In 1555 an important book was published in Rome: *L'antica musica ridotta alia moderna prattica* ... , Nicola Vicentino's *trattato*, which stated the level of research on the Greek *genera* according to the musicological views of the author, and proposed the practical use of these *genera* on a special instrument expressly designed for this purpose, the Archicembalo. This work caused extraordinarily intense polemics among musicologists from Vicentino's lifetime to the beginning of the eighteenth century. All this proves how lively the interest was in some aspects of organology, although more recent musicologists have undervalued the role of theoretical interest in the musical reconstruction of Greek *genera* as well as the practical importance of an instrument belonging to the Archicembalo type. Since some pieces of evidence show that the musicology and also the music of the Renaissance were based on the revival of Greek musical theories, it seemed necessary to me to experiment on an actual instrument if deeper and more precise knowledge about this kind of music was to be reached. Besides the necessary bibliographical researches, studies on Archicembalo-designed instruments were begun about 1968. First Vito de'...
Trasuntini's *Clavemusicae Omnitonum* was examined in detail. As the instrument has been out of use, practice on an Archicembalo required the reconstruction of a proper instrument. From the various instruments for which details existed, Vicentino's Archicembalo was chosen as probably the first Archicembalo designed in Renaissance times. Vicentino's *description of the Archicembalo* in the fifth book of the *prattica musicale*, Vicentino gives a detailed description and some measurements for making the instrument. The original description can be summarized and literally translated as follows: Chapter I - Preface to the fifth book of the musical practice of Don Nicola Vicentino, about the practice of the instrument which he named Archicembalo. 'So that students of the *prattica musicale* may be attracted to studying, playing and learning to compose on the Archicembalo, the first and most perfect instrument, since it lacks no consonance, I made the new *prattica* of chromatic and enharmonic music with some examples ... and I made drawings to make the instrument, with measurements of lengths, heights and widths, giving a plan of all the keys in their six orders with the pattern of the upper part in which the holes for the jacks are seated, which pluck the strings with their quills. I also give their measurements, and the positioning of the iron pins round which the strings are rolled (wrest pins), and the bridge upon which the strings are laid, and with the measurements of the rose which has to be pierced through, and how far it must be from the keyboard which appears out of the instrument.' Vicentino keeps referring to some peculiarities of the sound of the instrument with regard to many kinds of intervals, notes, examples and consonances. 'And how the performer can pass from one order to another: and the defects in the scaling of lutes, viole d'arco and other instruments are discussed, mentioning the namings of every key, which, when referred to its orders, suffers from its great imperfection. Students must not spare efforts to obtain such a rare and marvellous musical experience, which will make them renowned ... as the usual art of playing at this time is almost the same for every performer, and all performers progress in the same way and on the same keys ... except for different speeds ... but nobody plays on keyboards which are different from each other. Then our keyboard without imperfections will give fame to the student ... who will be praised by everybody as musico rarissimo et perfetto.' Chapter II - Description of the length, width, height and all the measurements, which are needed for making the Archicembalo, with drawings. After saying that drawings and measurements are quite sufficient for a skilled craftsman to make the Archicembalo easily, Vicentino describes both keyboards as laid on a single frame and removable from the instrument. The upper keyboard would have some keys pierced through, to allow the passage of some long jacks. In the first (lower) keyboard there are 69 jacks, and 63 in the second (upper) one. Altogether the jacks, which have to serve all the keys are 132. Thus the student or the craftsman
DELLA PRATTICA MUSICALE.

Dimostrazione della longhezza, & larghezza, & altezza di tutte le misure che occorrano a formare l'archicembalo, con il documento. Cap. II.

