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Title: The laws of counterpoint deduced from phenomena and confirmed on the basis of reason by Count Giordano Riccati, First Book

Original title: Le leggi del Contrappunto dedotte dai fenomeni, e confermate col razionecinio dal Conte Giordano Riccati, Libro Primo

Source: Udine, Biblioteca Comunale, MS 1026/II,1-249

[-1-] Chapter one

On the consonances

[signum] 1. It is known to be true that the nature of sounds consists in a series of vibrations of any sonorous body that by means of the air are transmitted to the auditory nerve and, once they reach the brain, they produce the sensations in our mind that we call sound. Given that the vibrations are all synchronous and of determined duration, which occurs in a sonorous body when its dimension, mass and elasticity remain constant, in that case the sound proves to be always the same in relation to its high or low pitch. Therefore, two bodies whose vibrations are of equal duration, so that one and the other produce the same number of vibrations in a given time are said to be in unison or to produce the same sound. In fact, if the vibrations of a sonorous body last longer and are fewer, while the ones of another one are shorter and frequent, in that instance the sounds prove to be different, namely the first one is lower and the second one is higher. This is all the more true when the durations of the vibrations are in a more extreme ratio between them, which corresponds to the fact that the lower-sounding body produces a smaller number of vibrations than the higher-sounding body.

[-2-] [signum] 2. Therefore, the sounds can be expressed equally well with numbers in two ways that are one the opposite of the other: either by indicating with them the number of vibrations produced by several sonorous bodies in a unit of time, or by distinguishing with numbers the durations of said vibrations, which durations must always lay in reciprocal ratio of the number of vibrations produced at the same time. In truth, if a string vibrates once in the space of time in which another one produces two vibrations, it is clear that the duration of a single vibration of the first string will be twice as long as the duration of a vibration of the second string. Therefore, if any series expresses the numbers of the vibrations produced by several sounds in a unit of time, the inversion of the series will be employed to indicate the durations of the vibrations of said sounds. For instance the series that denotes the number of the oscillations produced in a unit of time will be arithmetic, the durations of said oscillations will be expressed by an harmonic series which is the inversion of the arithmetic one. Conversely, if the numbers of the vibrations will respond to each other according to a harmonic series, one shall find that the durations lay in arithmetic progression. According to the first method of expressing the sounds, the smallest number is ascribed to the lowest sound that in a given time [-3-] produces a smaller number of vibrations than the high sounds. The complete opposite of this occurs according to the second method, and, because the lower sound, or the bass, takes so much longer to produce a vibration than the time employed by the high sounds, it will follow that the larger numbers are suited to the bass. Now, the Reader must know that it is my intention to express the sounds according to the first method, or according to the number of vibrations produced in a given time. The single reason that moves me to do so is the greater ease with which the musical consonances are represented in this way. In the following chapter we shall observe that the most exquisite consonant accompaniment is expressed through the arithmetic series 1, 2, 3, 4, 5, 6, whose six terms represent the number of the vibrations produced at the same time by as many sonorous bodies. Who wanted to indicate the same accompaniment through the duration of the vibrations would

have to employ the harmonic series of the fractions, namely, 1, 1/2, 1/3, 1/4, 1/5, 1/6. The most simple whole numbers to which the aforesaid progression can be reduced are the following ones: 60, 30, 20, 15, 12, 10.

[signum] 3. The most learned creator of nature structured our ear with such mastery [[that it is very extremely perceptive in discerning the ratio between the vibrations of the sonorous bodies. An extremely clear judgement]] that [[it ascribes [-4-] some very simple proportions]] to the simplest ratios between the durations of the vibrations of the sonorous bodies, [[in such a way that it is able to discern if the interval 1:3 is altered by a sixth of a comma, which is roughly 80:80 1/6 or 480/481, by distinguishing the addition or subtraction of a single unit to 480 in relation to the ratio 1:3 or 480:1440. As one moves on to ratios that are progressively less simple, the judgement of the ear becomes at first less clear and finally obscure and confused. Now, since these are not intellectual, but perceptive judgements, a more or less pleasant sensation corresponds to a judgement that is more or less clear that we call consonance, while a sensation more or less sharp that we call dissonance corresponds to a judgement that is more or less obscure. Moreover]] [correspond in the soul some pleasant sensations that are called consonant harmonies. These prove to be all the more simple and direct the simple is the proportion between the lengths of the vibrations. Hence the ear distinguishes a consonance from the other, for instance, the octave from the fifth and the fifth from the fourth, and it understands its exactness all the more, the greater it is their simplicity. It arrives to perceive in the fifth the alteration of a sixth of a comma 80:80 1/6 or 480:481, by which the fifths corresponding to the white keys of the organs and of the harpsichords are reduced. Once the simplicity of the ratios is reduced beyond the limits that are determined by experience, the harmonies begin to become sour and turn into dissonances. Many other sensations of ours add. in marg.] have the common feature that they appear pleasant up to a certain degree, but, once this limit is surpassed, they turn into unpleasant sensations. As proof that this is true, it is enough to reflect on what happens to us all the time. Let us approach a fireplace, for instance, and, as long as it sets our fibres into a bland motion, it produces a pleasant sensation, but, when it is too strong, then the sensation becomes unpleasant and it is not called warmth any longer, but it is described with a different name as a burning sensation.

[signum] 4. After these necessary premise I move on and I state, on the basis of experience, that there are three species of intervals that please the ear, namely, the aequisonances, the perfect consonances and the imperfect consonances. The simplest of the aequisonances is the unison, which is heard, as we have noted at [signum] 1, every time that two sounds produce the same number of vibrations in the same unit of time, and, therefore, a single vibration of the first sound is of the same length as a vibration that belongs to the second sound.

