

**ADDENDA ET CORRIGENDA OF THE DOCTORAL THESIS “A NEW CHEMISTRY OF SOUND” BY RITA TORRES<sup>i</sup>**

updated: 13.2.2017

VOLUME 1				
Page(s)	Location		Original text	Text should read / now reads
vii	Paragraph 6	-	[ <i>non-existent</i> ]	Mauricio Carrasco, Oriol Saladrígues, Martín Vishnick
		Line 2	Nicolas del Grazia Santiago, Martín Devoto, Díez-Fischer	Nicolas del Grazia, Martín Devoto, Santiago Díez-Fischer
xi / ...	Line 2 / ...		Fantasia	Fantaisie
2	Line 2		spaced, which	spaced, and the distribution of the intervals does not present a pattern, which
3 / ...	Line 6 / ...		number [when referring to a written representation]	numeral
15	Subsection 2.1.4, line 2		single string	single (portion of a) string
36	line 9 from page end		to be a “textural instrument”	is a “textural instrument”
44	Paragraph 1	lines 1-2	timbral possibilities. It changes, however, the identity of the sounds that are more limited in colour,	perceived timbral possibilities (apart from overcoming the guitar's weak projection problem). It changes, however, the identity of the sounds,
		after final mark	[ <i>non-existent</i> ]	This loss is compensated if amplification enriches the perceived timbre.
45-46	Subsection 2.3.1, last three lines of p. 45 and line 1 of p. 46		In a document for non-guitarist composers, <sup>88</sup> Andia (1983) was possibly the first to apply the term <i>multiphonic</i> on the guitar technique. However, he only uses it in regard to the possibility of using an extremely light pressure at conventional harmonics locations (see section 2.3.2):	In a handout for non-guitarist composers, <sup>88</sup> Andia (1983) was possibly the first to apply the term <i>multiphonic</i> to a guitar technique. This technique is, however, different from that under research here, because the string is excited twice (in the second time it is excited at the touch location with the touching finger), and only works at a few locations; the perception of the sounds is, however, similar:
47	Subsection <i>Gimeno – Los Armónicos ...</i> , title		Los Armónicos en la Música para Guitarra <sup>ii</sup> ]	Armónicos
48	Paragraph 1, last line		multiphonic harmonic studies ...	“multiphonic harmonic studies” ... . In a section on amplification, Vishnick suggests microphone locations for multiphonics without elaborating any further (p. 325).
50	Line 2 before <i>Artistic literature</i>		Finally categorising	Finally, categorising the sounds according to different descriptors
52	Paragraph 2, line 2		between frets	between consecutive frets
53	Lines 7 and last			
57	Line 6 from page end		two sounds, which are	one sound, which is
63	Line 9		1998	1988
66	Last line		or increasing the partial cover of their (smaller)	or increasing the partial cover of, their (smaller) loops
67	Line 4 from page end		what was stated above remains true	the distribution of the (now unequal) intervals between frequencies of neighbouring components still presents a pattern.
68	Line 10		out. Attempting	out. The systematic non-excitation of v.ms. does not change the character of the spectrum, as the unsystematic filtering already gives rise to a sound in which the frequencies of neighbouring components are not all equally spaced, and the distribution of the intervals does not present a pattern. Attempting
	Line 13		spaced.	spaced, and the distribution the intervals does not present a pattern.

<sup>i</sup> Torres, R. (2015). *A new chemistry of sound: The technique of multiphonics as a compositional element for guitar and amplified guitar*. Universidade Católica Portuguesa.

