

CHAPTER IV

THE APPLICATION AND EVALUATION OF THE MONOCHORD

ACCORDING TO THE DIVISION PROPOSED BY

BARTOLOMEO RAMOS DE PAREIA

In the final chapter before the epilogue to the *Musica practica*, Ramos categorizes those intervals which are pleasing to the ear and those which should be avoided. This discussion clearly demonstrates the mathematical ratios of which Ramos approved and disapproved, for he meticulously assigns "good" and "bad" values to each of them.

Ramos's division of the monochord results in three types of semitones: a "diatonic" semitone (16:15, 112 cents) that is the difference between the perfect fourth and the pure major third (4:3 - 5:4); a "chromatic" semitone (135:128, 92 cents) that is the difference between the whole tone and the diatonic semitone (9:8 - 16:15); and a "Pythagorean diatonic" semitone, also referred to as the *limma* (256:243, 90 cents), that is the difference between the perfect fourth and two whole tones (4:3 - (9:8)²). While several theorists have noted that Ramos fails to mention that his division necessitates the use of the Pythagorean diatonic semitone, this must not be construed as an oversight by the author. Ramos did not propose a

tuning system with the intent of discarding all Pythagorean ratios; rather, his system was offered as a refinement that attempted to explain contemporary practice. It should further be noted that Ramos's chromatic semitone differs from the Pythagorean diatonic semitone by merely 2 cents (the *schisma*).

A small discrepancy from traditional terminology results when Ramos refers to the chromatic semitone, or *apotome*, as the "major semitone."¹ In the Pythagorean system, the chromatic semitone (114 cents)--larger than the diatonic semitone of 90 cents--is labeled the "major semitone"; conversely, Ramos's diatonic semitone (112 cents) is actually larger than his chromatic semitone (92 cents). Thus, Ramos's designation of the chromatic semitone as the "major semitone" seems inappropriate. To avoid confusion, and because their mathematical ratios actually correspond in this manner, Ramos's chromatic semitone will hereafter be referred to as the "minor semitone" while his diatonic semitone will be referred to as the "major semitone." Table 10 illustrates the application of Ramos's semitonal ratios in a chromatic scale beginning on *C*, as well as Ramos's designations of "good" and "bad" semitones.

¹See Ramos de Pareia, *Musica practica*, 13.

TABLE 10

EVALUATION OF SEMITONES IN CENTS
 ACCORDING TO RAMOS'S DIVISION

	good 90		bad 92		bad 92		good 90		good 112		good 112	
C	C#	D	Eb	E	F	F#	G	Ab	A	Bb	B	C
	92 bad		112 good		112 good		112 good		92 bad		92 bad	

Type of semitone:

C P D C D C D P C D C D

** (C = chromatic, D = diatonic, P = Pythagorean)

Ratios: 90¢ = 256:243, 92¢ = 135:128, 112¢ = 16:15

Ramos obtains the two types of whole tones (9:8 and 10:9) by incorporating the possible combinations of semitones that result from his division of the octave. The major semitone plus the minor semitone produces the major whole tone (112 + 92 = 204 cents, 9:8); the minor semitone plus the Pythagorean *limma* produces the minor whole tone (92 + 90 = 182 cents, 10:9).

In his evaluation of the resulting whole tones, Ramos designates all of the major and minor whole tones as "good," but disapproves of the whole tones that are located between C#-Eb and F#-Ab. This evaluation seems odd in light of the fact that these "bad" whole tones are valued

at 202 cents--only a schisma in difference from the major whole tone of 204 cents. Conversely, Ramos unconditionally accepts the minor whole tones of 182 cents that hold a difference of the syntonic comma (22 cents)! The possible answer to this paradox may stem from the fact that Ramos bases his evaluation upon the specific notation of these intervals, accepting all whole tones spelled as major seconds but rejecting those spelled as diminished thirds. Table 11 demonstrates Ramos's evaluation of the whole tones and their corresponding ratios in cents.

