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Vicentino's Arciorgano; an Annotated Translation

Essendo cosa manifesta ad ogn'uno che il tenere ascose quelle cose che possono giouare al mondo, torna di grandissimo biasmo. Il Reuerendo Don Niccola Vicentino di Vicenti non volendo incorrere in questo errore, fa per la presente manifesto, per beneficio vniversale della Musica, come egli con lunghissima fatica e continuo studio, ha ritrouato `e posto nouamente in pratica vno Arciorgano di mirabilissimo artificio & armonia, il quale si vede manifestamente hauer suplito a molte imper-

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by

HENRY W. KAUFMANN

On October 25, 1561, Nicolo Bevil'acqua published a broadsheet at Venice that described the Arciorgano of Nicola Vicentino, a portable instrument, similar to his Archicembalo, which was capable of playing music in the diatonic, chromatic and enharmonic genera. The text of the original and a translation into English follow*1:

It is a fact clear to everyone that to keep those things hidden, which could be of use to the world, deserves the greatest censure. The Reverend Don Nicola Vicentino di Vicenti, not wishing to fall into this error, makes plain, for the universal benefit of music by means of the present document how he, after the longest effort and by continuous study, has invented and recently put into practice an Arciorgano of the most wonderful artifice and harmony which one sees manifestly to have made

fettioni che si ritrovano ne gli Organi ordinarii, & haver fatto l'organo perfetto.

Messer Vicenzo Colombo, eccellentissimo in questa professione di organi, è stato quello ilquale, ha posto in opera il detto Arciorgano secondo l'inuentione de l'armonia de l'autore, il quale con stupendo artificio l'ha in questa forma ridotto.

Tutte le canne son fatte di legno, accioche stia lungo tempo accordato, e renda dolce intonatione; la canna piu lunga è di sette piedi, ma per commodità di poterlo portare a viaggio, le sette canne maggiori sono state voltate di sopra in giu, tal che la canna piu lunga in apparentia nella facciata dinanzi rimane di cinque piedi, & questo si è fatto a fine che si possa trasportar di loco in loco per commodità di quei Principi che'l voranno godere.

Tutto disfatto e posto ne i suoi forcieri non serà la carica d'vn mulo, e sarà facile il metterlo insieme, e non v'andra piu tempo di quattro o cinque hore.

Il numero de le canne sono in tutto cento venti sei di voce graue e dolcissima, & ha cento ventisei tasti & altre tanti catenacci: le canne son poste in quattro ordeni in modo di vna mitra & col sommiero tanto bene ordinato, con cento ventisei animelle, che per il suo marauiglioso artificio, oltra la sua dolcissima armonia, è bellissimo da uedere, con cento ventisei tasti, son talmente disposti che rallegrano a vederli commodi alla pratica del sonatore, accommodati in si breue spatio, che non occupano piu luogo della lunghezza & larghezza della tastatura ordinaria de ogni organo.

L'acquisto, e la richezza dell'armonia, e di gradi che ha con tante corde aggiunte alla tastatura del comune orgono, che tutte mancauano; e questa, che ui si guadagna tutta la Musica perfetta Diatonica semplice e mista, e cinque sorti di consonantie in tal pratica mai piu non vdite ne vsate.

Prima si son guadagnate le quinte perfette sopra i tasti bianchi del comune organo che fanno vno vdir mirabile, poi due sorte di terze, vna maggiore, & l'altra minore, e similmente due sorti di seste doue auiene che quando le quinte perfette son tocatte insieme con le terze perfette, empieno di tanta armonia l'orecchie, che meglio in terra non si puo sentire.

up for many imperfections that are found in ordinary organs and to have constructed the perfect organ.

Messer Vicenzo Colombo, most excellent in this profession of organ building, has been the one who has put into operation the said Arciorgano according to the harmonic invention of the author, who, with stupendous artifice, has reduced it to this form.

All the pipes are made of wood so that they stay in tune a long time and give a sweet intonation. The longest pipe is seven feet, but for the convenience of being able to carry it while travelling, the seven larger pipes have been turned down from above, so that the longest pipe, seen from the front, remains five feet in appearance. And this is done for the purpose of being able to transport it from place to place for the convenience of those princes who wish to enjoy it.

All disassembled and put into its chests it will not weigh more than the [average] load of a mule, and it will be easy to put it together and will not take more time than four or five hours.

The number of pipes are 126 in all, low and very sweet in sound. And the instrument contains 126 keys and as many stickers. The pipes are placed in 4 orders in the manner of a miter and with the wind-chest so well arranged with its 126 valves, that the instrument, by its marvelous workmanship besides its most sweet harmony, is most beautiful to behold, with 126 keys. These are ordered in such a way that it is a delight to see them adapted to the practical needs of the performer, accommodated in so small a space that they do not occupy more room than the length and breadth of the ordinary keyboard of any organ.

The gain is [found] in the richness of the harmony and of the steps which the instrument possesses due to so many strings added to the keyboard of the common organ which all of them lacked. It is this which obtains here all the perfect diatonic music, simple and mixed, and five kinds of consonances in such practice never before either heard or used.

First there are obtained perfect fifths above the white keys of the common organ, which make a wonderful sound; then two kinds of thirds, one major and the other minor, and similarly, two kinds of sixths, in which case it happens that whenever perfect fifths are struck together with perfect thirds, they fill the ears with such harmony that no better can be heard on earth.

