

BOOK IV, the last book

CHAPTER I

The modes first used by the ancients.

Peter of Abano⁷⁵ states that according to Aristotle's thirtieth Problem only three modes were used: Dorian, Phrygian, and Lydian. Lucius Appulaeus, relating in Book I of *Florida* that after the contest of Apollo and Marsyas the piper Antigenidas played a soft, sweet melody, describes five modes, saying that a skilled piper makes all kinds of modifications, whether you want the simple Aeolian, the varied Iastian, the plaintive Lydian, the warlike Phrygian, or the religious Dorian. Five authentic and principal modes and ten companion or collateral modes are named by Martianus according to Aristoxenian tradition. It is well known through Polymnestor and the Argive Sacadas that the three most ancient modes were the Dorian, Phrygian, and Lydian. They were customarily named from peoples whom their melodies pleased by constant expression. From these modes they considered the Dorian appropriate for lower ranges of the voice, Lydian for higher, and Phrygian for median. To these diatonic modes a fourth has been added which is connected to the Lydian (for it is joined to the lower tetrachord of the Dorian). It is called Mixolydian as if a mixed Lydian. The earlier Sappho of Lesbos first instituted this mode, as Aristoxenus says.

Thus posterity has celebrated these four modes because ancient authority arranged a connection of consonances according to a consideration of harmonic division. The erudite call their melodious composition a circle of arts, as if a scientific orb. In the fable by Aristophanes called *Hippis* there is this: O, but I do not know music well, that is, the circle of arts. The erudite wish this to be interpreted in this way since they declare that music encompasses all disciplines, as Plato shows in the first part of *Laws*, saying that music cannot be treated unless as a universal discipline. This was clearly shown in I, 1, of *Theorica*. Since the mores of the mind are indicated in a certain way by song, Aristides Quintilianus rationally thinks that they are called modes. But since a consideration of the modes includes effects on the moods of mind and body they are called mores.

⁷⁵ *Op. cit.*, f. 167v.

CHAPTER 2

The properties of four modes and the excellence of the Dorian.

In the more serious matters the ancients admitted only the Dorian mode since they truly loved its perpetual constancy and severity. They did not approve anything deceitful or occult but anything simple and open. They chose the Dorians alone and considered the Dorian perspicuity of body, for the Dorians were distinctive and often wore tunics. So Plato admired the virile and serious Dorian music; the soft and effeminate music introduced later he said should be disdained, as is shown in Book I of our *Theorica*. He reproved much of the Lydian harmony because it was high and had fallen away from the gravity for which it was naturally suited, and he did not approve many other modes. They say its form was first introduced for the sake of weeping and lamentation. In Book I of *Musica* Aristoxenus says that Olympus played the pipe in the Lydian mode at the funeral of Pytho.

There are some who believe that this mode was created by Melampus; others attribute the use of the Lydian harmony to Chorebus, as Dionysius refers to the name. But when Pindar spoke about the wedding of Niobe in paeans he said that the Lydian mode was taught first in musical studies. Yet modes are mutually altered when they are changed from the most constant and severe actions to those that are joyful and pleasant, just as is said in the place in the proverb "from Dorian to Phrygian."⁷⁶ But those who are distinguished in humanity and facility are not pleased as much by the Dorian as by the Phrygian or the Lydian; thus those who love the Dorian do not approve of Antigenidas the piper because he changed his melody, although for those Antigenidas pleased, the Dorian was more pleasant.

Certain modes please certain people, for the Dorians were opposed to Phrygia, the Phrygians to the Dorians and Lydians, and the Lydians to the Phrygians and Dorians. Also, some citharists, lyrists, and pipers disapproved of others. Some used a large variety of strings, others were pleased by simpler melodies. Plato approved and admitted the Dorian harmony because it combined fortitude and temperance,

⁷⁶ In the *Dodecachordon* Glarean quotes Gaffurius here and discusses the proverb in detail; it is also found in the *Adagia* of Erasmus. See Clement A. Miller, *Heinrich Glarean: Dodecachordon*, *Musicological Studies and Documents* 6 (American Institute of Musicology, 1965), I, 130ff.

but he was not ignorant of any others conducive to preserving the republic, as Aristoxenus says in Book II of *Musica*. For it is believed that Plato had considerable interest in music, since he heard the Athenian Draco and Metellus of Agrigentum perform music. He preferred the Dorian harmony to the Phrygian because of its great seriousness. It is more appropriate for military action, and the Dorians showed a congruent magnitude and amplitude of noble thought in their melodies. Yet the Phrygians easily showed disorder, however much there may be force and vigor.

Lysias said the Athenian Lamprocles created the Mixolydian harmony, and others said Terpander. Some also call the piper Pythocliides the inventor of the Mixolydian mode. They believe its harmony is appropriate to commiseration and tragedy. But the poetess Sappho handed down the doctrine of tragedies to poets. She created the Sapphic meter and first employed the plectrum by which sounds are naturally produced on musical instruments. She became renowned in the forty-second Olympiad, at a time when Alcaeus, Terpsichorus and Pittacus became famous.

CHAPTER 3

The octave species to which these four modes belong.

Posterity has arranged the four confirmed modes (because they were invented first) so that they placed the Dorian as protus or first, the Phrygian as deuterus or second, the Lydian as tritus or third, and the Mixolydian as tetrardus or fourth. The Dorian or protus is given to the octave whose extremities are lichanos hypaton and nete synemmenon or paranete diezeugmenon, divided by mese. Thus mese joins two tetrachords demonstrating two fourths, namely, mese and synemmenon. The remaining lowest interval is a whole tone. This octave species is the one we described in II, 32, as the fourth species in the series.

They place the Phrygian or second on the octave species which is fifth in order, from hypate meson to nete diezeugmenon, divided by paramese. Mese also joins two tetrachords in this arrangement, forming two fourths; the remaining highest interval is a whole tone.

The Lydian or third is contained in the sixth octave species, from

parhypate meson to trite hyperbolaeon, and is divided by trite diezeugmenon. It joins two fourths, leaving a whole tone at the lowest place.

They place the Mixolydian or fourth on the seventh octave species between lichanos meson and paranete hyperbolaeon, with paranete diezeugmenon the dividing string. Trite diezeugmenon joins this heptachord by including two fourths; it sustains the highest interval of a whole tone.

CHAPTER 4

The observance and use of the Dorian mode among the ancients.

Nature has compared various human associations with the four modes. For the Dorian, very appropriate for more serious mental dispositions and bodily movements, was considered by the seers as the mover of phlegm. In the same way it was appropriate to distinguished men of talent, and its representation was given to painters in a color very similar to crystalline. Those very severe ancients Polymnestris, Thaletas Sacadas, and Alcuman (who developed love songs), changed many things in music, for they followed the style of Terpander and abandoned very little his modest and excellent music. They distinguished themselves in poetry, mathematics, and music. It is also said that Plato, the most erudite of men, knew that Alcuman, Pindar, Simonides, and Bacchilides sang many Dorian and some Parthenian songs, and that the prosody, paeans, tragedy and commiserate orations they sang were sometimes in the Dorian mode, even some songs of love. They also sang of war and Minerva, and thought the meter they called spondee was appropriate to the Dorian mode. This music was of a kind which established the spirit of man in a proper measure with great strength.

Thus the ancients extolled the Dorian mode as the leader of a correct and good manner of living, and as a teacher of extraordinary value. For Virgil made the citharist Hyopas perform this music at the banquet of Dido. Concerning the Phaeacian king Alcinous, Homer related that the Corcyraean Demodocus delighted the dinner guests with his cithara. If he sang of the coition of Venus and Mars, it cannot be considered to have been done for the pleasure of desire and enticement, but rather that he would deter the voluptuaries and the weak

from all unworthy passions of this kind in a free man. For this reason Phemius Ithacesius played in the Dorian mode at banquets. Also, King Agamemnon on leaving for the Trojan war left at home a poet musician who encouraged the king's wife Clytemnestra in song through praises of virtuous women to adhere to modesty and conjugal fidelity. So they say that Clytemnestra was not overcome by Aegisthus earlier because he suffered grievously by means of a musician who impeded his adultery with warnings. Therefore, even if the ancients were not ignorant of any harmony and did not use all the modes but only certain ones, they thought the Dorian the most distinguished and the principal mode, from which the others were developed. From this Polybius in Book 4 on the Arcadians declared Dorian music to be true, morally good, and very valuable to men; with reason the Cretans, Lacedemonians, and Arcadians valued it highly.