<sup>ii</sup> This title is the title of an online version of the encyclopaedia entry, which was accessed before the original version (<http://guitarra.artepulsado.com/guitarra/armonicosjulio2011/armonicosjulio2011.html>)

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Page(s)	Location	Original text	Text should read / Now reads	
69	Line 4	r.l.ds. and higher excitation strengths	r.l.ds. at the touch location and higher excitation degrees	
72	Lines 10-11	the string displacements	the string’s displacement	
73	Paragraph 2, line 1	of the sounds	of most sounds	
75	Line 5	when the	when playing multiphonics and the	
	Section 3.1	Line 1	string 6	string 6 – the lowest string, thus that offering the broadest spectral possibilities –
		Lines 4-8	Apart from the determining ... in live performance.	The influence of amplification on the audibility of the sounds’ weaker main partials was determined by evaluating the sound’s main partials and their relative loudness. This data was also used to determine the feasibility of multiphonics and, along each main partial’s reliability, the reliability of the sounds, in order to know the suitability of each location for live performance (under the playing conditions of the experiment).
78	Footnote 132	The r.d. of a v.m.’s closest node from the location is then half of the value of the v.m.’s r.l.d. at the location.	The r.d. of the closest node to a location is then half of the value of the r.l.d. at the location of the lowest v.m. sharing the node.	
79	Lines 5 to 3 from page end	all nodes are also at an r.d. from the location of 20% or over therefrom. V.ms. with a node at an r.d. ... higher than 20% (i.e. v.ms. with an r.l.d. of 40%) should then	all other main nodes are also at an r.d. of over 20% therefrom. Therefore, the v.ms. whose closest node to the touch location is at a distance therefrom of over 20% of their loop length (i.e. v.ms. at an r.l.d. of 40%) should	
83	Line 4	string.	string (half-tone lower).	
	Sorting and statistics, last line	discarded).	discarded). Non-predicted main partials with a relative loudness (see <i>Relative loudness of each main partial</i> ) higher than -10 phon in t.s. 1(their main nodes are at a greater distance, for which they decay rapidly) were also sorted in more guitars than the majority, as otherwise they were considered not representative.	
84	Line 4 from page end	respectively. Very soft	respectively. Considering that equal loudness curves are for pure and isolated tones, and partial masking is not taken into account, these distances should be lower. Very soft	
85	<i>Feasibility of multiphonics</i> , lines 2 to 10	played multiphonics right after the attack. This was assumed to have taken place when the r.l. in t.s.1 of at least one main partial ... of the sounds at type-A locations. Since the reference touch pressure was lighter than the usual pressure in harmonics, the v.ms. with nodes at the smallest r.d. from type-A locations were not always damped out during excitation, but, instead, during the touching (which is quite short for our auditory system to single the partials out). The r.l.s. of some of the main partials of the sounds at locations of type B and C should, nevertheless, be higher r.l.s. than those non-predicted partials, since the nodes of	played multiphonics. This was assumed to have taken place when the r.l. in t.s.1 (at the microphone in front of fret XII) of at least one main partial (other than the l.m.p.) is higher than the highest r.l. of non-predicted main partials of the sounds at type-A locations. This criterion is based on the following: since the reference touch pressure was lighter than the usual pressure in harmonics, the v.ms. with main nodes at the smallest r.d. from type-A locations should not have always been damped out during excitation, having, instead, been damped out during the part of the touching thereafter (which is quite short for our auditory system to single the partials out). The r.l.s. of some of the main partials of the sounds at locations of type B and C should then be higher than the r.l.s. of those non-predicted partials, since the main nodes of	
	<i>Reliability of the sounds of multiphonics</i> , lines 3 and 4	playing of multiphonics right after the attack. This was because the damping out of partials with a lower r.l. should be less perceivable.	playing of multiphonics and have moderate or high reliability in the sample. Only this kind of partials was considered, because the damping out of partials with a lower r.l. should be less perceivable, and that of partials of lower reliability less significant. When a guitarist not was not successful in producing multiphonics at a location at which, in the sample, there are main partials (other than the l.m.p.) with moderate or high reliability, he/she was considered to have produced reliable sounds.	

