Harpsichord & fortepiano

Vol. 19, No. 2 Spring, 2015

Musical Instrument Research Catalog
(MIRCat)

FINGERS CROSSED: Girolamo Diruta's *Il Transilvano* (1593): A RE-EVALUATION.

by Richard Lester

One of the most rewarding aspects of performing keyboard music from the Renaissance period is the opportunity to recapture early fingering systems that were in evidence during the sixteenth century, techniques that often determine our approach to shape, motion and the arrival of musical phrases, especially in music of that period. Research into the subject became paramount when I was recording the Frescobaldi series on historic instruments for Nimbus Records between 2009 and 2013, and although his music had opened up *"un nuovo mondo"* in keyboard playing, sixteenth century ideology on the subject was still a vital factor in the interpretation of the music. In essence, the fundamentum of early fingering technique is the importance placed on the middle fingers of each hand.

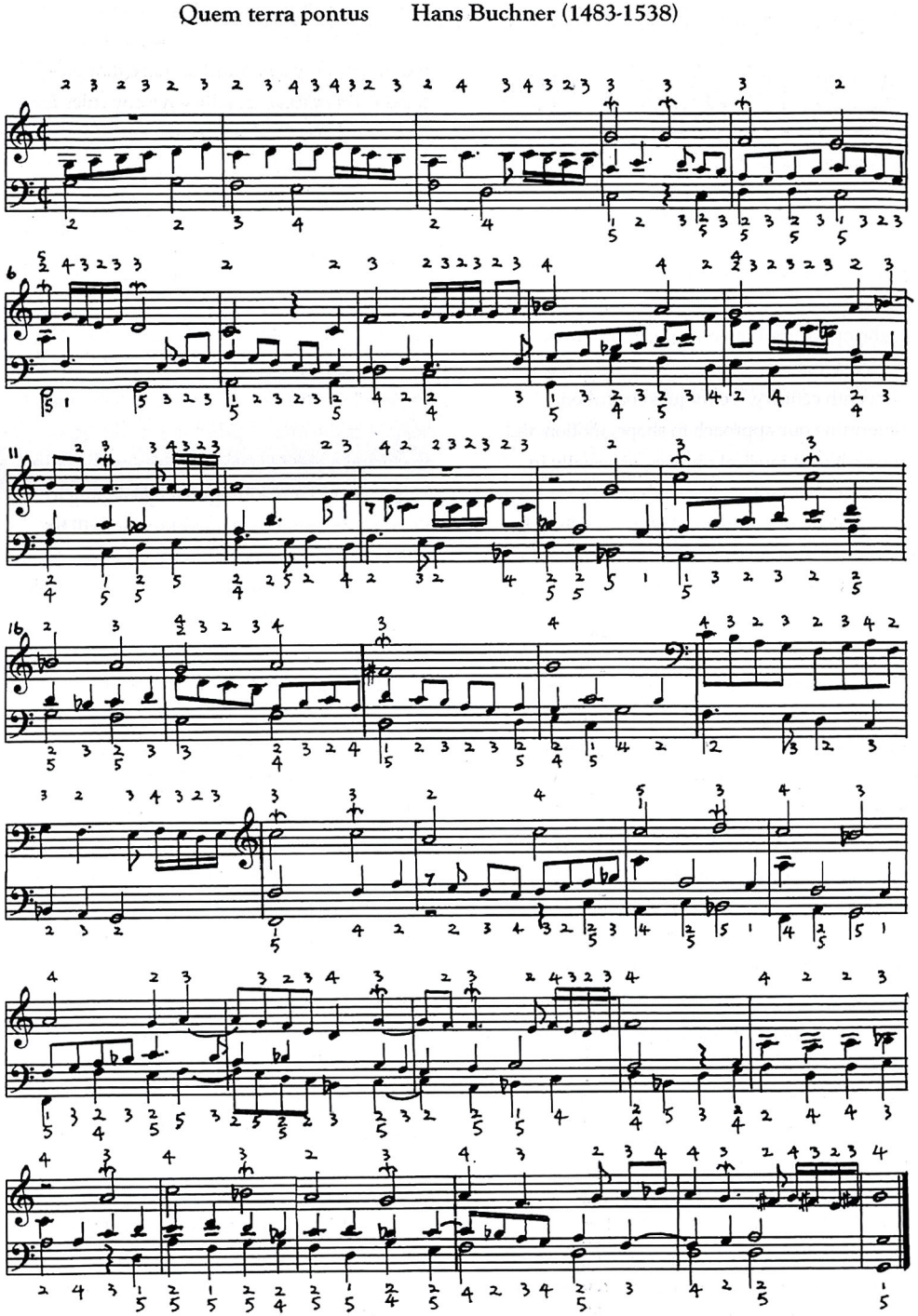
The most comprehensive early fingering treatises are those by Girolamo Diruta *(Il Transilvano, Venice 1593)* and Adriano Banchieri *(L'organo suonarino, 1605).* The principal distinction between both and modern fingering is the practice of passing a long finger over a shorter one, or, as will be seen, the reverse in Diruta's left-hand scale. More recently I began re-examining these treatises whilst working on two new recording projects: organ Masses by Girolamo Cavazzoni, Andrea Gabrilei and Claudio Merulo, and a further CD of Renaissance organ music from St Mark's, Venice.