TABLE 11
EVALUATION OF WHOLE STEPS IN CENTS
ACCORDING TO RAMOS'S DIVISION

C	D	E	F#	Ab	Bb	C
182	204	204	202	204	204	
good	good	good	bad	good	good	
C#	Eb	F	G	A	B	C#
202	204	204	182	204	204	
bad	good	good	good	good	good	
Ratios: 182¢ = 10:9, 204¢ = 9:8, 202¢ = 9:8 - schisma						

Likewise, in his discussion of "good" and "bad" semiditones, Ramos accepts the pure minor third (316 cents) and the Pythagorean semiditone (294 cents), but rejects the

three semiditones located between *Eb-F#*, *Ab-B*, and *Bb-C#*, even though these particular semiditones are only a schisma greater than the Pythagorean semiditone. According to Ramos, all semiditones are "good" except where there is a mixture of one "accidental order" (a mixture of flats and sharps) with another.² Semiditones that are notated as minor thirds are acceptable; those that are notated as augmented seconds are unacceptable. Table 12 demonstrates Ramos's evaluation of the semiditones and their corresponding ratios in cents.

As in the case of the semiditone, it is again this difference of a schisma that leads Ramos to label particular ditones as unacceptable. In his monochordal division, Ramos considers those ditones which are notated as diminished fourths (*C#-F*, *E-Ab*, *F#-Bb*, and *B-Eb*) and which hold the value of 406 cents to be objectional; conversely, the pure major third (386 cents) and the Pythagorean ditone (408 cents) that are notated as major thirds are acceptable. Table 13 demonstrates Ramos's evaluation of the ditones and their corresponding ratios in cents.

²Ibid., 79.

TABLE 12

EVALUATION OF SEMIDITONES IN CENTS
 ACCORDING TO RAMOS'S DIVISION

C	294 good	E _b	296 bad	F [#]	294 good	A	316 good	C
C [#]	294 good	E	316 good	G	294 good	B _b	296 bad	C [#]
D	316 good	F	294 good	A _b	296 bad	B	294 good	D
Ratios: 294¢ = 32:27, 296¢ = 32:27 + schisma, 316¢ = 6:5								

The most interesting discrepancy in Ramos's discussion of acceptable and unacceptable intervals occurs in his evaluation of the perfect fifths and perfect fourths. One of the major defects of both Pythagorean tuning and just intonation is the appearance of a perfect fifth--a "wolf fifth"--that is noticeably out-of-tune in relation to the other fifths. In a Pythagorean tuning on C, the wolf fifth occurs between the pitches G[#]-E_b; the problem of the wolf fifth is somewhat mitigated, however,

TABLE 13

EVALUATION OF DITONES IN CENTS
ACCORDING TO RAMOS'S DIVISION

		bad 406		good 386		good 408	
C	C# 386 good	E	F 406 bad	Ab	A 408 good	C	C#
		good 408		good 386		bad 406	
D	Eb 408 good	F#	G 406 bad	Bb	B 386 good	D	Eb
Ratios: 386¢ = 5:4, 408¢ = 81:64, 406¢ = 81:64 - schisma							

by the fact that the fifth *G#-Eb* would rarely appear in contemporary practice. In Ramos's tuning system, the wolf fifth occurs between the pitches *G-D*--a much more objectionable location. According to Ramos's tuning, the wolf fifth *G-D* (40:27) is 22 cents smaller than the pure perfect fifth (680 cents vs. 702 cents). This difference of a syntonic comma is quite audible and creates a perfect fifth that is very flat. Yet, consistent with his previous considerations in regard to the mixture of the accidental orders, Ramos labels the interval *G-D* as "good" while designating the interval *C#-Ab* as a "useless diapente."³

³Ibid., 80.

This "useless interval" holds the value of 700 cents--only a schisma difference from a pure perfect fifth! Once again, Ramos chooses to accept the intervals that are notated as perfect fifths, but rejects the diminished sixth interval of *C#-Ab*.

