

[?Jacobus], *Tractatus de consonantiis musicalibus*,  
with relevant passages from the *Speculum musicae* by Jacobus  
(trans. Rob C. Wegman)

1. Jacobus on the notion that the minor semitone has a proportion of 18:17 (*Speculum musicae*, Book II, Ch. 56)

Hanc opinionem aliqui valentes musicae tractatores tenuerunt et in suis dimiserunt tractatibus, imponentes eam Boethio qui tamen eam non tenuit, ut patebit infra. Si dicta opinio vera esset, facilius, brevius et clarius posset quis loqui de multarum consonantiarum proportionibus, ut de ditono, tritono, et de multis aliis. Tunc enim minimi termini ipsius ditoni essent .xxxiiii. et .xxvii., quia tollere semitonii minoris proportionem a sesquitertia, in qua fundatur diatessaron, est incidere in ditonum et eius proportionem, vel addere semitonii maioris proportionem ad semiditoni proportionem est labi in ditoni proportionem et, secundum hoc, ditonus fundaretur in super septem vel superseptimapartiente proportione. cum, secundum veritatem, fundetur in super decem septem partiente <proportione> et sint eius minimi et primi numeri .lxxxi. et .lxiv.

Tactam opinionem de proportione semitoniorum quandoque et diu tenui, sumens eam ex aliquibus musicae tractatibus, et ex imperfecto et etiam malo intellectu ipsius Boethii. Sicque pro tunc sentiens, in aliquibus musicae tractatibus, de semitoniorum proportionibus, secundum tactam opinionem, locutus sum. Sed, Deo gratias, qui ab errore illo me retraxit ut referam, cum tractatum hunc de musica facere proponerem, a quodam valente Boethii *Musica* mihi concessa est in qua, hic et ibi, respiciens, inter alia impegi in tertii libri, c. <.xiii.>, cui talis proponitur titulus: Quod semitonium minus maius sit quam .xx. ad .xix., minus

Some worthy writers on music have held this opinion and put it forward in their treatises, attributing it to Boethius who however did not hold it, as shall be apparent below. If the said opinion were true, then it would be possible to speak much more easily, more briefly, and more clearly about the proportions of many intervals, such as the ditone, tritone, and many others. For in that case the lowest numbers of the ditone would be 34 and 27, since to take away the proportion of the minor semitone [supposedly  $18/17$ ] from the *sesquitertia* [ $4/3$ ], in which the diatessaron is founded, is to fall into the ditone and its proportion [ $4/3 \div 18/17 = 34/27$ ], and to add the proportion of the major semitone to the proportion of the semiditone is to slip into the proportion of the ditone, and so, accordingly, the ditone would be founded in the proportion *super septem* or *superseptimapartiens*. Whereas in fact, according to the truth, it is founded in *super decem septem partiens*, whose lowest and first numbers are 81 and 64.

I myself have once held the said opinion about the proportion of the semitone, and for a long time at that, having taken it from certain treatises on music as well as from an imperfect and even bad understanding of Boethius. And feeling this way at that time, I spoke in certain musical treatises about the proportions of semitones according to the said opinion. But thanks be to God for drawing me back from that error, as I shall now relate. For when I proposed to make this present treatise on music, a certain worthy man lent me the *Musica* of Boethius. Looking through it here and there, I stumbled, amongst other things, upon chapter 13 of the third book, which is entitled: "That the minor semitone is greater than 20:19 but

vero quam .xviii. ad .xvii. (supplevi: probandum est). Vult dicere Boethius quod in capitulo illo probare intendit minus semitonium in maiore consistere proportione quam sit ea quae est inter .xx. et .xix., quae est sesquidecima nona, et in minore quam sit ea quae est inter .xviii.s et .xvii.s, quae vocatur sesquoctavadeclima; et haec sufficienter Boethius ibi probat.

Attendens igitur quod ea, quae probat ibi Boethius, stare non possunt cum opinione priore, quae tenet semitonium minus in <sesqui>septimadecima fundari proportione, quia haec maior est quam <sesqui>octavadeclima, percepit tunc primum opinionem tactam falsam esse et, ex tunc, illam penitus respui, licet, ex aliis Boethii dictis in primo et secundo libro, si perfecte advertissem, illam esse falsam potuissem percepisse, scilicet ex minimis terminis proportionis minoris semitonii quos ponit tam in primo quam in secundo libro et ex minimis terminis maioris partis toni quos ponit libro secundo, c. .xxx.

Consideransque quod errans in principiis errare potest amplius in aliis ad scientiam aliquam spectantibus, et cum illa sint quasi ianuae fundamentumque scientiae, aedificium vel tractatum facere nequit bonum qui errat in illis, qui igitur aliqualiter in consonantiarum proportionibus numeralibus credebam esse sciolus, coepi rursus musicae scientiae, de qua tractare proponebam, quasi novus et diligens esse discipulus, ardenter in *Musica* studere Boethii quam ceteris, quantum ad consonantiarum numerales proportiones, reperi meliorem. Quantum autem ex tunc in arte illa profecerim, subticeo.

Timens autem ne tacta Boethii *Musica* mihi concessa tolleretur a me, ut de ea memoriale <aliquid> mihi retinerem, ut amplius in ea proficerem, ut confidentius illa uti possem, qui de duobus primis libris, quos Parisius audieram, aliqua extraxeram, plura coepi et de illis et de aliis excerpere, in aliquibus locis

smaller than 19:20" (I have completed: "is to be demonstrated"). Boethius means that it is his intention in this chapter to demonstrate that the minor semitone resides in a proportion larger than that between 20 and 19, which is the sesquidecimanona, but smaller than that between 19 and 18, which is called sesquoctavadeclima. And Boethius does indeed demonstrate it plentifully there.