Fresh investigation, supported by practical re-evaluation of both Banchieri's and Diruta's methods, points to the fact that, with few exceptions, scale patterns in both systems in equal length notes can and should be performed perfectly evenly, and not, as I originally assumed, slurred in pairs. If further proof of an even touch was needed, Diruta makes the point abundantly clear: "Let the fingers press, not strike the key producing a good legato and keeping the note values even;" later adding that by keeping to his rules, "a smooth and sweet sound will be attained." This is not to advocate a blanket legato in scale patterns, regardless, as careful analysis of phrase structure enters the equation; and early fingering and phrasing go hand in hand.

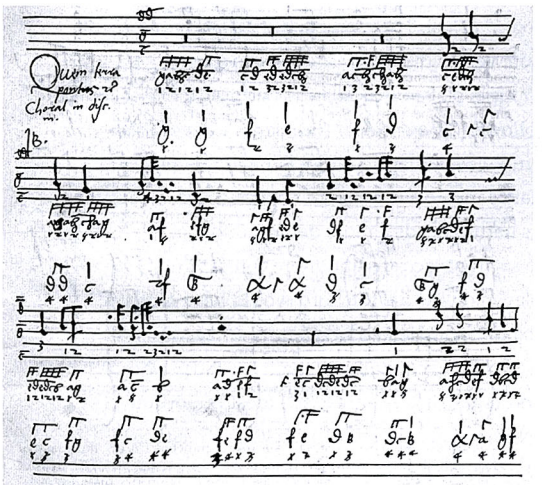
In the study of both treatises, Diruta's method, a comprehensive work in two parts, is not only presented in greater detail than Banchieri's, but is also more consistent in its approach. Primarily written for the beginner, it takes the form of a dialogue between Diruta and his pupil, Istvan de Josika, a Transylvanian diplomat who came to study with Diruta in Venice; it was the first instruction book of its kind to illustrate the technical treatment of the Italian organ in the sixteenth century. First published in Venice in 1593, *Il Transilvano* advises on how to read music, to play and to understand harmony, to transcribe vocal music for organ, and to select organ registration in relation to church modes, plus rules for singing.

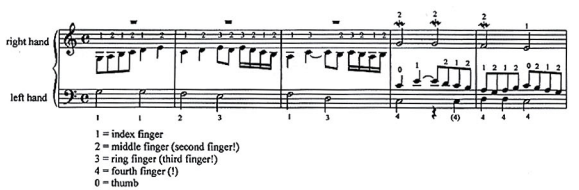
Diruta was a pupil of the great Claudio Merulo, who had been first organist at the Basilica di San Marco in Venice from 1564, and in the preface to *Il Transilvano* he gives all credit to "the most excellent Signor Claudio, my master

Ex. 1a. *Quem terra pontus* with annotated fingerings by the author.[2]



Ex. 1b Buchner, *Quem terra pontus* facsimile[3], available from http://commons.wikimedia.org/wiki/File:Buchner.png





and teacher…whose breast is a nest of courtesy." Merulo, in reply, confers upon Diruta the highest accolade, saying: "It is to my glory that he is my pupil, because in this dissertation he has brought honour to both of us." With such glowing approval, one can be certain that Merulo fully endorsed his pupil's recommendations, as he continues: "But finally it will be easy for everyone to put these rules into practice with the knowledge of the correct fingering to be used…" [1]

Other contemporary accounts also held Diruta's work in high regard, including those by Costanzo Antegnati *(L'arte organica, 1608)* and Adriano Banchieri *(L'organo suonarino, 1605)*. We can safely assume that Diruta's fingering theories followed closely those of his teacher, Merulo, and accordingly they have origins earlier than 1593. It is therefore the most pragmatic approach when studying the masters of the North Italian keyboard repertoire.

Before commencing this study, I turned my attention to other extant European treatises and the few that preceded them in historical context; and in fact, only a handful of those that predated *Il Transilvano* actually gave any rules for keyboard fingering. The earliest, by Sebastian Virdung in *Musica getutsch* 1511, explains that "it is impossible to give rules on fingering owing to the diversity of counterpoint and diminution." Not much luck there, then. Hans von Constanz Buchner, in his *Fundamentbuch* 1551, neatly illustrates his method with detailed fingering in a three part setting of the familiar Marian hymn, *Quem terra pontus.* (Ex.1)

In Buchner's system, 1= index finger, 2=3rd finger, 3=4th finger and 4=5th. There are clearly several impossible stretches that would test the largest hands. The example appears in *Early Keyboard Fingerings* by Mark Lindley and Maria Boxall[4] with the questionable assumption that "the musical effect of Buchner's technique, once it has been mastered, imposes a stylish inequality of quasi-dotting on the quavers." Buchner focusses attention on the middle fingers of each hand, reserving the thumb and fifth finger it appears, solely for intervals. There are similarities with Diruta's method, but there are also inconsistancies. Why, for example, are the last two quavers in the right hand of bar 20 marked 4 and 2, a downward interval of a third, and yet in bar 34, a similar interval is fingered 4 to 3? Both move from strong to weak notes, so why the inconsistency?