These two sounds, as to their pitch, are nothing but the same sound and must be expressed by the proportion of equality 1:1, which indicates the unison. Although the title of aequisonance is to be ascribed, strictly speaking, only to the unison, nevertheless experience teaches us that the same name must be assigned to all the proportions contained in the double series, namely, 1, 2, 4, 8, 16, 32 etcetera, which are very similar to the unison,

[Riccati, The laws of counterpoint, 5; text: Equisonanze, Unisono 1: 1, Ottava 1:2, Doppia, o Quintadecima 1:4, Tripla, o Ventiduesima 1:8, Quadrupla 1:16, Quintupla 1:32]

and so on. I shall provide further on [-6-] at [signum] 18. the reason why music theorists have applied the aforesaid names to such intervals.

[signum] 5. The perfect consonances follow the aequisonances in sequence. After the unit, the simplest odd number is three. Multiply this number by the series of double numbers 1, 2, 4, 8 etcetera, so that the result is also the series of double numbers 3, 6, 12, 24 etcetera that has the number 3 as its basis. If the numbers of the series of the series 1, 2, 4, 8 etcetera are compared to those of the series 3, 6, 12, 24 etcetera, the ratios that are produced place the perfect consonances in front of our eyes. These perfect consonances are none other but the simple fifths and fourths, or their compounded which consist of the a simple one with the addition of one or more octaves.

[Riccati, The laws of counterpoint, 6; text: Consonanze perfette. Duodecima, o Quinta sopra l'Ottava 1:3, Quinta 2:3, sopra la doppia Ottava 1:6, tripla 1:12, quadrupla 1:24, e così di seguito. Quarta compimento all'Ottava della 3:4, Undecima, o sopra 3:8, 3:16, 3:32]

[signum] 6. One shall find the imperfect consonances by comparing the numbers of the double series 5, 10, 20 etcetera, which is based on [-7-] the odd number five, which comes after the number three as to its simplicity, with the terms of the two series 1, 2, 4, 8, 16, 32 etcetera, and 3, 6, 12, 24 etcetera.

[Riccati, The laws of counterpoint, 7; text: Consonanze imperfette. Terza maggiore sopra la doppia Ottava 1:5, Decima 2:5, 4:5, tripla 1:10, quadrupla 1:20, e così l'altre replicate della Terza maggiore. Sesta minore compimento all'Ottava 5:8, minore sopra l'Ottava 5:16, 5:32, a cui si aggiungano, se si vuole, le più composte replicate della Sesta minore. 3:5, 3:10, 3:20, e così di mano in mano. 5:6, 5:12, 5:24, con tutte l'altre più composte replicate d'essa.]

[signum] 7. The number five is the last of the odd numbers that represents a consonance, since, if one moves on to the number seven, one begins [-8-] to cross the border with the dissonances, as we shall see at the appropriate place. [(a) third book, first chapter. add. infra lineas] The great simplicity of the octave 1:2 produces such an impression onto our ear that the sounds that constitute it are conceived almost as one and the same sound. Therefore, it should be given the title of aequisonance, rather than the one of consonance. In the fifth and in the other perfect consonances one hears a certain spirited character, but they abound, I would almost say, with redundant sweetness, which would render a composition soon too cloying, were it to consist only of perfect consonances. Finally, the imperfect consonances contain within themselves a most agreeable mixture of sweetness and sourness, but the sourness occurs in such a calibrated dose that its only scope is to garnish them and render their taste more full of flavour. As we enter the off numbers 7 and 9, the sour element is too pronounced in the intervals in which it occurs, and the impression that develops in the ear proves to harsh that it should be. Therefore, said interval need to be employed in counterpoint with the precautions that shall be explained at the appropriate time [(a) Third book, first chapter. add. infra lineas], and that suit their character more or less dissonant.

[signum] 8. The considerations that I am about to express, which are absolutely essential for the practice of counterpoint, will rest entirely on the observation of phenomena, since no progress can be made at all in physics without following its lead. The octave 1:2 is expressed by such a simple proportion that, as I also said ([signum] 7.), the ear judges the sounds that constitute it as identical. If one is asked to sing a sound that is beyond the limits of its voice, it shall occur often that that person shall sing it unwittingly at the higher or lower octave, while being convinced to be sing at the unison.

Therefore, it is with good reason that music theorists ascribe the same letter to two notes that answer each other at the octave, and, for instance, if the lower note is called C, the high one is also called c. They also forbid with good reason that two octave should be employed one immediately after the other, namely, that while a part moves from low C to low D, the other one should rise from high c to high d, because in that instance the movements C D, c d do not represent the movements of two parts, but of a single one. From the fundamental property of the octave, which, were it not pointed out to us with a finger by experience, intellectual reasoning alone certainly would not be able to uncover it, one can deduce many accessory and secondary properties that I shall be pointing out as we proceed.