TABLE 14
EVALUATION OF THE DIAPENTE IN CENTS
ACCORDING TO RAMOS'S DIVISION

		bad 700		good 702		good 702	
C	C# 702 good	G	Ab 680 good	D	Eb 702 good	A	Bb
		good 702		good 702			
A	Bb 702 good	E	F 702 good	B	C 702 good	F# 702 good	C#
Ratios: 680¢ = 40:27, 702¢ = 3:2, 700¢ = 3:2 - schisma,							

Likewise, in his discussion of "good" and "bad" perfect fourths, Ramos accepts the interval *D-G* (27:20, 520 cents) that is a syntonic comma greater than the pure perfect fourth, but rejects the augmented third *Ab-C#* that is only a schisma greater than the pure perfect fourth (500 vs. 498 cents).

TABLE 15

EVALUATION OF THE DIATESSARON IN CENTS
 ACCORDING TO RAMOS'S DIVISION

C	C# 498 good	good 498 F	F# 498 good	good 498 Bb	B 498 good	good 498 Eb	E
D	Eb 520 good	good 498 G	Ab 498 good	bad 500 C	C#	F	
E	498 good	A	498 good	D			
Ratios: $498\text{¢} = 4:3$, $500\text{¢} = 4:3 + \text{schisma}$, $520\text{¢} = 27:20$							

In many ways, Ramos remained a Pythagorean. He understood that the ditone must "theoretically" correspond to the Pythagorean ratio of 81:64 but, due to its audible harshness, he proposed an alternative that provided for pure major and minor thirds at some of the more common locations.

Ramos well understood that the typical fifteenth-century performer had little interest in the complicated ratios of speculative theory. Thus, rather than inundating the performer with complicated instrumental ratios, Ramos

based his acceptance and rejection of the intervals upon regular and irregular notational spellings; a method that the performer could easily understand and subsequently apply to effect purer thirds and sixths.

Lindley's Misinterpretation (1975) of Ramos's Tuning

In "Fifteenth-Century Evidence for Meantone Temperament," Mark Lindley asserts that Ramos is a proponent of meantone temperament--tempering fifths in order to acquire more resonant thirds and sixths. This assertion is grounded upon Lindley's manipulative and incorrect translation of Ramos's text, and justified by references to other period writings (including those of Gaffurius--Ramos's strongest opponent). Lindley's interpretation of Ramos's theories are, for the most part, nothing less than incredible leaps to unsubstantiated conclusions.

Lindley is correct to point out that Ramos oddly categorizes the wolf fifth $G-D$ as a "good" interval while disapproving of the interval $C\#-Ab$ but, as explained above, Ramos's intervallic evaluations are based upon the specific notation of the intervals rather than upon the actual value of the mathematical ratios themselves.

Lindley states that he could accept Ramos's tuning as a "Pythagorean" tuning if only Ramos had dismissed the interval $C\#-Ab$ as a "bad" fifth. Lindley explains that either this Pythagorean tuning designation would be based upon a wolf fifth from $C\#-Ab$ ("in which the thirds that beat profusely are labelled 'good' and those nearly pure 'bad,'"), or that Ramos's division is essentially a "regular meantone temperament with three flats and two sharps."⁴ An analysis of Ramos's evaluation of ditones (see Table 13 above), however, demonstrates the inaccuracy of Lindley's assertion. While it is true that Ramos labels the intervals that "beat profusely" (408 cents) as "good," the thirds that Ramos labels as "bad" can hardly be called "nearly pure," as categorized by Lindley. Ramos's "bad" thirds are only a schisma in difference from his "good" thirds (406 vs. 408 cents), and the "bad" thirds are actually closer to the pure intervals of 386 cents than to his "good" thirds.

If one were to rely, as did Lindley, upon the comments of Ramos's contemporaries in order to understand the inconsistency in Ramos's terminology, a degree of clarity may be found in the passage where Spataro discusses the theoretical vs. practical nature of specific intervals:

⁴Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 41.