CHAPTER 5

The nature and use of the Phrygian, Lydian, and Mixolydian modes among the ancients.

The Phrygian mode is depicted in a fiery color (as it provokes a greater movement of bile), for it is believed that it is appropriate to harsh and severe men in exciting them to anger. The cause of this is the very high whole tone above its two conjunct tetrachords as it moves forcibly with the speed of a high sound. It is said that with this mode, which uses the anapaest, the Lacedemonians and Cretans were easily incited to war. Their army was not accustomed to descend to battle before they were aroused by the sound of the tibia and the movement of the anapaest; by this sound they were reminded to strike the enemy forcibly with powerful and repeated blows. At a banquet of Alexander, Timotheus aroused the king with Phrygian music to arm himself. A drunken Tauromenian youth, whom Boethius recalls in the prologue of his *Musica*, was incited by the Phrygian sound and hastened to burn down a house in which a prostitute was hiding.

The Lydian mode (as some say) offers a pleasing sound to those who are very agreeable and jovial in nature. Thus it is said that the Lydians, jovial and agreeable by nature, were pleased by melodies of the same sort, which are comparable to a blood-red color. The

Tuscans, proceeding from the Lydians, followed their choral dances. Not only is the mode said to fit joviality and pleasure, but it is far from the modesty of the Dorian (as it is higher) and the severity of the Phrygian. It is believed by many to fit weeping and lamentation, emotions for whose sake we said it was formed originally. Olympus played the pipe in the Lydian mode at the funereal rites of Pytho, and therefore such performers are called *siticines* or funereal musicians. According to Boethius⁷⁷ it was customary with the ancients to precede the music of the piper with lamentations, just as Papinius Statius⁷⁸ testified in this verse: "The pipe with a curved horn brays lowly, to which the shades of children were usually led in a funeral procession." They were accustomed to do this in the Lydian mode, and while weeping the mourners sang their sorrow (which is especially feminine), so that with such a song it became sweeter through the weeping.

The Mixolydian has a twofold nature since it contains the lowest tetrachord of the Dorian mode and the highest whole tone above in the two conjunct tetrachords. It has the nature of excitement and of continence; for this reason painters show it in a mixed color. They say that in various dances (those that are more excited and those recalled to sorrow) it prefigures the customs of adolescents and the young. There are those who believe that the modes participate in celestial harmony. They say the sun rules the Dorian, and ascribe the Phrygian to Mars, the Lydian to Jupiter, and the Mixolydian to Saturn. Although they are ascribed to the eight lower strings in I, 2, of *Theorica*, a later description will show them more clearly.

CHAPTER 6

The addition of three collateral modes and their natures.

From what has been stated so far in this fourth book it is easily understood that the ancients arranged all harmonious music in four modes. But later musicians added three other modes to the first three modes by forming a substitution of the lower tetrachord and giving the same name to each associate mode, for they related the Hypodorian to the Dorian, the Hypophrygian to the Phrygian, and the Hypolydian to

⁷⁷ *De Musica* I,1; Friedlein p. 186.

⁷⁸ *Thebiad*, VI, 121.

the Lydian. From the modes invented first the order is this: Dorian first, Hypodorian second, Phrygian third, Hypophrygian fourth, Lydian fifth, Hypolydian sixth, and Mixolydian seventh. The latter mode lacks a mode name (because none was assigned to it); it is subjoined to a lower tetrachord whose ratio is expressed below.

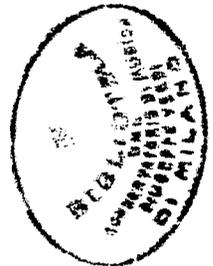
If you form from the added lowest string of the perfect and immutable fifteen-string system an order of modes according to the seven octave species, the Hypodorian will be first, the Hypophrygian second, the Hypolydian third, the Dorian fourth, the Phrygian fifth, the Lydian sixth, and the Mixolydian seventh. It is written that the effects and powers of the first modes that were adjuncts of the primary modes were opposed to them and were diverse in themselves. For the Dorian mode arranged its effects and powers according to modesty and virile constancy; it is said that these effects and powers were reversed in the Hypodorian mode, and its seriousness declined to inertia and sluggishness. For it was the plan of the Pythagoreans to lighten cares during the day with Hypodorian songs, but at night to bring back their interrupted devotion to Dorian music.

Posterity called the four original modes authentic and principal or leaders, and they are known to have greater strength and power than the excitement of any mental or physical conception, namely a harmonious division in a natural connection of consonances. Since the other modes are named from the same laterals (I call fourth- and fifth-species laterals), they are called collateral or accompanying. Just as an authentic mode or leader has its own species of fifth, as the Dorian, its collateral follower or the Hypodorian contains the same fifth. Also, the fourth-species that is above the fifth in the Dorian is below the fifth in the Hypodorian, the collateral and accompanying mode. The same thing holds true in the remaining modes.

CHAPTER 7

Collateral modes are opposed by nature to their authentic modes.

When collateral modes are raised for the sake of recalling excitement (for lowness recalls slowness and highness is said to cause speed), the lowest tetrachord of any collateral mode is joined to the lower tetrachord of its leader. But so that this will agree, a congruent



beginning is given to the fourth string of the immutable system, or lichanos hypaton of the first leader, which is called Dorian. Since there is a conversion from a harmonic to an arithmetic division, in which we said the octave is divided into two equal parts, the spirit is recalled from a limited excitement to a very tranquil state of mind. The same thing happens in the arrangement of two opposing proportions (as shown in the treatise *Practicabilium Proportionem*),⁷⁹ where each proportion immediately followed by its opposite removes the preceding proportion, so that the following notes are arranged according to the prior numbers.

Thus when each authentic mode is converted into its collateral mode, since its low tetrachord is joined to the lowest tetrachord of its collateral mode, it communicates its own properties in a contrary way, as we said, whose most potent relationship is the particular likeness of the conjunct tetrachords, for the lowest tetrachord of the Hypodorian includes the first fourth-species, or a whole tone, semitone, and whole tone from proslambanomenos to lichanos hypaton. Also, the same fourth-species is arranged on the first lower tetrachord of the Dorian, namely a whole tone, semitone, and whole tone between lichanos hypaton and lichanos meson.

The lower tetrachord of the Phrygian mode consists of the second fourth-species, a semitone and two whole tones between hypate meson and mese; it also forms the lowest tetrachord of the Hypophrygian, from hypate hypaton to hypate meson. The Lydian forms the third fourth-species in its lower tetrachord, two whole tones and a semitone between parhypate meson and trite synemmenon (for the sake of which it is believed that the synemmenon tetrachord was introduced); the Hypolyian also has these intervals in its lowest tetrachord from parhypate hypaton to parhypate meson. Since these collateral modes have a consonant fourth below the fifth, making them lower and turned upside down as it were, they are called plagal and subjugal. Because of the complication and inversion of the modes, which the Argive Sacadas is said to have created, they are also called tropes.

⁷⁹ This became Book IV of *Practica Musicae*. For details of the treatise see Clement A. Miller, "Early Gaffuriana: New Answers to Old Questions," *The Musical Quarterly* LVI (July, 1970), pp. 367-388.

CHAPTER 8

The nature of the Hypophrygian and the Hypolydian.

The Hypophrygian mode moderates and removes the nature and excitement of the Phrygian. The Lacedemonians and the Cretans were recalled from battle by pipers playing in the Hypophrygian mode. Alexander of Macedonia, furiously aroused at a banquet by the sound of the Phrygian mode, put on his armor, but was brought back to the banquet and his guests by Timotheus playing the cithara in the Hypophrygian mode. The gravity and slowness of the music thoroughly subjugated drunken, bold and wanton youths, for at a command of the Pythagorean Damon a piper playing a spondee allayed their furious wantonness and mitigated the folly of drunken disorder. Many believe that the Athenian Damon created this relaxed kind of harmony.

If all Italy and especially the ancient Latins were drawn to war by the sharp and lively sound of a trumpet in the Phrygian mode (as "the trumpet sounded *taratantara* with a terrifying din" in Ennius), they left a battle with a slow sound and a grave mode. Many used horns in battles. It is said that Turks, Pannonians, Swiss, and Persians were accustomed to invade enemy camps on all sides with drums beating a horrendous noise like thunder.