[signum] 9. Firstly, since the sound 1 is the same as the sound 2, and, for the same reason, the sound 2 is the same as the sound 4 and the sound 4 the same as the sound 8 etcetera, there follows as a consequence that the sound 1 is identical to the sound 4, to the sound [-10-] 8, to the sound 16 etcetera, while the double octave 1:4, the triple 1:8, the quadruple 1:16 etcetera deserve the title of aequisonances just as the simple octave does. This prerogative, that the intervals 1:4, 1:8, 1:16 etcetera, that derive from doubling, trebling and quadrupling the octave, decay so little as to their perfection as to deserve the same degree of it as the octave itself, namely, to be called aequisonances, is so particular of the octave as it is closely related to the unison, that there is no other interval that, when it is doubled, trebled etcetera maintains the character of the simple one. The reason derives from the fact that if one moves even by a single step from the ratio 1:2 to the other one 1:3, which immediately follows in the sequence of simplicity, it is true that one notices in it a residue of the unison, because of which two adjacent twelfths do not produce a good harmony and are forbidden in counterpoint, but this remnant is so small that it cannot for the basis of a reasoning corresponding to the one through which it was proven that the character of the simple octave is preserved by the double octave, the triple octave and so on. In fact, experience teaches that the interval 1:9, which is nothing but the ratio 1:3 multiplied by itself, or, shall we say doubled, is not excluded from the perfect consonances, but it pinches the ear in such a way that, as we shall see at the appropriate place [(a) Third book, first chapter, [signum] 3. add. infra lin.], it cannot be added to a consonant accompaniment, [-11-] except with aid of a previous preparation. [[The interval <...> that results by trebling the twelfth proves to be so inelegant that is completely banished from harmony.]] If we move on from the ratio 1:3 to the one immediately more complex, namely, 1:5, and we try to double it so that we obtain the ratio 1:25, the ear experiences to be of a very austere character [[which prevents it from being added as it is or after any proportion to the consonant accompaniment.]] The unison has lost every power in the mentioned ration 1:5, hence, one can employ quite successfully two major thirds above the double octave 1:5.

[signum] 10 The second property of the octave is that, whether it is added to an interval or detracted from another one that is greater than the octave, the additions and the remainders preserve the nature of the original interval. Thus, as the fifth above the octave 1:3 is a perfect consonance, the simple fifth 2:3 and the fifth above two octaves will be also such. Moreover, as the sounds 1, 2 and also the others 3, 6 almost as unisons, one can deduce that the intervals 2:3, 1:3, 1:6 represent almost the same interval, they are easily interchangeable in music and are subject to the same laws, so that, if two consecutive twelfths are forbidden, [-12-] the prohibition also extends to the ratios 2:3 of the simple fifth and 1:6 of the fifth above the double octave etcetera. On the strength of what was said, all the intervals that are larger than the octave are regarded as compounds of the interval that does not admit new subtractions of the octave, since it is smaller than the octave. Thus, the perfect consonances 1:3 and 1:6 are called compound intervals of the

fifth 2:3, since the first originates from replicating an octave beneath the sound 2 and the second one from replicating both the sounds 2 and 3, the first one at the lower octave and the second one at the higher octave. Therefore, I stated ([signum] 5) that the perfect consonances are nothing but fifths or fourths, either simple or compounded and, equally, the imperfect consonances are reduced to four classes, namely, major thirds, minor sixths, major sixths and minor thirds with their compounded intervals.

[signum] 11 one must consider the third property of the octave the fact that the interval that, added to an original interval, completes one octave or more must be ascribed to the same species of consonance as the original one. Therefore, the title of perfect consonance is ascribed correctly to the fourth 3:4 because it completes the ration 1:3 to constitute the double octave and the ratio 2:3 to create the simple octave, and 1:3 and 2:3 are both perfect consonances. Similarly, since the major third 4:5 and the [-13-] major sixth are imperfect consonances, the minor sixth 5:4, which combined with the major third constitutes the octave, and the minor third 5:6, which combined with the major sixth constitutes the octave, will have to be considered as such as well. One must note [with regard to the fourth 3:4 that, since it is the inverted form of a fifth 2:3, because it is created by transposing the bass 2 of the fifth an octave higher turning into the sound 4, the aforesaid inversion deprives it of that small amount of perfection that is sufficient to make it such that, while two consecutive fifths are avoided in counterpoint, two consecutive fourths are allowed, as long as they do not belong the bass, but to the inner parts add. in marg.]

[[[signum]]] 12 These intervals that complete one or more octaves can also be called inversions of those main and simple intervals, of which they are the completion. In fact, the ear considers them to be created by inverting the original disposition, so that the high part becomes the bass and, conversely, the bass becomes the high part by means of transporting it one or more octaves higher. Take the fifth 2:3, and, transposed the sound 2 to the higher octave, so that it becomes the sound 4, we shall hear the inversion of the fifth, which is the fourth 3:4. Such inversion causes the fourth to be deprived of the amount of perfection that is sufficient to make it such that, while otherwise two consecutive fifths are forbidden in counterpoint, two fourths are allowed, as long as they do not appear in the bass, but only in the inner parts. Now, since the ear distinguishes the perfect consonances much more distinctly that it distinguishes the imperfect, it follows that the fourth is recognised clearly as an inverted fifth lacking its true bass and that such a distinction shall not prove equally clear-cut in relation to the inversions of the imperfect consonances. [-14-] Therefore, we shall see in the following chapter that it is an indispensable feature of a fundamental consonant accompaniment that the fifth, simple or compounded, belongs to its base, and that the consonant accompaniments to the bass of which the fourth is referred are nothing but derivative of the fundamental accompaniments. These are recognised clearly as such and are not very suited to be employed very abundantly in the *bassi continui*. Conversely, we shall observe that the minor third 5:6, which is the inversion of the major sixth 3:5, belongs to the base of a fundamental accompaniment, and that the derivative accompaniments that do not pair up with the base, except in the case of imperfect consonances, are more often used in the *bassi continui* than the other to the base of which the fourth belongs, because the ear understands more clearly that the fundamental bass is lacking in these than in those.]]

