

Chapter Seven

The Music of Philosophy in Late

Antiquity

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The ambiguous title of this paper is intended to suggest two themes which I would like to develop: (I) music as it was conceived by, and of particular interest to, philosophers in Late Antiquity, in particular the Neoplatonic philosophers of the fourth, fifth and sixth centuries (Iamblichus, Syrianus, Proclus, Damascius, Olympiodorus); and (II) the impact of music, as these philosophers conceived of it, on the way in which they approached other areas of inquiry.

As regards the first theme, it will be seen that the term 'music', as it will be used here, has a very limited and particular sense: it refers to what might be called 'harmonics', i.e. that part of mathematical science which examines the quantifiable ratios represented in musical intervals. This way of seeing music, which I will call the 'Pythagorean' view of music, was to assume more and more importance as Neoplatonic philosophers, beginning in particular with Iamblichus in the early fourth century, came to give mathematics a central, pivotal role in philosophy, as part of their increasing interest in the Pythagorean origins and components of Platonic philosophy. The Pythagorizing of Platonism in Late Antiquity would result in more emphasis being given to the mathematical sciences, which included, along with arithmetic, geometry and astronomy, 'Pythagorean' music. The Pythagorizing of Platonism also led to a tendency to 'mathematize' the various branches of philosophy. Thus it can be shown¹ that arithmetical and geometrical conceptions and methods were influential in the metaphysics and physics of late ancient Neoplatonists. We can in consequence ask if music, too, as it was understood by the Neoplatonists, influenced them in the way they approached their other philosophical inquiries? This question forms the second theme of my paper.

Although some of the texts to which I will refer, in particular Augustine's *De musica* and Boethius' *De institutione musica*, have exerted enormous influence in history and are relatively well-known, with the exception of some work published in particular by Stephen Gersh (1992, 1996), little has been done in examining the

¹ See O'Meara (1989).

Greek background to Augustine and Boethius, as I have indicated it above: the Greek Neoplatonic interpretation and philosophical appropriation of music. As the subject is very large and can become rather complex, I will attempt in this paper merely to provide a general framework, pointing to some questions and making some suggestions.

I

How was music, as one of the four mathematical sciences, understood in the Neoplatonic schools of Late Antiquity? We might begin our answer to this question by recalling Boethius' influential distinction between three kinds of music: 'cosmic music', 'human music', and music as found in instruments (*De inst. mus.* I, 2). 'Cosmic music' is what must be supposed to arise from the mathematical structures and cycles of the heavenly bodies, of the seasons and of the elements constituting the world, whereas 'human music' has to do with the structures composing the human soul, the human body and the relation between soul and body. Both cosmic and human music, we might feel, actually belong to physics and biology, to the study of the organization of the cosmos and of human nature. It is music in the *third* sense, music arising from man-made instruments, that is the object of the mathematical science of which Boethius wishes to treat in his *De institutione musica*.

The notions of cosmic and human music evoke Pythagoreanism, and we can suppose that the third kind of music that will be presented by Boethius in his book is also Pythagorean in approach, to the extent at least that Boethius is believed to draw his information and inspiration largely from a no longer extant introduction to music written by a second-century propagandist of Pythagoreanism, Nicomachus of Gerasa.² To have some idea of the emphasis Nicomachus would have put on music as Pythagorean, we can read his *Manual of Harmonics* in which Pythagoras appears as the 'very first' (πρώτος) discoverer of the essentials of 'harmonics'.³ Now 'harmonics' is described by Porphyry as the first part of music, according to the Pythagoreans.⁴ Music also includes rhythmic, metrics, what relates to instruments, to poetry and delivery. However, harmonics is the first part of music, Porphyry tells us, 'in order, having an elementary function, and contemplative of first principles'.⁵ The reference to the 'elementary function' of harmonics in music may have to do with the didactic virtues of harmonics as both an elementary and

fundamental basis for the study of music. At any rate the priority, in terms of theoretical knowledge, of harmonics in the list of the parts of music given by Porphyry is clear. If music has to do with what is expressed in instruments, it is the harmonics expressed in these instruments that is of primary interest in a 'Pythagorean' approach.

The same point can be made by means of the contrast Damascius draws between Pythagorean and Aristoxenian music. Developing a distinction made in Plato's *Philebus*, Damascius compares 'music that uses sense-perception as its criterion, and the truly scientific method, e.g. musical theory based on the harmonic ratio, the latter practised by the Pythagoreans, the former by the school of Aristoxenus'.⁶ This contrast is by no means new. It is already made by Ptolemy, for example, and, before him, by Ptolemais of Cyrene in extracts from the *Pythagorean Elements of Music* attributed to her which Porphyry quotes.⁷ As opposed, then, to an Aristotelian, empirical study of instrumental music such as that proposed by Aristoxenus and his followers, the 'Pythagorean' approach preferred by the late Antique Neoplatonist takes an interest in music as expressed by instruments to the extent that it is based on harmonic ratios: these ratios are the primary and fundamental object of music as a mathematical, theoretical science.