. . . the more you try to criticize Bartolomé Ramos, my master, the more you get enmeshed and show clearly your ignorance, small knowledge, malice, and obstinacy . . . Bartolomé Ramos has said that (only in practice, that is in musical usage and activity) the ditone corresponds to the 5/4 ratio, but not in speculative music, . . . where the ditone corresponds to the ratio 81/64 . . . the 81/80 ratio [the syntonic comma] (which is the difference between the Pythagorean intervals and the intervals used by experienced musicians is audible--not imperceptible as in your above-mentioned chapter you have concluded. For were it not appreciable, the harsh Pythagorean monochord would not [have to] be reduced, smoothing [it] to the sense of hearing . . . Bartolomé Ramos [also] judged that the difference is perceptible between the 6/5 minor third and the minor third corresponding to the 32/27 ratio, because otherwise it would be self-defeating to add the 81/80 interval in order to reduce the musical intervals from harshness to smoothness.⁵

Lindley interprets this passage, in which Spataro discusses the syntonic comma, as evidence that Ramos promoted meantone temperament; Spataro, however, makes no mention in

⁵" . . . quanto piu tu cerchi reprehendere Bartolomeo Ramis mio preceptore, tanto piu te ne vai intrucando: et fai manifesta la tua ignorantia: poco sapere: malignita: et obstinatione . . . da Bartolomeo Ramis e stato dicto che (solo in practica overo in la Musica usitata: et activa el ditono cadete in la comparatione sesquiquarta: & non in la Musica speculativa . . . in la quale cade el ditone tra .81. ad .64. comparati . . . la proportione cadente tra .81. ad .80. laquale e la differentia cadente tra li pythagorici intervalli: & li intervalli da li modulanti usitati e sensibile; & non insensibile come nel predicto tuo capitulo hai concluso. Perche non essendo sensibile: el duro monochordo pythagorico non seria riducto in molle al senso de lo audito . . . da Bartolomeo Ramis e stato inteso essere differentia sensibile tra il semiditono sesquiquinto & il semiditono cadente tra .32. ad .27. comparati: perche altramente: el seria frustratorio la additione de lo intervallo cadente tra .81. ad .80. circa el ridurre li Musici intervalli de duro in molle"

Spataro, *Errori di Franchino Gafuria da Lodi* (Bologna, 1521), ff. 21v-22r; quoted and translated by Mark Lindley, "Fifteenth Century Evidence for Meantone Temperament," 42.

this passage of tempering the fifths or of any division of the syntonic comma into fourths--a necessary requisite in the generation of meantone temperament. Moreover, the wolf fifth that would arise from meantone temperament falls between $G\#-Eb$ (approximately 59 cents larger than the wolf fifth of just intonation), whereas the wolf fifth in Ramos's tuning occurs between $G-D$. Spataro does, in fact, refer to a tuning discrepancy, but it is not the discrepancy between Pythagorean tuning and meantone temperament as Lindley asserts; rather, it is a discrepancy between Pythagorean tuning and just intonation.

Lindley continues his discourse by addressing Ramos's disregard for the necessity of having a pure fifth on $C\#-G\#$. Because Ramos's monochordal division uses the pitch Ab rather than $G\#$, Ramos proposes cadential alternatives that can be utilized by the performer in order to avoid the interval of $C\#-G\#$ which, he claims, is a "useless diapente, since it is rarely made and, to tell the truth, should never be made."⁶

In order to avoid the problem that results from the use of Ab instead of $G\#$, Ramos provides an alternative for the traditional double leading-tone cadence, demonstrated below in Figure 1. Because Ramos's scale does not have the pitches $D\#$ and $G\#$, but rather the enharmonic spellings of

⁶Ramos de Pareia, *Musica practica*, 80.

E_b and *A_b*, Ramos suggests that poor intonation can be avoided by moving the tenor from *B_b* down to *A*, the middle voice from *D* to *E*, and the cantus from *G* to *A*. The final result is a Phrygian cadence, rather than a Lydian cadence. By changing the cadence in this manner, singers can not only avoid both the "bad ditone" of *B-E_b* and the "bad major hexad" of *B-A_b* but, as Ramos states, such a transition will not only be "good," but will be even "better, sweeter, and smoother"⁷ than the first.