Being mindful that what Boethius demonstrates in that place cannot be reconciled with the former opinion, which is that the minor semitone is founded in the *sesquiseptimadecima* proportion, because in fact it is larger than *sesquoctavadeclima*, I realized that the said first opinion was false, and from then on I thoroughly rejected it—though if I had paid proper notice I would already have been able to perceive that it is wrong from other statements by Boethius in the first and second books, namely, from the lowest numbers of the proportion of the minor semitone which he states in both the first book and the second, and from the lowest number of the greater part of the tone, which he states in chapter 30 of the second book.

Considering that he who is in error with respect to principles may be even more greatly in error with respect to other things pertaining to a certain discipline, that those [principles] are as it were the gates and foundation of knowledge, and that he who is in error about them shall not be able to fashion a building or a treatise, therefore I, who now believed myself to be rather a bungler in the numeral proportions of intervals, began once again, like a fresh and eager student of the musical science about which I proposed to write, to study the *Musica* of Boethius which, as far as the numeral proportions of intervals are concerned, I found to be better than the others. How much I have accomplished in that art since then I do not say.

However, being afraid that the said *Musica* of Boethius which had been lent to me would be taken from me again, I began—in order that that I would retain <more> of it in the memory, that I would be more accomplished in it, and that I would be better able to use it confidently—[began] to excerpt more things than I had extracted from the first two books which I had heard [in lectures] at Paris, [excerpting]

textum Boethii quem habebam nudum, sine scriptis, sine glossis abbreviare, in aliquibus locis qui mihi difficiliores videbantur, ut occurrebat, exponere in textu et figuris. Illud autem opus occasione semitonialium proportionum compilatum me non modicum detinuit et hoc opus retardavit; sed expedit nonnunquam, retrocedere, ut longius saliatur. In hoc autem opere praesenti, de multis me iuvo quae habentur in opere illo. Quodsi quis haberet forsitan Boethii *Musicam*, et praesens opus non minus caperet.

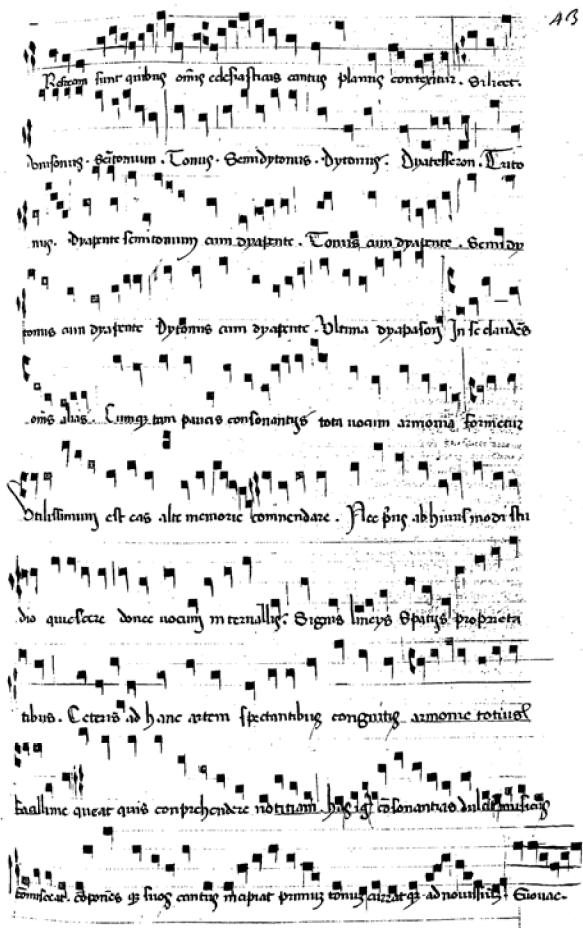
from both those [first two books] and others, and also in certain places to summarize Boethius's text, of which I had a bare copy, without writings, without glosses, and in certain places which seemed to me more difficult to expound it in texts and figures wherever opportune. This work, [which I] compiled for the sake of the semitonal proportions, detained me not a little, and slowed down this present work; but sometimes it is appropriate to step back in other to [be able to] leap further. In this present work I rely on many things that are contained in that work. So even if someone perhaps had the *Musica* of Boethius, the present work also would grasp [the subject matter] no less.

## 2. Jacobus on the song *Tredecim consonantiae sunt* (*Speculum musicae*, Book II, Ch. 14)

Et sunt .xiii., unisonum et diapason computando cum illis, post unisonum illas ordinando, secundum viam generationis, sic: unisonus, semitonium, tonus, semiditonius, ditonus, diatessaron, tritonus, diapente, semitonium cum diapente, tonus cum diapente, semiditonius cum diapente, ditonus cum diapente; sequitur diapason quae continet in se ceteras ipsam praecedentes. Et hoc exemplariter patet in quodam cantu, posito in principio cuiusdam alterius brevis operis et consonantiis et tonis et tonorum vel modorum intonatione super psalmos. Ibi enim tactae consonantiae, cum dicuntur, et cantantur. Quem cantum, ut magis appareant quae dixi, hic repetere non pigebit.