Let us try to describe now in more detail the primary object of musical science, harmonic ratios, as understood by the Neoplatonist philosopher. I have already referred to Nicomachus as an important source for Boethius' manual of music. Nicomachus had been made a key part of the curriculum of the Neoplatonic schools by Iamblichus, who found in him a Pythagorizer after his own heart and an author of useful manuals which Iamblichus integrated and adapted in his 10-volume work *On Pythagoreanism*. He used Nicomachus' *Introduction to arithmetic* in vol. IV of *On Pythagoreanism* (= *In Nicomachi arithmetici introductionem*) and, I would suggest, in vol. IX, the lost introduction to music by Nicomachus also used by Boethius. Vol. IX of Iamblichus' *On Pythagoreanism* is no longer extant, but we may be able to reach some idea of its contents by reading Boethius' *De inst. mus.* and by allowing for the adaptations that would have been made both by Iamblichus and by Boethius.

Nicomachus is already an important presence earlier in Iamblichus' *On Pythagoreanism*, for example in vol. III (= *De communi mathematica scientia*), where Iamblichus deals with mathematical science in general and, in this context, following Nicomachus, describes the object of music, as distinguished from the objects of the other mathematical sciences.⁸ The differentiation of the object of music begins from a distinction, among beings in general and in the universe in

² On Boethius' use of Nicomachus, cf. Guillaumin's introduction to his edition of Boethius *Inst. arith.* (= Boethius, 1995), XXX-XXXI.

³ *Man.* chs. 5-6.

⁴ Porphyry, *In Ptol. harm.* 5.21-6 (I take it that the third person plural here refers to the Pythagoreans).

⁵ 5.26-7.

⁶ Damascius, *In Phileb.* 225 (transl. Westerink); cf. Plato, *Phileb.* 56a, *Rep.* 531b2-c4; Plotinus, *Enn.* 6.3, 16.20-24.

⁷ Ptolemy, *Harm.* 1.2; Porphyry, *In Ptol. harm.*, 24.1-6, 25.9-26.4 (translated in Barker, 1989, 240-42).

⁸ Cf. Gersh (1996), 87-8.

particular, between the nature of the discrete and that of the continuous. The discrete is numerical plurality (*πλῆθος*), which tends to numerical infinity, whereas the continuous is magnitude (*μέγεθος*), which can be infinitely divided. Since the infinite is unknowable, divine providence has produced two sciences which limit the infinities of the discrete and of magnitude and have made them knowable: arithmetic as the science of finite plurality or number, and geometry as the science of finite magnitude.⁹ Within this division between kinds of objects and their corresponding sciences, Nicomachus, followed by the Neoplatonists, introduces two subdivisions: of plurality into plurality *per se* and plurality in relation to another; and of magnitude into magnitude at rest and magnitude in movement. These subdivisions yield the objects characterizing the remaining mathematical sciences, music and astronomy. Thus, whereas arithmetic deals with plurality (number) in itself, music concerns number in relation. And whereas geometry deals with magnitude at rest, astronomy concerns magnitude in movement. From this we can conclude that the 'Pythagorean' definition of the subject-matter of musical science, as taken over by Iamblichus and Proclus from Nicomachus, amounts to seeing music as a sort of extension, or subsidiary, of arithmetic: as arithmetic studies numbers, so music studies the relations or ratios (*σχέσεις*, *λόγοι*) between numbers. The suggestion of subsidiarity is made by Iamblichus, in relation to astronomy, which has a position in relation to geometry parallel to that of music in relation to arithmetic.¹⁰

The Nicomachean division of the four mathematical sciences will be puzzling, if we take it to be a kind of dichotomous classification in terms of genera and species, in which two main genera (the discrete and the continuous) are subdivided further, thus yielding four species of objects to which correspond the four mathematical sciences. For the principles distinguishing the species seem unrelated: why is one genus, that of the discrete, divided by the distinction *per se* / in relation to another, whereas the other genus, that of magnitude, is divided by the distinction in rest / in movement? However, as is made clear in the following chapter of Nicomachus, the division of the mathematical sciences does not represent a classification in terms of genus and species, but an ordered series based on priority in which the posterior members of the series (music and astronomy) presuppose, but are not presupposed by, the prior members of the series (arithmetic and geometry) and in which arithmetic is the first science presupposed by all of the other sciences.¹¹ Thus the distinctions yielding the sub-classes (*per se* / in relation to another, at rest / in movement) represent in fact orders of priority in which what is *per se* is prior to

what relates to another, and what is at rest is prior to what is in movement.¹² Thus arithmetic and music are not co-ordinate species, but arithmetic, by virtue of its objects, is prior to and presupposed by music, just as astronomy is posterior (and subsidiary) to geometry. We need only find an order of priority subordinating geometry to arithmetic (I will indicate shortly how this may be done) in order to see the complete Nicomachean classification as a series based on priority: arithmetic, the first member of the series, is followed by geometry, which presupposes arithmetic, and these two members of the series are followed in turn by the sciences which presuppose them, music, which is posterior to arithmetic, and astronomy, which is posterior to geometry.

Pythagorean music deals then with relations between numbers or finite pluralities. Pluralities of what? Iamblichus refers to music as articulating the relations between sounds and the quantity of excess and deficiency in these relations.¹³ In order to explain this claim, we might recall Nicomachus' definition (*Manual*, ch. 12) of relation (*σχέσεις*) as 'the ratio (*λόγος*) measuring the distance in each interval' between sounds; his distinction (ch. 2) between continuous speech and discrete human sounds, the object of music, in which sounds are separated, unconfused (*ἀσύγχυτον*), articulated quantities; and his demonstration (ch. 4) that the intervals between sounds are a function of differences in quantity and number (length of sounded strings, size of holes in wind-instruments, etc.). However, I do not think that this means, for Iamblichus, that the object of study in Pythagorean music is *sounds*, as they are articulated in measurable intervals expressing numerical ratios. To put the matter in another way, we might ask the question: what is the precise ontological status of the numerical relations that are the object of Pythagorean music?