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92	<i>Technique feasibility degrees</i> , line 2	-10 phon. A guitarist	- 10 phon. They also show that the r.l. of those partials in t.s. 2 is -40 phon or lower, which corroborates the assumption that partials with such an r.l. are not perceivable. A guitarist
93	Figures 3.5 and 3.6, caption, line 1	average analysis data	relative amplitude mean and standard deviation (y axis) and their corresponding relative loudness values (relative amplitude against the normalized equal loudness curves) of the main partials (x axis) of the sounds
	Figure 3.6, line 2	(M1)	(M1). The symbols differentiate the number of guitars in the data of which a partial was detected
	Section 3.2, line 3	<i>tremolato</i> in	<i>tremolato</i> when sounds of multiphonics are to be played in
95	Lines 13-16	The sounds chosen for the flashes' pulses are the highest-pitched component of the (soft) tones that result from striking a string with a plectrum (the string needs then to be muted on its nut side). The tones on this side of the string	The kind of sounds chosen for the flashes' pulses is that produced by the string portion resting on the bridge when the string is struck with a plectrum (the other portion of the string needs then to be muted). The (soft) tones on this portion of the
97	Line 2 from page end	lower strings	highest-pitched strings
99	Fig. 3.7, caption, lines 2-3	Only one flash was	Only two flashes were
101	Lines 10-11	of the guitar ... based on which the most piece	of the traditional tuning of the guitar ... based on which the most of the piece
104	Subsection <i>Main partials</i> , line 2	both. Players	both. The notation of main partials with frequency values does not seem appropriate, due to the possible variations in tuning and the inharmonicity of the higher partials, which depends on the string's specifications. Players
107	Subsection 4.1.1, line 8	excitation strength (four times higher than all other v.ms.) is then approximated at a lower r.d. by the amount	excitation degree (which is at least about four times higher than all other v.ms.) ... is then approximated at a lower r.d. by the degree
	Last two lines	amount of damping ... excitation strength	degree of damping ... excitation degree
108-9	lines 2 and 1 from end of p. 108 and line 1 of p. 109	those v.ms. are more prone to damping with ... enough strength to give rise to loud partials. The higher v.ms. are also more prone to	if both those kinds of v.ms. suffer even greater damping, due to an increase of the touch pressure or a slight deviation from the touch location, their degree of excitation is thereafter certainly not enough to give rise to loud partials; the higher v.ms. suffer also greater
108/9	Tables 4.1-4.4	(a shading flags a majority)	[ <i>this should be located after the last word of the caption (since it refers to the shadings of the percentage values)</i> ]
114/15	Tables 4.9-4.12		
109	Line 4	10	11
110	Table 4.5, caption	with	at which the technique of multiphonics has
111	Lines 4-6 / Lines 7-9	a v.m. higher than ... / a v.m. at a higher ...	a v.m. higher/lower than v.m. 11 with a main node at a smaller/greater r.d. from the location than a main node of the v.ms. up to v.m. 11 gives rise to partial strong enough to compete with the partials given rise by those v.ms.
	Lines 5-4 from page end	is, on the opposite side ... of v.m. 9	is at the same distance from the location as a main node of v.m. 9 on the opposite side
112	Line 2	of this	of the other
	Section 4.1.4, line 8	are more prone to	suffer greater
115	Lines 2-3	With amplification, it should only be also possible to play harmonics	With amplification with close microphone placement, it should only be also possible to obtain sounds of harmonics