[signum] 12. The truths explained in the preceding paragraphs, which are founded on experience, will be a certain guide to establish the proportion between the simplicity of the consonances and that of the other musical intervals. The simplicity that I am pursuing at the moment is the one that is grasped by the ear and on which the judgement on the degree of perfection of a given interval is based, hence it may classed as an [-15-]

aequisonance, a perfect consonance or an imperfect one etcetera, according to the individual case. The perfect consonances require that the larger odd number that is found in their ratios be 3, while the imperfect consonances require it to be 5. We shall see later on [(a) Third book, First chapter, [signum] 7. add. infra lineas] and we shall confirm this with indisputable experimental evidence that all the ratios in which there is no odd number larger than the number seven are indeed dissonant, but they are at the same time very privileged. The dissonances that admit an odd number not larger than the number nine are judged by the ear to be dissonance of more severe nature, and they require to be handled with very possible rigour. If one applies this approach to the other dissonant intervals to whose ratios the odd numbers 11, 13, 15 etcetera contribute, one shall arrive in the end to odd numbers that are so compounded that, because the ear shall remain displeased, as it is so confused in evaluating those ratios in which they are contained, that it shall not tolerate in any way that they should be added to the consonant accompaniment. [[I have ascertained above ([signum] 9) that such are the ratios 3:27 and 5:25]]

[signum] 13 Therefore, if the hierarchy of the musical intervals is determined solely by the larger odd number that occurs in their ratios, it seems evident to me that the simplicity of the intervals themselves can be determined solely by means of the [-16-] [[aequisonances, and among the perfect or imperfect consonances etcetera]] mentioned odd numbers. So, since the intervals take a lower place in the hierarchy if a higher odd number occurs in their ratios, there follows that the sought after simplicity of intervals shall be inversely proportional to the larger odd numbers that are found in the proportions of said intervals. See the table.

[Riccati, The laws of counterpoint, 16; text: Semplicità delle equisonanze 1, consonanze perfette 1/3, imperfette 1/5, dei rapporti dissonanti privilegiate, che non ammettono numero impari maggiore del 7. 1/7, dissonanti, nei quali non c'entra del 9 1/9, 11, 1/11, ha luogo 13, 1/13, [[15]] 1/15, et cetera.]

If one admits my method of measuring the simplicity [-17-] of the musical intervals, one sees clearly why, if one raises the octave to the second or third power etcetera, or if one doubles or trebles the octave, the simplicity of the resulting ratios 1:4 1:8 etcetera is always equal to the unit, because the unit raised to the power of two or three is always equal to itself, and, consequently, in the aforesaid ratio there is no odd number larger than the unit. This does not occur when other odd numbers are raised to a particular power, since 3 raised to the power of two is nine, to the power of three is 27 etcetera, and 5 to the power of two is 25 and to the power of three is 125, and so on. Therefore, when the ratio 1:3 is doubled to produce 1:9, the simplicity of the new interval 1:9 lays in the same relationship to the interval 1:3 as 1/9 to 1/3, namely, in the reciprocal ratio of the odd numbers more complex, 9 and 3, that occur in those ratios.

[signum] 14. At this point, I must not hide an objection that someone could move to me, namely, that I presume that all the ratios that belong to the same class are equally simple, which contrasts clearly with experience. In fact, albeit the unison, the octave, the double octave etcetera are all aequisonances, who does not know that the unison is simpler than the double octave, etcetera? This objection will fall as soon as I inform the Reader that, when I say that all the intervals that belong to the same class are equally simple [-18-] this must not be understood in its most rigorous sense, but allowing instead a suitable adjustment. It is true that the ratios 1:1, 1:2, 1:4, 1:8, 1:16, 1:32, 1:64 etcetera shed progressively a certain degree of simplicity, so that, while the simplicity of the unison is expressed by the number 1, the degrees of simplicity of the following intervals

shall be expressed through fractions that are smaller by degree. However, it is true that these fractions decay by such a minute amount that the values of the degree of simplicity of the ratios 1:32, 1:64 etcetera are much closer to the number 1, which indicates the simplicity of the unison, than to 1/3, which indicates the degree of simplicity of the ratio 1:3. Experience proves irrefutably what I said, because, in counterpoint 1:64 is employed as a consonance and 1:3 as a perfect consonance. The correctness of my method will be even clearer if one compares the imperfect consonances with the dissonances of the number 7. Expressed as 1/5 the simplicity of the ratio 1:5, one shall indicate as 1/7 the simplicity of the ratio 1:7. This is undisputed. The experiments teach us that the ratios 5:8, 5:16, 5:32, etcetera represent imperfect consonances, and conversely the ratio 1:7 represents a dissonance. On this basis, it appears clear that the simplicity of the ratio 5:32 agrees with the fraction 1/5, because, were it equivalent or too close to 1/7, the ratio 5:32 would not please the ear, but would sound as harsh as the ratio 1/7.

[-19-] [signum] 15. Now that I have explained and demonstrated my method, I believe it necessary to say something about the one of Signor Eulero contained in the second chapter of the work entitled Tentamen Novae Theoriae Musicae. He calls sweetness of the intervals what I call simplicity and aims to establish its true value. The observation the intervals are all simple to a certain degree, but not all of them are sweet, as one moves from the positive to the negative, or from the consonant to the dissonant, has persuaded me to alter Signor Eulero's definition. However, this is something of little importance. This famous Author agrees with me in establishing that the ratio 1:1 belongs to the first and highest degree of sweetness, the ratio 1:3 to the third degree, the ratio 1:5 to the fifth and the ratio 1:7 to the seventh. This is equivalent to saying that the degrees of sweetness of the intervals 1:1, 1:3, 1:5, 1:7 are equivalent as a series to the values 1, 1/3, 1/5, 1/7. However, then he deviates from the path by assigning the second degree of sweetness 1:2 to the octave and by establishing the law that, if a compound interval is created either through the union or subtraction of two simple intervals, the degree of sweetness of the first interval shall be found by adding together the degrees of sweetness of the intervals that constitute it and subtracting the number one. For instance, the more complex interval 2:3 is created by subtracting the ratio 1:2, whose degree of sweetness is 2, from the ratio 1:3, whose degree of sweetness is 3. Now, [-20-]  $2+3-1=4$ , which is the degree of sweetness of the ratio 2:3.