Nofra perpetua memoria, & acciò che resti nel mondo un fermo masso a gli presenti, & posteri, ho deliberato di farlo stampare il disegno della forma dell'archicembalo, con le presenti & sotto scritte linee, che furono le misure che in seguito furono a ogni Pratico di fare si convenga, formare il fusi sopra detto Archicembalo con facilità; & oltre le misure delle linee, sarà pia a desiderare del disegno delle due fabbriche, più volte con le misure giuste, che non occorrerà all'operatore si non integrar quelle sopra il legno con poca fatica di misurare, perché consegnerà infine i fusi della prima fabbrica, e formarà il primo telaro, il quale si metterà in un pezzo, & il secondo telaro sarà mobile, & si causerà fuore & si inmetterà sotto a muovere la taffi, come il primo; & questa seconda fabbrica sarà formata per cagione di alcune fustelleri longhe, che presso di sotto si veggono in luoghi in dette fabbriche. & questa seconda fabbrica sarà in altri sugli, che si incomincia formarono la fabbrica a questo; & appare che si faranno fustelleri altre fustelleri, che barreranno la superficie bucata di fustelleri del coperchio, messi rati con giglio, & giuste, perché la fabbrica del register è tutta l'importanza del strumento, per accomodare le corde a fustelleri; & la prima fabbrica di raccordare il secondo, che hanno da fessure a tutti i teloli, i quali furono tutti 132, fustelleri. Finito lo Studente qui di Operare, quando verrà principio a formare il predetto strumento, sarà necessario che prima elegga il legname impropriato che sia buono & fermo, che sia di molta forza fisica, & che in questo tempo è fess, & che possa muovere & sopra quel parte dell'armonia, sotto a muovere il sole, quella parte sarà migliore, & poterlo effettuare in modo che possa cimentare esso strumento, & poi quel largo porterà la misura della longhezza, che sarà la flessa fatta linea, la quale entrerà al'interno nella predetta longhezza del strumento, & ancora la medesima entrerà oltre nella larghezza del strumento.

E così dimostrò tutte le misure con le linee, con la dichiarazione sopra di esse.

Linea che entra due volte nella profondità, o altro altezza del strumento.

Linea dell'altezza delle superficie fino al coperchio, ove si reggono le chiavi, ove i grumi di ferro che tengono le corde, & questa medesima stessa dall'altezza delle prime fabbriche, ove primo telaro fino al piano basso del strumento.

Linea dell'altezza del morto del strumento, ove di quella parte che è dalle fonde di taffi.

Linea dell'altezza delle due fabbriche poste una sopra l'altra.