And there are thirteen, including the unison and diapason, arranging them from the unison onwards according to the way of generation, thus: unison, semitone, tone, semiditone, ditone, diatessaron, tritone, diapente, semitone with diapente, tone with diapente, semiditone with diapente, ditone with diapente; then follows the diapason which contains within itself the other [intervals] preceding it. And this is apparent, by way of example, in a certain song that was placed at the beginning of a certain other short work about intervals and toni and the intonation of toni or modi upon psalms. For the said intervals are named as well as sung there. In order that the things I have said may be more clearly apparent it shall not be displeasing to repeat that song here.

3. The song *Tredecim consonantiae sunt*, in Paris BnF lat. 7207 (a), 7207A (b), and the *Tractatus de consonantii musicalibus* (c)



(a)

(b)



(c)

#### 4. Jacobus on the motet *Non pepercit deus nato proprio* (*Speculum musicae*, Book II, Ch. 14)

Item, quod, in praedicto cantu, dicitur quod omnis cantus ecclesiasticus contexitur .xiii. consonantiis, quarum prima est unisonus, ultima diapason, non est per hoc intelligendum quin cantus aliquis ecclesiasticus supra diapason a suo fine possit ascendere, sed non immediate, similiter nec descendere, nam cantum ecclesiasticorum diapason, quantum ad voces suas extremas, terminat immediatos ascensus vocum vel descensus. Ideo qui aliquantum cantum planum ecclesiasticum immediate supra diapason, utendo consonantiis quae sequuntur diapason, prout suas voces extremas immediate respiciunt, ascendere facit vel descendere, peccat, nec debet talis cantus in Ecclesia recipi.

Secus est de cantibus mensuratis. Patet in motetto illo: *Non pepercit deus nato proprio*, et de quibusdam etiam planis cantibus in quibus, gratia exempli, ponuntur consonantiae altiores quam sit diapason. Iuxta quod notandum quod immediati ascensus vel descensus vocum nunc plures sunt quam essent tempore Guidonis Monachi.

Also, when it says, in the aforesaid song, that every ecclesiastical song is woven together from thirteen intervals, of which the first is the unison and the last the diapason, one is to understand from this that an ecclesiastical song may ascend beyond the diapason above the finalis, but not in a direct leap, and likewise in the case of descent, for the diapason of ecclesiastical songs, as far as the outermost notes are concerned, marks the limit to upward and downward leaps. Therefore, he who makes an ecclesiastical plainchant leap up or down more than a diapason, using the intervals that come after the diapason in terms of its outermost notes, is in error, and such a song must not be admitted in church. In measured songs this is different. This is apparent in that motet *Non pepercit deus nato proprio*, and even in certain plain songs in which, for example, intervals larger than the diapason are notated. Concerning which it must be remarked that there are now more upward and downward leaps in use than there were in the time of Guido the Monk.

## *Tractatus de consonantiis musicalibus*

Tredecim consonantiae sunt quibus omnis ecclesiasticus cantus contexitur, scilicet: unisonus, semitonium, tonus, semiditonius, ditonus, diatessaron, tritonus, diapente, semitonium cum diapente, tonus cum diapente, semiditonius cum diapente, ditonus cum diapente, ultima diapason, in se claudens omnes alias. Cumque tam paucis consonantiis tota vocium harmonia formetur, utilissimum est eas altae memoriae commendare nec prius ab huiusmodi studio quiescere donec vocium intervallis, signis, lineis, spatiis, proprietatibus ceterisque ad musicam spectantibus cognitis harmoniae totius facillime queat quis comprehendere notitiam. Has igitur consonantias dulciter musicus commisceat componensque suos cantus incipiat primum tonum curratque ad novissimum.

Harum consonantiarum si ipsarum voces in eodem tempore proferantur, quaedam concordant aliaeque discordant. Est enim concordia duorum sonorum diversorum vel plurium in eodem tempore prolatorum se compatiens harmonia uniformiter suaviterque veniens ad auditum. Ex hac descriptione descriptio patet discordiae. Quanto igitur aliquae voces diversae simul prolatae magis se compatiuntur secundum auditum, tanto meliorem faciunt concordiam et quanto minus peorem. Et ideo voces quae nullo modo possunt se compati apud auditum, sed quaelibet per se vult proferri, penitus discordant. Ideo vult Boethius in *Musica* sua quod non dicitur consonantia ut hic sumitur, aequaliter et univoce de suis speciebus, sed secundum prius et posterius.

Concordiarum tres sunt species: perfecta, imperfecta et media. Concordia perfecta dicitur quando plures voces simul

There are thirteen consonances [hereafter translated as intervals] with which all ecclesiastical chant is woven together, namely, unison, semitone, [whole] tone, semiditone [minor third], ditone [major third], diatessaron [fourth], tritone, diapente [fifth], semitone with diapente [minor sixth], tone with diapente [major sixth], semiditone with diapente [minor seventh], ditone with diapente [major seventh], and lastly the diapason [octave], which encloses all others within itself. Since all sounding harmony is formed from so few intervals, it is most useful indeed to commit them deeply to memory, and not to rest from such study until one has an easy comprehension of the knowledge of the harmony of the whole, having learned the intervals, signs, lines, spaces, proprieties of voices, and other things pertaining to music. Let the musicus therefore mingle those intervals sweetly, and let him, while he is putting together his chants, begin the first tone and let him run to the last.