Examples of other contemporary early fingering systems can be found in Fig. (i), illustrating similarities and discrepancies which are too numerous to discuss, but which, in the grander picture, are beneficial in highlighting Diruta's treatise as a preferable instruction manual. In examining just how these particular methods of fingering and touch embraced consequences in phrasing and articulation, I concluded that there was actually little to

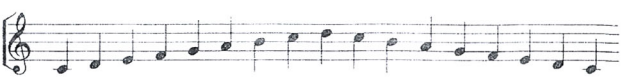
choose between any of them, and Diruta's more consistent approach, although fairly elementary in concept, provides clearer principles.

Diruta's first rule for playing is concerned with position: to sit erect and still, at the centre of the keyboard. The arm should guide the hand which must always remain straight in respect to the arm and level with the keyboard, so that the hand does not drop below the keys. The fingers should be placed lightly, evenly, curved, and relaxed on the keys. He illustrates this point by saying that if you wish to "slap a man in anger, you tense the hand and wrist, but when you wish to stroke, you keep the hand relaxed and light in touch, as though caressing a child." One further point concerns students' manner at the keyboard, advising against unnecessary contortions which make the player look like a ridiculous comedian, a comment with which Merulo also agreed.

Diruta continues by recommending the following rules for proficiency in the works of all the masters. After position at the keyboard, he concentrates on touch, already referred to: that the fingers should press, not strike the keys to produce a good legato. When the key is struck and the finger lifted from the key, part of the sound is lost. This point is illustrated with precise note values marked "Good" with a series of minims played legato, and "Bad" with crotchets followed by a crotchet rest. Separation of this kind was perhaps a rather cynical reference to dance music played on the harpsichord, which by its nature needs a more detached touch. It is safe to say that toccatas and more contrapuntal music played on the harpsichord would have received the preferred legato treatment.

Diruta, when talking about the harpsichord and organ, advises that "the most important reasons, to begin with the first, are that the instrument must be quilled equally, and that its action should be easy, and that it must be played quickly so that the sound is not lost" We sense that Diruta was rather dismissive of dance players as "If dance players wish to play something musical, they cannot help striking the keys."

Figure (i): Contemporary fingering systems[5]



Hans von Constanz	R.	2	3	2	3	2	3	2	3	4	3	2	3	2	3	2	3	2
(Implied)	L.	4	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	4
Juan Bermudo	R.	1	2	3	4	1	2	3	4	-	4	3	2	1	4	3	2	1
	L.	4	3	2	1	4	3	2	1	-	1	2	3	4	1	2	3	4
Tomas de Santa Maria	R.	3	4	3	4	3	4	3	4	-	4	3	2	3	2	3	2	3
	or	2	3	4	3	4	3	4	3	-	3	2	3	2	3	2	3	2
	L.	4	3	2	1	4	3	2	1	-	1	2	3	4	1	2	3	4
	or	2	1	2	1	2	1	2	1	-	3	4	3	4	3	4	3	4
Nicolaus Ammerbach	R.	2	3	2	3	2	3	2	3	4	3	2	3	2	3	2	3	2
	L.	4	3	2	1	4	3	2	1	2	3	2	3	2	3	2	3	4
Antonio Cabezon	R.	3	4	3	4	3	4	3	4	-	4	3	2	3	2	3	2	1
	L.	4	3	2	1	4	3	2	1	-	1	2	3	4	3	4	3	4
Adriano Banchieri	R.	3	4	3	4	3	4	3	4	-	3	2	3	2	3	2	3	2
	L.	3	2	3	2	3	2	3	2	-	1	2	3	4	3	4	3	4
Girolamo Diruta	R.	2	3	4	3	4	3	4	3	4	3	2	3	2	3	2	3	2
	L.	4	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2

He later continues

> *"The same effect that one derives from the organ, that of sustaining the sound, should be employed on a quilled instrument; for example, when a breve or semi-breve is played on an organ, one hears the entire sound without again pressing the key, but when playing the quilled instrument for the same note duration one loses half the sound. One must then, with the vivacity and dextrousness of the hand, make up for the lack of sound by striking the notes often and gracefully. In brief, he who wishes to play sounds cleanly and gracefully, should study the works of Signor Claudio Merulo, and here he will find all that he seeks."*[6]

This is further evidence not only of an even and legato touch on both instruments, but strong attestation of re-striking notes on the harpsichord that fade, due to the nature of the instrument; especially on Italian harpsichords where the sound decays rapidly. Re-striking notes is distinctly more effective in some of the glorious tied suspensions in many of Merulo's toccatas. What sets early fingering apart from our accepted modern system of freely using the thumb and fifth finger, referred to earlier, is the importance it places on the middle fingers of each hand.

Diruta makes a distinction between "good" and "bad" fingers. "Good" fingers play the accented or "good" notes and the "bad" fingers play the unaccented or "bad" ones: viz, the first and third notes in groups of four continuous equal length notes would be classed as "good" notes and the second and fourth as "bad." He numbers the fingers 1 to 5 starting with the thumb. The thumb makes a bad note, the second, a good one; the third, a bad one; the fourth a good; and the fifth a bad. The second, third, and fourth fingers are those which play all the fast notes. The same is true of the left hand.