Linea che dimostra che l'immagine della voce di esser tattino da fustelleri, tanto quanto un ga due volte, e la medesima longhezza sarà e una volta opposti, la lunghezza detta del fuso.
making the instrument needs to select the necessary wood as suitable and dry, cut sometime beforehand. He who can know what part of the tree was facing the sun, should choose it as the best... The measurements of the instrument are shown in lines, mostly fractions of the real lengths. Length, 20 x 9.8 cm (196 cm); width, 8 x 9.8 cm (78.4 cm); height, 2 x 10.8 cm (21.6 cm); height from the lower surfaces
to the cover where the keys or iron pegs holding the strings are fixed, and the same measurements serve to measure the distance from the first keyboard frame to the lower plane of the instrument (missing), height of the dead part of the instrument or of the part beside both the margins of keys, 6.9 cm; height of the two keyboards laid one on top of the other, 5.3 cm; width of the space between the curved bridge and the bent side — it continues the same to the middle of the instrument and then it becomes gradually larger to the end of the instrument, 10.6 cm; length of the white keys of the first order, which appear out of the instrument, 6.9 cm; length of the black keys of the second order which appear out of the instrument, 3.9 cm; length of the black keys of the third order which appear out of the instrument, and these three orders are on the first frame, 2.1 cm; length of the white keys of the fourth order which appear out of the instrument, 6.2 cm; length of the black keys of the fifth order which appear out of the instrument 3.8 cm; length of the black keys of the sixth order which appear out of the instrument, and these three orders, i.e. the fourth, fifth and sixth ones are placed upon the second frame, which can be drawn out or put in easily as it is provided with two iron clasps fixed to the instrument, 2 x; height of the first black key laid on the first frame of the third order, these two orders of semitonia are assembled one on top of the other, when they come near together to simplify matters, 4.1 cm; widths of white and black keys are to be arranged according to the good judgement of the Master, and their lengths also, so that the player can run smoothly with his fingers over them all, and comfortably reach the most distant keys of both keyboards with one hand ... As regards all the measurements the skilled Master has to make the instrument well so that it can be played easily. The lengths of the entire keys need not be given, for they are shown exactly in the drawing of the keyboard. Little pieces of lead are to be played at the ends of the longest keys so that they will come down faster, otherwise they will go slowly owing to their (greater) length. And a little piece of chamois leather has to be provided where the jacks hit the long part of the key, so that the jacks do not make a noise going down. And there are four holes near the centre of the frame, in which four iron rods are put to support the second frame, and every key has its own hole through which goes the iron peg (= balance pin) supporting it. The length of the first treble string which has to be twice as long, 2 x 15.8 cm (31.6 cm) length from the bridge to the first jack, 6.2 cm; distance of some holes for wrest-pins from the front wall (= name board) which hides the internal parts of the keys, to the instrument, 1.9 cm; length of the long jacks, 10.8 cm; length of short jacks, 7.2 cm; In the first order of jacks there are short and long jacks, the second order in the jacks will be of the same lengths. The frame will be pierced through, underneath the piercings in the keys. All the iron pegs will have some chamois leather (i.e. white female chamois) except those at the ends of the keys which have cloth (felt) so that they do not make a noise, and underneath all the jacks chamois leather is placed upon the wood. And the Master building the instrument will make the keys smooth and quick and noiseless, and the quills in the jacks will be soft and short to permit the placing of the strings; and above all good and perfect strings have to be fitted since bad strings make the instrument bad, and they have to be thin or thick for the first frame as much as for the second one, as there is little difference in pitch between the frames, i.e. half a minor semitone higher. The Master having followed these directions, the instrument will be a good and perfect Archicembalo. Made a little smaller, the Archicembalo will be suitable for singing, thus it is a tone lower if made with the given measurements. The instrument will be good and perfect when the strings are very well tightened on the instrument. Remarks about the reconstruction of Vicentino's Archicembalo and reliability of Vicentino's designs. Some points in the foregoing instructions are not literally reliable, however Vicentino's descriptions, 21 cm; length of short jacks, 7.2 cm; length of the highest string, so that the resulting length of the string scale of the instrument is of about 31.6 cm. For iron strings and for yellow strings respectively. On the average, the yellow string scale measures about 15.8 cm. Multiplying this length by two gives approximately 31.6 cm. This length is in any case inconsistent with an 8' c"" one, but it would represent a 16' c"". On the contrary, the inclusive length of the case, 196 cm, is clearly inconsistent with the shape of a 16' Italian harpsichord. Statistically, the most probable exact interpretation points out that the line on page 100 would not have to be multiplied by two, but the actual length on the page is the real length of the highest string, so that the resulting scale of the instrument is of about 31.6 cm. for c". Another point concerns the shape of the tail angle. As to this question, it is impossible to give one explanation more reliable than another, whether the angle was
square or pointed in accordance with the two main patterns of typical Italian harpsichords. In the reconstruction the square tail angle was preferred, this form giving the possibility of a nearly just scale from $c''$ to $G$: $c'': 16.8$ cm.; $c'''$: 31.6 cm.; $c$: 63.2 cm.; $c$: 126.4 cm.; $G$: 168.5 cm. The last point concerns the keyboard and frame which were to have been pierced through. Being a matter of technological importance, it was resolved to avoid the piercing through of keys and frame, since it is apparently impossible to establish criteria fit to distinguish the 'long' and 'short' jacks of the first jack order (note, the white keys of the lower keyboard). In fact, the question should be changed to another about the order of placement of the strings exactly according to the succession of the keys. Unfortunately, Vicentino's drawings do not coincide with each other, although they are reduced to the same scale. Rather, the shape of the tops of the upper frame keys would require quite a great number of borings in the keys. The seats of such borings seem really not to be rational in regard to the process of sawing out the key tops fitted around adjacent key tops. Furthermore each practical solution to this question will be reflected on the succession of both strings and jacks. In the reconstruction certain inversions in the succession of the string were tolerated to avoid more uncertain processes in making the keys of the upper frame. It is possible to define other orders of strings and jacks starting from different presuppositions, as (1) keeping the string succession in rigid conformity with the succession of sounding frequencies (2) previous choosing of plucking timbre according to various possibilities of arranging the jacks in the three ranks apparent on the drawing. As regards the criteria carried out in the reconstruction about plucking timbres, the front rank contains the jacks of 4th and 6th orders of Vicentino's (all the white keys and half of black keys of the upper keyboard) the opposite rank the jacks of 1st and 2nd orders (all the white keys and the front black keys of the lower keyboard) the medium rank the remaining jacks of both keyboards. This choice is justified by the fact that the number of the jack mortises in the opposite rank coincides with the sum of the keys of Vicentino's 1st and 2nd orders, and lower frame keys being obviously longer than upper frame ones, the placing of the jacks of the 1st and 2nd orders does not allow any easier positioning. Besides the uncertainties stated above about keyboard designs there is the fact that Vicentino's keyboard drawings are not extended to the whole keyboard, Vicentino presumably thinking the jack mortises would be arranged symmetrically with reference to the middle of the keyboards. The designed cell of three jacks, which has to be tidily reproduced for the entire compass of the instrument, does not