The ancients celebrated Polymnestor as creator of the Hypolydian mode, the collateral of our Lydian; they say he made a lower sound by adding longer strings. It is said to subvert the pleasantness of the Lydian, its leader, to tears and to participation in a harmony of lamenting. So it happens that the three plagal modes are opposed to their own leaders in nature and order, just as a proportion of lesser inequality is opposed to a proportion of greater inequality of the same denomination. Just as *proportio submultiplex* is opposed to *multiplex*, and *subsuperparticulare* is opposed to *superparticulare*, so Dorian is opposed to Hypodorian, Hypophrygian to Phrygian, and Lydian to Hypolydian, because of a lowered tetrachord and effective properties. They are also usually compared to the order of the lower constellations, for it asserted that here is a similar nature of the Hypodorian to the moon, the Hypohrygian to Mercury, and the Hypolydian to Venus. Thus only these three follow their principal modes in a connection of their lowest tetrachord.

*The nature of the Mixolydian and the superaddition
of the Hypermixolydian.*

Since the Mixolydian mode is connected by its lower tetrachord to the lowest tetrachord of the Dorian, it does not have a collateral mode which inverts its natural effect. So its effect is called twofold, namely excitement and a retreat from it, for principal modes either allow the inversion of the particular effect of their subordinate modes, or any of them may use the function of the subordinate mode as their own. Since the lower tetrachord of this mode is divided disjunctly from the lower tetrachord of the Dorian (yet arranged according to the same fourth-species, namely clearly taken from the synemmenon tetrachord), it receives a lesser amount of the Dorian nature because of its disjunction and distance. As we said about the Lydian, two of the same conjunct types of consonances can have a greater participation in their nature.

In order to harmonize the entire disdiapason system with the modes Ptolemy added an eighth mode which reaches the highest octave species between mese and nete hyperbolaeon. He exceeded the Mixolydian by a whole tone above and called the mode Hypermixolydian, as if above the Mixolydian. The lower tetrachord of the Hypermixolydian is connected conjunctly to the lower tetrachord of the Phrygian, producing the first fourth-species and completing the first fifth-species up to nete hyperbolaeon.

Thus the Hypermixolydian mode is not called either a principal or a collateral mode (as some think), since it does not produce the same fourth-species in its lower tetrachord as the lowest tetrachord of the Phrygian mode, to which it is joined conjunctly. For the Phrygian mode has the second fourth-species from hypate meson to mese, and the Hypermixolydian has the first fourth-species from mese to paranete diezeugmenon. Yet the second diatonic fourth-species can be assigned to either part when it is considered from mese on nete synemmenon. This is especially prohibited, since its octave form is different than the first octave-species or Hypodorian, for it contains a common string different than that of the first octave-species. This would be unsuitable, since each similar species of consonance containing a single common string of another type of the same genus

belongs to another type and species, as our Boethius zealously states in IV, 13, showing that a fourth consonance is varied by only three species.

The Mixolydian is ascribed to Saturn (as it is higher than the other modes we discussed and is considered to have command of lamentation). The Dorian is correctly compared to the sun, for in its median position among the seven primary modes it shares its own tetrachord with the other modes; the sun has a median position among the seven planets and customarily gives light or heat to other planets from its own rays. Thus the poet sang: Residing in the middle Phoebus embraces everything.⁸⁰

The Hypermixolydian, the highest mode of all, is attributed to the firmament as a participant of that sublime and divine harmony and free of corruptible properties (which are thought to belong to other modes). Many other things could be said here about the relationship of the modes to the planets, but since they are the thoughts of others and are fully discussed by Marcus Manilius, Ptolemy, and Haly, and especially since Johannes of Saxony has studiously cited them in commentaries on Alcabitius⁸¹ in the second difference in the natures of the seven planets, I decided they should be omitted so that later I may not be accused of error. Those who pontificate on professions foreign to their own, labor mostly for their own satisfaction and have been rejected by learned men, for when they try to interpret astronomy exactly they alter it shamelessly.

⁸⁰ Attributed to Ausonius in *D. Magni Ausonii opera omnia* (London, 1823), I, 367, line 11.

⁸¹ See Paul Kristeller, *Iter Italicum* (Leiden, 1965), I, 298.

CHAPTER 10

The harmonization of the seven modes and planets in a Sapphic poem with the Dorian and Hypodorian modes.

Lancinus Curtius, a very distinguished poet of our time, has composed a Sapphic poem for us to unite the nature and order of the seven modes with the heavenly bodies. It is:

Gaphuri tandem modulis levata
Musa: non longum dea carmen adde
Musicae: alterna vice nomen unum
Nectit utrasque.

Hoc Iovis: Phoebi: charitum: Minerve et
Mercuri Inventum celebratur: ecquid
Mirum habet si musa deos faventes
Ducta ab olympo.

Sacra sunt dive: rude quod polivit
Saeculum: Amphion: Linus ut reposcant
Hoc decus: Vatum labor est: vetustas
Orsa recondit.

Haec nitet: prestat magis audientes
Et deos: paeana choro canente
Fare mi sol lare resoluto
Num mala ceduntur?

Vatibus sed divum: hominumque amores
Gestaque ut cantent monimenta pangit
Lege sic carmen nitidum: et soluta
Verba resultant.

Musica quando est homo nexus arte
Motibus natura regit per aequis
Corpus: at mentem numeris negabit
Nemo teneri.

Musices septemque modos Planete
Corrigunt septem totidemque chordis
Thracis antiqui lyra personabat
Cognita sylvis.

Omnis ordo: aetas: locus hac levatur
Dorius sub sole citat iacentes
Mentis affectus: habilis per omnes
Surgere cantus.

Dorium infra qui est modulum: bicornis
Suscitat phoebe: miseros remulcet
Auget humores: hominum sopore
Lumina stringit.

Congruit Marti Phrygius superbo
Igneus bilem: et movet arma: ab armis
Qui subest huic revocat: deique est
Cura volucris.

Lydius tutela Iovis fluentem
Sanguinem impulsu placido coercet
Cui Venus praeses subit: et benigna
Sorte feruntur.

Bile Mixtum Lydium agit sub atra
Luteum Saturnus: hiat Tragoedis
Aptus: hoc Sappho mea gloriatur
Forte reperto.

Musicae tandem liceat quid arti
Lesbius vates: pede duxque claudio
Voxque Milesi: Samiique monstrat
Empedoclisque.

Barbitos: testudo: lyra et choraule
Tibiae pecten: cytharaeque plectra
Et tubae naulum crotalumque cornu et
Tympana pulsant.

Musicae reddant veteres coronas

Myrthus et flores: apiumque: lauri

Thus: manus: cespes: preceque ac acerra

Vota fatigent.

Lyric poets sing such a Sapphic song by giving long syllables a complete measure of time beating. We notate them as breves and short syllables as semibreves containing exactly half of the breves. The text [of the upper part] is sung according to the natural form of the Dorian mode. Lyric poets sing the text [of the lower part] of this Sapphic song according to the Hypodorian mode, in which the fourth consonance lies below the fifth consonance. Long syllables are given to breves and short syllables to semibreves, as shown here:

Musical notation for the first line of the Sapphic song. The upper staff is in treble clef and the lower staff is in bass clef. The lyrics are: Mu - si - ces se - ptem - que mo - dos pla -

Musical notation for the second line of the Sapphic song. The upper staff is in treble clef and the lower staff is in bass clef. The lyrics are: ne - tae, cor - ri - gunt se - ptem to - ti - dem -

Musical notation for the third line of the Sapphic song. The upper staff is in treble clef and the lower staff is in bass clef. The lyrics are: - que chor - dis, Thra - cis an - ti - qui ly -

Musical notation for the fourth line of the Sapphic song. The upper staff is in treble clef and the lower staff is in bass clef. The lyrics are: ra per - son - a - bat, co - gni - ta syl - vis.

If two lyric poets sing together, the one in the Dorian mode and the other in the Hypodorian, the harmony will flatter the ears in a most agreeable manner.

CHAPTER 11

The interval by which one mode is higher or lower than another.