[signum] 16. There follows, as a strict consequence of the two opinions of Signor Eulero explained just now, that some intervals are made out to be sweeter and others less sweet than it is necessary. The sequence of the octaves, simple 1:2, double 1:4, triple 1:8 etcetera, that, according to the teachings of experience belong appropriately to the first degree of sweetness, according to the author quoted above are assigned to the first, second, fourth degree of sweetness, and so on. Entirely conversely, he ascribes the ratios 1:3, 1:9, 1:27 etcetera to the third, fifth, seventh degree and so on, while, as a matter of fact, they belong to the third, ninth, twenty-seventh degree and so on. Leaving aside that the Signor Eulero's method places the ratios 1:4 (aequisonance), 1:3 (perfect consonance), and in the fourth the ratios 1:4 (aequisonance), 2:3 and 1:6, perfect consonances, I shall consider more closely the ratios assigned to the fifth degree. They are these: 1:16 (aequisonance), 1:12, 3:4 (perfect consonances), 1:5 (imperfect consonance), 1:9 (dissonance). First of all, it proves intolerable that ratios that belong to three degrees of consonance should have the same degree of sweetness. However, even if one leaves this to one side, who will be ever able to understand that the ratio 1:9, that is not admitted in counterpoint unless with the precautions to prepare it first and then resolve it, is as sweet as the ratios 1:16, 1:12, 3:4, 1:5, that are all consonant and pleasant to the ear? This mere reasoning is sufficient to throw out Signor Eulero's method, who, in fact, when [-21-] he formulated it, had not

paid the necessary attention to experience and to the common and proven judgement expressed by practical musicians on the harmonic proportions. Therefore, I shall omit many other errors, albeit not less considerable. If the Readers are so inclined, they shall be able to look for them with ease.

[signum] 17. I shall end the present chapter with some considerations on the names of the musical ratios. Established and generally embraced tradition requires musical intervals to take their name from the number of the diatonic notes, including the first and the last one that one counts between two sounds that respond to each other in an interval. Thus, the ratio 1:2 is called octave because, counted eight notes in the diatonic system, which I shall discuss in the third chapter, the sounds of the two extreme be expressed by the ratio 1:2. Equally, counted three notes, the sounds of the first and of the third answer each other according to the ratio 4:5 or in the other one, namely, 5:6. Therefore, both of them are called thirds, although the specification of major is added to the former and that of minor to the latter, in order to distinguish them. The famous Signor Henfling [(a) Miscellanea Berolinensia. add infra lineas.] rightly criticises somewhat the traditional names of the musical intervals. It is known that the fifth 2:3 and the fourth 3:4 added together produce the octave 2:4 or 1:2. The sum of the numbers five and four produces nine, rather than eight. In general, if two intervals are added together to create one, one must subtract the number one from the sum of the names [-22-] of the intervals that constitute the new one; if the sum consists of three intervals the number two must be subtracted, and so on, so one shall have the true name of the compound interval. For example, two fifths and a fourth form the twelfth 1:3. added together the numbers 5+5+4, I find the number 14, and, if the number two is subtracted, the remainder is the number 12, from which the twelfth takes its name. One must proceed in the opposite way when one wants to resolve the interval into its component factors.

[signum] 18. This inconvenience would be removed if the names of all the intervals were reduced by a unit, according to the thinking of the praised author, so that one would derive their names not from the number of the notes, but from the number of the diatonic elements that constitute them, which we call seconds, and we call firsts. [[Accordingly,]] The ratio 1:2 would be called sevenths, the ratio 2:3 fourth, the ratio 3:4 third. Added together the numbers 4 and 3 the result is precisely 7, from which, according to Signor Henfling, the ratio 1:2, which is composed of the two 2:3 and 3:4, receives its name. With the same precision one proceeds either to create an interval out of three, four or five, or, conversely, to divide into its components. There is no doubt at all that one should prefer Signor Henfling's method if the musical intervals were devoid of names and one had to name them now for the first time. However, since their names have been established for such a long time, and, since it would be inordinately difficult [-23-] to change a language that practical musicians have learned since their infancy, and since, lastly, they are signs that have no bearing on the essence of music, the reader will have noticed that I abided by the ancient use. Since concepts are tied firmly to names, one would struggle disproportionately to erase such impressions and we would not be able to get accustomed, for instance, to conceive the idea of the aequisonance 1:2 when we hear the name of the seventh to which one used to associate the idea of a dissonance.

Second Chapter.

On the systems of harmony and of melody.

[signum] 1 Harmony and melody are the only means through which the ear can grasp [in the way explained above chapter 1. [signum] 3. add. supra lin.] the proportions between the vibrations of the sonorous bodies and to gain pleasure from the comparison of low and high sounds. One must understand as harmony an aggregate of several sounds that reach our ear at the same time. Since those sounds reach our mind at the same time,

the mind can build very exquisitely a concept of the relationship existing between the timing of their vibrations. The term melody means a progression of sounds that are not heard at the same time, but in succession one after the other. Here, the judgement of the mind is rather more obscure because, while it has present to itself the sensation of a sound, it has nothing of the preceding one but the memory of it.