When the steps of those intervals are performed at the same time, some of them are concordant and others discordant. For concord is the harmony of two or more different sounds that are performed at the same time and which blend together, reaching the hearing uniformly and sweetly. From this description follows the description of discord. The greater the blend between different sounds when they are sung together, according to the hearing, the better the concord they make, and the less the worse. Therefore sounds which are unable to blend at all, according to the hearing, and which strive to sound apart, are thoroughly discordant. Therefore Boethius holds in his *Musica* that one does not speak of interval as understood here, equally and univocally of its species, but according to before and after.

There are three types of concords: perfect, imperfect, and middling. One speaks of a **perfect concord** when several sounds

prolatae ita se compatiuntur secundum auditum, quod vix valet inter eas distinguere; et continet sub se duas consonantias, scilicet unisonum et diapason.

Unisonus est consonantia unius vocis a qua non fit progressio, nec ascendendo nec descendendo, sive a diversis proferatur sive ab eodem continuetur vel proteletur. Hanc vocat Boethius vocem sine intervallo prolatam, id est sine ascensu vel descensu. Fit autem haec consonantia in vocibus cuiuscumque clavis, exceptis .b.fa.b.mi vocibus.

Diapason est consonantia quae inter unisonos a qualibet littera ad sibi similem elevatur, sicut de .C. gravi in .C.faut ad .c. acutam in .c.solfaut; similiter est in aliis. Et dicitur a *dia* quod est “de”, et *pan* quod est “totum” vel “omnis”, et *son* quod est “sonus”, quia in se continet omnes alios sonos ut tonum, semitonium, et sic de reliquis. Haec consonantia, ut vult Boethius, consistit in proportione dupla, quemadmodum octo se habent ad quattuor, et includit in se quinque tonos perfectos cum duobus semitonii imperfectis quae perfectum nequeunt facere tonum. His autem duabus consonantiis tamquam melioribus utitur maxime ecclesia, ut suas voces simul tempore prolatas respiciunt. Harum consonantiarum exempla patent hic:

performed at the same time blend to such a degree, according to the hearing, that [the hearing] is scarcely able to tell them apart; and it comprises two intervals, namely, unison and octave.

The **unison** is the interval of a sound from which there is no step away, either ascending or descending, whether it be performed by different [singers] or continued or pursued by one and the same. Boethius calls this a sound performed without interval, that is, without ascent or descent. This interval occurs in pitches of any key, excepting the pitches of b fa/b mi.

The **diapason** is the interval between unisons which extends from any letter to the same letter, as from low C, in C fa ut, to high c, in c sol fa ut; likewise in others. And it is named after *dia*, which means “from,” and *pan* which means “the whole” or “all,” and *son* which means “sound,” because it contains within itself all other sounds such as whole tone, semitone, and so forth. This interval, according to Boethius, resides in the duple proportion, such as the relationship between eight and four, and it encloses within itself five perfect whole tones, with two imperfect semitones that are unable to make a perfect whole tone. The church uses these two intervals above all as being better ones, as regards their pitches performed at the same time. Examples of those intervals are as follows:

Unisonus similiter et diapason

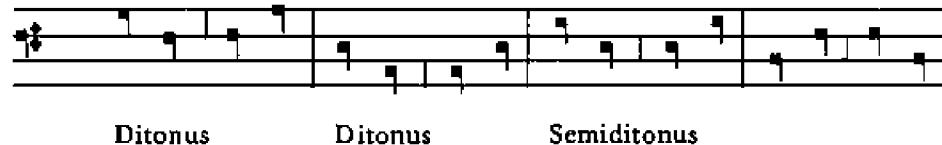
Concordiae imperfectae sunt quarum voces simul tempore prolatae differre multum ab auditu dinoscuntur, non

**Imperfect concords** are those whose sounds, when performed at the same time, are distinguished by the hearing as differing greatly, yet

tamen discordant; et sunt duae, scilicet semiditonius et ditonus.

Semiditonius est consonantia inter duas voces tonum perfectum cum semitonio imperfecto continens. Et talis consonantia fit inter re et fa ascendendo, similiter inter mi et sol, et econverso descendendo.

Ditonus est consonantia quae inter duas voces duos perfectos continet tantum tonos. Et dicitur a *dia* quod est “duo” et *tonus*, quia in se continet duos tonos perfectos, videlicet ascendendo ut-mi, fa-la, et econverso descendendo. Est autem semiditonius consonantia melior ditono, maxime cum suae voces dulciter simul proferantur. Omnis enim concordantia perfecta semitonium vel semitonia requirit, licet semitonium per se sumptum concordantiam pravam habeat. Praetectarum consonantiarum exempla patent hic:



Concordantiae mediae sunt quarum voces simul prolatae meliorem faciunt harmoniam immediate tactae, non tamen tantam ut perfectae; et sunt duae, scilicet diapente et diatessaron.

Diapente est quaedam consonantia quae inter duas voces tres tonos continet perfectos cum semitonio imperfecto. Et modis duobus fit ascendendo, scilicet ut-sol, re-la, et totidem modis descendendo. Et dicitur a dia quod est “de”, et pentha quod est “quinque”, quasi de quinque vocibus constituta. Fit autem haec consonantia in proportione sesqualtera, in quali se habent sex ad quattuor.

Diatessaron est consonantia inter duas voces vel sonos duos tonos perfectos includens cum semitonio imperfecto. Et

they do not produce discord; and there are two, namely, semiditone and ditone.

The **semiditone** is a interval between two steps which comprises a perfect whole tone plus an imperfect semitone. And this interval occurs between re and fa ascending, likewise between mi and sol, and the other way round descending.