The lowest mode, the Hypodorian, contains four strings which occur in every genus, namely, it includes the median and extremes of two conjunct tetrachords. They are: proslambanomenos, hypate hypaton, hypate meson and mese. The highest mode, the Hypermixolydian, also necessarily contains four immobile strings, for it includes mese and two extremes and a median of two conjunct tetrachords forming a heptachord. They are: paramese, nete diezeugmenon and nete hyperbolaeon, for it is an octave higher than the lowest mode, the Hypodorian. Every higher octave string is equal to the lower octave string. The other modes are enclosed within the extremes of these two modes. According to this, two tetrachords in a heptachord with three immobile strings cannot be joined together. For there are seven immobile strings in the perfect system of fifteen strings which remain unchanged in one and the same place in every genus, as proslambanomenos, hypate hypaton, hypate meson, mese, paramese, nete diezeugmenon, and nete hyperbolaeon. There are eight moveable strings which change according to the permutations of the genera. They are the strings included within the outer strings of tetrachords, as parhypate hypaton, lichanos hypaton, parhypate meson, lichanos meson, trite diezeugmenon, paranete diezeugmenon, trite hyperbolaeon, and paranete hyperbolaeon.

The Hypodorian mode, the lowest of all, is a whole tone below the Hypophrygian mode in the system, a semitone below below the Hypolydian, a fourth below the Dorian, a fifth below the Phrygian, a minor sixth below the Lydian, a minor seventh below the Mixolydian, and an octave below the Hypermixolydian. The Hypophrygian mode is a whole tone above the Hypodorian in the system. It is a semitone below the Hypolydian (not a whole tone as some think), a minor third below the Dorian, [a perfect fourth below]⁸² the Phrygian, a minor sixth

⁸² The text in brackets is lacking in the printed edition.

[below the Mixolydian], and a minor seventh below the Hypermixolydian. The Hypolydian, which is not a whole tone above the Hypodorian, as some say, but a semitone or trihemitone above, is a whole tone below the Dorian, a major third below the Phrygian, a fourth below the Lydian, a fifth below the Mixolydian, and a major sixth below the Hypermixolydian.

The Dorian mode is a fourth above the Hypodorian, a minor third above the Hypophrygian, a whole tone above the Hypolydian, a whole tone below the Phrygian, a minor third below the Lydian, a fourth below the Mixolydian, and a fifth below the Hypermixolydian. The Phrygian mode is a fifth above the Hypodorian, a fourth above the Hypophrygian, a major third above the Hypolydian, a whole tone above the Dorian, a semitone below the Lydian, a minor third below the Mixolydian, and a fourth below the Hypermixolydian. The Lydian mode is a whole tone below the Mixolydian, a major third below the Hypermixolydian, a minor sixth above the Hypodorian, a diminished fifth above the Hypophrygian, a fourth above the Hypolydian, a minor third above the Dorian, and a semitone above the Phrygian.

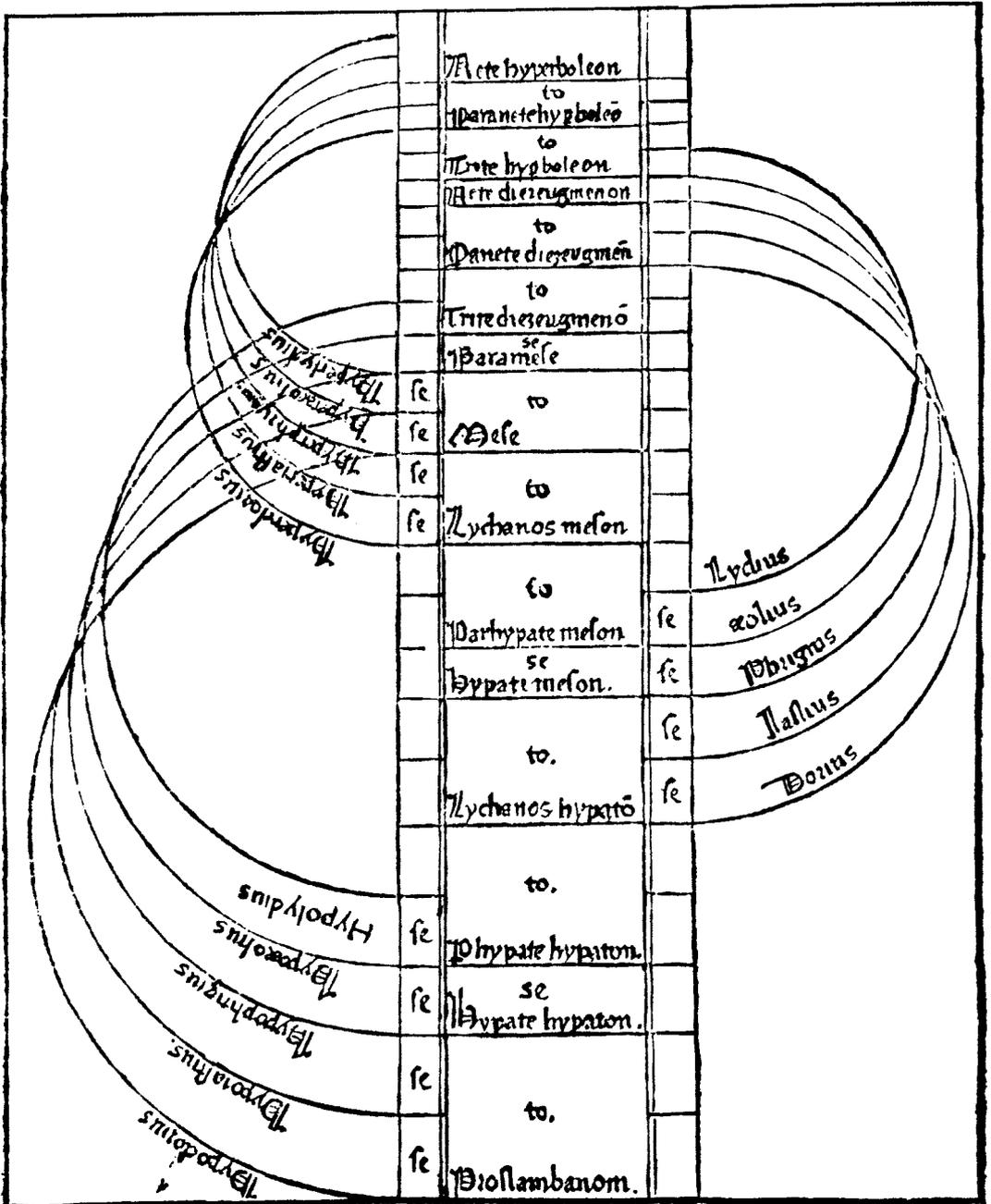
The Mixolydian is a whole tone below the Hypermixolydian, a minor seventh above the Hypodorian, a minor sixth above the Hypophrygian, a fifth above the Hypolydian, a fourth above the Dorian, a minor third above the Phrygian, and a whole tone above the Lydian. The highest mode, the Hypermixolydian, is an octave above the Hypodorian in the system, a minor seventh above the Hypophrygian, a major sixth above the Hypolydian, a fifth above the Dorian, a fourth above the Phrygian, a major third above the Lydian, and a whole tone above the Mixolydian.

Posterity has celebrated only these eight modes because in their course they include the complete diatonic extent of the immutable and perfect system of fifteen strings. They believe the other five modes that Aristoxenus lists, the Hypoastian, Hypoaeolian, Iastian, Aeolian, and Hyperastian, useless for a sensible harmony of a full and complete system (as Bryennius says), and giving only an empty demonstration of harmony. Martianus Capella names fifteen modes which Cassiodorus in Book II of *Institutio divanarum et humanarum rerum* arranged so that the systems of each mode were raised or lowered by only one semitone. But since according to Aristoxenus each octave system completes twelve equidistant semitones, the two higher modes, the Hyperaeolian

and Hyperlydian, are diminished, since in the full system of fifteen strings they do not seem to fill out an octave and are considered superfluous, for they exceed the disdiapason system by two semitones. But since this may seem hard to understand by listening we have subjoined a diagram so that it may be apparent to the eyes.⁸³

⁸³ The diagram, which is reproduced by Glarean, actually contains the fifteen modes of Martianus Capella. For Glarean's criticism of Gaffurius's understanding of the ancient modes, see C. A. Miller, *Heinrich Glarean: Dodecachordon*, I, 99ff.