![Diagram of Vicentino's keyboard](http://www.harpsichord.org.uk)
create a symmetrical form. In fact, working out Vicentino's drawings, rather more than 132 mortises would have to have been cut. All these exceptions may be taken into a reasonable tolerance, as Vicentino himself concedes to the Master of Archicembalo, due to the fact that the drawings are presumably not the final ones. Case construction was carried out in accordance with old Italian making conceptions, using only cypress wood. Quills were cut from Delrin. Their length is naturally short, for the little space provided for in the drawings, but not shorter than 2.5 mm. As regards diameters of strings there are no great problems, even if Vicentino did not specify how thick the strings should be. According to results of published specialized investigations and to results of research on some Italian harpsichords which have not yet been restored, it is possible to suggest a minimum diameter for iron string in the higher three octaves about 0.25 mm, increasing to 0.30 for c, to 0.40 for G.

Questions about tunings
It seemed that the most difficult obstacle to overcome would be Vicentino's tuning. In fact, some questions about old tunings systems appear really intricate and they involve necessary syntheses of many physical, technological and historical data often quite hard to reach even separately. In principle, today it is not generally understood why the old writers were so worried about tuning problems. It is almost impossible to speak about the philosophical grounds on which tuning systems were once based. It is scarcely necessary to remember that the richer the sounds are in technological and historical data often quite hard to reach even separately. In principle, today it is not generally understood why the old writers were so worried about tuning problems. It is almost impossible to speak about the philosophical grounds on which tuning systems were once based. It is scarcely necessary to remember that the richer the sounds are in

Pythagorean perfect ratios being inconsistent with tempered fifths, apparently shortened as much as those used for meantone tuning of the first and second orders. In fact, all major thirds of the lower keyboard are perfect (natural) but the missing flats limit them to the following series:
- a flat; c; e; g sharp; b sharp;
- e flat; g; b; d sharp;
- g flat; b; d; f sharp; a sharp;
- d flat. f. a. c sharp, e sharp;

