter and has members or extremities. As contrasted to other, dangerous heresies, rustic simplicity does not sound very serious and is not even mentioned in the chapter on condemned errors, where heretics are said to conspire against the true Church of God.⁴²

For some reason, the idea that the world was made of atoms (naturally created by God), had a clear appeal to Isidore. No divine matter was necessary to postulate, thus falling in danger of attributing eternity to something other than God. The movement of atoms as dust in a sunbeam, which in the pagan tradition was governed by chance alone could now be governed by divine providence. Traditionally, in Christianity there was (and still is) a somehow paradoxical claim that in the universe there exist both providence on the one hand (which is the foreknowledge and government of God) and personal freedom for rational beings on the other. Maybe to the bishop of Seville the movement of dust in the light of the sun before one's eyes represented the compromise: to us it looks genuinely as movement by chance but in reality it is guided by the omnipotent Creator.

The Biblical account of creation was of course an extremely important source of any medieval cosmology. Even the more scientific-minded theologians and philosophers had to make up a natural philosophy which at least did not contradict to the lines from Genesis. On the other hand, Genesis was traditionally interpreted according to the philosophical preferences of each author. Thus although it is earth from the traditional elements that appear first in the first chapter of the Bible, this is not taken to represent the earth as an element but the globe itself. Similarly, when it is said that the Spirit of God moved above the waters, no medieval theologian or philosopher jumped to the conclusion that water is the origin of everything. Ambrose in *Hexaemeron* stated explicitly that although the name is water it does not follow that Thales' theory should be accepted.⁴³ As we have seen,

⁴⁰ *Etymologies* VIII, 6, 15.

⁴¹ *Ibid.* and VIII, 6, 23.

⁴² *Etymologies* VIII, 5, 70.

⁴³ *Hexaemeron* 2, 6.

the work was known to Isidore, and thus he was liberated from the consideration of water as the original stuff of the universe.

Opting for atoms as the prime matter from which the elements are made up was convenient because Isidore imagined the elements to exist only in an impure state.

Therefore all elements exist in all, but each receives the name from that which it has the most.⁴⁴

If everything is made up of indivisible particles it is easy to imagine how these mix to form the elements. One part water with ten part air will form air, albeit this mixture is unclear. As all elements are unclear, it will be simply the quantity of atoms that will determine their name and the characteristics. From this it follows that at first pure atoms of elements were created and later they collided to form the universe as we know it.

4. Conclusion

Isidore of Seville was an atomist in a sense. He most likely imagined the world as made up of the four elements earth, water, air and fire and he saw these in turn as a mixture of indivisible particles, each being the minutest possible part of one element. The largest quantity of particles present will determine the properties of bodies. The theory may not stand up to very detailed philosophical examination, but it was not meant to be a coherent natural philosophy. The good bishop was writing an encyclopedic work and his personal convictions can only be glimpsed behind the general information, but he as well as everyone else certainly had personal convictions. Instead of accepting Stoic philosophical elements because of their attractive moral message, instead of adopting Platonic philosophical ideas because of their quasi-resemblance to Christian doctrines, or simply ignoring anything beyond the elements St. Isidore showed a remarkable inquisitive spirit. He attempted to explain matter as far as possible.

On the other hand, Isidore was certainly concerned with providing information from a Christian point of view. Atomism was handy for this as well. Atomistic physics, if extended to the supernatural, can leave no room for gods or God, and this much had to be clear to St. Isidore from both the

⁴⁴ 'Quapropter omnia elementa omnibus inesse, sed unumquoque eorum ex eo quod amplius habet accepisse vocabulum.' *Etymologies* XIII, 3, 3.

De Natura Deorum of Cicero and *De Rerum Natura* of Lucretius. The immaterial nature of God according to Christian theology on the other hand will not suffer from atomically built nature. On the contrary, whereas other possibly available solutions for the primary stuff determine the view of the deity, atoms do not. Water, fire, numbers etc were considered divine and thus are incompatible with Christianity, since one part of the creation is considered equal to God. Atoms are not divine. They simply exist and collide. An immaterial, omnipotent God (putting aside the problem of interaction between the immaterial and material) can do with them as He pleases, even create them and govern their movement. God and the universe are clearly two separate things; this is exactly how a Catholic bishop from theseventhcentury wished them to be.

About the atoms of language and numbers, one cannot be certain whether these were Isidore's original ideas. We can only speculate that the idea behind them is God creating the basic building blocks and giving rational ability to humans to use them and form language and arithmetics. This kind of reasoning suits well into the general way of Isidore's thinking, as he admired learning and scientific achievements.

It is rather difficult to say what kind of effects the ideas about atomism had at the time or in the immediate future. Isidore's encyclopedic work was immensely popular in the Middle ages, and this popularity started to rise immediately after the bishop's death. In Ireland it was known and circulated within fifty years, while in the ninth century Rhabanus Maurus used much of the *Etymologies* into his *De Universo*. Chapter nine of Rhabanus' *De Universo* on the atoms, was copied almost verbatim from the *Etymologies*.⁴⁵ Isidore's contemporaries are silent about their attitude to atomism, and it would take an extensive amount of research before one could say anything definite about the bishop's influence in subsequent centuries. This is not only valid for his atomism but also the entire cosmology.

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⁴⁵ Rhabanus Maurus, *De Universo* 9, 2
 [http://www.fh-augsburg.de/~harsch/Chronologia/Lspost09/Hrabanus/hra_rm00.html].