Diagram of thirteen Aristoxenian modes and two added by posterity, with each whole tone divided into two equal semitones.



Since Aristoxenus and his followers divided the 9:8 whole tone into two equally spaced semitones, (sharply opposed by Ptolemy), no exact proportions between the small and large Pythagorean semitones have been cited.

CHAPTER 12

Muses, constellations, modes, and strings belong to a mutual order.

There are those who believe that muses follow the order of constellations and modes. Some enumerate only three muses and others list nine born of Zeus and Memoria. In *Metamorphoses*⁸⁴ Ovid calls them Mnemonides in this line where he said: O Muses, tarry, for he knew them. Diodorus Siculus in Book V said they were very celebrated and described the proper position of each as if of objects related to the art of music. Homer also honored them with extraordinary celebrity. St. Augustine in Book II of *De Doctrina Christiana* named nine muses. He refuted the idea that they were daughters of Zeus and Memoria and relied rather on the opinion of Varro that three workmen had each made three representations of the muses in the temple of Apollo, who were then given names by Hesiod in *Theogony*. Through the ancients it was desired to give the muses cognomens that were good and useful and that would teach men things that were unknown by the uneducated.

Some believe that the muses arose from the head of Apollo, as expressed by a poet in this verse: *Mentes Appolineae vis has movet undique musas*.⁸⁵ Others say that they were taught by Apollo; for this reason Apollo himself is called music, as we said more fully in Book I of *Theorica*. Many believe that Apollo's cithara is portrayed with ten strings, and others say seven, as if the seven essential strings which Virgil in Book VI⁸⁶ of the Aeneid relates in this line: Also the long-robed Thracian priest plays and sings to a lyre with seven strings. They also have seven intervals: ditone, semiditone, fourth, fifth, major sixth, minor sixth, and octave. Number seven is arranged with a certain perfection since it and its aggregate parts equal number twenty-eight

⁸⁴ V, 280: *Mnemonides (cognorat enim) consistite dixit.*

⁸⁵ This verse, which is the heading of the diagram at the end of this chapter, is attributed to Ausonius. See Haar, *op. cit.*, p. 11.

⁸⁶ Line 645.

between ten and one hundred with their aliquot parts.

It is said that Clio invented history, Melpomene tragedy, Thalia comedy, Euterpe pipes, Terpsichore the psaltery, Erato geometry, Calliope literature, Urania astronomy, and Polyhymnia rhetoric. But Anaximander Lampascenus and Zenophanes Heracleopolites in their books have interpreted the muses in another way, and others as the naturalist Pisander and Euximenses in the book *Theologumenon*. They compared the muses in order to the requisite instruments of the human voice. A tone sounds with four teeth placed in opposition at which the tongue strikes. To the upper teeth one muse was ascribed and another to the lower. But if one of them were lacking they say a syllable rather than a tone would result. They also give two muses to the two lips as appropriate instruments of the words. They apply another muse to the tongue which as a curved plectrum striking a certain vowel forms the breath. A muse is given to the palate whose cavity produces sound. Another muse is given to the windpipe which in its round passage gives exit to the breath. They ascribed a ninth muse, fitting for quiet and silence, to the lungs, which like a goldsmith's bellows, produce and renew a tone.

Fulgentius in his interpretation of fables established nine muses of learning and science. Clio is chief of these, as if the first with an understanding of learning. For *fama* of Latin is called Clio in Greek, and so in Homer there is "we listened to fame alone" and also elsewhere. For great glory is a sceptre, and no one looks to knowledge except to increase the worthiness of his own fame. From this Clio is placed first, as if the thought of seeking knowledge. The second muse, Euterpe, is called well pleasing in Latin. Since the first is to seek knowledge the second is to take pleasure in what is sought. The third muse, Melpomene, relates to persevering in contemplation, just as the first seeks, the second desires what is sought, and the third renews by studying what is chosen. The fourth is Thalia, capacious or germinal. Epicharmus says in *Comedia: Germina dum non viderit famem consumit*. The fifth is Polyhymnia, as if having a memory of many things, for memory follows capacity. The sixth is Erato, which is found the same in Latin. It is proper that with the preceding capacity and memory one may find anything similar with his own ingenuity.

The seventh is Terpsichore, or pleasing instruction. Thus Hermes says in *Opimandre*: without knowledge of food and nourishment and

with an empty body. For after invention it is also necessary to understand and judge what you invent. The eighth is Urania or heavenly, for after a judgment you select what you affirm or what you reject. It is beneficial to choose the celestial in order to reject the noxious and transitory. The ninth is Calliope or fine-voiced, as Homer says: the voice of the songful goddess. Thus according to the plan of Fulgentius, knowledge and learning are sought as a gift of the muses so that in a requisite and successive way they are understood to agree with seeking, taking pleasure, persevering, grasping, keeping in mind, inventing, judging, selecting, and expressing.

Callimachus, the Greek writer, is a fine authority on the gifts of the Muses, as the poet shows in this epigram: Calliope invented the knowledge of heroic poetry, Clio, the sweet song of the noble chorus to the music of the cithara, Euterpe, the resounding tone of the tragic chorus. Melpomene gave the knowledge of the lyre to mortals for sweet sounds. Terpsichore, as a favor, skilfully constructed pipes. Erato invented the very delightful hymns of the gods. Learned Polyhymnus invented the delights of the dance. Polyhymnia gave harmony to all songs. Urania discovered the heavens and the celestial bodies. Thalia invented comedy and illustrious customs. We think, as many believe, that the muses fit the stars, modes, and strings, so that we ascribe them to single strings to which the beginnings of modes are given, placing one with each.

Subterranean Thalia is placed first, as if silent, as this verse says: In the beginning nocturnal silence germinates with song and Thalia lies silent in the bosom of earth. Marcus Tullius Cicero compared the earth to silence because it is immovable, just as the underground three-headed Cerberus is compared to the Apollonian feet. To the lowest added string is given the beginning of the Hypodorian (because it is the lowest of modes) and the moon, the home of Cancer (as astronomers believe), since it is the lowest planet, and Clio, as in this poem: Persephone and Clio breathe and therefore the Hypodorian is born; here arises the origin of song. To the second string, hypate hypaton, is given the beginning of the Hypophrygian, and Mercury, home of Gemini and Virgo, and also Calliope herself, with this verse: The Hypo string produces a string connected to the Phrygian, which Calliope brings forth, and as an interpreter she produces divinity. The third string or parhypate hypaton, is given to Terpsichore, the

Hypolydian, and Venus, Libra, and Taurus, as in the verse: The third string shows the beginning of the Hypolydian; Terpsichore stands opposite and Venus creates Paphos. The fourth string, lychanos hypaton, has the Sun, home of Leo, and Melpomene. It is given the Dorian mode in this verse: Melpomene and Titan form (I believe) the mode in the fourth place which is called Dorian.

On the fifth string or hypate meson, are Erato, Mars, Aries, Scorpio, and the Phrygian mode, as in the verse: Erato wanted to assign the fifth string to the Phrygian; also Mars is ever-loving of war and not peace. The sixth string, parhypate meson, has Jove, home of Pisces and Sagittarius, also Euterpe and the Lydian mode, as in this poem: the Lydian of Euterpe contains also the music of Jove; sounding sweetly, the sixth string rules because a goddess is present. On the seventh string, lichanos meson, is Saturn with Aquarius and Capricorn, also Polyhymnia and the Mixolydian, as in the verse: Saturn and also Polyhymnia govern the seventh string; from it the Mixolydian takes its beginning. The eighth string or mese is given to Urania, the Hypermixolydian, and the stellar orbit, as in this poem: When the Hypermoxolydian sees the eighth string of Urania as a friend, it turns the heavens with skill. At the end of Book II of *Musica*, Aristides Quintilianus gave a somewhat contrary arrangement of muses and modes. In Herodotus of Halicarnassus, who treats nine muses in his *Hysteria*, a different order can be found. The Greeks place the three Graces to the right of Apollo; they are called Charities or the attendant Graces of Venus. Aglaia is considered splendor, Thalia is freshness, and Euphrosine represents pleasure. But they appear in the subjoined diagram.