Si sono ancora acquistati molti gradi d'accenti che fra tasti si ritrouano, accommodati, a varie sorti di pronuntie, simili alla pronuntia humana, di modo che proui pure vn cantore de intonar qual si voglia vocce, l'organista haurà sempre modo di rispondergli nel medesimo tuono sopra vno de tasti del detto perfetto organo, e sopra di quello potrà dar principio a sonar de tutti i tuoni, cosa di ammiratione grandissima nella professione della Musica, il simile auerrà nelle chiese, che ogni Maestro di cappella potrà intonare, o fare intonare, qual si voglia voce in choro che tornerà commoda a suoi cantori & l'organista col detto instrumento sempre risponderà in tuono, e se per forte, cantando i cantori, cresceranno ouer caleranno, l'organista potrà sempre accordar co' cantori nel fin de la lor voce, con bel modo potrà ritornare nella prima intonatione, che alcuno non se n'accorgerà.

Si ha ancor in questo instrumento questo guadagno che nel concertare varie sorti d'instrumenti non occorre accordarli con detto Arciorgano, ma sia qual sonatore si voglia di liuto di viola o d'altro, potrà accordare indisparte a suo modo il suo liuto, o la sua viola sempre accorderà con detto Arciorgano, perche è di tal ricchezza, e perfettione che ha il modo di accordarsi subito, con tutti gli istrumenti e con tutte le voci.

Si è fatto questo primo d'vn registro solo, ma si potranno gli altri far di piu registri, e da camera e da chiesa secondo l'intentione di chi vorra seuirsene.

Sopra questo instrumento si posson sonare tutti i tre generi della Musica cio è il Diatonico, il Chromatico, & l'Enarmonico, in ogni tasto caminando però d'vno in altro tasto, & anchor tutte le sorti di Musica, antiche, & moderne con commodità di comporre, e di sopra cantare, e sonare tutti i modi di cantari e di aeri secondo l'idioma che da natura cantano tutte le nationi del mondo, cio è se l'inuentore della sopra detta armonia, sentirà cantare vn Spagnuolo, vn Francese, vn Polonio, vn'Inglese, vn Turco, o vero vn'Hebreo, ancora che tutte le nationi del mondo stan differenti di pronuntie, e di varii accenti, egli scriverà e comporrà a quattro & a piu voci quel suo cantare con maggiore armonia, & con piu consonantia che no si fa nella Musica comune, e potrà dette compositioni cantare e con gran diletto de gli ascoltanti sopra il detto Arciorgano.

There are also obtained many gradations of accents which can be found among the keys, accommodated to various kinds of pronunciation, similar to human pronunciation, so that you can prove it merely [by having] the singer intone any pitch that he wishes, [and] the organist will always find the way to respond to him with the same tone [played] on one of the keys of said perfect organ. And more than this, he will be able to begin playing from any tone — a thing of the greatest admiration in the profession of music. The same will happen in churches, that any chapel master can intone or have intoned for his choir any pitch that will prove suitable to his singers, and the organist, with said instrument, will always respond in pitch. And if by chance, while the singers are singing, they sharpen or flatten, the organist can always agree with the singers when they reach their final tone, [and] with a fine manner, he can return to the first intonation, and no one will be aware of it.

There is also in this instrument this advantage: that in the playing together of various kinds of instruments, it is not necessary to tune them with said Arciorgano, for whatever player one wishes, be it of the lute or of the viola or of any other instrument, he can tune his lute or his viola, regardless of his method, and it will always be in tune with said Arciorgano because it is of such richness and perfection, that it can tune itself at once with all instruments and with all voices.

This first [Arciorgano] is made with only one register, but others can be made with several registers, and for the chamber or the church, according to the desire of him who wishes to make use of it.

On this instrument one can play all three genera of music, that is, the diatonic, the chromatic and the enharmonic, on every key, moving, however, from one to the other, and also all kinds of music, ancient and modern, with the convenience of composing, and above all of singing and playing all manner of songs and airs according to the idiom which all the nations of the world sing. That is, if the inventor of the aforesaid harmony were to hear a Spaniard, a Frenchman, a Pole, an Englishman, a Turk, or a Hebrew sing, since all the nations of the world differ in pronunciation and vary in accent, he will write and compose his song for four and more voices with greater harmony and more consonances than one does in the usual music, and he will be able to sing said compositions to the great delight of the listeners with the [aid of] said Arciorgano.

Molte altre commodità sono in detto instrumento, come sarebbe a dire da imparare a sonare, & a cantare le pronuntie delle passioni delle parole, cosa che non si puo se non in qualche parte nella comune Musica; quando dolce, quando amaro, quando allegro, quando mesto, quando soaue, quando aspro, quando ombroso & oscuro, e quando lucido, e chiaro, quando pio e diuoto, e quando crudele e disperato, quando di lamentatione e di pianto, quando di allegrezza e di iubilatione, quando morto, e quando viuo, secondo l'affetto che vuol muouere il sonatore; tutto questo appresso a gli altri, e stato grandissimo acquisto, hauendo ritrouato il modo del cantare, e con armonia comporre, e sonare, i modi del cantare di tutte le nationi del mondo.

Piu oltre tra gli altri modi di comporre e di sonare, ve n'è vno da comporre vna Musica da far recitar, ad vn cantor solo con l'intrumento, e sarà Musica tale, che da quello s'vdirà recitare ogni sorte di parole, ouer parlar alquanto also accompagnato dall'armonia.

Tutte le sopradette cose ogni giorno sono vedute, & vdite da molti Signori, & gentilhuomini, & da molti altri, e chi piu s'intende di Musica, piu si marauiglia di tale inuentione, conoscendo chiaramente, che con detto instrumento, gli eccellenti pratici de la Musica commune possono imparare a sonare & a cantare questa noua Musica in vn mese, o poco piu, secondo che piu e meno vi faranno studio.