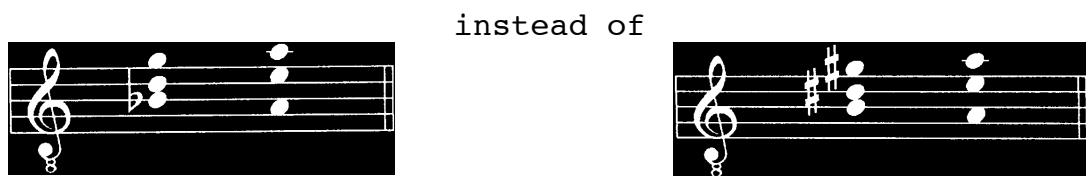


Figure 1. Ramos's Proposed Alternative to the Traditional Double Leading-Tone Cadence

Ramos's suggestion of a cadential alternative to avoid the *G_#* and the discourse that follows clearly demonstrates his interpretation of the *A* cadence as a representative of the deuterus, rather than the protus, mode. In *Musica Ficta: Theories of Accidental Inflections in Vocal Polyphony from Marchetto da Padova to Gioseffo Zarlino*, Karol Berger notes that there was considerable disagreement during the period regarding the modal interpretation of the *A* cadence, especially in regard to

⁷Ibid.

the choice of which leading tone should be implemented by the performer.⁸ Most theorists maintained that A was the *finalis* of the protus mode and, therefore, such a *finalis* implied a lower leading tone G#; Prosdocimus, Ugolino, and Ramos, insisted that A was the *finalis* of the deuterus mode with a key signature of one flat and, therefore, such a *finalis* implied an upper leading tone of Bb.⁹ Although examples do exist to provide evidence that composers did acknowledge the A cadence within the confines of the deuterus mode--even when there were no flats in the signature--the overwhelming majority of fifteenth-century musicians favored the use of the A cadence within the confines of the protus mode. In fact, no matter what the mode, there seems to be a preference at cadences for the implementation of the lower leading tone whenever possible.

⁸Karol Berger, *Musica Ficta: Theories of Accidental Inflections in Vocal Polyphony from Marchetto da Padova to Gioseffo Zarlino* (Cambridge, Mass.: Cambridge University Press, 1987) 143-48.

⁹See Ugolino d'Orvieto's *Declaratio musicae disciplinae*, ed. by Albert Seay, vol. II (Rome: American Institute of Musicology, 1960), 51ff and Prosdocimus de Beldemandis's *Tractatus musice speculative contra Marchetum de Padua* in D. Raffaello Baralli and Luigi Torri, "Il Trattato di Prosdocimo de'Beldomandi contro Il Lucidario di Marchetto da Padova," *Rivista musicale italiana* XX (1913), 750-51.

There can be little doubt of Ramos's conviction that the A cadence is representative of the deuterus mode:

And if anyone wishes to say that there [on *h*]¹⁰ the *protus* is born again, and the conditions which *d* held to should also be obtained on *h*, and [that] since *d* was shown to have a semitone below and above itself, *h* also [ought to proceed] in the same way, we will respond by saying that the argument does not proceed [logically], since the former held *g*, which claims all similitude to itself below and above in the *synemmenon* tetrachord. Nevertheless, [this is not true] with *h*, because it contains two tones below itself. . . .

Therefore, that string [*h*] is the *deuterus* in the conjunct [tetrachord, and it is] as much authentic as it is plagal.¹¹

Ramos's conviction is grounded in logic; his choice for a modal interpretation of the A cadence within the deuterus mode rests heavily upon a determination to avoid the necessity of the pitch *G#*--a pitch that does not occur in Ramos's monochordal division.

It should be noted that Ramos does not prohibit the use of the lower leading tone in the *D* cadence. In his discussion of counterpoint, Ramos advises the reader to change the minor sixth into a major sixth whenever this penultimate interval leads to the octave, and provides an

¹⁰For Ramos, *h* refers to the pitch *a*.

¹¹Ramos de Pareia, *Musica practica*, 80.

example with a lower leading tone (*C#*) instituted by means of *musica ficta* (see Figure 2).¹²

Further, in his fifth rule of counterpoint--a rule in which the minor third leads to the unison--Ramos reveals a bias for the upper leading tone cadence in passages that come to rest on a unison.