[-24-] [signum] 2. It is easy to prove that in a perfect musical system both harmony and melody must take place. Music that is aimed at pleasing the listener certainly cannot consist of mere harmony, because, however elegant a harmonic accompaniment may be, it would soon prove boring if the music did not move to another one. I leave it to those who are experts in music to judge in what condition it would be reduced, were it deprived of harmony, which, as we have seen, is the principal basis on which the ear relies to judge the proportion between the vibrations of the sonorous bodies. Moreover, all the fundamental, derivative and dissonant harmonic accompaniments would be excluded from it, and thus one would cause very grave damage to the melody as well. In the first place, the melody would be deprived of all the harmonic accompaniments that are employed as a representation of the melody. In the example written below one plays melodically on the harmonic accompaniment C E G of the major third, fifth and octave.

[Riccati, The laws of counterpoint, 24; text; et cetera]

Secondly, the melody would be deprived of those movements that, although they are really melodic, nevertheless depend in such a way on harmony that, were this to be rejected, they would also vanish as a consequence. The following example, in which the movements D E, D C, B C, G, G, G E, etcetera, are realised,

[-25-] [Riccati, The laws of counterpoint, 25]

in as much as the harmonic accompaniments of the major third, fifth and octave have been matched to the fundamental notes G and C. It is clear that, once these are removed, music also loses the mentioned melodic passages that derive from passing from a sound of the first chord to another sound that belongs to the second chord. What I have explained here more briefly shall be better understood as we move on.

[signum] 3 Meanwhile, the two elements, harmony and melody, that must constitute a perfect musical system, certainly must not be introduced into it without laws and at random. Hence, it seems clear to me that the accomplished musical system that we look for must be created necessarily by the union of two systems one of harmony and the other one of melody. Also, since the consonances please the ear and the dissonances produce a sensation that can be more or less harsh, in the creation of the aforesaid systems of harmony one must pay attention only to the former, since the latter must be at the service of the former and must be used as a sort of condiment, which means that they must be subject and secondary, as salt is in culinary recipes. First of all I shall deal with the two systems of harmony, which are called perfect consonant accompaniments, and then I shall move on to discuss [-26-] the single system of melody.

[signum] 4. Consonant accompaniment is the one in which, when the sounds that constitute it are compared two by two, they answer each other in a consonant ratio. The consonant accompaniment must satisfy an extra requirement, namely, that the best union of consonance must belong to the lower sound of the bass, so that, consequently, the less perfect combinations are allotted to the higher voices. Since the bass produces vibrations that are longer lasting than those of the higher sounds, the perception has the opportunity to concentrate on them and to ponder them, therefore it has a more clear representation of

the bass than of the high parts, whose vibrations, which are very fast, evade its notice, so to speak. Moreover the longer-lasting vibrations of the bass contain within themselves the shorter vibrations of the higher parts and this helps the ear to evaluate the proportion between the duration of the low and high vibrations. Therefore, since the bass is a sound that is recognised more distinctly than the high sounds and since it represents the whole, while these represent individual parts, it occupies in music the most prestigious and majestic position, and the higher parts are compared chiefly with it.

[signum] The comparison shall prove completely clear [proportionately to the various degrees of the musical intervals add. in marg.] when the duration of a vibration of the bass shall be the multiple of the duration of a higher sound, which occurs in the ratios 1:2, 1:3, 1:4, 1:5, 1:6 etcetera between the numbers of the vibrations that occur in an equal unit of time, which determine the length of the vibrations, such as 1: 1/2, 1:1/3, 1: 1/4 1: 1/5, 1: 1/6 etcetera. The aforesaid harmonies are endowed with the best bass and deserve the name of essentially fundamental. Because of the consonant sounds 1, 2, 4, the ratios 2:3, 2:5 and 4:5 retain the prerogative of being fundamental. In fact, if the bass of the fundamental proportions 1:3, 2:3, 1:5, 2:5, 4:5 is turned into the higher part by transposing it one or more octaves upwards, the ratios 3:4 (fourth), 5:8 (minor sixth) are produced, which the ear considers as inversions of the fifth 2:3 and of the major third 4:5 devoid of their true bass and that are not tolerated by it to be employed as base of a fundamental accompaniment. Now, since the ear perceives the perfect consonances much more distinctly than the imperfect ones, there follows that the fourth is recognised clearly as an inverted fifth and such recognition shall not be as clear-cut as the recognition of the minor sixth as the inversion of the major third. Finally, the harmonies 3:5, 5:6, which do not contain the numbers of the series 1, 2, 4, 8 etcetera, are neither fundamental nor inverted. Therefore the minor third 5:6 is allowed in a fundamental chord, while major sixth 3:5 is not able to enjoy this privilege because it is composed of a fourth 3:4 placed beneath and by a major third 4:5 placed above, or vice versa, the first of which is clearly an inversion of the fifth and requires as its bass the lower octave of the higher sound, [[A consonant accompaniment can be etcetera]] that falls beneath the sound 3 by a fifth or by a minor third, according to whether the major sixth is divided into one or the other of the ways mentioned above. A consonant accompaniment can be complete or incomplete. I call complete the accompaniment to the bass of which when any new consonance is added (I do not as new [-27-] consonances the compounded ones of the ones already employed)

some dissonance is produced, which clashes with one part or the other. Consequently, the accompaniment to the bass of which one can couple some new consonance that shall not produce any dissonance when it is compared to the other sound.