*Among heavenly bodies some form
masculine sounds, some feminine, and some are common*

Aristides has said that of the sounds which generate motion in celestial bodies, some are masculine in nature, some feminine, and others common, according to the property of each sphere. A masculine sound in a celestial body is sharp and firm, suitable for action and work; a feminine sound is weak and quiet, unsuitable for industry and labor. From these characteristics individually established or mixed a variety of sounds occur. For although the moon is weak and every source of corporeal movement emits a feminine sound, it is drawn for a little while to a masculine nature; since it receives the downward flow of other bodies its feminine nature is set free and it participates with the masculine, because the force of generating and nourishing bodies flows into lower bodies. Sacrificial priests and ministers believe this to indicate its masculine and feminine nature (I say more feminine) in invoking a goddess. As the orb of Mercury is mostly dry because of its proximity to the sun, if ever it is separated from it because of its size (although it has little humidity), it rarely delights in nocturnal appearances, but more often daytime, and is believed to produce a mixture of a masculine and a feminine sound, with the masculine participation greater than the feminine. Since the orb of Venus, delightful to view and mostly clear and pleasant, is humid, it is said to be pleasing at night and to emit a feminine sound. Because the orb of the sun is dry it mostly burns up in heat and energy; it is said to produce a masculine sound. The orb of Mars, warm and violent, takes pleasure in humid and nocturnal figures; it produces a sound that participates in both natures, but leaning more to the masculine. The orb of Jove, pleasant in all respects, is called the close rival of the orb of Venus; it is believed inferior in warmth to Mars and is thought to allay the coldness of Saturn. Like the orb of Venus it has a tempered mixture of both, since it is appropriate for producing the daily breath of life and procreating children. It is the author of marriage and is said to produce a feminine sound. Since Saturn is sharp, dry, and laborious, Aristides Quintilianus says it forms a masculine sound.

CHAPTER 14

Heavenly sounds are perceived by virtue alone

We do not think it incongruous to agree with the conception of Pythagoras and Plato, who said that celestial sounds are produced according to a certain order of instrumental sounds. Yet they are inaudible to us because we have ears that cannot hear the very great distance and rather confused mixture of heavenly bodies. There are some who accidentally have a weaker sense of hearing and who scarcely hear or do not hear at all a human tone. But those who are endowed with virtue and distinguished mores, and are removed from baser men (who live like beasts), can hear without difficulty celestial sounds with the uncorrupted senses of their nature. As we said in Book I of *Theorica*, Plato is the author of this subject. Therefore, just as those who reach the summit of virtue and a true understanding of knowledge and wisdom are able to see the presence of divine forms by avoiding all evil, so it is easy to hear harmony and universal sound. But those who are enveloped in unworthy vices find this difficult or impossible. For they know fleeting and earthly pleasures, adhering to brutal sensuality far from the first disposition of nature (I call it divine), as Ovid says: And when lower beings look at earth, and the face of man is able to see the sublime heaven, they withdraw with incredible loss. Vice is indeed found easily and without work, but virtue is prepared on a straight path for a long while and with great toil, as in the fine poem by Hesiod. For we can grasp vice at once without labor; it is an easy path and is never far away. But virtue must be prepared with long labor in remote places and must be sought on a straight path. You will not reach the heights easily at first; after that it is easy, although difficult at first. Thus Diogenes of Sinope cited those musicians who fitted the strings of the lyre to a suitable harmony and who brought them into pleasing and well ordered moral patterns.

CHAPTER 15

The ancients understood music more by ratio than aural sense

Thus far the things concerning harmonic capability have been treated. They are usually considered according to sense or according to

ratio. Plato in *Timaeus* teaches that music perceived by the senses is much surpassed by music perceived by the intellect.⁸⁷ By taking the available strings you can easily find the sounds of each by genus, some making a consonance by their outer numbers, others being included by the consonance of the outer numbers. From these, according to the outer numbers, the following consonances occur: duple, triple, quadruple, *hemiolia*, and *sesquiertius*. Others are contained between the outer numbers (an octave for example), as a ditone and trihemitone, or according to Ptolemy 5:4 and 6:5, or a major sixth or minor sixth; they are exceeded by the extremes of the octave consonance. Thus Pythagoras, in replacing death with life, recommended the use of a monochord to his pupils, as Aristides says, for he taught that the most sublime music is understood more by the intellect through numbers than by the sense of hearing. He suitably maintained this teaching as he also drew its beginning from the universe. But because this is mixed with corporeal material it falls from the exactness of numbers, since indeed in the place above us there is true and incorruptible music, as our holy church declares to exist in angelic choirs. Plato and the Pythagoreans also affirm this in the intervals and courses of heavenly bodies. From this we cannot have intervals divided into equal parts, and being encumbered by corporeal density we have imperfect consonances in the system.

CHAPTER 16

*Consonant numbers offer much to other arts*⁸⁸

It is easy to see how much is produced by numbers in a consideration of other arts. When you look at a picture you find nothing in it that is without the proportion of numbers. You see the mixtures and proportions of colors through numbers, and also the disposition of the picture is arranged according to them. Such a proportion in natural bodies produces beauty, just as it is also followed in the measurement of figures and comparison of colors; for this reason painters wish life and customs to be understood in form, figure, and colors.

⁸⁷ See *Timaeus*, trans., R. G. Bury (London, 1929), p. 109.

⁸⁸ This chapter is based on Book III of Aristides Quintilianus; p. 126ff in Wallis.

It is well known that medicine in all its aspects establishes through numbers the detection of seizures and the proportions of intermitten fevers. Some of these are similar to consonant proportions, as an alternate fever to duple, tertian fever to hemiola, and quartan fever to a fourth; these do not completely bring the danger of death. Others are serious and have a certain similitude to them, as semitertian fevers which indeed add danger yet which retain some hope of recovery. Those which are without any consonance are considered very serious, continuous, and dangerous.

But when we look at everything in the universe and find that things seem to be called consonant without question, and that kindred relationships of life and customs bring concord, as the efficacy of fortune, the participation of sagacity, the consonance of action and practice, we also find that the remaining way of life is harmonious. In consonant proportions there is friendship, in dissonant proportions the opposite occurs. Frequently some median proportion adjusts their unsuitability, as a dissonant interval which becomes consonant when placed in the middle.

In the same way deliberative and popular public matters hold a middle position which is called military; in the best public interest it never desists from its proper function. In this military order the highest posts are an armed soldier and an equestrian; their median is called a trainer by choosing a likeness with the highest posts in a lightly armored foot soldier. Also, just as nothing beautiful can be found that is not consonant with the universe, music would not be established and would not reach such strength it has in action or offer stability and divine power except that it has great similitude to celestial bodies. There are also some common things in other arts which are mostly appropriate and especially to music. Yet it is proper above all because it arises from opposing forces, just as the nature of harmony and the universe bear a certain likeness. Thus whatever of this sort that exists outside the proportion of song either is not harmonious or rather is overwhelmed by silence.

CHAPTER 17

The parts of the mind are adapted to musical ratios.

Many ancients wish the human mind to be considered through consonant numbers; the Pythagorean Philolaus called it harmony. In III, 5, of *Harmonics*, Ptolemy compared three simple intervals to the first three parts of the mind, namely, intellectual, sensitive, and habitual. He gave the octave to intellectual, the fifth to sensitive, and the fourth to habitual, because the fifth is closer to the equisonant octave than the fourth and is more consonant, as it were. It is closer to equality and the sensitive is closer to the intellectual than the habitual, so that it is also a participant of the other part. Where there is habit there is not always sense and where there is sense there is not always intellect. Contrariwise, where there is sense there is always habit and where there is intellect there is always habit and sense. So where there is a fourth there is not always a fifth, and where there is a fifth there is not always an octave. Contrariwise, where there is a fifth there is always a fourth, and where there is an octave there is always a fifth and a fourth.

Some name species of an habitual mind, namely, increased, stationary, and decreased, which they usually compare to the three fourth-species. They give four species to the sensitive parts of the mind, namely, sight, hearing, odor, and taste; they ascribe the four fifth-species to them. They make touch the most common species of all because by touch in some way they make their perceptions clear to the senses. There are seven species of intellectual parts of the mind, namely, imagination, intellect, thought, judgment, opinion, calculation, and knowledge; these are compared to the seven octave-species.