Figure 2. Ramos's Lower and Upper Leading-Tone Cadences

In the penultimate chapter of his treatise, Ramos continues his discussion relative to the tuning of *g* and *h*, referring to the fact that the major third above *E* (*G#*) will be out-of-tune in a Burgundian cadence approaching an *A finalis*. Ramos advocates the complete elimination of the *G#* either by employing only the root and fifth of the concord, or by substituting the pitch *G_* for *G#* (see Figure 3).

¹²"But if [the tenor] descends from *e* to *d*, or at another similar place, the organum must not make *k l* because it is a minor sixth. But if we wish to do [this], it is necessary to raise *k* if we ascend from the lower part [to a higher] note, or to sustain [*e*] if we descend from the higher note [to the lower note--that is, from *c* to *b*]." Ibid., 52.

But other practicing musicians say: "If this [tuning of the note between *g* and *h*] were to be made, the diapente *e-square* _ would not have an intermediate third [*g#*]," which is a major [third] in relation to the lower [note] and a minor [third] in relation to the upper [note], as we have said in the second part, the third treatise [in the chapter] concerning composition.

But this is not an obstacle, because when that [harmony] of the Phrygian is aroused, it does not matter if it lacks the intermediate third, or if the major [third] is established in relation to the upper [note] and the minor [third] is established in relation to the lower [note].¹³



or instead of



Figure 3. Ramos's Alternatives to the Traditional Burgundian Cadence

Lindley, however, translates the passage related to Burgundian alternatives in the following manner:

Now other practitioners say [that] in this arrangement *B* and its fifth do not have the intermediate third [*D#*] major to the lower note [*B*] and minor to the upper [*F#*]. But that is no obstacle, because in a Phrygian [cadence] it does not matter if that third is missing or if the third placed there is a major third to the upper note and minor to the lower [i.e., *D_*].¹⁴

¹³Ibid, 80.

¹⁴Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 48.

The fifth to which Ramos's discussion is directed concerns $E-B_{\flat}$, not $B-F^{\sharp}$ as is stated by Lindley. It is possible that Lindley's error results from a misunderstanding of Ramos's literary style. In the phrase "*diapente e-quadro*," Lindley translates the Latin "e" ("from," or "out of") followed by the letter b (\flat) as "B and its fifth," i.e., $B-F^{\sharp}$. Ramos, however, does not employ the word "e" in the sense of "from" in any part of the treatise; rather, Ramos uses the word "ex" to render this meaning.¹⁵ Further, Ramos makes absolutely no mention of the pitch name F^{\sharp} in this passage. One may argue that a literary preposition should occur before the pitch E , but Ramos rarely uses a preposition before such a letter that represents a pitch; rather, the reader must insert this preposition for himself. Ramos is not, as Lindley believes, referring to a cadence (in modern terms) of V-i in E minor,¹⁶ nor is Ramos referring to the major third above B (D^{\sharp}), for he has already demonstrated in preceding paragraphs that the pitches $B-D^{\sharp}$ (E_b) will be acoustically unacceptable. Rather, Ramos is emphasizing that the pitches $E-G^{\sharp}$ will result in intonation problems and that

¹⁵In Part 1, Treatise 1, Chapter 2, Ramos uses the word "e" in the phrase "*e regione*" ("in a straight line"). This is an idiomatic phrase and does not serve to support the argument of "e" as a typical component in Ramos's Latin style usage.

¹⁶See Lindley's Example 1, 47.

such a concord should be avoided whenever his tuning method is employed.¹⁷ Ramos assumes that the reader knows exactly what he means; singers are to avoid *D#* and *G#* whenever they choose to implement his division of the monochord.

This interpretation of the passage relating to Burgundian alternatives is verified by the subsequent paragraph in the *Musica practica*:

But some [people], wishing to satisfy both parts, insert another string between the third *b* [*ab*] and *h*, which they make distant from the third *b* [*ab*] by the space of a comma. Nevertheless, this is not praised on account of this: because then it would be another mixed genus rather than the simple diatonic [genus].¹⁸

Here, Ramos notes that one solution to the concerns posed by the lack of *G#* is to insert an additional string between *ab* and *h*. Lindley makes use of this passage in an attempt to substantiate his hypothesis that Ramos was an advocate of meantone temperament. Although it is true that additional strings were occasionally employed on keyboard instruments to split certain black keys that would have otherwise produced unacceptable intonations, and while it is also true that the use of split keys was a manifestation of meantone temperament, Ramos clearly instructs against

¹⁷This error also appears in Barbour's *Tuning and Temperament*, 92. Such a mistake is understandable due to the fact that Ramos leaves out the necessary nouns and pitch names that would help to clarify his meaning.