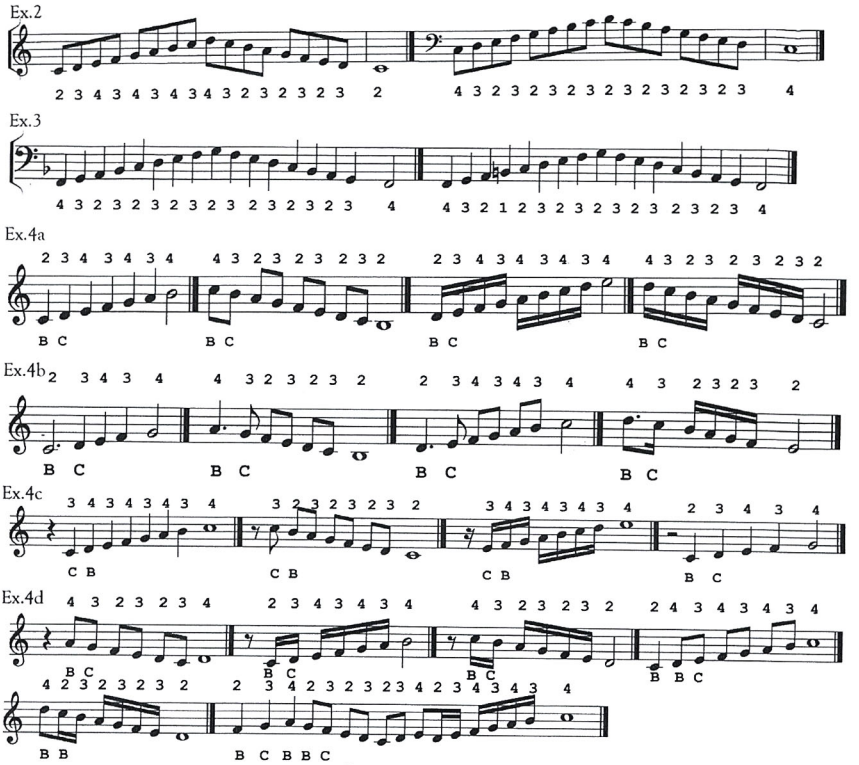
Generally speaking "good" notes are played with 2 and 4, and "bad" with 1, 3 and 5. The 1st and 5th fingers though are generally reserved for "bad" notes that leap a third, fourth and fifth. Diruta's rationale concerns scale passages in which the right hand, crossing the longer digit over the shorter one, ascends one octave from c with 234343434....stipulating that the last note {d} should be played with the fourth finger, and descends, 432323232; whilst the left hand ascends from c 432323232 to d, and descends 232323234; ergo crossing the shorter digit over the longer. (See Ex.2)

Diruta's reasoning here concerns the apparent weakness of the 4th finger in the left hand to that of the right. This may appear initially awkward, but becomes quite a natural movement with practice, especially heeding Diruta's important advice of letting the arm guide the hand. Difficulties often arise in scale passages when accidentals are encountered, but the principle in Example 2 remains. He continues by emphasizing the complication in passing the thumb over B-flat in the left hand: whereas by using the 3rd finger, "the most frequently used", the problem is overcome. It should be noted here that Diruta says that "the use of the thumb is good when playing B-natural."[7] The following (Ex.3) is given, to which I have added fingerings.

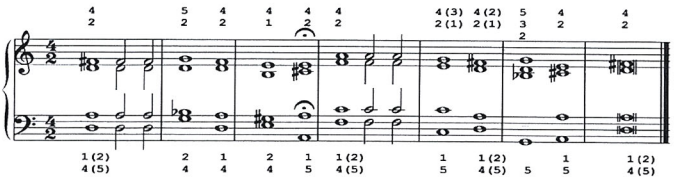
Further illustrations include notes of different values, and notes with rests where the good finger is marked with the letter B (*buono*), and the bad finger as C (*cattive*). (Ex. 4a, 4b, 4c and 4d).

Diruta continues: "You will find that the first of these species of black keys must be played with the good finger except those that have rests of the same value as the notes, as you will see in the third example." No reference though to black keys appears in any of the examples that follow and we can only assume that sequences with accidentals follow the principle of Example 2. However, when such passages arise, they can prove challenging, especially at speed. Figure (ii) illustrates another couple of enigmatical points where the thumb would be an easier option; so when Diruta stipulates that all fast passages are to be played with the "second, third and fourth fingers," it leaves us in a quandary, but one must accept that there