Iamblichus deals with this question in *On Pythagoreanism* vol. III to the extent that it concerns mathematical science in general, without specific reference to the objects of music.¹⁴ However, the position he takes can be assumed to apply to the objects of music. He refuses to ascribe either ontological priority or posteriority to the objects of mathematical science in relation to the nature of soul. This means that the objects of mathematical science exist neither prior to the constitution of soul, nor posterior to it. Since the material universe and the sounds that it includes are produced after the soul and by soul, it follows that the objects of music, numerical relations, exist prior to the constitution of the world and of its sounds. Iamblichus, however, does not identify the nature of soul with that of the objects of mathematical knowledge: in some way, which is left unexplained, soul and the objects of mathematical science are of equal ontological rank.

⁹ Nicomachus, *Intro. arith.* 1.3; Iamblichus, *De comm. math. sc.* 7, 28 17-31.4; Proclus, *In Eucl.* 35.17-36.1; Boethius, *De inst. mus.* II.3, Gersh (1996), 87-8.

¹⁰ Iamblichus, *De comm. math. sc.* 31.1.

¹¹ Nicomachus, *Intro. arith.* 1.4, 9.9-11.23; Iamblichus, *De comm. math. sc.* 4, 14.23-15.2. Ordered series of prior and posterior terms are an important feature of Neoplatonic philosophy, on which cf. Lloyd (1990), 76-8.

¹² Nicomachus, *Intro. arith.* 11.1-2 and 13-14.

¹³ Iamblichus, *De comm. math. sc.* 30.23-5.

¹⁴ *De comm. math. sc.* ch. 10. For a translation and detailed commentary on this text, cf. Dörrie and Baltés (2002), 50-53 and 228-44.

The unclear relation between soul and mathematical objects can be understood better if we appeal to a theory concerning mathematical objects which may go back to Iamblichus and is clearly formulated a little later by Syrianus and Proclus.¹⁵ According to this theory, mathematical objects are *concepts* which are articulated by discursive reason in the form of numerical plurality (arithmetic) and the projection of this plurality in extension, the imaginative space of geometry. Mathematical objects are discursive conceptual projections of higher truths, present to soul as above discursive reason and as innate in the nature of soul, what later Neoplatonists call 'substantial reasons' (*οὐσιώδεις λόγοι*). Thus mathematical objects exist in soul, but are not identical with soul: they are the way soul elaborates a discursive scientific knowledge of its own constitution. This can be described quite easily in the case of the objects of music: since soul, in Plato's *Timaeus*, is a combination of components 'bound' as a structure by particular harmonic intervals, soul, in exploring in music such numerical relations, is in fact developing a discursive knowledge of her own inner constitution. Syrianus asks rhetorically: 'What then: is there no contemplator of the harmonic ratios which the god gave soul before the ordering of the visible world?'.¹⁶ The contemplator is soul herself and she does this by projecting in musical science the structures that compose her. Referring to the *Timaeus*, Proclus tells us: 'let us say that it is by virtue of her [the soul's] otherness, i.e. the plurality and diversity of the ratios in her, when she has been constituted and has noted that she is both one and many, that the understanding (*διάνοια*) projects numbers and the knowledge of numbers which is arithmetic; and by virtue of the unity of plurality in her and the community of bond that binds her together, she projects music... Again, her activities being firmly rooted in her constitution, she produces geometry out of her own nature...'.¹⁷

If I may summarize briefly this rather long account of the objects that are of concern to 'Pythagorean' music, as a science adopted and interpreted by Neoplatonic philosophers, we may say that this music deals with *concepts* that are discursive, scientifically developed projections of truths about numerical relationships, which truths pre-exist in soul as innate and constitutive of her very nature. Such numerical ratios may find expression in audible sounds and in instruments. Such sounds may remind us of a musical knowledge innate in us,¹⁸ but they are not the objects of Pythagorean music. This music, is, as Proclus says in the similar case of geometry,¹⁹ a way for us of looking at ourselves, a form of self-knowledge, an approach to the structure of our soul.

To describe the Neoplatonic conception of Pythagorean music, I would like to refer, not only to the way in which this music's objects are conceived, but also, much more briefly, to the method(s) which might also characterize it. Returning to Iamblichus, we find in *On Pythagoreanism* vol. III an account of mathematical method in general, an account which may be taken to include music. Mathematical method involves procedures (division, definition, syllogistic argument) which are also found in logic and which can be described as following the best practices of reasoning as exemplified in logic.²⁰ Proclus finds a rigorous application of these methods in Euclid's geometry and tends to describe as 'geometrical' any argument or demonstration that represents the best of method in discursive reasoning.²¹ An attempt to apply Euclidean method in music can be found in the short demonstration that Proclus adds to the little treatise of Pythagorean music that he inserts in his *Commentary on the Timaeus*.²² In this demonstration, he proves in Euclidean fashion the theorem that 'if in a disjunct proportion²³ one of two mean terms is the arithmetic mean between the extremes, then the other mean term is the harmonic mean between the extremes'. A Euclidean demonstration of musical truths is already to be found in particular in the *Sectio canonis* attributed to Euclid and which is quoted by Porphyry in commenting on Ptolemy's *Harmonics* and also used by Boethius in his *De inst. mus.*