[signum] 5. After this premise, I come to explain the structure of the two systems of harmony or of the two perfect consonant accompaniments that are also called fundamental. Since I state that the intervals that differ by one or more octaves are equivalent to each other, I shall consider them as one and the same, and I shall adopt the names of the more usual consonances that do not exceed the octave. All the other consonant ratios are repetitions of these, while an accompaniment does not stop being fundamental if a consonance is substituted by another one equivalent to it. First of all, I apply to the low voice the octave expressed by the very simple ratio 1:2, and then I have the fifth 2:3, the most exquisite consonance after the octave, answer the bass. Thus, I divide perfectly the octave into two perfect consonances, namely the fifth, that belongs to the bass, and the fourth that corresponds to the inner part, so that I am presented with a consonant fundamental accompaniment, but not complete, which is expressed through [-28-] the following three numbers, namely, 2, 3, 4. Our accompaniment is of such

elegance, since it consists only of equisonances and perfect consonances ordered in the most perfect form, that are perceived most clearly by the mind, as we see that without it there cannot be a complete and perfect consonant accompaniment. Therefore, let us find out which consonances may be added to it in order to accomplish it. If I add the fourth 3:4 to the bass, it is enough to reflect that it forms the dissonance of a major second 8:9 with the fifth already introduced, which goes against the nature of the consonant accompaniment. For the same reason, the two imperfect consonances of the major thirds 3:5 and of the minor sixths 5:8 are excluded, because, if they are compared to the fifth, they produce in one part a major second, or the tone 9:10, and in the other the minor second 15:16, which is also called major semitone, both of which are dissonant. [Add to this that, as I explained at [signum] 4, the aforesaid three consonance can never correspond to the base of a fundamental accompaniment. add. in marg.]

Therefore, we are left with the fact that it is allowed to employ one or the other of the two imperfect consonances that we have yet to consider, namely, either the major third 4:5 or the minor 5:6, because they cannot be referred to the bass together at the same time, as they produce the dissonance of the minor semitone 24:25, that is the difference between the major third and the minor one.

[signum] 6. The perfect consonant accompaniment of the major third owes its origin to [-29-] the major third. In it the fifth is divided in the most elegant way into the two thirds, the major one beneath and the minor one above. Such an accompaniment laid out in its more exquisite form, which is used in music in the lowest parts, is expressed through the series of numbers that is the most simple of all, namely, 1, 2, 3, 4, 5, 6. Note that the two best equisonances 1:2 and 1:4, the two best perfect consonances 1:3 and 1:6 and the best imperfect consonance 1:5 correspond to the bass 1. Nature, our great teacher, illustrates our accompaniment with three experiments. Firstly, it allows us to hear it in the first six sounds of the trumpet and of the *tromba marina*, which are represented by the numbers 1, 2, 3, 4, 5, 6 in our series. Secondly, if one plucks a string, in the first sound, which is the main one and the strongest of the entire string, are contained the sounds 2, of the two half of the string, 3, of the third parts and so on those of the 4, 5, 6 of the fourth, fifth and sixth parts. One must clearly recognise that the string does not only vibrate in its entirety, but also divided into two, three, four parts etcetera, which is a feature that is both noticeable and true, which is proven clearly with some experiments. [[From the related experiment one can derive confirmation as to why the ear likes the register of the organ called [-30-] *ripieno*, especially when it is composed of six pipes that produce the sounds of the series 1, 2, 3, 4, 5, 6. It is sufficient to consider that the aforesaid register imitates artificially what occurs naturally when a string is played.]] The third experiment, which is the opposite of the one mentioned just now, was discovered by Signor Giuseppe Tartini, the most famous violinist and no less master of the art of counterpoint. There the bass determines an excellent series of high sounds, while, conversely, in this one two or more high sounds determine the perfect bass. Let two notes be played on the violin that constitute any consonance. Once this consonance, or the two sounds that constitute it, are expressed with the most simple whole numbers that are prime with each other, as long as the smallest of them is not equal to the unit, one shall always hear in the air the sound 1, that provides the perfect bass for the chosen consonance. It is easy to discover that the consequence of this is that the sound hanging in the air shall always be the base of the perfect accompaniment with the major third and the sounds of the violin are two of the ones that occur in the described accompaniment. For instance, if the consonance played on the violin is a major sixth 3:5, the bass heard in the air will be 1, which shall accompanied at the octave by the sound 3 and by the sound 5 a major third above the double octave.

[signum] 7. In the first chapter at [signum] 2 I [-31-] informed the reader that, since the number of the vibrations produced in a unit of time by several sonorous bodies, through which I usually express the sounds, is represented by the arithmetic series 1, 2, 3, 4, 5, 6, the durations of the vibrations of said sounds are represented by the harmonic series 1,  $1/2$ ,  $1/3$ ,  $1/4$ ,  $1/5$ ,  $1/6$ . I also said in this chapter ([signum] 4) that the most long-lasting vibrations of the bass have the property of containing within themselves the less long-lasting vibrations of the higher sounds, and that the best bass fulfils an additional requirement, namely, that its vibrations are measured exactly by the vibrations of the higher sounds. In fact, the length 1 of the lowest vibrations contains twice the length  $1/2$ , three times the length  $1/3$ , four times the length  $1/4$  etcetera of the vibrations of the higher sounds. In the second experiment, the duration 1, that represents the whole, determines the durations  $1/2$ ,  $1/3$  etcetera that are its simplest aliquot parts in the sequence. In the third experiment, conversely, the quantity 1 is determined by the aliquot parts  $1/3$  and  $1/5$ , which is the most simple quantity that can be measured by both those fractions.