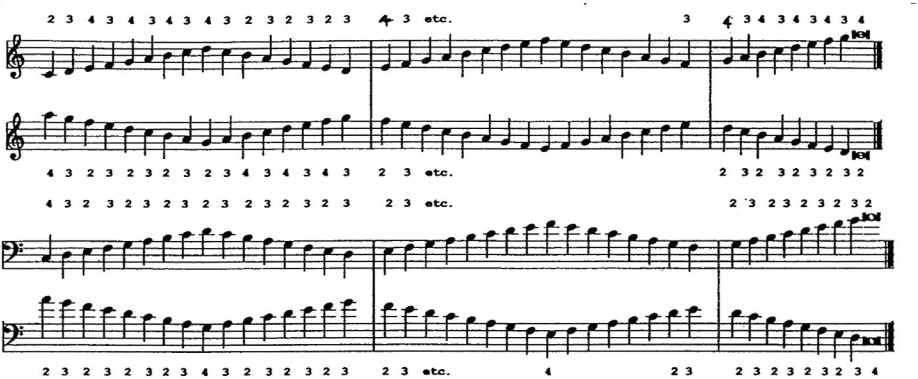
Ex. 2-4 from Mark Lindley and Maria Boxall, *Early Keyboard Fingerings: an anthology.*



Ex. 5. from Mark Lindley and Maria Boxall, *Early Keyboard Fingerings: an anthology.*



Ex. 6. from Mark Lindley and Maria Boxall, *Early Keyboard Fingerings: an anthology.*



Harpsichord *& fortepiano*

Figure (ii). Examples of contemporary fingerings

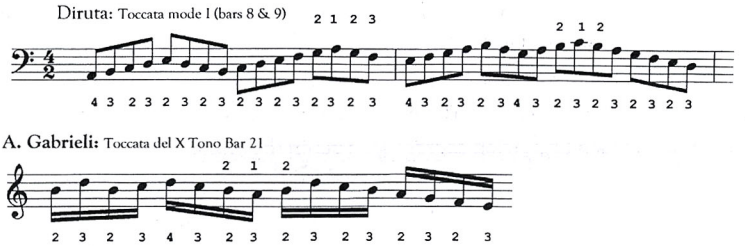


Figure (iii). Examples of fingering for intervals

Intervals	3rd	4th	5th	6th	7th	Oct
Hans von Constanz	4	-	5	5	-	5
Buchner	2	-	2	2	-	1
Juan Bermuda	3 4	-	-	4 5	-	5
	1 2	-	-	1 2	-	1
Tomas de Santa	2 3 4	-	5 4 3	5 4 3	-	5
Maria	1 1 2	-	2 1 1	2 1 1	-	1
Nicolaus Ammerbach	4	5	5	5	5	5
	2	2	2	2	1	1
Antonio Cabezon	2 3 5	-	4 3	4 3	-	-
	4 1 3	-	1 1	1 1	-	-
Adriano Banchieri	4	4(5)	5(4)	5	-	5
	2	2	2(1)	2	-	1
Girolamo Diruta	Fingers most convenient		4 5	Fingers most convenient		5
			1 2			1

will always be exceptions where common sense prevails. Just why Diruta and others considered the thumb to be so inconsequential is a mystery. Juan Bermuda's preference for 12341234 in an ascending right hand passage and 43214321 in the left is fairly unique; that then poses the question as to whether the thumb passes under or makes a lateral movement; a point not discussed in any other treatise.

When recording the Frescobaldi series, I was afforded the luxury of a split-keyed [chromatic] harpsichord of c1619 by Giovanni Boni with 16 notes to the octave; the advantage of this arrangement increases the tonal parameters that fall outside of the mean-tone comfort zone.[8] Contemporary fingering techniques were also designed to embrace a more complex chromatic harpsichord with 19 notes to the octave, and quite common in Italy up to around the mid-sixteenth century. Another factor that facilitates a more fluent execution is the shallow touch, especially on Italian keyboard instruments; a further bonus is that the height of accidentals above naturals on both Italian organs and harpsichords is generally lower than those on European models: the aforementioned Boni harpsichord was a case in point.

Il Transilvano also contains useful advice for playing intervals and I have included these in Figure (iii.) Octaves are to be played with 5 and 1, a fifth with 4 and 1 or 5 and 2, while the intervals of the sixth, fourth and thirds are played with the most "convenient fingers." Diruta makes no mention of fingering for chords, but Adriano Banchieri *(L'organo suonarino, 1611)* clarifies the point. He advises that generally in the right

hand, a root position chord e.g. (f a c) would be fingered with 2 4 5, a first inversion chord (a c f) with 2 3 5, and a second inversion chord (c f a) with 2 4 and 5. In the left hand, root position (f a c) is 5 4 2, and a first inversion 5 4 and 2. There are no suggestions for a second inversion chord, but one assumes it to be 5 3 and 2; identical treatment also applies to chords with accidentals. Chordal progressions generally received more varied degrees of detachment and a legato touch was less in evidence, a point implied by Diruta's own suggestions for fingering an Intabulation (a method of transferring a vocal piece into instrumental tablature), with Ex. 5.

Diruta's fingerings are shown with thirds played with the most convenient fingers. The exercises that follow in *Il Transilvano* are directed at the more proficient performer and written in the form of scale passages for each hand for the specific purpose of fluency (See Ex.6.) Note the swivel action required in the left hand on the last two crotchets of bar 1 moving into bar 2. There may well be a case for using the thumb here, which Diruta has already implied when discussing the left hand B-natural. (See Ex. 3). Early on in part one of *Il Transilvano,* Diruta says that although certain skilful players use the first and second finger in the right hand, or the fourth finger in the left hand in descending scales, he considers their use very clumsy adding that "if organists would keep their hands flexible, they could easily negotiate the most difficult passages."