To pass onto the upper keyboard, Vicentino uses the tempered fifth g flat (already reached by tempered fifths) — c flat*. There is no note corresponding in musical current practice to this c flat (about 1/5th of an octave higher than a) the only musical meaning in a tuning system on an Archicembalo being that this c flat is one perfect fifth above the V of the meantone tempered lower keyboard, at which Vicentino is supposed to have aimed. But the resulting 'e' too high if the meantone shortening of the fifth is a fourth of a comma. But through this it is possible to trace back the real value of Vicentino's presumable meantone shortening. From this c flat to the 'e' of the lower keyboard (according to Vicentino's system: from B to E) there are 11 shortened fifths by which c flat has to be reached: c flat-g flat-d flat-a flat-e flat-b flat-f-c-g
- d a-e (c flat-e: fifth in the ratio 2/3). Thus, 11 by the value (in cents) of Vicentino's shortened fifth makes 7 by 1200 cents - 701,955 cents. Vicentino's shortened fifth has the value of 699,822 cents (decimals of cent are used for mathematical purpose only). Possible tunings of Vicentino's Archicembalo are shown in the tables. The just theoretical division of the octave into 36 parts gives fifths of 700,000 cents, so that Vicentino's shortened fifths of 699,822 cents are a little shorter than the theoretical ones. Such little differences seem to be negligible, but it is impossible in the practice of tuning to pass them over for musical
reason. Nobody would compare Vicentino's shortened fifths and theoretical fifths tempered for a 36 degree-scale on an Archicembalo, if that had not a musical meaning. Furthermore, if thirds or other intervals (reconstructed with differently shortened fifths) are to be compared, there will be more noticeable differences. Vicentino's great intuition was how practically this art was to be applied. The minor enharmonic semitone coincides with the comma, sometimes it is the double of a comma. The debate of Vicentino's comma, sometimes it is the double of a comma. The comma obtained in every couple of the 'same' notes of the lower keyboard and the upper keyboard. On this keyboard resulting major thirds and shortened fifths without beats) are tuned between each note of both keyboards) controlled. In conformity with the fraction of syntonic comma which shortens the fifths, the difference in pitch between the two keyboards may change in conformity with the sensation of perfect thirds, who cycles may produce changings in the pitch differen between the two keyboards. The minor enharmonic semitone coincides with the comma, sometimes it is the double of a comma. The comma obtained in every couple of the 'same' notes of the lower keyboard and the upper keyboard. On this keyboard resulting major thirds and shortened fifths without beats) are tuned between each note of both keyboards) controlled. In conformity with the fraction of syntonic comma which shortens the fifths, the difference in pitch between the two keyboards may change in conformity with the sensation of perfect thirds, who cycles may produce changings in the pitch differen between the two keyboards. The minor enharmonic semitone coincides with the comma, sometimes it is the double of a comma. 

Vicentino explains his aims in a few passages (for example: p. 105r. 105v.) besides describing the procedure for choosing the consonances in chapter 6, p. 104v. without moving the external fingers set by the octave chord, the performer will touch with the other fingers (displacing them from the thirds and fifths of the same order) the perfect fifths and major thirds more perfectly tuned than those we use, so that we can obtain the fifths- and thirds used by the ancients. All of dichiarations of chapter 18 have to be considered in accordance with the basic tuning system practised but it would need too much space to be done. Too much space would also be needed for the following chapters in which successions of all the kinds of tones and semitones are described. These successions would permit the comparison of the two main tunings of chapters 5 and 6 with the lists of intervals formed on notes of all kind of genera (consonances) semitones or sharps in any order or transposed ones. Most of these examples are the units of measures inconsistent with each other used to form intervals or scales in some parts of the treatise. Very briefly listed in an example they are: four different tones i.e. Tono accidentals — about (sic) 8/7; Tono naturale — 9/8; Tono (maggiorre) naturale accidentale - 10/9; Tono minore accidentale — 13/12; all of these being composed by an entire number of diesis minori; the diesis minore has the value from a minimum of 34.6 cents to a maximum of 45.6 cents; the approximation is much larger than the value of the presupposed interval between the shortened fifth and the fifth in the ratio 3/2, whichever is the way by which the syntonic comma is divided to obtain the meantone tuning. Similar remarks can be made as regards the semitones and diesis which in abstract contexts are composed by an entire number of 8/7; different tones i.e. four form intervals or scales in some parts of the treatise. 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expression allowed by the Archicembalo are really confirmed.18