The **ditone** is a interval between two steps which comprises only two perfect [whole] tones. And it is named after *dia*, which means “two,” and *tonus*, because it contains within itself two perfect tones, namely, ut-mi and fa-la ascending, and the other way round descending. But the semiditone is a better interval than the ditone, particularly when its two steps are performed sweetly together. Every perfect concord requires a semitone or semitones, even though the semitone taken by itself makes a dreadful concord. Examples of the aforementioned intervals are as follows:

Medium concords are those whose steps, when performed at the same time, struck immediately, produce a better harmony but not so much as do perfect ones; and there are two, namely diapente and diatessaron.

The **diapente** is a certain interval which contains, between [its] two steps, three perfect tones and an imperfect semitone. And it occurs in two ways ascending, namely ut-sol and re-la, and in equally many ways descending. And it is called after *dia*, which means “from,” and *pentha*, which means “five,” as it were made up from five steps. This interval is based in the *sesquialtera* proportion, in which six are related to four.

The **diatessaron** is a interval between two steps or sounds that comprises two perfect tones with an imperfect semitone. And it occurs

fit tribus modis ascendendo, scilicet ut-fa, re-sol, mi-la, et totidem modis descendendo. Dicitur autem diatessaron a dia quod est “de”, et tetras quod est “quattuor”, et saron quod est “vox”, quasi de quattuor constituta. Vel dicitur diatesseron, quod idem est, a dia quod est “de”, et tesseron quod est “quattuor”. Consistit autem diatessaron in proportione sesquitertia, quemadmodum quaternionius ad ternarium se habet.

Hae duae consonantiae simul sumptae secundum sub et supra diapason efficiunt, et aptius est ut diatessaron supra diapente ponatur quam econverso. Est enim diapente melior concordia et dulcior quam diatessaron, nam in maiore numerorum proportione fundatur. Istarum concordiarum exempla patent hic:



Discordiarum duae sunt species, perfecta scilicet et imperfecta. Perfecta discordia est quando duae voces in eodem prolatae tempore compati se non possunt secundum auditum; et sunt quattuor, scilicet semitonium, tritonus, semitonium cum diapente, ditonus cum diapente.

Semitonium est imperfecta distantia duarum vocum immediate se habentium quae in vocem humanam non valet dividi. Et dicitur a semus, -ma, -mum quod est “imperfectus, -ta, -tum” et tonus, quasi imperfectus tonus. Est autem duplex semitonium: quoddam maius, quoddam minus. Non enim est possibile tonum perfectum in duo semitonia aequalia dividi, ut probat Boethius tam in primo *Musicae* quam in secundo. Horum autem semitoniorum in quae

in three ways ascending, namely ut-fa, re-sol, and mi-la, and in as many ways descending. And it is called diatessaron after *dia*, which means “from,” and *tetras* which means “four,” and *saron*, which means “sound,” as it made up from four. Alternatively it is called diatessaron after *dia*, which means “from,” and *tesseron*, which means “four,” which amounts to the same thing. The diatessaron is based in the sesquitertia proportion, in the way that the quaternary [number] relates to the ternary.

When those two intervals are taken together according to under and above [placed on top of one another], they produce the diapason. And it is more suitable that the diatessaron be placed on top of the diapente than the other way round. For the diapente is a better and sweeter concord than the diatessaron, for it is founded in the greater proportion of numbers. Examples of those concords are as follows:

There are two species of discord, namely, perfect and imperfect. There is a **perfect discord** when two sounds performed at the same time do not blend together according to the hearing; and there are four, namely, semitone, tritone, semitone with diapente, and ditone with diapente.

The **semitone** is the imperfect distance between two sounds that are immediately [next] to one another, which [distance] cannot be divided in the human voice. And it is named after *semus*, -*ma*, -*mum*, which means “imperfect,” and *tonus*, as it were imperfect tone. But the semitone is twofold: one greater, and one smaller. For it is not possible to divide the perfect tone into two equal semitones, as Boethius demonstrates in both the first and second [books] of *Musica*. Since the

tonus perfectus dividitur, cum inaequalia sint, alterum dicitur minus, alterum vero maius. Semitonium minus a Graecis dicitur *diesis*, id est “minus semitonium”. Semitonium maius a Graecis vocatur *apotome*. A nobis autem, ut ait Boethius, vocari potest *decisio*, nam cum fere accedat ad tonum, cadit tamen ab integritate eius.

Fit autem tam semitonium minus quam maius inter mi et fantummodo, ascendendo et descendendo. Est enim notandum quod mi et fa reperiuntur vel in diversis clavibus consequenter posita, vel in eadem, composita tamen. Primo modo inter mi et fa ascendendo, et fa-mi descendendo cadit semitonium minus, sicut inter mi de .E.lami et fa de .F.faut. Secundo modo inter fa et mi ascendendo, et mi et fa descendendo cadit semitonium maius, sicut in .b.fa.b.mi quae proprie non dicitur una clavis. Habet enim pro suis diversis vocibus signa diversa, et inter alias rationes haec est una quare in .b.fa.b.mi non est mutatio. Quemadmodum igitur fa de .F.faut superat mi de .E.lami in semitonio minore, ita mi de .b.fa.b.mi, fa de .b.fa.b.mi superat in semitonio maiore, et quia voces altiores graviores debent sequi, in compositione illius clavis ponitur mi post fa. Posuit autem Boethius semitonium minus consistere in proportione decima septima, sicut se habent octodecim ad septendecim, maius vero in sexta decima magis, sicut se habent septendecim ad sedecim.