L'autore di detta armonia, ha seco vn Clauicembalo fatto al modo dell' Arciorgano con altre tanti tasti per poter studiare sopra quello, e fin' hora egli vi sona alquante compositioni, che ricercano, parte diatonicamente tutti i tasti, e parte misti di varie sorti de gradi, caminando da vn tasto all'altro con belli accordi in proposito delle parole con vario proceder d'armonia e de gradi.

L'Inuentore di questo Arciorgano l'ha voluto publicare, a fine, che se ad alcuno di quelli Principi che si dilettano di fauorire quelle inuentioni che diano giouamento a l'arti & a le scientie, e conseguentemente al mondo; piacesse d'vdirlo, o di porlo in pratica se ne possi preualere facendo saperea quel generoso Principe che'l detto inuentore, gli donara il Clauicembalo, l'Arciorgano, e se stesso offerendosi d'insegnare il modo di sonarlo ad ogn'vno che ne sarà desideroso, & appresso d'insegnar di cantare quei due generi di Musica, che hoggi non sono in vso i quali si potranno cantare, nelle chiese & nelle

Many other conveniences are [found] in said instrument, as, for example, in learning to play and to sing the expression of the passions of the words, a thing which can only be achieved partially in the usual music: [that is] when it is to be sweet, when bitter, when happy, when sad, when suave, when harsh, when shadowy and obscure, when lucid and clear, when pious and devout, when cruel and desperate, when lamenting and weeping, when rejoicing and jubilating, when dead and when living, according to the effect which will move the player. All this in addition to other [advantages] has been acquired in the grandest way by having discovered the method of singing, and composing in harmony, and playing, the musical procedures of all the nations of the earth.

Furthermore, among the other modes of composing and of playing, there is one of composing [a type] of music that involves recitation by a solo singer with the instrument, and it will be such music that in it one will hear recited every sort of word or rather lofty speech, accompanied by harmony.

All the above mentioned things are seen every day and heard by many lords and gentlemen, and by many others, and who, the more they understand music, the more they marvel at such an invention, since they know clearly that with said instrument the excellent practitioners of the usual music can learn to play and to sing this new music in a month, or a little more, depending on whether they apply themselves a lot or a little.

The author of said harmony has in his possession a Clavicembalo, made in the manner of the Arciorgano, with just as many keys, in order to be able to practice on it. And up to now, he plays on it some compositions which employ all the keys, partly diatonically and partly mixed with various kinds of steps, moving from one key to the other with fine chords, [always] in accordance with the words and with a varied procedure of harmony and steps.

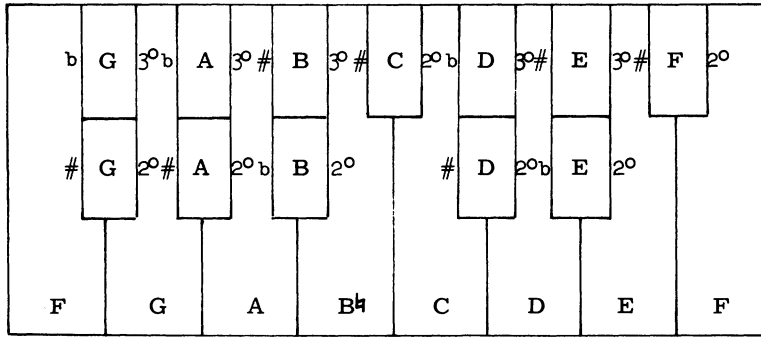
The inventor of this Arciorgano has wished to make it public so that if any of those princes who takes a delight in favoring those inventions which are useful to the arts and sciences, and consequently to the world, should be pleased to hear it or put it into practice, provided that he can avail himself of it, let it be known to that noble prince that the said inventor will give him the Clavicembalo, the Arciorgano and himself, by offering to teach the method of playing it to anyone who would be desirous of it, and also to teach the singing of those two genera of music, which are not in use today but which can be sung in

camere, & communicarà quelli ad ogn'vno, a laude del'eterno Idio, & tutta quella virtù, che con vn studio di tanti anni s'ha acquistata, per beneficio del mondo, & a perpetua memoria de presenti, & di quelli che verranno dopo noi per molti secoli.

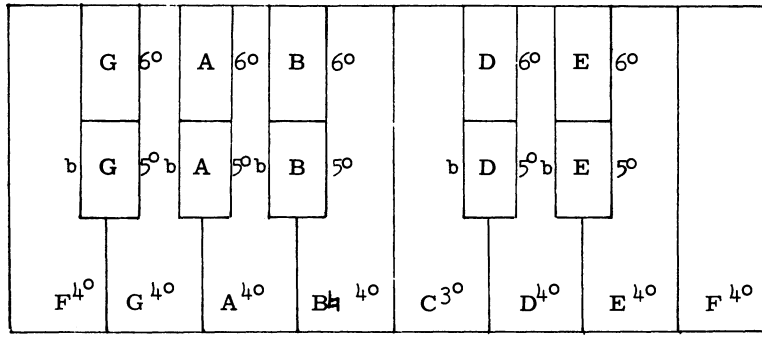
In Venetia, Appresso Nicolo Beuil'acqua.
1561. Adi 25. Ottobrio

example 1

FIRST FRAME OR KEYBOARD



SECOND FRAME OR KEYBOARD



churches and in chambers, and he will transmit the knowledge of these to anyone, to the praise of the eternal God, and all that competence which, with a study of so many years, he has acquired, for the benefit of the world and to the perpetual memory of the present generation and to those who will follow us through many centuries.

In Venice, by Nicolo Bevil'acqua.
The 25th day of October, 1561.