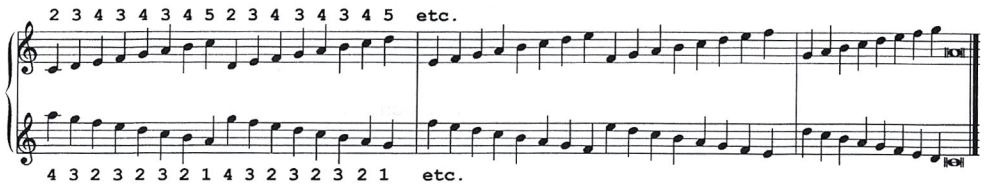
What follows is a discussion of good and bad leaps. A good leap is that of an octave or sixth or any other consonant or dissonant interval, providing it is the good note that leaps. A leap is bad when jumping to one of the aforementioned intervals and in this case, can be made with the first, third or fifth finger, as one pleases, with either hand. Diruta, in explaining about the third finger, also tells Transilvano that "At times, one finds bad notes which make wide leaps of a third, fourth, and fifth. In this case, these can be made with the first and fifth fingers, as one pleases, and can be done conveniently with one hand or the other." To my mind there is some confusion over which digit actually leaps, so a certain amount of common sense is needed and will be explained later in the musical examples. This section is concluded with the following advice that when the fingers are playing an ascending passage with the right hand, the second finger and thumb are often tensed and the fifth finger curved in too far causing tightness and a decrease in speed. Keeping the hand light and supple will assist the negotiation of difficult passages with ease. Diruta's examples demonstrating leaps are shown at (Examples 7, 8, 9 & 10, all from Mark Lindley and Maria Boxall, *Early Keyboard Fingerings: an anthology.*)

In part II, Book I of *Il Transilvano,* Diruta is asked by Transilvano to explain *"groppi"* and *"tremoli."* Diruta replies that there is a variety of both types used in the process of diminution. The *groppo* divides long notes into a melodic movement of quavers and semiquavers that in essence resembles an elongated modern turn. (See Ex.11) *Tremoli* are trills which may be used at the beginning of Ricercari or Canzoni or anywhere else where desired. The rules for "good" and "bad" notes do not apply to *tremoli* and are played with successive fingers, no matter which finger falls upon it; the second and third fingers are suggested and the bad finger may play the first good note of a *tremolo.*

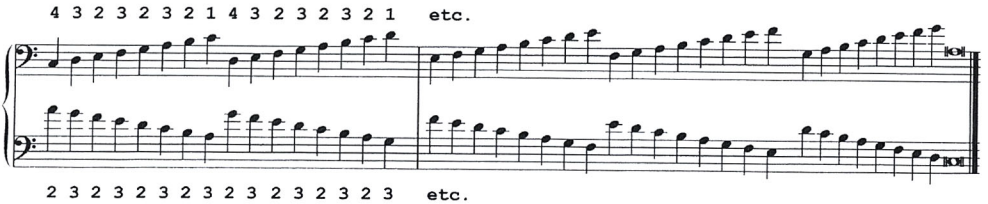
Example 12 however is rather ambiguous. Transilvano inquires how to perform this tremolo to which Diruta replies, "With the second and third fingers. The tremolo which follows is played with the fifth and fourth (?), and these are the fingers which play the tremolo with the right hand." He continues, "I must advise you in this case that the bad finger may play the first good note of the tremolo;" this surely means the third and fourth finger plays the second tremolo. (See Ex. 12, 13 & 14).

When discussing *tremoletti* (Diruta's name

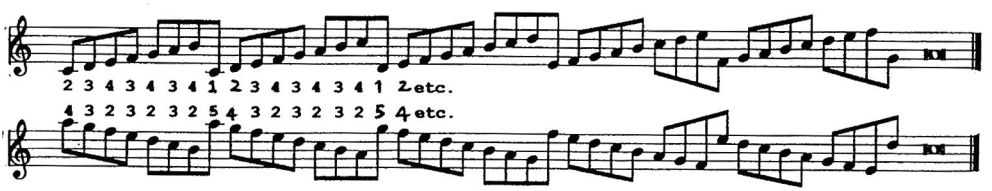
Ex. 7 Exercise for good leaps with the right hand



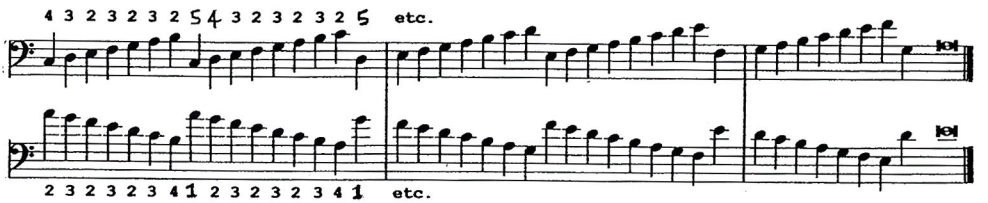
Ex 8 Exercise for good leaps with the left hand