Tritonus est consonantia inter duas voces tres tonos perfectos continens. Unde deficit a diapente in semitonio minore et superat diatessaron in maiore semitonio. Et dicitur tritonus a tris quod est “tres” et tonus, quia in se tres tonos perfectos includit. Fit autem haec consonantia inter voces .F. gravis de .F.faut in regula seu linea et mi de .b. acuta, id est de .b.fa.b.mi in spatio sive in loco pari; similiter inter vocem .b. praetactae et vocem .e. acutae, id est .e.lami in regula.

Semitonium cum diapente est consonantia quae inter duas voces tres tonos perfectos requirit cum duobus semitoniiis imperfectis quae tonum perfectum non faciunt. Et intelligo ubique

two semitones into which the perfect tone is divided are unequal, one is called minor and the other major. The minor semitone is called *diesis* by the Greeks, that is, “minor semitone.” The major semitone is called *apotome* by the Greeks. But we may call it *decisio*, as Boethius says, for although it almost approaches the tone, it does fall short of its wholeness.

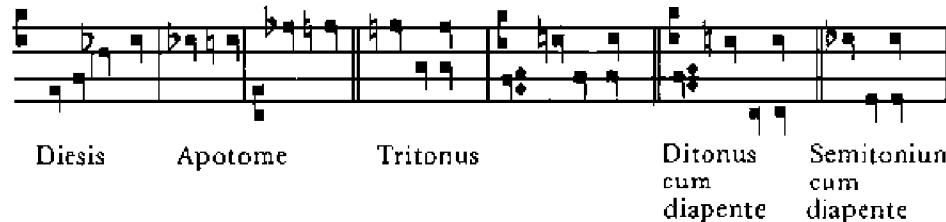
Both the minor and major semitone occur only between mi and fa, ascending as well as descending. It must be noted that mi and fa are found either in different keys in succession, or in the same composite one. In the first way the minor semitone falls between mi-fa ascending and fa-mi descending, as between mi of E la mi and fa of F fa ut. In the second way the major semitone falls between fa-mi ascending and mi-fa descending, as in b fa/b mi, which is not properly called a key. For it has different signs for its different pitches, and this is one reason, amongst others, why there is no mutatio in b fa/b mi. But just as fa of F fa ut exceeds mi of E la mi by minor semitone, so mi of b fa/b mi exceeds fa of b fa/b mi by amajor semitone, and since higher pitches must follow the lower ones, mi is placed after fa in the composition of this key. Boethius posited that the minor semitone is based in the *decima septima* proportion, as between eighteen and seventeen, but the major rather in the *sexta decima*, as between seventeen and sixteen.

The **tritone** is a interval between two steps that comprises three perfect tones. So it falls short of the diapente by a minor semitone, and exceeds the diatessaron by a major semitone. And it is called “tritone” after *tris*, which means “three,” and *tonus*, because it contains within itself three perfect tones. This interval occurs between the steps F gravis of F fa ut in the rule or line, and mi of b acuta, that is, of b fa/b mi in the space or equal place; likewise between the aforementioned step b and the step high e, that is e la mi on the line.

The **semitone with diapente** is the interval between two steps which calls for three perfect tones plus two imperfect semitones that do no add up to a perfect tone. And by “imperfect semitone” I always

“semitonium imperfectum” semitonium minus de quo dictum est prius. Abundat autem dicta consonantia a diapente in semitonio minore. Et fit haec consonantia de .D. gravi, id est .D.solre, ad fa de .b. acuta, id est fa in spatio, tam ascendendo quam descendendo. Similiter et in aliis locis diversis in compositione gammatis haec consonantia potest reperiri.

Ditonus cum diapente est consonantia inter duas voces, unam gravem, aliam acutam, quinque tonos continens perfectos cum semitonio imperfecto et deficit a diatessaron in semitonio minore. Fit autem haec consonantia de .C. gravi, id est .C.faut, ad mi de .b. acuta, id est de .b.fa.b.mi. Tactarum consonantiarum exempla patent hic:



Discordia imperfecta est quando duae voces in eodem tempore prolatae secundum auditum quodammodo se compati possunt, sed discordant; et continet sub se tres consonantias scilicet tonum, tonum cum diapente, semiditonum cum diapente.

Tonus, ut hic sumitur, est perfecta distantia duarum vocum immediate se habentium, quarum una est gravis, alia acuta, duo continens semitonia inaequalia, ut tactum est, scilicet unum minus et alterum maius. Dicitur autem tonus a tono, -nas quia perfecte tonat, id est perfecte duarum vocum immediate sub et supra prolatarum manifestat distantiam. Unde ubicum<que> duae voces a linea in spatio continua<n>tur, tam ascendendo quam descendendo, fit tonus, praeterquam inter fa et mi, verbi gratia: de ut in re, de re in mi, de fa in sol, de sol in la ascendendo, econverso descendendo. Consistit autem tonus in proportione sesquioctava, in qua se habent novem ad octo.

understand the minor semitone of which I have spoken before. The said interval exceeds the diapente by a minor semitone. And this interval occurs between low D, that is, D sol re, and fa of high b, that is, fa in the space, ascending as well as descending. Likewise also in various other places in the composition of the gamut this interval can be found.