I would like to conclude the first part of my paper with some indications concerning the content of Pythagorean music, in particular as regards some key ideas that would have been of particular interest to Neoplatonic philosophers in their assimilation of what they considered to be Pythagorean music. Their sources of information for Pythagorean music would have included, not only the work of Nicomachus used by Iamblichus, but also texts attributed (rightly or wrongly) to such Pythagoreans as Philolaus, Archytas, and, as we have seen, Ptolemais of Cyrene. To judge from Porphyry's commentary on Ptolemy's *Harmonics*, other materials were also of interest, not only Ptolemy's work, but also texts of Aristoxenus (also cited by Proclus) and the *Sectio canonis*. Until the necessary research has been done, the question must remain open as to whether or not the Neoplatonic philosophers made any new theoretical contributions to the body of Pythagorean music that they found in these sources. At any rate the following ideas in Pythagorean music, among others, were of particular interest to them.

Pythagorean music, we have seen, deals with relations, or ratios, between numbers. These relations include the following, according to Iamblichus:²⁴ 'the

¹⁵ Cf. Sheppard (1997); O'Meara (1989), 166-9; O'Meara (2001); Dörrie and Baltes (2002), 239-41.

¹⁶ Syrianus, *In met.* 25.8-10.

¹⁷ Proclus, *In Eucl.* 36.17-37.3; cf. *In Tim.* II 136.5-20.

¹⁸ See Porphyry, *In Ptol. harm.* 25.26-9; Boethius, *De inst. mus.* 1.9.

¹⁹ Proclus, *In Eucl.* 141.4-142.2.

²⁰ See O'Meara (1989), 47.

²¹ See O'Meara (1989), 171.

²² Proclus, *In Tim.* II 173.11ff. Proclus also planned to add to his commentary an appendix on mathematical theorems which would probably have included harmonics (cf. *In Tim.*, III 76.24-9).

²³ On disjunct proportions cf. Nicomachus, *Intro. arith.* II.21, 121.15; Boethius, *De inst. mus.* II.13; Münkelhaus (1976), 84-6.

²⁴ *De comm. math. sc.* 30.13-14.

equal and unequal, the multiple, the epimoric, the epimeric, and suchlike'. This list corresponds to the series of relations explained, in the same order, by Nicomachus, who is followed by Iamblichus in the following book of *On Pythagoreanism*.²⁵ The various kinds of relations are described as follows. 'Equality' of relation between numbers is given when there is no excess or deficiency of one number in relation to another, whereas 'inequality' exists where there is such excess or deficiency. There are various kinds of inequality, including multiple, epimoric and epimeric relations. A *multiple* relation is when one number is a multiple of another ($n:n \times x$; e.g. 1:2). An *epimoric* relation occurs when one number includes another number together with a fraction of that number ($n:n+n/x$). The most important epimoric relations are the *hemiolic* ($n:n+n/2$; e.g. 2:3) and the *epitritic* ($n:n+n/3$; e.g. 3:4). An *epimeric* relation exists when a number includes another number together with several fractions of that number. Further types of relation are produced by combining the first types. Without going into the details of this, we should note at least that the list of kinds of relations, as forms of inequality, represents a progression in inequality, or rather increasing degrees of a falling away from equality (thus: double, one and a half, one and a third).²⁶ In showing how we can derive the various forms of inequality, represented by the various kinds of relation, from equality, Boethius claims: 'As unity is the origin of plurality and number, so equality is the origin of ratios'.²⁷ Equality is the equivalent, in music, of the one in the science prior to it, arithmetic. And as all numbers derive from the one, so the series of kinds of relations or ratios, representing increasing degrees of inequality, derive from equality.

The relations or ratios measuring intervals in music can be concordant (*σύμφωνος*) or discordant (*διάφωνος*). Porphyry quotes various definitions of concord given in various authors and suggests also that the Pythagoreans had various ways of referring to it.²⁸ One of these, naming concord as a unity (*ἐνότης*), corresponds to the definition Nicomachus gives of concord: 'Systems [i.e. combinations of one or more intervals] are concordant when the notes which bound them are different in magnitude, but when struck or sounded simultaneously, mingle with one another in such a way that the sound they produce is single in form (*ἐνοειδῆ*) and becomes as it were one sound. They are discordant when the sound from the two of them is heard as divided and unblended'.²⁹ The Nicomachean

concept of concord sees it, then, as a unity in plurality, as diverse sounds which, while both mixing and remaining diverse, sound together *as if one*, in unison.³⁰ The word for this 'one-like' character of concord (*ἐνοειδής*) first occurs, I believe, in Nicomachus' music and would subsequently become a fundamental term in Neoplatonic metaphysics.