Philosophers divide our mind in another way, namely into rational, choleric, and concupiscibile. The octave is fitted to the rational part of the mind for the same reasons of equality given above. The choleric, which in a certain way approaches the rational, is applied to a fifth consonance. The concupiscibile, which is placed underneath, is given to the fourth consonance. There are three kinds of virtue in the concupiscible part of the mind: temperance, continence, and modesty, which are related to the three fourth-species. The choleric has four: mildness, timidity, fortitude, and tolerance, which are given to the four fifth-species.

But the seven octave-species are said to correspond to the seven virtues of the rational mind. They are: acuteness in movement, ingenuity in good contacts, skill in perception, proper consultation in a judgment, wisdom in contemplation, prudence in action, and experience in practice. For in our minds the intellectual and rational parts are naturally adapted to dominate the other subordinate parts, just as in the perfect system as Ptolemy formed it the equisonant devising of consonances and concords took precedence above all else.

That first divine frenzy and very natural beginning is shown in melodic proportion, as Aristides states in Book III of his *Musica*. For the mind that has fallen into this orb of earth, descending (as Plato thinks) from wisdom into ignorance, because of corporeal gravity is filled with turbulent thought and action, forming as it were everything unsuitable in its time of generation; therefore in present times it is said to be applied more or less in certain circles. On account of great ignorance and forgetfulness it is filled with senselessness, which is thought to be mitigated by melody. For melody is an ornament of the mind and the intellect. Nor are those wrong who assert that parts of the mind are mutually joined according to arithmetic division because of an identical size and an increased equality; a corporeal magnitude is joined to geometric division because the parts of the magnitude are different. A living being arises from both, namely mind and body, according to which a harmonic division is appropriate.

CHAPTER 18

The conception of the human body is formed in harmonious comparisons.

It is appropriate here to describe by what reason musical proportions apply to human generation, just as it was treated in more detail in I, 3, of *Theorica*; here I will pass over it in a few words. If to number 6, called the first sign of generation, we compare the consequent numbers which have a harmonic relationship to it, we will easily perceive the first, smaller offspring of generation, which is called *septimestris*, that is, a mature procreation of seven months. The numbers 6, 8, 9, 12, mutually form 4:3, as 8:6 and 12:9. *Hemiolia* or 3:2 is 9:6 and 12:8; *dupla* or 2:1 is 12:6. From this they are called a

fourth, fifth, and octave. When the original four numbers are added together they form 35; from this addition physicists say that generations of seven months are produced if 35 is multiplied by 6.

We have omitted here many things which Macrobius in Book I of *Somnium Scipionis* treated fully through number 7 on man's birth, senses and parts in various ages. But when we arrange numbers beginning with 1, so that musical consonances are joined according to arithmetic proportions in this order: 1, 2, 3, 4, we place an equal and uniform proportion according to 1, for no number precedes it to which it could be referred. 2:1 makes a duple proportion or an equisonant octave, 3:2 is *hemioia* or a fifth, 4:3 is *epitrite* or a fourth, 3:1 is triple or an octave and a fifth, and 4:1 is quadruple or a disdiapason. When 1, 2, 3, 4, are added together 10 results; if it is added to 35 it will become 45. When this is multiplied 6 times 270 results, which fill out a period of nine months. In the latter the greater number of fetuses are born; because it may reach the tenth month it is called *decimestris*. Also, in this number of days (plus one) St. Augustine declares in the fifty-sixth question of the book *On eighty-three questions* that the body of the Lord was completely formed. But a birth of eight months, because it is part of smaller proportions, either is not achieved or the infant living in the womb quickly languishes and dies.

When you consider the parts of the body, those which impart beauty seem to fit a proportion of consonant intervals. By beauty I do not mean those parts which show unseemly effeminacy but which encourage an aptitude for good, as the divine Plato also wished it to be understood, saying that the purpose of music is the love of virtue. Thus those who achieve virtue through musical means are truly worthy of friendship before others.

CHAPTER 19

Musical systems are considered in the body of the universe.

It is also appropriate to consider which complete musical intervals and which of their derivatives are joined to the properties of nature and of the universe. The fifteen tones of the perfect disdiapason system are compared to the fifteen days of the waxing of the moon, so that no one

could oppose it; indeed, sound and the moon are mutually compatible in natural motions. For just as the moon waxes for fifteen days and wanes mostly for the same number of days, so the human voice and instruments rise naturally to fifteen sounds and turn and descend to the bottom. But if one goes higher in pitch he will confuse the ratio of harmonic consistency by this excess, since among the Pythagoreans, according to Boethius (as already stated), the entire ratio of music was contained in only fifteen strings. For the fifteenth tone, the end of the highest sound and the first of the descending tones, is the same as the first tone.

The five tetrachords of the perfect system are compared to the elements, so that hypaton is equal to earth because it is lowest, and meson is fit for water because it is next to earth. Synemmenon is given to air because air is drawn into holes in the earth and into the depths of the sea for the sake of the respiration of what exists in those places. Diezeugmenon is attributed to fire, whose descent is forcible, since it is opposed to nature, for its natural course is upward. Since the hyperbolaeon has the highest position in the perfect system it is attributed to the summit.

When you consider the two octaves in the perfect system in comparison to the universe, the first and lower octave signifies the material place of the world which is moved directly; the second higher octave is said to indicate the upper air and circular motion. Also, the first and lower octave is ascribed to the active and irrational part of the mind; the second octave is compared to the rational part of the mind. In the life of man the two octaves have a twofold action. The first and lowest encourages vice; the second, as if sublime, encourages virtue.

In Book I of *De Musica* Boethius ascribed musical harmony to the four seasons of the year and to the four elements (as we said in I, 2, of *Theorica*). Pythagoras is said to have given spring to air and number eight because of its mildness, summer to fire and four because of its heat, autumn to earth and six because of its dryness, and winter to water and twelve because of its wetness. According to this connection of Pythagoras spring to autumn will contain a consonant fourth, to winter a fifth, and to summer an octave. A fourth is also given this name to show its four parts. An octave signifies the concordant movement of planets. Thus in the body of the universe the best known example of music is shown.

CHAPTER 20

Musical systems are compared to virtues, senses, and states.

Finally, we did not believe it should be passed over in silence that musical systems contribute much to the perfection of virtue, which some call divination (because it is the greatest ornament and salvation for anyone). The hypaton and meson tetrachords are attributed to temperance, to which a twofold effect is ascribed. The lowest hypaton tetrachord (not by chance) seems to bring together quiet and complete abstinence from illegal pleasure, yet legitimate pleasure, whose praises concern moderation, rightfully belongs to the median tetrachord. Justice approves of temperance in determining conjunct tetrachords, for there is a union of justice and temperance connected by its own power which unites humanity through a communication of public use and private benefits. The disjunct tetrachord is applied to fortitude, which above all excludes any vice. They say it divests the mind of corporeal feelings, so that the tetrachord is moved from lower to higher considerations. The hyperbolaeon tetrachord is said to fit prudence, for since it is the highest terminus of all it is said to possess the highest good.

Three different fifth-species are usually related to these virtues, for justice and temperance are compared to the first and lowest fifth-species, as if to an ornament of the concupiscence of the mind. Fortitude, as if the virtue and substance of the choleric, is usually applied to the second fifth-species. To the third fifth-species (because it is highest) is ascribed prudence, as if a rational substance closest to the sublime and divine essence. It is not inconsistent to compare in order the three theological virtues of faith, hope, and charity to the three fourth-species, and the four virtues we call cardinal, or justice, temperance, fortitude, and prudence, to the four fifth-species. The seven virtues are thought to fit the seven octave-species.

The ancients added the four humors⁸⁹ in man's nature to melodic concord (as we said in the exposition of the modes). Also, the arrangement of the five natural senses follows the order of the true interpretation of consonant proportions (which we call rational). Touch, which exists throughout the body and which children receive at

⁸⁹ Sanguine, phlegmatic, choleric, and melancholic.

birth, is compared to a fourth consonance, which likewise occurs everywhere in the very perfect system of fifteen strings. Since taste fulfills a need of life (among other things) and is very similar to touch (for taste is the touch of the tongue), it is usually ascribed to the fifth consonance, which follows the fourth consonance in closeness and participation of species. Since a duple proportion or octave consonance contributes most to the pleasantness of a fifth consonance it is compared to odor because of its proximity in the order of consonances. Odor follows taste and they participate together in the same things; thus those who lacked a mental perception of a food revived it completely when the aroma was brought to the sense of smell. Since the sense of hearing is far from other senses, for it possesses two sides, left and right, it is usually applied to triple proportion or to an octave and a fifth, and separated by a *hemiolia* from the pleasantness of a simple octave. But sight, the highest of the other senses, since it does not need contact with other bodies, usually follows the same law as the other senses and is given a quadruple proportion, whose extremes are separated by a disdiapason.