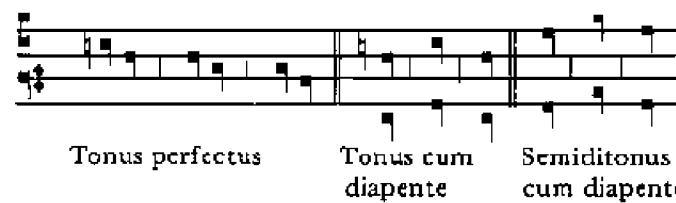
The **ditone plus diapente** is the interval between two steps, one low, the other high, that contains five perfect tones with an imperfect semitone, and it falls short of the diapason by a minor semitone. This interval occurs between low C, that is C fa ut, and mi of high b, that is, of b fa/b mi. Examples of the said intervals are as follows:

The **imperfect discord** occurs when two sounds performed at the same time can blend to a certain degree according to the hearing, yet are still discordant; and it comprises three intervals, namely, tone, tone with diapente, and semitone with diapente.

The **tone**, as understood here, is the perfect distance between two sounds in immediate [neighboring] relationship, of which one is low, the other high, containing two unequal semitones as already said, namely, one minor and the other major. The tone is named after *tono, tonas* [to resound], because it resounds perfectly, that is, it perfectly manifests the distance between two sounds performed immediately under and above. Thus, wherever two sounds continue from a line into a space, ascending as well as descending, there is a tone, except between fa and mi, for example: ut-re, re-mi, fa-sol, sol-la, all ascending, and the other way round descending. The tone is based in the sesquioctava proportion, in which nine relate to eight.

Tonus cum diapente est consonantia inter duas voces continens quattuor tonos perfectos cum semitonio imperfecto, sicut de ut in la ascendendo et econverso descendendo. Et componitur a tonus et diapente.

Semiditonus cum diapente est consonantia inter duas voces quattuor includens tonos perfectos cum duobus semitoniiis imperfectis. Unde deficit a diapason in tono perfecto. Voco autem “tonum perfectum” qui cantatur ex duobus semitoniiis inaequalibus, uno scilicet maiore, altero vero minore. Imperfectus autem tonus est qui resultat ex duobus semitoniiis imperfectis, id est minoribus. Et hic tonus imperfectus, ut vult Boethius in primo libro *Musicae* sua, in tantum superat semitonium maius in quantum minus ab ipso maiore superatur. Habet autem semiditonus cum diapente voces .c. acutae, id est .c.solfaut ad illas de .D. gravi. Istarum trium discordiarum vel discordantiarum exempla patent hic:



Visum est de consonantiis respective declarando quae ipsarum bonam habent concordiam et quae malam. Similiter etiam ostensum est de qualibet quid sit, nec hoc facientes ordinem quem habent via generationis et imperfectionis tenuimus, sed potius illum quem habent via perfectionis, magis prout scilicet concordiam vel discordiam faciunt, ut brevius expediremus nos.

Notanda sunt quaedam consequenter circa praecedentia: primo, quod omnis imperfecta discordia immediate veniens ante bonam, bona est et maxime ante diapason et unisonum. Secundo notandum est quod aliae sunt consonantiae a

The tone with diapente is the interval between two sounds that comprises four perfect tones with an imperfect semitone, like ut-la ascending, and conversely descending. And it is put together from a tone and a diapente.

The semiditone with diapente is the interval between two sounds that comprises four perfect tones with two imperfect semitones. It falls short of the diapason by a perfect tone. I call a “perfect tone” that which is sung out of two unequal semitones, namely, one major and the other minor. The imperfect tone, however, is one that is produced from two imperfect semitones, that is, minor ones. And this imperfect tone, according to Boethius in the first book of his *Musica*, exceeds the major semitone by as much as the minor is exceeded by this major one. But the semiditone with diapente has the pitches high c, that is, c sol fa ut, and low D. Examples of those three discords, or discordants, are as follows:

We have reviewed the intervals in order, clarifying which of them produce good concord and which bad. Likewise we have shown the nature of each, and we have not held them to make an order by way of generation and imperfection, but rather by way of perfection, that is, as they make more concord or discord, as we shall shortly do.

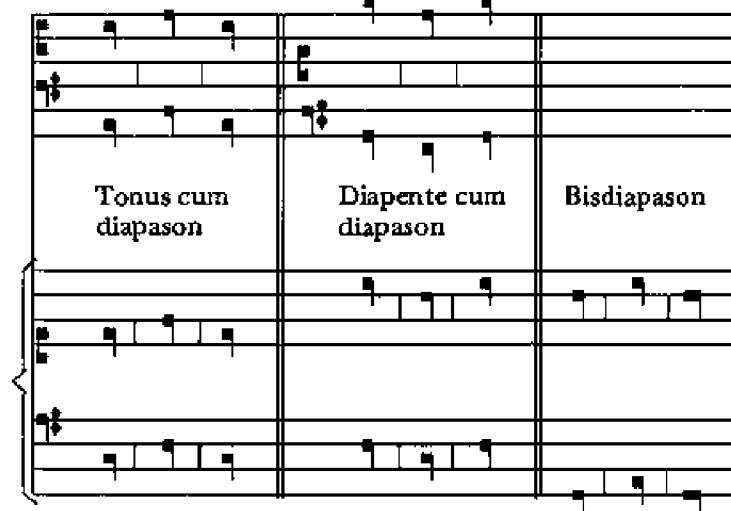
Certain things are in consequence to be noted concerning the previous things: first, that every imperfect discord coming immediately before a good [concord] is itself also good, above all before the diapason and unison. Secondly it is to be noted that there

praetactis, ut tonus cum diapason, diapente cum diapason, et bisdiapason.