If concordant ratios are ratios that are unified, and equality, the source of musical ratios, is equivalent to the principle of unity in arithmetic, then we can conclude that the types of relations or ratios distinguished in Pythagorean music, to the extent that they are forms of inequality proximate to equality, represent degrees of concord.³¹ And indeed the numerical relation closest to equality, the multiple relation, is described as the highest concord, the 'most complete' (*κατακορεστάτη*), the 'concord of concords'.³² The first multiple relation (1:2) sounds as the octave. Next in the progressive departure from equality come epimoric relations of which the first are the hemiolic and epitritic: these, also, are recognized as concords, the hemiolic (2:3) sounding as the fifth, the epitritic (3:4) sounding as the fourth. These are the principal kinds of concord (or harmony) recognized by the Pythagoreans, according to the sources used by the Neoplatonists. However octave, fifth and fourth constitute an order of priority, a series (1:2; 2:3; 3:4) in which the octave is the first and highest member. The octave represents the nearest numerical relations come to unity, the closest diverse elements can come together to becoming one.

II

With these elements of Pythagorean music in hand, we may begin the inquiry I would like to introduce, in the second part of this paper, concerning the use and impact of Pythagorean music in late Antique Neoplatonic philosophy. As in Plato, music has, for the Neoplatonist, an important place in philosophical education. As Calcidius indicates: 'Music orders the soul rationally, calling her back to her former nature and making her at last into what she was when god at first made her'.³³ This educational purpose is the inspiration of Augustine's *De musica*³⁴ and is described

²⁵ Nicomachus, *Intro. arith.* I, 17ff.; Iamblichus, *In Nic. arith. intro.* 35.11ff. Verity Harte has suggested to me that such a series may be what is being referred to in Plato, *Phileb.* 25a7-b11.

²⁶ See the arguments in Ptolemy, *Harm.* I 7, Augustine, *De mus.* I. ix.15; Boethius, *De inst. mus.* II.7.

²⁷ Boethius, *De inst. mus.* II.7 (transl. Bower); cf. Nicomachus, *Intro. arith.* I 23.6ff.; II 1.1.

²⁸ Porphyry, *In Ptol. harm.* 95.30-32; 96.

²⁹ Nicomachus, *Man.* ch. 12, 262.1-6 (transl. Barker); cf. Nicomachus, *Intro. arith.*, 115.2-3; Iamblichus, *In Nic. arith. intro.* 119.20 (*ἐνοειδῆς*); Boethius, *De inst. mus.* 1.28. Compare Plato, *Phileb.* 17c11-d7 (above n. 25).

³⁰ Cf. Plato, *Rep.* 617b6, quoted by Plotinus in *Enn.* 4.3 12.24. Plotinus may be referring to the Pythagorean (Nicomachean?) concept of concord in *Enn.* 1.3 1.26 (*τὸ μὴ ἓν*); cf. *Enn.* 1.6 2.20.

³¹ Cf. Boethius, *De inst. mus.* I.32; II.18. Cf. Plato, *Phileb.* 25d11-e2 (and above n. 25); Gersh (1996), 119-20.

³² Nicomachus, *Man.* ch. 5, 244.19-21; ch. 9, 252.12; Porphyry, *In Ptol. harm.* 163.4; Iamblichus, *In Nicom. arith. intro.* 120.9-10; Damascius, *In Phaed.* I 368.10.

³³ Calcidius, *In Tim.* 267, 273.2-3; cf. Plato, *Tim.* 90c2-d7.

³⁴ Which deals however mostly with the part of music that comes after harmonics, i.e. rhythmic. An attempt to argue for an Augustinian spiritual education through music (from which however Platonist metaphysics is removed) can be found in Davenson (1942).

also by Aristides Quintilianus (III, 27), who refers to music, in the context of a Platonic vision of the descent of soul in the body,³⁵ as in the service of philosophy, assisting the soul in her return from this world to a transcendent life.

Late Antique Neoplatonists saw this return of the soul to her transcendent divine origins as a divinization, or assimilation of the soul to divine life. Indeed this divinization is the goal of their philosophy and their philosophy, in general and in its various branches, was seen as method or way for the soul to attain this goal. Thus the various sciences constituting the philosophical curriculum, the practical sciences (ethics, politics) and the theoretical sciences (physics, mathematics and metaphysics), represented stages in a progressive scale aimed at the transformation and divinization of the soul in which soul, beginning with the acquisition of lower forms of moral perfection or virtue (the ethical and political virtues, cultivated on the level of the study of the practical sciences) gained access to higher degrees of virtue and assimilation to divine life (the purificatory virtues and the theoretical virtues developed in the theoretical sciences).³⁶

In taking account of this elaborate edificatory system, we might ask where music might fit in this scheme and how it might fulfil the function assigned to it in the scheme. Boethius suggests that, while sharing with the other mathematical sciences a theoretical function, music also has a moral role.³⁷ Fitting this to the Neoplatonic scale of virtues and sciences, it would seem to follow that music has, with the other mathematical sciences, a role fairly high up in the scale, in the cultivation of the theoretical virtues through theoretical science, but that it also has an edificatory function lower down in the scale, at the start of the education of the soul, on the level of the practical virtues and sciences. I would like to describe in more detail these two levels at which music can have a function in philosophical education, levels which might be taken as corresponding roughly (i) to the educational role given to music in Plato's *Republic* Books II-III, on the one hand, and (ii) to the role assigned to mathematical science in the image of the line at the end of book VI, on the other. I start with the lower level (i), music as part of moral education, the beginning level represented by the ethical and political virtues. As this subject is discussed by Anne Sheppard,³⁸ I will limit myself to making some brief remarks.