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116	Line 5	depends on the degree of excitation	depend on the loop displacement at the location	
	Line 10	reliability	detection	
	Lines 7-4 from page end	in t.s. 1 it is possible to play sounds with up to nine loud moderately or highly reliable main partials, in t.s. 2 the maximum number	the sounds in t.s.1 have up to nine loud main partials with moderate or high detection, the maximum number	
118	Table 4.14	VI+	27	27 [typed in grey]
		IX.5	17	17 [typed in grey]
		XV-	2	2 [typed in grey]
119	Table 4.15, various locations	[various numerals]	[as in the last page of this attachment (the very soft partials were typed in black)]	
123	Line 1	when the	when playing multiphonics and the	
126	Lines 2-3	pressure. The amplification	pressure; (d) the technique of multiphonics is employed at usual harmonics locations. The technique of multiphonics differs acoustically from that of harmonics in the way the vibrational modes (v.ms.) are filtered. With respect to mode number, the filtering is systematic in harmonics and unsystematic in multiphonics. Therefore, the distribution of the intervals between frequencies of neighbouring components does not present a pattern in multiphonics, which makes easier the perception of multiple pitches. The amplification	
127	Line 4	location of its corresponding	location of the closest node of its corresponding	
	Line 11 from page end	attributes	descriptors	
	Line 2 from page end	revealed through	revealed to an audience through	
135	Gimeno, J. (2011)	Los armónicos en la música para guitarra. ... <i>Suplemento</i> (pp. A49-A83).	Armónicos. In F. Herrera (Ed.), <i>Enciclopedia de la guitarra: Biografías, danzas, historia, organología, técnica</i> (Suplemento, pp. A49-A83).	
155	Line 3	and all takes lasted 1 s	and each sound's decay lasted about one second in all takes	
157	Line 5	contrary. A black	contrary. A “x” means that data is not available, and a “-” means that the evaluation is not applicable. A black	
	Table, XVIII.5, Reliability, G5	-	0	
163	Table	[values in grey background typed in grey]	[typed in black]	
<b>VOLUME 2</b>				
Location	Original text	Text should read / Now reads		
Introduction, line 6	(M). When	(M). In each graph, the partial number is plotted in the x axis. The relative amplitude mean and standard deviation are plotted in the y axis, and their corresponding relative loudness values are obtained by reading those values against the normalized equal loudness curves. In the sample's graphs, the symbols differentiate the number of guitars in the data of which a partial was detected, being the correspondence explained in each page of that kind. When		
Score, The fireflies..., pp. 2 and 3	VIII <sub>+1/6</sub>	VIII <sub>+1/4</sub>		

**Table 4.15.** Number and relative loudness category at t.s. 2, of the main partials with moderate or high reliability of the sounds of multiphonics at the investigated locations

Relative loudness category correspondence with number formatting: bold underlined: loudest main partial; bold – loud; normal – moderately loud; italic – soft; grey – very soft; parentheses – not perceivable. \* moderate or lower technique feasibility; \*\* moderate or lower sound reliability