¹⁸Ramos de Pareia, *Musica practica*, 80.

this approach based on the fact that it results in another mixed genus rather than the simple diatonic genus.

Lindley again misinterprets Ramos's comments concerning Tristan de Silva's endorsement of an extra string inserted between F and $F\#$ that would serve to introduce Gb to the gamut. Having supplied yet another faulty translation--one clearly taken out of context with the blatant omission of a section that is necessary for its correct understanding--Lindley concludes that Ramos is of the opinion that the extra string proposed by de Silva is "pointless," and that Ramos prefers to split $Ab/G\#$:

Now my friend Tristan de Silva used to say that another string should be inserted between F and $F\#$. From this intermediate third we gain not utility, but discrepancy and discord in the whole system, since neither another natural nor an accidental of another type [i.e., a flat] is to be gained by this means. But enough on this point. (However, the first proposal is better proof of which in another volume I shall explain with very firm mathematical reasoning.) But now with an epilogue to the above I shall end this work.¹⁹

Lindley's interpretation is nothing short of a manipulation of the original text; it serves to support Lindley's argument that Ramos was an advocate of meantone temperament.

First, Ramos states that de Silva's solution is erroneous, and that he, Ramos, accepts neither the addition of the string between F and $F\#$ nor the addition of the

¹⁹Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 51.

string between *Ab* and *A*. Second, an accurate translation of the passage clearly demonstrates a view quite opposed to the one advanced by Lindley:

But our friend Tristan de Silva used to say that another string should be inserted between *f* and the second *_* [*f*♯]. And thus he claimed to have discovered it by means of the numbers themselves. Indeed, we believe that the error will appear to him just as [the error] that *gamma*--a note which was added by our [predecessors]--would someday be treated as *proslambanomenos*. Therefore, we do not believe that the latter [the string between *F* and *F*♯] nor the former [the string between *Ab* and *A*] should be admitted in our diatonic genus. For then we would fall into that error which we have read Timotheus of Miletus fell into--according to the testimony of Boethius--namely, that he converted the diatonic genus into the chromatic (which is better). [And] on account of this, the Lacedaemonians of Laconia cast him out of the city, since he was harming the souls of the young boys which he had accepted for the purpose of teaching, and by deviating from the moderation of virtue toward softness, he was producing effeminate [young men]. Therefore, that intermediate third does not bring usefulness as much as it advances discrepancy and discord in the entire order, since, as the masters say, by this means it may not be arranged according to the natural [order] nor according to another accidental order. But enough concerning these things. Nevertheless, they will better perceive [the concepts] of the first [volume], whose truth we will explain in the following volume with the firmest numerical calculations. But now, let us put an end to this work by continuing [with] the epilogue mentioned above.²⁰

One might assume that Lindley's omission of the significant text concerning Ramos's rejection of the extra strings can be attributed to differences between the A-80 and A-81 editions; for the missing section of text that would destroy Lindley's argument may only be found in the

²⁰Ibid., 80-81.

A-81 edition of the *Musica practica*. An examination of Lindley's article, however, reveals that Lindley possessed and relied largely upon Johannes Wolf's modern reprint of the *Musica practica*; this reprint includes the text for both the A-80 and A-81 editions.²¹ Further, Lindley's translation of the last portion (referring to the discrepancy and discord brought about by the intermediate third) reveals that he did indeed have A-81 in his possession,²² for this portion of text only appears in the A-81 edition. By means of this evidence, one can only conclude that Lindley had access to the A-81 edition, but chose to omit this important passage because it undermines his hypothesis of meantone temperament.