Tonus cum diapason habet bonam concordiam, maxime cum in medio profertur diapente; et fit haec consonantia ex duabus diapente.

Diapente cum diapason est consonantia quae inter unisonos octo tonos perfectos requirit cum tribus semitoniis imperfectis. Et consistit haec consonantia, ut vult Boethius, in proportione tripla, sicut se habent sex ad duo. Non vult Boethius quod diatessaron cum diapason faciant consonantiam. Tunc enim sequeretur quod aliquae musicales consonantiae in proportione numeri superpartientis fundarentur, ut patet naturas scienti numerorum maioris et minoris inaequalitatis. Haec autem negat Boethius in *Musica* sua.

Bisdiapason est consonantia quaedam in quadrupla consists proportione, in quali se habent octo ad duo, et tam ista quam praecedens bona sunt ad concordiam faciendam. Istarum trium consonantiarum exempla patent hic:



Notandum est ulterius quod consonantiam diapason excedentem, qualiscumque fuerit, plana musica non recipit ita

are other intervals than the ones mentioned, like the tone with diapason, diapente with diapason, and bisdiapason.

The **tone with diapason** produces good concord, especially when a diapente is performed in the middle; and this interval is made up of two diapentes.

The **diapente with diapason** is a interval between two unisons which requires eight perfect tones with three imperfect semitones. And this interval, according to Boethius, is based in the tripla proportion, such as between six and two. [If so,] then it would follow that certain musical intervals were founded in the proportion of the superpartient number, as is apparent to one who knows the natures of the numbers of major and minor inequality. Yet Boethius denies this in his *Musica*.

The **bisdiapason** is a certain interval that is based in the quadrupla proportion, in which eight relate to two, and both this and the previous one are good for the making of concord. Examples of those three intervals are as follows:

It is to be noted, moreover, that plain music does not accept any interval that exceeds the diapason, of whatever kind it may be,

quod aliquis in ea immediate ascendat ultra diapason vel descendat. Quaedam tamen talium consonantiarum in cantibus ad musicam mensuratum longis brevibusque temporibus spectantibus reperi possunt, ut patet in illo moteto *Non pepercit deus nato proprio*, et caetera. Volens igitur discantare vel discantum aliquem facere consonantiis concordiam habentibus utatur eas debito modo commiscendo tam in discantu cum eadem littera ut in cantilenis, scilicet in rondellis, quam in discantu cum diversis litteris ut in motetis triplum vel tenorem habentibus. Tenor enim cuidam litterae aequipolle quam etiam in discantu cum littera et sine littera, quod contingit proprie in conductis et quodam ecclesiastico cantu qui improprie organum vocatur.

Potest autem discantum faciens quandoque in locis debitiss intermiscere discordantias ad pulchritudinem sui cantus salvandam, maxime in discantu currente. Dico autem “in locis debitis” quia in omnibus modis in discantibus observandis utendum est semper concordantiis in principio perfectionis, sive fuerit longa, sive brevis, sive semibrevis. Similiter et in fine ante pausationes, maxime cum simul discantus pausat vel pausant cum tenore, necnon et in fine totius discantus. Debet autem quilibet discantus tenorem habere vel aliquem cantum qui loco tenoris ponatur. Dicitur autem tenor a *teneo*, -nes, quod totum discantum tenet. Est enim fundamentum ipsius et ab ipso totus cantus debet regulari. Discantus vero dicitur quasi de cantu, id est tenore, sumptus, vel quasi diversorum cantus. Est autem in quolibet cantu mensurato salvanda perfectionum aequipollentia, ita quod tot perfectiones sint in tenore quot in discanto, vel in triplo, si fuerit triplum, vel econverso, computando tam voces rectas quam obmissas usque ad penultimam ubi non servatur proprie mensura, sed potius organicus punctus. Et haec dicta de consonantiis musicalibus ad praesens sufficient. Explicit tractatus de consonantiis musicalibus.

when somebody makes a direct upward or downward leap beyond the diapason. Yet some of those intervals can be found in songs that pertain to music measured in long and short tempora, as is apparent in that motet *Non pepercit deus nato proprio*, and so on. So he who wishes to sing discant, or to compose some discant, let him use intervals that have concord, mingling them in the proper way, both in discant with the same text [in all voices], as in cantilenas, that is, rondelli, and in discant with different texts, as in motets that have a triplum or tenor. For the tenor counts as having a certain text both in discant with text and without text, which happens properly in conducti and in a certain ecclesiastical song which is improperly called organum.

He who makes discant may sometimes mix in discords in the appropriate places in order to preserve the beauty of his song, above all in running discant. I say “in the appropriate places,” because one must always, in all the [rhythmic] modes observed in discant, use concords at the beginning of the perfection, whether it be longa, or breve, or semibreve. Likewise also at the end before the rests, above all when the discant rests, or [discants] rest, together with the tenor, and also at the end of the discant as a whole. Every discant must have a tenor, or some song that is notated in the place of the tenor. Tenor is called after *teneo*, *tenes* [to hold], since it holds the whole discant. For it is the foundation, and on the basis of it the whole song must be ruled. One speaks of discantus as it were taken “from cantus,” that is, from the tenor, or, as it were, a song of different ones. In every measured song the equipollence of perfections is to be maintained, in such a way that there are as many perfections in the tenor as there are in the discant or the triplum (if there be a triplum), or the other way round, counting both sounds and rests all the way to the penultimate, on which the measure is not properly maintained, but rather an organ point. And these statements about musical intervals suffice for the present. Here ends the treatise concerning musical intervals.