The need for a portable Arciorgano rather than the less mobile Archicembalo may have been occasioned by Vicentino's campaign on behalf of his enharmonic genus throughout many important cities of Italy. Galilei reports that Don Nicola, at some time in his career,

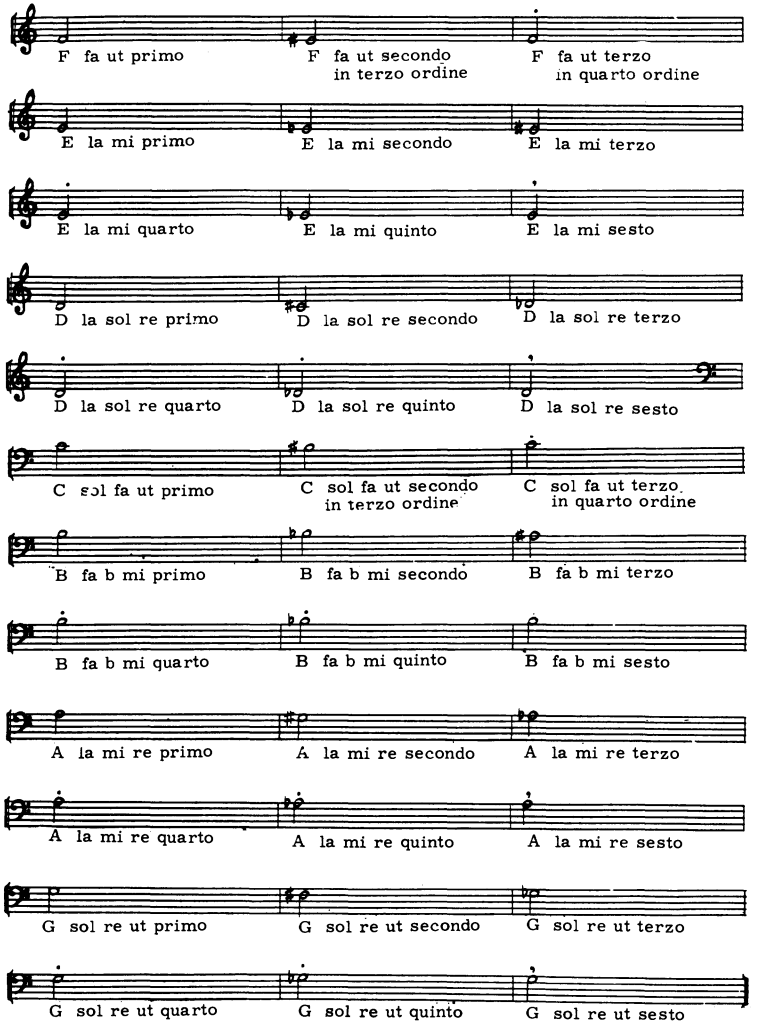
> had a number of pupils who, particularly while he played the enharmonic, sang that genre of music composed by him. He let this music be heard in all the principal cities of Italy and I personally heard it at various times and places on a number of occasions*2.

Some of these performances may even have taken place before 1560*3, since Galilei refers to one of Vicentino's pupils, Giacomo Finetti by name, whom he had met at Venice in that year and who told him "that wishing to settle down, he found it necessary to lay aside his master's enharmonic and attend to other things."*4

The claims asserted for the Arciorgano resemble those made for the Archicembalo, which is described in detail in the last book of Vicentino's treatise, L'Antica Musica, and it is to this book that we now turn for more precise information concerning these microtonal instruments. Both are provided with 2 keyboards, each containing 3 ranks or orders of keys, placed in removable frames. The Archicembalo is fitted with a total of 132 keys, extending through 3 1/2 octaves. The Arciorgano, on the other hand, contains only 126 keys with no indication given as to which ones are omitted. Example 1 shows the disposition of the 6 orders of keys within the frame work of the 2 keyboards. To facilitate the reading of this keyboard, the octave from f-F will be given in descending order with Vicentino's notation and denomination. *5 (Example 2)

The descending octave has been used because it shows more clearly the progression from one order to the next. The names of each of the notes in the succeeding orders are derived from

example 2



the name of the note in the first order that served as their point of origin. This sometimes causes a contradiction between the name of the note and its notation. For instance, A la mi re secondo is notated as G#. Vicentino is aware of this difficulty since he admits that his A la mi re secondo is commonly called G sol re ut sustentato, and that G sol re ut secondo is better known as F fa ut sustentato, but he prefers to think of the location of his notes on the keyboard rather than on the staff. In his opinion, the name A la mi re secondo shows more exactly the descent from A la mi re primo than does the more common designation. *6

Another problem arises in connection with the notes C and F which do not exist in 6 forms as do the others. Their complete identification is given in Example 2, but in practice, a full form such as C sol fa ut secondo in terzo ordine is abbreviated to C sol fa ut terzo if it progresses to the fourth order, or it is called C sol fa ut secondo if it moves from the first order. A similar dichotomy can be seen in the diagram of the keyboard (Example 1) in which F fa ut terzo in quarto ordine is indicated as F^{40} while C sol fa ut terzo in quarto ordine is shown as C^{30}

The first order is made up entirely of white keys which correspond to those found in most organs, monochords, harpsichords and similar instruments. It is commonly referred to as the diatonic or natural order, although the presence of a minor third or major third within this order would, according to Vicentino's theory, introduce elements of the chromatic and enharmonic genera respectively. *7 The second order contains those black keys most frequently used in 16th-century organs and the general run of keyboard instruments. In modern terms, these would include F#, G#, B^b, C#, and E^b. These tones lie either a major or a minor semitone above the white notes of the diatonic order. *8 The second order is also known as the chromatic order since its use is always indicated by means of accidentals. If it is employed consistently, that is, if only the second rank of keys is played, it may be called the natural chromatic, although it does not often appear in this pure form. More commonly, the notes of this order are mixed with those of the first, resulting in a concomitant transmutation of species of the genera. A whole step, such as F to E^b, or even F# to G# within this order, is spoken of as a diatonic step in the chromatic order, or referred to simply as a chromatic tone, the word "tone" implying origin in the diatonic species.