Loc.	Main partials	Loc.	Main partials	Loc.	Main partials
0.5	sounds not reliable	V.5	<b>4, 7, <u>11</u>, 15, 18</b>	XII+	technique not feasible
I--**	<b><u>1</u>, 23, 25</b>	VI--	3, 4, <u>7</u> , 11, 15, 18, 25	XII.5*	sounds not reliable
I-*	1, (18, 19), <b>20, <u>21</u></b> , 22, 23	VI-	3, 4, <u>7</u> , 10, (11), 18	XIII-*	<b><u>2</u></b> , (19), 23
I	1, (15), <b>16, 17, <u>18</u>, 19</b> , 20	VI	3, <u>7</u> , <b>10</b> , 17, 24	XIII	<b><u>2</u></b> , (13), 15, 17, (19), 21
I+	(13), 14, <b>15, <u>16</u></b> , (17, 18)	VI+	3, 7, <b>10</b> , 13, 17, 23	XIII+	<b><u>2</u></b> , 11, <b>13, 15</b> , 17, (19)
I++	(11), 12, <b>13, <u>14</u></b> , 15, (16), 25, 27	VI++	<b><u>3</u></b> , 7, 10, <b>13</b> , 16, 23	XIII.5	2, (9), 11, <b>13</b> , 15, 24
I.5	10, 11, <b>12</b> , 13, 25	VI.5	<b><u>3</u></b> , 10, 13, <b>16</b> , 19, 22	XIV-	2, (7), 9, <b>11</b> , 13, 20
II--	9, 10, <b>11</b> , 12, (13), 21, 23	VII--	<b><u>3</u></b> , 10, 16, 19, 22, 25	XIV	2, 7, <b>9</b> , 11, 16, 20
II-*	9, <b>10</b> , 11, 19, 21	VII-*	sounds not reliable	XIV+**	2, 7, <b>9</b> , 11, <b>16</b> , 25
II	8, <b>9</b> , <b>10</b> , 17, 19	VII	technique not feasible	XIV.5	2, 5, <u>7</u> , 9, 16, 23
II+	<b>8, 9</b> , 10, 17, 25	VII+*	sounds not reliable	XV-**	5, <u>7</u> , (9), 12, 16, 19
II++	7, <b>8</b> , 9, 15, 17, 23	VII.5	<b><u>3</u></b> , (8), 11, <b>14</b> , 17, 20, 23	XV	5, <u>7</u> , 12, 17, 19, 26
II.5	<u>7</u> , <b>8</b> , 15, 22, 23	VIII-	<b><u>3</u></b> , 8, <b>11</b> , 14, (17), 25	XV+	<b><u>5</u></b> , 7, <b>12</b> , 17, 19
III--	6, <u>7</u> , (8), 13, 15	VIII	3, 5, <b>8</b> , <b>11</b> , 13, 14, 19	XV.5	<b><u>5</u></b> , (7), 12, 17, 22
III-	<b>6, 7</b> , <b>13</b> , 19, 20	VIII+	3, 5, <b>8</b> , 11, 13, 21	XVI-*	<b><u>5</u></b> , (12, 17)
III*	<b><u>6</u></b> , (7), 13, 19, 25	VIII.5	3, <b><u>5</u></b> , 8, <b>13, 18</b> , 21, 23	XVI *	<b><u>5</u></b> , (8, 13, 23)
III+*	(5), <b><u>6</u></b> , (13, 17)	IX-*	(3), <b><u>5</u></b> , (8), 13, (18, 23)	XVI+	<b><u>5</u></b> , (8), 13, 18, 23
III++	5, <b><u>6</u></b> , 11, 17, 23	IX*	<b><u>5</u></b> , (12), 17, (22)	XVI.5	<b><u>5</u></b> , 8, <b>13</b> , 18, 23
III.5	<b><u>5</u></b> , 6, <b>11</b> , 16, 17, 21, 27	IX+	<b><u>5</u></b> , 7, 12, 17, 22	XVII-	3, 5, <b>8</b> , <b>13</b> , 18, 21
IV--	<b><u>5</u></b> , (6), 11, 16, 21	IX.5	5, <u>7</u> , <b>12</b> , 17, 19	XVII**	3, 5, <b>8</b> , 11, 13, 19, 21
IV-*	<b><u>5</u></b> , (6, 11, 16)	X-	5, <u>7</u> , 9, 16, 23	XVII+**	3, 5, <b>8</b> , 11, 14, 19
IV*	(4), <b><u>5</u></b> , (9), 14, 19, 24	X	2, <u>7</u> , <b>9</b> , 11, <b>16</b> , 23, 25	XVII.5	3, 5, <b>8</b> , <b>11</b> , 14, 17, 19
IV+	4, <b><u>5</u></b> , 9, 14, 19, 23	X+**	2, 7, <b>9</b> , 11, (13), 16, 20	XVIII-	<b>3</b> , 8, <b>11</b> , 14, 17, 25
IV++**	4, 5, <b><u>9</u></b> , 13, 14, 22, 23	X.5	2, 7, 9, <b>11</b> , 13, (15), 20, 24	XVIII	<b><u>3</u></b> , (8), 11, <b>14</b> , 17, 20, 25
IV.5	4, 5, 9, <b>13</b> , 17, 22	XI-	2, 9, 11, <b>13</b> , 15, (17)	XVIII+	<b><u>3</u></b> , (11), 14, 17, 20, 23
V--	<b><u>4</u></b> , (5, 9), 13, 17, 21, 25	XI	<b><u>2</u></b> , (11), <b>13</b> , <b>15</b> , 17, (19)	XVIII.5*	<b><u>3</u></b> , 14, 17, 20, 23
V-*	<b><u>4</u></b> , (9, 13)	XI+	<b><u>2</u></b> , (15), 17, 19, 21, 23	XIX-*	sounds not reliable
V	technique not feasible	XI.5	<b><u>2</u></b> , 23, 25	XIX	technique not feasible
V+	<b><u>4</u></b> , 15, 19, 23	XII-*	sounds not reliable		
V++	<b><u>4</u></b> , 7, <b>11</b> , 15, 19, 23, 26	XII	technique not feasible		