Conclusion

Twentieth-century musicologists have attempted to categorize Ramos's monochordal division as either a form of meantone temperament or of just intonation. Clearly, Ramos's tuning does not fall under the generally accepted definition of meantone temperament. Although meantone temperament is similar to just intonation with respect to the employment of pure major thirds, meantone temperament

²¹See Lindley, "Fifteenth-Century Evidence for Meantone Temperament," footnotes 3, 4, 5, 8, 9, 25, 27, and 42. See also Wolf, ed., *Musica practica*, 102.

²²See Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 51.

is based upon the tempering of fifths (by one-fourth of a syntonic comma) and upon the utilization of equal-sized whole tones.²³ Lindley's assertion that a form of meantone temperament is proposed in the *Musica practica* is without merit; Ramos advocates the use of ten pure fifths and two different sizes of whole tones (9:8 and 10:9). Admittedly, Ramos accepts two impure fifths (*G-D* and *C#-Ab*) rather than the single wolf fifth that was indigenous to most tuning systems of the fifteenth century, but this single inconsistency is hardly sufficient to label Ramos as a proponent of meantone temperament. Further, Ramos advises against the use of split keys--a salient feature of meantone temperament--because he strongly discourages the use of different strings for enharmonic pitches.

Several musicologists, including François Fétis, have assumed that Ramos was an advocate of equal temperament.²⁴ Ramos, however, did not believe that enharmonic spellings could be acoustically equivalent and, therefore, the argument that Ramos was an advocate of equal temperament must be rejected.

The tuning method proposed by Ramos results in a temperament that is more conducive to some keys than to

²³The first true discussion of meantone temperament appears in Pietro Aaron's treatise *Thoscanello* (1523).

²⁴Fétis, *Biographie Universelle des Musiciens*, 178.

others; such a factor could lead one to conclude that Ramos's tuning was actually a type of irregular temperament. While irregular keyboard temperaments were more prevalent during the late seventeenth and early eighteenth centuries, Ramos's monochordal division does indeed contain characteristics inherent to irregular temperament.

Irregular keyboard temperaments generally require that the more frequently used thirds are tempered to a lesser degree than the thirds that are employed less frequently, and that not all fifths have the same ratio. Ramos himself proposes the use of three different sizes of thirds, which results in a temperament where certain key signatures are more "in tune" than others. Ramos's method cannot be classified as irregular temperament, however, because the purpose of re-tuning the fifths in irregular keyboard temperaments is to eliminate the wolf fifth; the wolf fifth is a salient feature of Ramos's system.²⁵

Barbour's description of Ramos's method as "an irregular tuning, combining features of both the Pythagorean tuning and just intonation"²⁶ may be the best

²⁵The first published description of irregular temperament within a complete chromatic tuning appeared twenty-nine years after the publication of the *Musica practica*. See Arnolt Schlick's *Spiegel der Orgelmacher und Organisten* (1511).

²⁶Barbour, *Tuning and Temperament*, 4.

description to encompass the intricacies of Ramos's tuning system. Ramos's system not only provided the practicing musician with a simpler division of the monochord, but allowed for a greater number of pure intervals and triads whenever the division was utilized in certain key signatures.²⁷

A examination of Ramos's monochordal division and his comments about this division in the *Musica practica* reveal his true intentions. Ramos did not propose his tuning with the intention of abolishing the Pythagorean ratios; for these ratios figure predominantly in his proposed monochordal division. Rather, Ramos offered his tuning system as a refinement to Pythagorean tuning in order to meet the demands of the fifteenth-century practicing musician. The result of Ramos's modifications to the Pythagorean system was a tuning that greatly increased the number of pure intervals, thus improving intonation, and profoundly influencing the future development of instrumental tuning.

²⁷Although Ramos's tuning results in unacceptable major and minor triads on *G* (an audible *faux pas* that is difficult to dismiss), an examination of Ramos's monochordal division reveals the existence of several pure triads that fall within the common key signatures employed during this period, i.e., the three pure major triads of *C-E-G*, *F-A-C*, *Bb-D-F* and the three pure minor triads of *A-C-E*, *D-F-A*, *E-G-B*. Furthermore, there are several other triads in Ramos's tuning that would likewise find acceptance among the advocates of Pythagorean tuning as well as in the circles of the fifteenth-century practicing musician.