Vicentino's terminology becomes rather confusing at this point because he uses the word "chromatic" with two meanings, first in the root sense of pertaining to the chromatic genus, and secondly, as a synonym for accidental. Thus, "accidental" minor third of the chromatic genus and "accidental" major third of the enharmonic genus would be understood better than the "chromatic" minor third and the "chromatic" major third which he proposes.*9

The keys of the second order are split to provide for the third order, which is then completed by the insertion of shortened black keys between the semitones, E-F and B-C. Although Vicentino does not name this order, it seems to be a continuation of the chromatic, which includes the less usual semitones: G^b, A^b, A#, B#, D^b, D#, E#. It is also more restricted than the other orders with respect to transferrals of species from other genera, "since in its steps, one can not give any termination of the imperfect consonances, that is, of any major third and only one minor third."*10 These 3 orders are all contained within the first frame (telare) or keyboard (tastatura).

The second frame begins with the fourth order, which contains the same white keys as the first order, but pitched a minor enharmonic diesis higher. This level of the keyboard is also referred to as the enharmonic order, which, when it is used consistently, is called natural enharmonic. The description of transferred species becomes even more complicated with this enharmonic order than with the chromatic or diatonic. Although the phrase "toni Diatonici Cromatici in Enarmonico ordine"*11 can be translated literally as "chromatic diatonic tones in the enharmonic order," its real meaning is better conveyed as "tones, diatonic in origin, which have been chromaticized, that is, modified by accidentals, so that they can be used within the enharmonic order." Similar circumlocutions would be necessary for the phrases, "gradi, o spetie del genere Cromatico, Cromatici in Enarmonico ordine," that is, the minor third; or "grado o spetie del genere Enarmonico Cromatico, in Enarmonico ordine," that is, the major third.

The fifth order supposedly stands in the same relationship to the fourth as the second to the first. In the latter case, however, both major and minor semitones occur, whereas in the former, only major semitones are found. The third and last rank of keys in the second keyboard is known simply as the sixth order, and resembles the first diatonic order by using plain names, unmodified by accidentals, for its notes. The pitch, however, is a comma above that of the first order.

The tuning of the Archicembalo and Arciorgano unfortunately presents several perplexing problems, especially in connection with the second keyboard. The first two orders are apparently tuned in a kind of mean tone temperament, "according to the use of the other keyboard instruments with the fifths and fourths somewhat shortened, as the good masters do."*12 The amount of tempering is not indicated, but a tuning in which the fifths are tempered by 1/4 syntonic comma comes closest to the 31-division of the octave which is the basis of Vicentino's overall system.*13 However, with the extension of this "common" tuning to the third order of the instrument, a closed system*14 of 19 notes to the octave is temporarily evolved. Both Zarlino and Salinas have described such 19-division systems, but in the former case, the tuning probably involved a temperament of 2/7 comma while the latter shortened the fifths by 1/3 comma. Zarlino himself admitted the 2/7 temperament to be inferior to the 1/4 comma system *16, a factor which may well have militated against its adoption by Vicentino.*17 Salinas's method, on the other hand, affected unfavorably both the fifths and the major thirds.*18 The invention of this system is credited to Salinas who first described it in 1577 in his De Musica Libri VII, much too late for Vicentino to have known it from this source. Nevertheless, Don Nicola seems to have been troubled by the sound of his own thirds and fifths within the first keyboard, because he gives implicit directions for improving these intervals by means of the other orders:

> Another fine convenience will be found in this tuning that when the performer plays in the first order, and not moving the fingers of the hand when stretching the octave, he can move the middle fingers to play the thirds and the fifths [in the fourth order] and in the same orders that he plays the perfect fifths, in those he will find the major thirds, more perfectly than those which we use.*19

The questions raised by this primary tuning are multiplied as the other orders are described. The tuning of the third order proceeds around the cycle of tempered fifths in the following manner: starting with G# in the second order (G#2), the fifth higher moves into the third order on D#3, down an octave and up a fifth to E#3,*20 up a fifth to B#3 and then down another octave. The flatted keys are derived similarly from $E^{b}2$, descending by a fifth to $A^{b}3$, and another fifth to $D^{b}3$, then down an octave and a fifth to $G^{b}3$, ending a fifth lower on B4, which is thus supposedly the same as $C^{b}3$. This concept of enharmonicism in the modern sense of the term would mean that all the notes of the fourth order could be named by their equiva-

lents: G^{bb}, A^{bb}, B^{bb}, C^{b}, D^{bb}, E^{bb}, F^{b}. This is obviously impossible, since Vicentino states precisely that the difference between the first and fourth ranks of keys is equal to 1/2 of the minor semitone, that is, a minor enharmonic diesis.