(i) Plato's appeal in *Republic* II-III for the use of music as an edificatory method is recalled by Olympiodorus in his commentary on the *Gorgias*. Olympiodorus compares the kind of music in question, which he describes as 'divine', with a 'popular' or degenerate type of music. Divine music acts on the passions, mastering them and ordering the soul.³⁹ Olympiodorus has in mind in particular the tripartite

soul of the *Republic*, soul composed of reason, spirit and desire, in which the soul is brought into order when reason rules spirit and desire. Music can act on the irrational parts of the soul, since it can have an influence on spirit and on desire.⁴⁰ This suggests, I think, that the moral edification brought about by music that Olympiodorus has in mind is not so much that represented by the 'political virtues', in the late Neoplatonic scale of virtues, as that corresponding to what Neoplatonists described as the 'ethical virtues', which consist in a moral habituation preliminary to the cultivation of practical reason developed in the 'political virtues'.⁴¹ Music then can play a role in the moral habituation of a soul preparatory to its access to the first stage of a philosophical education properly speaking, that represented by the practical sciences and virtues. As an example of this moralizing effect of music, Olympiodorus tells the story of how Pythagoras used music to cure a youth of his erotic passion.⁴² A century earlier than Olympiodorus, also in Alexandria, Hypatia cured a pupil afflicted with the same passion, of which she was the object. But, Damascius tells us,⁴³ she did not use music: she had recourse to a more drastic remedy, a form of visual shock-therapy.

(ii) His passions sorted out, Hypatia's young admirer could begin his philosophical education in the practical sciences and virtues, progressing then to the higher levels of perfection represented by the theoretical sciences and virtues, where music might be met again, but this time as one of the mathematical sciences forming part of the theoretical sciences. Here the mathematical sciences, including music, act as a means for human reason to make the transition from theoretical knowledge of the world (physics) to the highest level of theoretical knowledge and virtue, that reached in metaphysics ('theology' or 'dialectic' as this science was then called), in which the soul reaches a grasp of the transcendent divine principles of her own nature and of the world.

The bridging function of mathematics, facilitating the passage from materiality to the knowledge of immaterial being had been described by Plato in his image of the line (*Rep.* VI, 511ad). Plotinus summarizes this idea as follows: 'He must be given mathematical studies to train him in philosophical thought and accustom him to firm confidence in the existence of the immaterial'.⁴⁴ This passage in Plotinus was used by Iamblichus in *On Pythagoreanism* III, was quoted again by Proclus and is often used later by the Alexandrian Neoplatonists.⁴⁵ It describes the training

5-7; Plutarch, *De Iside* 80, 384a (the Pythagoreans).

⁴⁰ Olympiodorus, *In Gorg.* 41.3-4.

⁴¹ For a summary of the theory of 'ethical virtue', as distinguished from 'political virtue', see O'Meara (2003), 46-8.

⁴² This story is often told in late Neoplatonic texts from Alexandria; cf. the *app. crit.* (*ad loc.*) of Olympiodorus and Boethius, *De inst. mus.* I 1.185. See Sheppard's paper in this volume.

⁴³ Damascius, *Vit. Is.* 43A.

⁴⁴ Plotinus, *Enn.* I.3 3.5-7 (transl. Armstrong).

⁴⁵ Iamblichus, *De comm. math. sc.* 55.15-19; Proclus, *In Eucl.* p. 21.20-24; cf. the *app.*

³⁵ Another chapter in Aristides Quintilianus on a Platonic descent of soul in the body (II,17) is discussed in detail by Festugière (1954).

³⁶ Cf. O'Meara (2003), chs. 3-5.

³⁷ Boethius, *De inst. mus.* I.1.179.

³⁸ In her article 'Music Therapy in Neoplatonism', published in the present volume (in which she refers in particular to an important text in Proclus, *In Remp.* I 59.20-60.6).

³⁹ Olympiodorus, *In Gorg.* p. 41.1-20. Cf. Plato, *Tim.* 47c6-e2; Aristotle, *Politics* VIII,

in pure reason Neoplatonists found in mathematics, a study involving, they believed, the rational development of a knowledge of transcendent principles, thus preparing the soul for access to yet higher levels of knowledge. In the case of music, 'Pythagorean' music as these philosophers understood it, we can see that this music was a foretaste of arithmetic: it could lead back to arithmetic (the study of number *per se*), which in turn, as the highest of the mathematical sciences, would prepare the student for the transition to metaphysics.

The mediating, pivotal function of mathematics in the scale of sciences is expressed in the idea that mathematics anticipates, foreshadows, the science above it, metaphysics, as if a image of it, just as mathematics represents itself a kind of paradigm or model of the sciences below it in the scale of sciences. This idea is developed by Iamblichus in two chapters (15 and 30) of *On Pythagoreanism* vol. III (*De comm. math. sc.*) and by Proclus in his *In Eucl.* Iamblichus' chapters concern, as usual, the mathematical sciences in general, but we might ask if anything might be said concerning music in particular as an image of metaphysics and model of physics and of the lower, practical sciences. In ch. 15, Iamblichus uses expressions which could allude to music with reference to metaphysics, physics and ethics. However, these expressions (*εὐταξία*, *ἀναλογία*, equality, *ὁμολογία*, the *λόγοι* of virtues),⁴⁶ if capable of being linked to musical theory, are not necessarily and exclusively linked to music, and Iamblichus' indications remain, in general, rather sketchy. Later in the work *On Pythagoreanism*, in volumes V-VII (which are no longer extant), Iamblichus dealt with *arithmetic* in relation to physics, ethics and metaphysics and it is possible, due to the close link between arithmetic and music, to find in some fragments remaining from these books, as we will see, indications relating music to these other sciences.

