## *ADDENDA ET CORRIGENDA* OF THE DOCTORAL THESIS “A NEW CHEMISTRY OF SOUND” BY RITA TORRES[i]

updated: 12.8.2019

| **VOLUME 1** | | | | |
|---|---|---|---|---|
| **Page(s)** | **Location** | | **Original text** | **Text should read / now reads** |
| vii | Paragraph 6 | - | *[non-existent]* | Mauricio Carrasco, Oriol Saladrigues, Martin Vishnick |
| | | Line 2 | Nicolas del Grazia Santiago, Martín Devoto, Díez-Fischer | Nicolas del Grazia, Martín Devoto, Santiago Díez-Fischer |
| xi / … | Line 2 / … | | Fantasie | 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 | *[non-existent]* | 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,[88] Andia (1983) was possibly the first to apply the term *multiphonic* 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,[88] Andia (1983) was possibly the first to apply the term *multiphonic* 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 *Gimeno – Los Armónicos* …, title | | Los Armónicos en la Música para Guitarra[[ii]] | 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 *Artistic literature* | | 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. |

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

[ii] 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 – |
| | Section 3.1, 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 *Relative loudness of each main partial*) 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 | *Feasibility of multiphonics*, 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.ls. of some of the main partials of the sounds at locations of type B and C should, nevertheless, be higher r.ls. 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.ls. of some of the main partials of the sounds at locations of type B and C should then be higher than the r.ls. of those non-predicted partials, since the main nodes of |
| | *Reliability of the sounds of multiphonics*, 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 | *Technique feasibility degrees*, 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 | *tremolato* in | *tremolato* 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 *Main partials*, 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 |
| | Lines 3 and 6 | Sabat and Sabat | Sabat and von Schweinitz |
| 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) | [*this should be located after the last word of the caption (since it refers to the shadings of the percentage values)*] |
| 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 |

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|---|---|---|---|
| 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 |
| 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]* |
| | Table 4.14, IX.5 | 17 | 17 *[typed in grey]* |
| | Table 4.14, XVI- | 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.<br>The amplification | pressure; (d) the technique of multiphonics is employed at usual harmonics locations.<br>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. … *Suplemento* (pp. A49-A83). | Armónicos. In F. Herrera (Ed.), *Enciclopedia de la guitarra: Biografías, danzas, historia, organología, técnica* (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]* |

**VOLUME 2**

| 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$_{+1/6}$ | VIII$_{+1/4}$ |

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