The whole problem seems to have been avoided by postponing the tuning of the fourth order until that of the fifth had been completed. He begins the tuning of the fifth order with C fa ut secondo in terzo ordine, that is, B#, and seems to progress as before, but his terminology is very unclear and unexplained. The fifth above B#2 is described as Fa fa ut quinto in quinto ordine, which is contradictory to his previous statement that F, because it moves a semitone to E in the natural diatonic order, can only be divided into 3 orders instead of the customary 6. *21 The next fifth leads to another unexplained location on the keyboard, C sol fa quinto, which is then followed by the easily identifiable $A^{b}5$, $E^{b}5$ and $B^{b}5$. It would therefore seem that Fa fa ut quinto represented $G^{b}5$ and C sol fa quinto, $D^{b}5$, the 2 unaccounted-for notes of the fifth order. A B# to a rather high G^{b} may possibly be accepted as a kind of fifth *22, but the amount of tempering does not agree with any of the fifths so far described. On the other hand, if the modern notational representations of a cycle of fifths from B#, that is, double-sharped F, D, G, D and A, are taken into account, the divergence from the given keys of the fifth order seems to be just as great.

Vicentino uses this fifth order to accomplish the tuning of the fourth level of keys. Starting with B fa mi quinto ($B^{b}5$), he moves into the fourth order on F4, and then continues around the circle of fifths to produce the other notes. This at least has the merit of agreeing more or less with the approach to the fourth order from the third in which C^{b} was considered the equivalent of B4. If, however, a double sharp, the last note reached in the cycle of fifths used in tuning the fifth order, is substituted for $B^{b}5$, the fourth order would have to be expressed in terms of double-sharped E and B and triple-sharped F, C, G, D and A, which would again contradict a series supposedly only a minor enharmonic diesis above the pitch of the natural tones of the diatonic order.

The tuning of the sixth order is not given, so that no clarification can be derived from that source. All that is said about this last order is that its pitches are a comma above those of the diatonic, which would mean that this order serves as an intermediate pitch between the first and the fourth orders, since the comma is equivalent to 1/2 the minor enharmonic diesis.

To confuse the issue completely, Vicentino offers a second tuning for his instrument, based on the perfect fifth. The "puzzling doctrine of the perfect fifth," as Barbour calls it*23, states that the last 3 orders can be tuned with the first 3 by means of this interval. In other words, the perfect fifth of any tone in the first order can be found in the fourth order, and the same would be true of the relationship of the second to the fifth orders and the third to the sixth. Unfortunately the distance between these related orders is not the same so that the fifths would not all be of the same size. Moreover, to take only one specific example, the fifth G to D which is "shortened" in the first order, when "perfected" by playing the D in the fourth order, would exceed the size of a real perfect fifth. The only solution is to understand the term "perfect" in a relative sense.

Vicentino has stated that the main purpose of the comma and the diesis was "to aid a consonance."*24 In his discussion of the interval of the third larger than the minor third by an enharmonic diesis, he adds that because of the proximity of this interval to the major third, it assumes the nature of the larger interval rather than the smaller one. *25 If the fifths normally used are all tempered, any increase in their size would bring them closer to the perfect fifth. It seems logical, then, to assume that Vicentino's use of "perfect" for his alternate tuning of the instrument was intended only in a general sense and not as a specific description.

If exactness had been his goal, he would not have added still another method for obtaining the perfect fifths. In Chapter 17 of his book on the Archicembalo which explains the various leaps and steps from G4, Don Nicola states that a note in the first order will find its perfect fifth in the sixth order, if the interval ascends; "and the same sixth order will serve the fourth order to make perfect fifths, when said perfect fifths descend."*26

Perhaps the solution to the puzzle lies in extending to the fifth the concepts of "propinqua" and "propinquissima" that Vicentino used for other intervals, especially the thirds and sixths. The former term involved an increase of a diesis in the size of the interval, so that the "propinqua" of the "common" fifth would be found in the relationship of the first to the fourth orders. The latter term increased the interval size by a comma, so that the "propinquissima" of the tempered fifth would appear between the first and the sixth orders. In both cases, the "shortened" fifth of the usual tuning would be brought closer

to the idea of a "perfect" fifth.

Cerone, speaking of the Archicembalo, comments that this instrument "at first sight frightened any organist, however eminent, to see such a large quantity of strings and also such a large number of semitones."*27 According to the same source, only Luzzasco Luzzaschi could play it well, a fact which he demonstrated by writing some compositions especially intended for performance on this complicated contrivance.*28 It is not to be wondered that, with all the difficulties encountered merely in tuning the instrument, it did not receive the approbation of many 16th-century contemporaries of its inventor.

In Vicentino's opinion, however, the advantages of his microtonal instruments over the common run of those for keyboard were manifold. His Arciorgano could accompany not only the usual pitches found in Western music, but could also accord with the more subtle intonations of Hebrew or Turkish melodies. It could also adjust to the sound of lutes and viols which were tuned according to the modern tempered system.*29 Moreover, should a choir flatten or sharpen its pitch while singing, the organist could intone the new pitch unobtrusively, and by modulating "in a fine manner," lead the choir back to the correct intonation. In his treatise, Vicentino identifies this practice with the transposition that he calls "musica finta" or "false music" and which involves the use of four flats.*30 By means of these accidentals, the organist quickly adjusts the species of his modes so that he does not discord when the chorus flattens the pitch. For example, if the choir is singing in the Dorian mode and happens to lower the pitch one degree, the organist, by the use of the flats of "musica finta," will begin to play a Dorian on C, and thus cover the error of the performers.