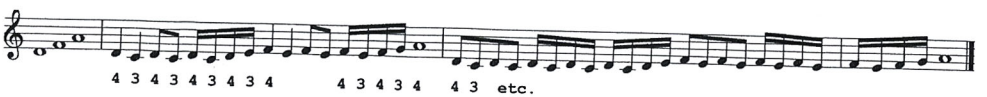
Ex. 9 Exercise for bad leaps with the right hand



Ex. 10 Exercise for bad leaps with the left hand



Ex. 11, from Mark Lindley and Maria Boxall, *Early Keyboard Fingerings: an anthology.)*

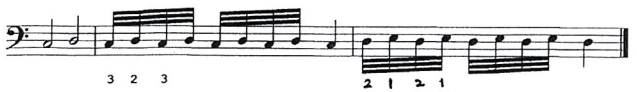


for a trill of only one or two oscillations and often used by Merulo to embellish notes that descend by step), he advises that "when you find a *tremoletto* on any one note, you must execute it with the succeeding finger, whether good or bad, because in the case of *tremoli*, one should not observe the rule for good and bad fingers." With reference to *tremoletti* on syncopated notes he states that "they should be played with those fingers most convenient in order to execute the passage." (See Ex 15.)

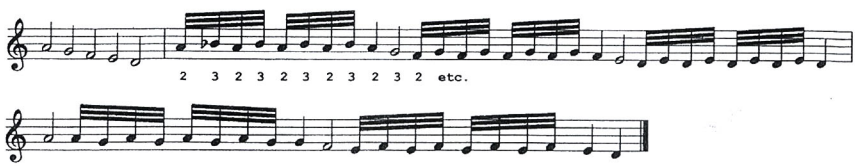
Transilvano clarifies Diruta's advice stating that "The first *tremoletto* falls on a good note and is played with the second and first fingers in the left hand. The second *tremolo* of four biscromes (demi-semi quavers) falls on a bad note, so, in

Ex. 12

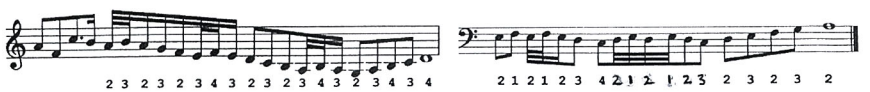
Ex. 13



Ex. 14



Ex. 15



playing it with the third and second fingers, you cannot complete the passage with the fingers in order. This is caused by the syncopation which enters on the bad note. The good note of the *tremolo* should be played with the second and first fingers." Diruta agrees that Transilvano has understood, but adds that the same is true of the right hand in similar passages. This whole section concludes with a set of pieces for Transilvano to practice, "just as one who has never studied should, by observing my rules, improve in a very short time."

Frederick Hammond, in his book *Girolamo Frescobaldi*, comments that "The instrumental and vocal tutors of the sixteenth and seventeenth centuries demonstrate the central importance of articulation by their extended considerations of breathing, tonguing, fingering and bowing. Serious organists and harpsichordists may profit by their example to move beyond the nineteenth-century concept of "touch" as a blanket articulation – legato, staccato and half-staccato – applied to a given passage like paint from a roller."[9] There is no doubt that to the trained ear, a discernable difference between early and modern fingering is evident, a practice that every serious performer of Renaissance music should address, and a vital factor in drawing the performer closer to its demiurgic roots; this is a consideration that modern fingering tends to disregard. It is only when technical dexterity is sufficiently accomplished that the shaping of musical phrases can be perfected. Ricercari, canzoni *alla francese* and toccatas were improvised on a daily basis in churches throughout Italy. The genuine impromptu performance relies on a convincing improvisatory experience from the score, a discipline that requires an accomplished keyboard technique, thorough preparation and musical insight.

Diruta wrote *Il Transilvano* for the beginner and towards the end of his preface he acknowledges that "One arrives at perfection by steps, by time, and by study." His teacher, Claudio Merulo to whom *Il Transilvano* is dedicated, praises the work of his pupil saying that "Every diligent person should study this book……This work is a bright light to keep one progressing in darkness." Students who study this rudimentary treatise will develop a sound

basis from which a virtuoso technique in early fingering can be developed and perfected, whilst maintaining fundamental principles.

Below are some musical examples by Diruta and Merulo in context which I hope will allay most queries, although it is impossible to cover everything. However, there is always a solution and I should be pleased to answer any queries that readers may have via email: mimo45@tiscali.co.uk An accompanying DVD with the Nimbus release of Masterworks and Miniatures, a CD devoted to composers associated with St Mark's, Venice demonstrates many of the points made in this article.

In the second part of this article entitled Frills and Trills I intend to discuss the way in which diminutions were used quite freely in keyboard music with interesting examples that answer many questions.

Musical Examples in context

I have prepared three more musical examples with fingering by myself, according to the principles of Diruta. The annotated scores can be found at www.hfmagazine.info/home/archive

Diruta, Toccata per Organo, from the appendix to *Il Transilvano,* Online, *at International Music Score Library Project,* < http://imslp.org/wiki/Il_Transilvano_%28Various%29>, Accessed 1 November 2014.