NOTES
1 Nicola de' Vicentini (Nicola Vicentino, b. Vicenza 1511, d. Milan c.1576) lived the first part of his life at Vicenza (Northern Italy) and attended the Trissino Academy. Very little is known about his musical formation, but that he declared himself pupil of A. Willaert. Contradictory sources indicate that he was connected with the Ferrarese court, however Vicentino affirms in his book that he was himself pupil of A. Willaert. Contradictory sources indicate that he was music teacher of several members of the family of Duke Ercole II. Vicentino was in Rome on a trip with the Cardinal Ippolito d'Este where he sustained in 1551 his theory in comparison with Vicente Lusitano. Vicentino having lost, 1'decided to publish his theory in the aforementioned trattato. In 1552-54 Vicentino stayed in Siena, in 1555 again in Ferrara, in 1561 described in a publication the arcicembano, in 1563 assumed the post of Master of the Chapel at the Cathedral of Vicenza, in 1570 was rector of S. Tommaso in Milan where he possibly died in 1572 or 1576. Apart from the trattato only a small part of Vicentino's music is still preserved (See: H.W. Kaufmann: The life and works of Nicola Vicentino, American Institute of Musicology, 1966).

2 Most musicologists of every age have written about Vicentino's theory, poteniating against most aspects of it. The ancients (Zarlino, Artusi, Signion, Gallei, Doni), criticized the inconsistency between Vicentino's theory and Greek music. Since then Vicentino's designs have been quoted inaccurately (Rossi, Kircher). In the past century Vicentino's theory was completely distorted (Fetis), other musicologists made vague descriptions of the Archicembalo (Sachs, Light, Wright) and rather obscure summaries of the theory (Delia Corte, Malipiero). Besides Colonna's Sambuca Lineata (1567) design, there are some other schemes of possible archicembali from Zarlino to Negetti (1670) and Bresciani (after 1711) made the last description of an archicembalo that we possess.

3 A complete documentation about this practice is in course of publication (see: V. Gai: // instrumenti musicali della corte medicea (L.). Licosa Fkenze, 1969, p.6.) The instrument is described as about 3.30 m. long and about 87 cm. wide.


5 The only 16 Italian harpsichord, whose description we know, was presumably the cimabula of Girolamo Zenti (1658) with due principali unisoni et ottava bassa in the inventory of Principe Ferdinando di Toscana (1700). See V. Gai: // instrumenti musicali della corte medicea (L., Liscon Fkenze, 1969, p.6.) The instrument is described as about 3.30 m. long and about 87 cm. wide.


7 Besides F. Hubbard's plate II (op.cit.) and D. Shortridge's figure 9 (J.D. Shortridge: Italian Harpsichord Building..., in Smithsonian Institute Bulletin 225, 1960) which show schemes of frameworks, the internal structure of three original Italian harpsichords of unknown makers was taken into account.


9 Evidence of old stringing has been found on the instruments of note 7 and on other keyboard instruments which have not yet been restored, both spinette and cembali, in private ownership or in CaRezzonico Museum at Venice (2 x 8' cembali of an unknown maker). The cembali have the remains of thicker stringings than those described by Thomas. On the contrary, the spinette (in private ownership, of unknown makers and those in Museo del Conservatorio B. Marcello at Venice, of Franciscus Patavinus (?) 1552 and in Museo del Conservatorio Cherubini in Florence, of Benedetto Floriani 1568) have the remains of thinner stringings.