Vicentino seems rather concerned lest anyone confuse this music written in four flats with chromaticism:

> One ought not to speak of falsified music but rather of falsified transcription, because [although] the music is notated with four flats which [thus] to the eye seems completely transformed by the notation, to the ears there is no difference to be heard between music written with flats and that without [flats], as I have said above; and lest anyone call this composition chromatic music, we have already explained in the first book what sort of thing chromatic music [really] is, which involves the change that one heard when first there is a tone and then it is transformed into a semitone, and [con-

versely] from a semitone into a tone, with the chromatic species and with the deprivation of progressing by natural steps.*31

One observation in particular made by Vicentino in the circular describing the Arciorgano foreshadows the future in a striking way:

Among the other modes of composing and of playing, there is one of composing a type of music that involves recitation by a solo singer with the instrument, and it will be such music that in it one will hear recited every sort of word or rather lofty speech, accompanied by harmony.*32

This statement, interpreted in the light of L'Antica Musica as a whole, presages many of the innovations of the Seconda prattica. It bears witness to the battle of those original musical spirits of 16th-century Italy who fought for a new and contemporary art, a battle fought with the aid of ancient theory.*33 Those like Doni*34, who criticized him for his misunderstanding of Greek theory, lost sight of the fact that Vicentino's avowed purpose was not to revive ancient music but to interpret it so that it would be "reduced to modern practice." Others, such as Artusi*35, opposed him because their basic conservatism rebelled against the novel and visionary concepts evoked by Don Nicola's imagination Although his experiments led him into paths which took him far afield from the main stream of music, they at least inspired future theorists to find the right road to the future. Perhaps the fairest estimate of his achievement can be summarized in the words of Burney:

He was a practical musician, and appears to have known his business; in his treatise he has explained the difficulties in the Music of this time, with such clearness, as would have been useful to the student, and honourable to himself, if he had not split upon the enharmonic rocks, and chromatic quicksands.*36

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1 A copy of this document appears in A. Catelani, Circolare descrittiva l'arci-organo. In: Gazzetta musicale di Milano, IX (1851) 209-210. It was also reprinted and translated into German by J. Wolf, Das Arciorgano des Nicola Vicentino (1561). In: Der deutsche Instrumentenbau, No. 35 (1900) 299-302.

2 "...haveva... alquanti suoi scolari, che in quell mentre ch'egli sonava l'enharmonio imparticolare cantavano quelle tal sorte di musica, dal medesimo composta: la qual musica fece udire per tutte le principali città d'italia, et io in particolare l'udii in diversi tempi et luoghi, piu volte." The quotation and translation are taken from C. V. Palisca, The Beginnings of Baroque Music: Its Roots in Sixteenth Century Theory and Polemics. Unpub. diss. (Harvard, 1953) 341-342.

3 Vicentino's activities during the '50's and '60's of the Cinquecento are sparsely documented. He probably left the service of his patron, Cardinal Ippolito II d'Este, in the late '50's. The last paragraph of the description of the Arciorgano serves notice of his availability for a new position. During 1563 and 1564, he filled the post of chapel master at the Cathedral of Vicenza, his native city. Cf. G. Mantese, Storia musicale vicentina (Vicenza, 1956) 47, n. 36, 37. Finally, in a letter written March 25, 1570, he identifies himself as Rector of St. Thomas's, Milan. Cf. B. A. Wallner, Urkunden zu den Musikbestrebungen Herzog Wilhelms V. von Bayern. In: Gedenkboek aangeboden aan Dr. D. F. Scheurleer op zijn 70sten Verjaardag (The Hague, 1925) 370. Presumably his trips "per tutte le principali città d'italia" account for the years otherwise left undocumented.

4 "...che havendo egli voluto trovare ricapito gli era stato di mestiere lasciare da parte l'enharmonio del suo maestro, et attendere ad altro." Palisca, op.cit., p. 342.

5 The dot (.) over a note raises its pitch by a minor enharmonic diesis, the comma(,) by an interval of the same name which is equal to half of the minor enharmonic diesis. The minor enharmonic diesis occurs between the major and minor semitones. Boethius calls this interval a comma, but since Vicentino's semitones do not agree in size with those of the earlier theorist, the new name has become necessary. Cf. N. Vicentino, L'Antica musica ridotta alla moderna prattica (Rome, 1555) f. 17v-18.

6 Ibid., f. 103v-104v.

7 Instead of considering the tetrachord as a unit, Vicentino felt that the use of any one of its component members was sufficient to identify the genus. Thus, chromatic could be represented (1) by the series: minor third, half-step, half-step; (2) by the minor third alone; (3) by a half-step alone. Similarly, the major third alone could be interpreted as evidence for the existence of the enharmonic genus. In essence, then, the music commonly sung was in reality a mixture of the three genera. Ibid., f. 95. This type of interpretation was not limited to Vicentino alone, although he was practically the only theorist to include the enharmonic in his consideration of mixed genera. Bermudo, for example, speaks of a semichromatic genus which combines the diatonic and chromatic: "Quattro generos ay de Musica eneste tiempo, co[n] viene asaber diatonico, Chromatico Enarmonico, y Semichromatico. Este genero Semichromatico, es compuesto de eldiatonico y del chromatico, y es lo ahora tañen y cantan en composicion." Bermudo, Declaración de Instrumentos musicales,

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1555, facs. ed. M. S. Kastner. In: Documenta musicologica, Ser. I, no. XI (Kassel, 1957) f. 22, col. 1. This opinion is repeated in the treatise of a less well-known Spanish theorist, Martin de Tapia: "No ay hombre que no alabe (y con gran razon) la musica de este tiempo, y es mezclade de el genero Diathonico y Chromatico." Tapia, Vergel de musica (Burgo de Osma, 1570) f. 44v. Morley similarly remarks that the "kind of music which is usual nowadays is not fully and in every respect the ancient Diatonicum... so that it must needs follow that it is neither just Diatonicum nor right Chromaticum." T. Morley, A Plain and Easy Introduction to Practical Music, ed. R. A. Harman (London, 1952) 103. He continues with the observation that a point used by organists, consisting of the notes E, F, F#, G, G#, A, is not right Chromatica, but a bastard point patched up of half Chromatic and half Diatonic. Lastly it appeareth... that those virginals which our unlearned musicians call Chromatica ... be not right Chromatica but half Enharmonica." Ibid.