Diruta, Toccata di Salto Cativo del Sesto Tuono, (Rome: Cristiano Accardi, 2006) at http://imslp.org/wiki/Toccata_di_Salto_Cativo_del_Sesto_Tuono_%28Diruta,_Girolamo%29 International Music Score Library Project , Creative Commons Attribution 3.0.10

Merulo, Toccata Settima Ottavo Tono 1604, from Merulo, *Toccate d'intavolatura d'organo libro primo e secondo,* ed. Laura Alvini, Archivum Musicum: Collana di testi rari 43 (1598 and 1604); facsimile reprint, (Florence: Studio per Edizioni Scelte, 1981): 28-9.

Diruta's *Toccata per Organo* included in the appendix to *Il Transilvano* is an excellent and straightforward starting point for any performer interested in experimenting with his fingering system. At the outset to this article I claimed that to a certain extent, 16th-century fingering techniques govern our approach to the shape, motion and arrival of musical phrases. As so often happens, a long phrase can be performed more easily with modern fingering if any leaps are involved; but this is not the object of the exercise. Frederick Hammond states that, "Since they (early fingerings) are less capable of unlimited extensions – or at least concerned with it – they force the performer to consider smaller units of meaning and their relation one to another. The study of 17th- century fingerings is thus perhaps the simplest (but by no means the only) way to bring the keyboard player up against the question of articulation." [11]

Diruta's *Toccata on the VIth mode* is a good example of negotiating leaps and I have given a few alternatives. Certainly leaping with the third finger in most cases breaks up a phrase neatly into sensibly smaller units. If we examine the right hand of bar 4 in Merulo's *Toccata Settima,* modern fingering would allow an uninterrupted continuation of the long phrase beginning in the right hand semiquavers to the C Major cadence of bar 5. Diruta has previously explained that a good leap is one which is made on an accented note and a bad leap is one which is made on an unaccented note. He also refers to the fact that when a bad note makes wide leaps, the thumb and 5th finger may be used as is convenient in either hand. In bar 4 of the Merulo example, the long phrase reaching its climax on top D, a good note, then leaps a 7th to the bad note, E, presumably with the thumb, therefore implying a musical break in the phrase: using a third finger at this point would force a break in the

phrase and is just another of many examples where fingering causes a re-assessment of phrase structure in smaller units.

Bars 3 and 4 of the Merulo Toccata present another minor complication: that of achieving a smooth transition from an accidental to a natural. Note that in the second group of semi-quavers in bars 3 and 4, the 2nd finger on F# moves to E with 3. In order to execute a legato progression, the hand must incline towards the E, returning to F# with 4, then placing a 3rd finger on G. Similar keyboard problems occur elsewhere, but are attainable with diligent practice.

1 This and all following translations are taken from Catherine Crozier, *"The principles of keyboard technique in Il Transilvano"* (Master of Music Dissertation, University of Rochester, 1941): 20, 22.

2 Mark Lindley and Maria Boxall, *Early Keyboard Fingerings: an anthology,* (London: Schott, 1982): 34. Fingering here are added by Richard Lester.

3 Public Domain at http://commons.wikimedia.org/wiki/File:Buchner.png
Source c.1525. Transcription from tablature and edition by Wetwassermann - with original fingering, 2006.

4 Lindley and Boxall, viii.

5 Fingering table as summarized by the author includes information from Hans von Constanz Buchner: *Fundamentbuch* 1551; Juan Bermuda: *Declaración de instrumentos musicales*, 1555, 5 vols; Tomas de Santa María: *Arte de tañer fantasia*, Valladolid, 1565; Nicholas Ammerbach: *Orgel oder Instrument Tabulatur*, Leipzig 1571; Antonio Cabezon: *Obras de musica para tecla, arpa y vihuela*, 1578; Girolamo Diruta: *Il Transilvano* (Venice 1593); Adriano Banchieri: *Conclusioni nel suono dell' organo* (Bologna, 1608). First five items taken from Mark Lindley and Maria Boxall, *Early Keyboard Fingerings: an anthology,* (London: Schott, 1982): xi. The Banchieri and Diruta fingerings at the foot of that table are taken from Frederick Hammond, *Girolamo Frescobaldi*, (Cambridge, Mass. and London: Harvard University Press, 1937): 234.

6 Crozier, 22.

7 Crozier, 25.

8 Readers can visit www.richardlester.org.uk, click on "videos" and "Frescobaldi Unmasked" for further information on the Boni instrument.

9 Frederick Hammond, *Girolamo Frescobaldi*, (Cambridge, Mass. and London: Harvard University Press, 1983): 235.

10 Diruta, Toccata di Salto Cativo del Sesto Tuono , (Rome: Cristiano Accardi, 2006) at http://imslp.org/wiki/Toccata_di_Salto_Cativo_del_Sesto_Tuono_%28Diruta,_Girolamo%29 International Music Score Library Project , Creative Commons Attribution 3.0.

11 Hammond, 235.