If, however we look first at Proclus' parallel treatment of the matter in his *In Eucl.*, we find more specific information. Proclus explains the importance of mathematics for physics by referring to the account of the making of the universe in Plato's *Timaeus*, an account in which musical ratios play a crucial role. This allows us to take it that his references to 'good order' (*εὐταξία*), proportion, equality may be taken to concern music.⁴⁷ And, when he comes to mathematics as paradigmatic for ethics, Proclus seems to have music specifically in mind where he refers to the 'harmonious life', naming musical concords (among other mathematical paradigms) in relation to the principles of the virtues.⁴⁸ This suggests that we might do well to concentrate on the importance of music as a theoretical science for ethical science and for physics. I will discuss in particular music's value for ethical science and conclude my paper with some comments about music's relevance for physics.

crit. (ad loc.) of Plotinus (1951-1973); Julian the Emperor, *Or.* IV.5 248b.

⁴⁶ *De comm. math. sc.* 55.13 and 24-5; 56.7-8.

⁴⁷ Proclus, *In Eucl.* 22.17-24.

⁴⁸ Proclus, *In Eucl.* 24.4-14.

Going back to Iamblichus' work *On Pythagoreanism*, if we look at the fragments that have survived, as I have argued,⁴⁹ from vol. VI, *On Arithmetic in Ethical Matters*, we can find some clues concerning the importance that musical theory might have for ethics. Iamblichus claims that the first principle of ethics is 'measure'. Other principles are 'limit' and the 'perfect' (or 'complete'). 'Completion' (*τελείωτης*), Iamblichus tells us, 'unitarily (*ἐνοειδῶς*) brings to fulfilment the best measure of life'.⁵⁰ This language suggests that a complete, fulfilled, happy life is based on measure and involves a unification of a diversity of components, on the model, perhaps, of the unitary effect achieved in musical concord. This, I think, is the suggestion being made in the fragment that follows: 'There is further as a model of good character (*τοῦ σπουδαίου*) the mean which binds together the difference in numbers, making all harmonious (*προσῆγορα*), producing all proportions, and making the soul into something well-adjusted (*εὐάρμοστον*)'.⁵¹ Analogies or proportions, which are combinations of ratios, can be arithmetic, geometric or harmonic. But Iamblichus may be thinking more particularly of the Pythagorean concept of concord. A little further on in the fragments, Iamblichus compares particular numbers with particular virtues. Wisdom is compared with the monad, justice with the number 4 or 5 and moderation (*σωφροσύνη*) with the number 9, since moderation is the cause of 'symmetry'.⁵² The symmetry in question may be that paradigmatically represented by the concord of the octave, since the identification of the virtue of moderation with the octave is made by Proclus in a passage of his commentary on Plato's *Republic* to which I would like now to turn.

The context of this passage is Plato's reference in the *Republic* to the virtue of moderation as being a concord (*συμφωνία*).⁵³ Plato does not actually identify this concord as that of the octave,⁵⁴ but this is what Proclus takes him to mean. This concord includes and unifies all of the different components of the moral life. What this means is that the three parts of the soul, reason, spirit and desire, function together as one, thanks to the virtue of moderation which embraces them all. Proclus describes the relations between the several parts of the soul in terms of the intervals of the fourth (desire as related to spirit) and the fifth (spirit as related to reason). This expresses for him both the closer (natural) proximity of spirit to desire (both are irrational in nature), as in the interval of a fourth (e.g. 3:4), and the closer (moral) relation of spirit to reason (spirit obeys reason), as in the interval of a fifth (e.g. 2:3). As a concord, the fifth precedes the fourth, and both taken

⁴⁹ O'Meara (1989); the text is printed and translated on pp. 223-7.

⁵⁰ O'Meara (1989), p. 222.4-9.

⁵¹ p. 224.12-15.

⁵² p. 224.31-52. Cf. Aristides Quintilianus III.23.

⁵³ Plato, *Rep.* 430e, 431e; cf. 443d; Olympiodorus, *In Gorg.* 5.1-4. See Long (1991) for a study of the use by early Stoics of Pythagorean/Platonic harmonics with reference to the virtues.

⁵⁴ Cf. Winnington-Ingram's note in Festugière's transl. of Proclus, *In Remp.* II, p. 194.

together compose the highest concord, the octave.⁵⁵ Wisdom is the virtue of reason as the highest, ruling part of the soul; moderation and courage characterize spirit in its alliance with reason in controlling desire, moderation being found again in desire, but starting in reason. Spanning all parts of the soul, moderation is thus what unifies the soul's 'intervals' and the secondary concords (fifth and fourth) that they constitute, making *as if one* the life of the complex diversified whole that is the soul.⁵⁶ In explaining these harmonies of the virtuous soul, Proclus refers to the Pythagoreans and, as we can see, goes quite far in making use of their theory of musical concord. The effect of this, I think, is a particular emphasis on the *one-likeness* of the good life led by the whole made up of different parts that is the soul. This emphasis means also that the virtue of moderation emerges as of particular importance: it corresponds to the highest concord, the unity that the moral life can attain. But what of the fourth cardinal virtue, the virtue which is presupposed, according to Plato's *Republic*, by the other virtues, justice?