8 Vicentino suggests an easy way to remember the notation of these semitones. The minor semitone is smaller than the major, hence will lie nearer to its point of origin, that is, either on the same line or space, e.g., F to F#, A to A^b. The major semitone, as the larger interval, will be located further away, that is, on an adjacent line or space, e.g., A to B^b, G to F#.

9 Ibid., f. 101v.

10 "...perche ne i gradi di quello, non si puo dare termine alcuno delle consonanze imperfette, cioè d'alcuna terza maggiore, & sola da una minore." Ibid. There is no reason, however, for not considering the whole steps as accidental tones derived from the diatonic genus.

11 Ibid.

12 "...secondo l'uso de gli altri stromenti con le quinte & quarte alquanto spontate, secondo che fanno li buoni Maestri." Ibid., f. 103v.

13 J. M. Barbour, Tuning and Temperament (East Lansing, Michigan, 1953) 37.

14 "... a regular temperament in which the initial note is eventually reached again." Ibid., p. ix. In the situation here under discussion, the C of the first order is closed with the B# of the third order.

15 Ibid., p. 30, 34.

16 Ibid., p. 33.

17 That Zarlino published his Istitutioni armoniche in 1558, does not mean that Vicentino could not have known the 2/7 comma temperament, because the instrument which contained that tuning had been built at Zarlino's behest as long before as 1548, by Maestro Dominico Pesarese. D. H. Boalch, Makers of the Harpsichord and Clavichord 1440 to 1840 (London, 1956) 24, col. 1.

18 Barbour, op. cit., p. 33-34.

19 "...un'altra bella commodità si ritroverà in questo accordo che quando il sonatore sonerà nel primo ordine, & non movendo li deti della Mano quando farà ottava potra muovere i deti di mezzo, che toccheranno le terze & le quinte & nelli medesimi ordini, che toccerà le quinte perfette in quelli si ritroverà anchor le terze maggiori, piu perfettamente accordate che quelle, che noi usano." Vicentino, op. cit., f. 104v.

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20 Erroneously given as E la mi terzo instead of F fa ut secondo in terzo ordine. Ibid., f. 103v.

21 Ibid., f. 104.

22 Just such an accidental fifth is given by Vicentino as the penultimate example of a series of leaps of the fifth. Ibid., f. 145v.

23 Barbour, op. cit., p. 118.

24 "...peraiutare una consonanza." Vicentino, op. cit., f. 18.

25 Ibid., f. 21v-22.

26 "... & il medesimo sesto ordine servirà al quarto ordine à far le quinte perfette, quando discenderà dette quinte perfette." Ibid., f. 109v.

27 "... por la primera vez espanta à qualquiera eminente Organista, por ver ten grande cantidad de cuerdos, y tambien un tan gran numero de semitonos." P. Cerone, El Melopeo y maestro (Naples, 1613) f. 1041.

28 Ibid. These works have been lost according to O. Kindeldey, Luzzasco Luzzaschi's solo-Madrigale mit Klavier-Begleitung. In: Sammelbände der internationalen Musikgesellschaft, IX (1908) 562.

29 Both lutes and viols were tuned in equal temperament, "con la divisione de i semitoni pari." These equal semitones cause errors when playing with other instruments, whose semitones are unequal. But the Archicembalo and the Arciorgano can correct these defects because of the microtonal divisions. Vicentino, op. cit., f. 146v.

30 From our viewpoint, only three flats are actually employed. The E^b is notated both in its high and low positions on the staff and is thus counted twice. Later examples of "musica finta" vary from two to four in the number of flats, but always involve a transposition down a tone. Cf. Ibid., f. 46v-47v, 50-50v. There are no examples of "musica finta" given in which a sharpened pitch is corrected.

31 "...non si dè dire musica finta, ma più presto transcrittione finta, perche la Musica è notata con Quattro b. molli, che alla vista, pare tutta tramutata p[er] lo notare, & à gl'orecchi nissuna differenza si sentirà dalla Musica scritti con b. molli, à quella scritta senza come di sopra hò detto, & accio che alcuno no[n] dica Musica Cromatica à quella compositione che sarà notata con quattro b. molli, noi già nel primo libro haviamo dichiarato che cosa sia Musica Cromatica, laquale sarà la tramutatione che si sentirà quando prima serà [!] tono, poi che si tramuterà in semitono, & di semitono in tono, con le spetie Cromatiche & con la privatione del caminare per i gradi naturali." Ibid., f. 47v.

32 See supra, p. 4.

33 H. Zenck, Nicola Vicentinos L'Antica musica (1555). In: Theodore Kroyer-Festschrift (Regensburg, 1933) 87.

34 See especially G. B. Doni, De praestantia musicae veteris libri tres (Florence, 1647) 22, where he states that Vicentino and his imitators would not have fallen into error had they understood the writings of Aristoxenus and others: "Quem in errorem delapsi profecto non essent, si antiquas illas germanasque harmonias ex Aristoxeni, aliorumque scriptis, percepissent."

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35 In his discussion of the debate between Vicentino and Lusitano, Artusi states categorically that he sides with the latter: "In questa parte [that is, whether music is purely diatonic or a mixture of the three genera] io tengo col Lusitano." G. M. Artusi, L'Artusi overo delle imperfettione della moderna musica ragionamenti (Venice, 1600) f. 38. The very title of this work bespeaks Artusi's innate conservatism.

36 C. Burney, A General History of Music from the Earliest Ages to the Present Period (London, 1776-1789) III, 162.