10 See: note 2 and for example F. Hellwig: The single-strong Italian harpsichord, in Ripin: Keyboard Instruments Studies ..., Edinburgh University Press F. Hellwig writes, referring to the Trasuntino's Clavemusicum Omnionium, ‘... but also the problem of keeping even a single set of strings in tune must have bordered on the insuperable.’

11 Two copies of Trasuntino's tetrachordum were used to try the actual possibilities of tuning the Archicembalo following the means of a comparison tester, but without satisfactory results, due to the large tolerance of such a method of comparative tuning.

12 Vicentino's tuning directions are discussed in: H.W. Kaufmann: The Life and Works of Nicola Vicentino, American Institute of Musicology, 1966 and in More on the Tuning of the Archicembalo in Journal of the American Musicalological Society of the same author. But Kaufmann's conclusions do not seem to be definitive because he did not fully consider the really intricate implications in Vicentino's tuning process owing to fundamental meantone intervals on which both the processes are based. As to Lemme Rossi's ratios (see: Table II in the Kaufmann's article, op.cit.) defining archicembalo tuning by logarithms, it should be taken into consideration that such little intervals must be determined after more attentive examinations.

13 This is the only way by which the two tuning processes can be unified. It seems impossible to establish whether Vicentino used $1/3$ of syntonic comma shortened fifths or a very closed interval such as Zarlino's $2/7$ of comma, or even $1/3$ of comma. Barbour supposed this, thinking that the tuning of the lower keyboard had to be completed with a cycle of shortened fifths. In fact, this seems a problem near to the first one of Vicentino, but Vicentino certainly aimed to complete the cycle of fifths in his whole two-keyboard system. If Vicentino did not complete the description of the whole cycle and did not draw attention to the discrepancies in his 36-part subdivision of the octave, this was presumably caused by the excessive tolerances in his means of inquiry, logarithmic procedures in mathematics not yet being invented. Modern means as to the reconstruction of the instrument and the possibility of easy ways of calculation allows experimental confirmations of the various hypotheses of Vicentino's possible goals. In any case Vicentino, having been a pratico (pragmatist), musical results have to be taken as standards of discrimination among various solutions, the one which may correspond to an actual meaning of tastatura senza difetto et perfetta (keyboard without defect and perfect) or organo divino (divine organ) even though the cycle of fifths can not be completed (chapter 5 and 6 of the 5th Book).

14 Interesting questions arise from what Vicentino might have intended by 'major thirds, more perfectly tuned than the ones we use' (p.104v. and 105r.) if not thirds in the ratios 4/5 and 5/6. And also why he did not use major and minor natural thirds as tuning means. Using only shortened fifths as the means of tuning for meantone systems may be inadequate. Substantially Vicentino assumes the various thirds as means of expression.

15 See: S. Tanaka: Studien im Gebiete der reinen Stimmung in Vierteljahrschrift für Musikwissenschaft VI, 1890, about the theoretical delimitation of a 'pure' tuning.
case of both lute and harpsichord and comparing the qualities of their timbres (in: Discorso attorno alle opere dello Zarlino ... p.127) Research on the influence of sound timbres on tuning systems is being carried out.

16 Vicentino, op.cit., p.143-144.

17 Comparisons between all these statements of Vicentino's are impossible in this article, although experiments have been tried on the reconstructed Aichicembalo. The level of minuteness which was reached in the music-ological research of the Renaissance period, makes it difficult for us to reconstruct views concerning the Archicembalo, so that it is difficult or even impossible to synthesize them briefly. Thus, in this article Vicentino's 'second' way of tuning (chapter 6) is discussed, referring to the 'first' (chapter 5), but with only desultory references as to Vicentino's more general theory declared in the 1st, 2nd, 3rd and 4th books of his trattato. Closer references to Vicentino's abstract theories as well as to his 'first' way of tuning would need more space and would overstep the limits of an article.