In one version of his lectures on Plato's *Phaedo*, Damascius provides us with a little more information on Proclus' comparison between musical intervals and the virtues. He tells us that wisdom is a concord between the knower and the object of knowledge, and that justice, too, is a concord: 'Justice is discriminating concord, whereas moderation is integrating concord; justice seeks its own in such a way as to keep each thing distinct (*ἀσύγχυτον*), yet common to all. Moderation, then, is concord between the controlling and the controlled, justice between the rulers and the ruled.'⁵⁷ The point seems to be that justice and moderation are equal and complementary virtues, each expressing a different aspect of the Pythagorean concept of concord according to Nicomachus:⁵⁸ the aspect of distinction between functions which are not confused, justice, and the aspect of the unified order that is achieved, moderation. It is the same concord, in short, whose aspects find expression in the concepts of justice and moderation. Justice and moderation, as virtues concerning the whole structure of soul's life, contrast, it seems, with the two other cardinal virtues which have to do with subordinate intervals in or between a part or parts of the whole.

Damascius indicates that he does not agree with all of what he reports from Proclus.⁵⁹ This disagreement is more extensive in another version of his lectures on the *Phaedo*.⁶⁰ There, he makes the point⁶¹ that wisdom is to be seen, not as a purely cognitive activity, but as a practical virtue involving desire, and is rather a concord

of what benefits and is benefited. He also rejects the contrast between justice and moderation, as virtues of the whole ('octaves'), and wisdom and courage, as virtues of parts (lesser concords): rather, wisdom and courage are also octaves, extending throughout the whole of the soul. If it is true, Damascius concedes, that wisdom applies more to reason, and courage more to spirit, it is also the case that moderation also is more proper to desire, 'imposing a certain restraint on its shamelessness and looseness', as in the case, we might add, of Pythagoras' wanton youth and Hypatia's amorous student. Finally, Damascius claims that, just as all virtues are present in all of the soul, so also in each part of the soul are to be found concord and harmonic ratio, bringing into harmony the many contrary desires in each part.

Damascius, we might conclude, goes very far in throwing into confusion Proclus' correlations between virtues and musical intervals. Proclus' distinction between the octave(s) that are justice and moderation and the secondary concords that are wisdom and courage disappears: all four virtues appear to be octaves. And within each part of the soul emerge further complexities, further wholes composed of parts: they, too, require unification through structures of concordance. Whatever we may think of this disagreement between Damascius and Proclus, and whether or not we might feel that there is something arbitrary in these combinations of music and ethics, the important point, I think, is that in approaching ethical concepts, the late Neoplatonists could find in music a theory of relations, of structure and in particular of unification, which influenced the way in which they saw the moral life, a life whose paradigms, they believed, were to be found in a higher theoretical science, in music.

I would like to conclude with just a few words about the relation between Pythagorean music and physics. We could compare music and physics along lines similar to those we have followed in relating music to ethics. However our enquiry would become very extensive. The reason for this is the fact that in his account of the making of the world in the *Timaeus*, Plato describes the making of the world-soul in terms of a very involved and quite obscure theory of harmonic intervals. The soul, in turn, orders the world, which is in consequence an expression of soul, a structure also representing harmonic relations, constituting what Augustine calls the *carmen universitatis*.⁶² The extraordinary complexities and richness of Plato's harmonical accounts of the constitution of the soul and of the world mean that the Neoplatonist commentators on Plato's *Timaeus* were led to have recourse to the literature of Pythagorean music at their disposal in order to explain Plato's text. Thus Proclus' incomplete but nevertheless enormous commentary on the *Timaeus*, based principally on the commentaries (now lost) of Iamblichus and Syrianus, is to a considerable extent devoted to presenting Pythagorean music in connection with explaining the production of soul and of the world. This entails, for our inquiry, a task not yet attempted and which cannot be

⁵⁵ As for example in the series 6, 8, 9, 12, where 8 and 9 are fourths and fifths in relation to the octave 6:12. Cf. Nicomachus, *Man.* ch. 6; *Sectio canonis*, prop. 6; Iamblichus, *In Nic. arith. mro.* 120.7ff.

⁵⁶ Proclus, *In Remp.* I 211.26-213.27.

⁵⁷ Damascius, *In Phaed.* II 55.

⁵⁸ Above, 136, 139.

⁵⁹ Damascius, *In Phaed.* II 55.9-11.

⁶⁰ Damascius, *In Phaed.* I 372.

⁶¹ Made in more detail in II 55.

⁶² Augustine, *De mus.* VI.xi.29.

attempted now: the reconstruction in detail of Pythagorean music as known and integrated by Neoplatonism, and the exploitation of this reconstruction in determining how the Neoplatonists' version of Pythagorean music is used in, and affects, their accounts of the nature of soul and of the ordering of the world. We are very far at the moment from being able to see the results of such an inquiry.⁶³ However, I believe we can at least expect that Pythagorean music will have the function of a paradigmatic science for physics, a science of relations providing, along with the other mathematical sciences, models of concepts of use in sorting out the organization of soul and of the world.⁶⁴

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⁶³ For a recent study in this area, see Lernould (2000).

⁶⁴ I am indebted to the participants in the colloquium for their questions and help, in particular Anne Sheppard, Verity Harte and Peter Adamson.