What should be said about the seven different intervals when they are compared to the seven stages of life? The trihemitone species in the incomposite chromatic tetrachord is compared to infancy (because it is near to a smaller interval). The diatonic species from the incomposite enharmonic tetrachord is ascribed to childhood. The incomposite fourth-species is attributed to adolescence, and the incomposite fifth to middle youth. The incomposite minor sixth is given to manhood, the incomposite major sixth to middle age, and the octave species, incomposite or also divided in harmonic proportion, completes as it were the varied and somewhat simple ratio of the entire concord, and is usually attributed to old age. This fills out the course of all nature and completes its obligation with ripe old age. Concerning it a very wise poet sang: I will fill a place and I will be returned to darkness.⁹⁰ Homer also tells us: No one ever escapes the cruel fate of death. But it is valuable for later times to unite moral music to heavenly choirs and divine harmony, for the soul is not separated from the body in death (as the earthly believe) but in a transmutation of life. The abode of perpetual happiness with the dead is acquired in observation of fear of the Lord, as our protector St. Ambrose promises.

⁹⁰ Quoted from Capella, *op. cit.*, I, 66.

The end.

Honor, praise, and glory to the immortal King of the universe, the invisible and one God, Who is blessed in His gifts and holy in all His works. Amen.

*From the writings of Pantaleon Meleguli of Lodi.*⁹¹

Franchinus Gaffurius first saw the light of day in Lodi on ⁹² Thursday, January 14, 1451, at the twelfth hour. His father Betino, from the town of Almenno in Bergamo, was active in military service as a horseman and foot soldier; the mother, Caterina Fissiraga (Fixiraga), was a very virtuous woman. From the beginning Franchinus was destined for the religious life. In his youth he spent an upright, composed life. When he had attained the dignity of the priesthood he devoted himself very earnestly after the second year to musical studies in his homeland. The Carmelite friar, Joannes Godendach [Bonadies], was his first teacher. When he first prepared to leave his homeland after these rudiments, he went to Mantua where his father was then in the service of the illustrious Marchese Ludovico Gonzaga. Day and night in an intense period of two years he worked very diligently on many things in the theory and practice of the art and he resolved much with accuracy. Then he left for Verona where he taught publicly for two years. He wrote *Musicae institutionis collocutiones* and *Flos Musicae*⁹³ and concentrated on the limitless art. Soon he was called by Prospero Adorno to Genoa where he taught one year; when the former was driven out of the city by Baptista Campofragoso, Bona Maria, and Gian Galeazzo, Duke of Milan, Gaffurius followed him to Naples. There, with the encouragement of the king's secretary, Phylippinus Bononius, his contemporary fellow citizen, and being well versed in musical studies, he distinguished himself so much that he did not hesitate to discuss music very sagaciously at this time with Joannes Tinctoris, Gulielmus Guarnerius, Bernard Hycart, and many other distinguished musicians. In this period he wrote *Theorica*,⁹⁴ a very

⁹¹ This heading is lacking in the MSS.

⁹² The three MSS lack the rest of the sentence from this point.

⁹³ Both treatises are lost.

⁹⁴ Actually the *Theoricum opus* (1480), which appeared again in an enlarged form as *Theorica musicae*.

subtle work. Then there arose the pest in the city and the very dangerous war with the Turks, who after conquering everything in the way in Puglia, had assaulted⁹⁵ Otranto; he returned to Carolus Palavicinus, Bishop of Lodi, having been summoned by his letters, and went to Monticelli in the territory of Cremona. He remained with the bishop three years, during which time he instructed many youths and began⁹⁶ to write his *Practica*. Meanwhile, overcome by the requests of the citizens and attracted by a stipend, he went to Bergamo. But immediately following the war that the Duke of Milan waged against the people of Bergamo he was compelled to return home. Finally the Lodi canon, Romanus Barnus, theologian and jurisprudent, succeeded as archbishop of Milan with the greatest authority. Through his own love of music and the fame of Gaffurius, he brought the latter to him. The value of this accomplished musician among all distinguished men because of his singular virtue grew with such force that with the quick consent of the entire council of the principal church and without any envy among other singers, he was made music director on⁹⁷ January 22, 1484. The entire citizenry testifies how much he aided music there by teaching, lecturing, and composing. Witnesses are the many pupils he taught, also endless volumes of which two are especially outstanding, *Theorica* and *Practica*. Because he had written the others with perhaps less effectual solicitude, he allowed his recent works (also in the vernacular),⁹⁸ as if white clay kneaded and exactly shaped, to be printed in this distinguished city. Moreover, works of old Greek musicians, as Aristides Quintilianus, Manuel Bryennius, the *Introductorium* of Bacchius the elder, and the *Harmonics* of Ptolemy, were translated into Latin through his care and expense by various translators. Most recently he has brought out this present book on instrumental harmony which he wrote at the age of 49. Whoever looks at its material and studies it carefully must confess that the art of music began with the ancients but that it was completed by him. Therefore, if anyone is secure in a life well spent, in glory and a consciousness of

⁹⁵ The MSS have *expugnantes caeperant* for *expugnaverant*.

⁹⁶ The word "began" (*occepit*) is very important, for the *Practica* was not completed until after Gaffurius had established himself in Milan. The four books of the treatise were originally separate MSS, each with a different dedicatee. See my article "Gaffurius's *Practicae Musicae*: origin and contents," in *Musica Disciplina* XXII (1968), p. 105.

⁹⁷ The date is lacking here in the MSS.

⁹⁸ The phrase "also in the vernacular" is lacking in the MSS.

right, which is the reward of labor, I believe the principal one is Franchinus, who was able to restore indebted mortals through his studies.

*Master Gulielmus Le Signerre of Rouen, engraver of woodcuts,
to the reader*

Stop wondering, I ask the reader, if in this book
A faulty woodcut is seen somewhere.
I thought that my talents and studies had completed
The shapes; I grieve not pleasing you.
When so much paper is wetted and dried (as you know)
It is frequently spotty in spite of the artisan. Farewell.

Epigram of Pantaleon Meleguli of Lodi to the reader

Whether you deserve to be triumphant as a soldier under Apollo,
Or a debtor cultivates you from the the whole city,
Or your work is to seek the causes of things of nature
And by its strength this shape of the world is established,
Either your tenets emulate the Socratic pages,
Or they please regions under Epicurean sway.
Whoever you are, not knowing the Muses, the reader wishes you
To study these books as a throng at its sacred rites.
Since new mysteries of harmonic law are revealed,
Which must be kept secret from unexpurgated men,
You who are wicked may leave the throng of Apollo with his sacred
rites,
While the high priest Franchinus sings with pure eloquence.

Hendecasyllabic poem by Franciscus Phyllippineus

Whichever Muse is able to play the lyre,
Calliope is chief of the nine sisters.
Only the books of Franchinus resound with them.
They go even further by singing of all
The Thracian poets, new and old,

The divine founder, descendant of Atlas,
May sound the strings of the cithara,
Franchinus has cultivated the muses without fear,
He has guarded Parnassus and the groves of Diana.
The author drank of the fountains of Helicon,
Beneficial in his gift of the Muses.
All music sounded first in the upper heavens,
As the high priest knows.
Let the reader not consider vain music,
You may ponder a creation, you may often
Read diverse authors; that will be allowable.
Whoever desires music, let him read the present
Book; he will become a skilled citharist
If he has time to study; for every
Flamen who sings hymns to a god
Of the heavens, let him try to see the muses
Of Lodi; they give new fluidity
To the composite voice of the nine sisters.
They bring light to new Virgils,
They bring light to new Muses,
Certainly the Italian Muses the new
Maecenas, Grolier, will again come to visit.

Printed at Milan on November 27, 1518, by Gotardus Pontanus, in the thirty-fifth year of the author's prefecture, under the felicitous reign of Pope Leo X and the most Christian French King Francis, Duke of Milan.