[signum] 4. If one applies the minor third in the bass, so that the major one si above, the result is the second perfect consonant accompaniment with a minor third. This one can be expressed [-32-] with the numbers 1, 2, 3, 4,  $24/5$ , 6 which are similar to the series 1, 2, 3, 4, 5, 6 employed to express the perfect accompaniment with the major third. Similarly, if one indicates the lengths of the vibrations of the sounds that constitute the perfect accompaniment with the major third with the series 1,  $1/2$ ,  $1/3$ ,  $1/4$ ,  $1/5$ ,  $1/6$ , the lengths of the vibrations of the sounds that constitute the perfect accompaniment with the minor third shall be expressed with the series 1,  $1/2$ ,  $1/3$ ,  $1/4$ ,  $5/24$ ,  $1/6$ . I repeat the pairs of series that express the two perfect consonant accompaniments, the first one with the major third and the second one with the minor third, so that the considerations that I am about to make shall appear clearer.

[Riccati, The laws of counterpoint, 32; text: *Accompagnamento consonante perfetto per Terza maggiore, Numeri delle vibrazioni fatte in tempo pari dai suoni dell'accompagnamento per Terza maggiore. 1, 2, 3, 4, 5, 6. Durate delle dei suoni, che formano il detto. 1,  $1/2$ ,  $1/3$ ,  $1/4$ ,  $1/5$ ,  $1/6$ . consonante perfetto per minore,  $5/24$ ,  $24/5$ ]*

[-33-] First of all the two pairs of series agree perfectly both as to the aequisonances and as to the perfect consonances, in respect of whom the base 1, common to both the accompaniments, proves to be an excellent bass. The only discrepancy consists in the fifth sound through which the imperfect consonances worm their way into our accompaniments. In the accompaniment with the major third the fifth term 5 of the first series and 1.5 of the second one ensure that the first of the two series is regularly arithmetic and the second one regularly harmonic, so that the basis 1 is the perfect base for the sound 5, and, since the length of one of its vibrations equals  $1/5$ , it is contained five times in the length 1 of a vibration of the bass. In the accompaniment with the minor third the fifth term takes on the values  $24/5$  in the first series and  $5/24$  in the second. Because of this the first progression does not proceed regularly, since it is arithmetic from the number one to the number 4, and harmonic in the remaining part from the number 4 to the number 6, because the three terms 4,  $24/5$ , 6 are equivalent to the following ones, namely,  $24/6$ ,  $24/5$ ,  $24/4$ . A similar irregularity is observed in the second series, which is the inversion of the first one because the first four terms, 1,  $1/2$ ,  $1/3$ ,  $1/4$ , decrease according to the harmonic ratio, while the last ones,  $1/4$ ,  $5/24$ ,  $1/6$ , decrease according to the arithmetic ratio, because they equal to the three  $6/24$ ,  $5/24$ ,  $4/24$ . What matters most is that the length 1 of a vibration of the bass is not measured exactly by the duration  $5/24$  of a vibration of the sound  $24/5$ , so this sound is not the best one in relation to the sound

24/5.

[signum] 9. The adduced considerations demonstrate clearly how much more elegant the accompaniment of the major third is than the other one of the minor third. Nevertheless, the ear is pleased with the latter as well and considers it as perfect because an aggregate of consonances belongs to its bass, that, albeit it is not the best one, it is better than any of the others that correspond to the higher parts. The ear remains satisfied that it can hear the best one in the equisonances and in the perfect consonances, which it can judge with complete clarity. As to the imperfect consonances, our ear is not so sensitive. The best perfect accompaniment, 1, 2, 3, 4, 5, 6 requires that the octave 2:4 and the fifth 4:6 should be divided in the most exquisite way, the former into the two perfect consonances, the fifth 2:3 belonging to the bass and the fourth 3:4 corresponding to the inner part 3, and this one into the two imperfect consonances, the major third 4:5 towards the low register and the minor third 5:6 towards the high register. The first most excellent division cannot be abandoned by a perfect consonant accompaniments, because, if one inverts it by placing the fourth at the bottom and the fifth above, [-35-] as we have already noted [[when we dealt with the consonance (a) First chapter [signum] 12.]] [at [signum] 4 add. supra lin.], given the relation of aequisonance that occurs between two sounds at the octave, one can discover clearly that the fourth is nothing but an inverted fifth and that, consequently, the harmony lacks a real and proper bass. Touched the fourth 3:4, and since there is a sort of equivalence between the sound 4 and the sound 1, the ear immediately forms an idea of that sound and it is not satisfied because it is missing.

[signum] 10. This essential observation allows us to touch by hand that in a perfect consonant accompaniment, if the best division of the fifth 4:6 is abandoned, one can embrace agreeably its inversion that assigns the minor third to the base and the major one to the inner part. If the fifth 4:6 together with its compound intervals were regarded among the aequisonances, so that the sounds 4 and 6, and 1 and 6 were linked together by a harmonic identity, then, when we hear the minor third 5:6, we would realise immediately that it is an inversion of the intervals 1:5 and 4:5, that derives from changing the sounds 1 or 4 into the aequisonant 6. Now, the ratios 4:6 and 1:6 do not belong to the aequisonances in reality, and, consequently, the sound 6 is in no way the same as the sounds 4 and 1, the last one of whom, according to Signor Tartini's experiment [-36-] is heard in the air in its role of best and natural bass, when the minor third 5:6 is played on the violin. Therefore, since the ear has no way to form the idea of the sound 1, it cannot realise that it is missing either, and, therefore, the minor third is assigned correctly to the bass, since, incidentally, it can join the best accompaniment 1, 2, 3, 4 consisting only of aequisonances and perfect consonances without the introduction of any dissonance.

[signum] 11 The Reader will have noted that I have abandoned the opinion of those authors, among whom the renown Monsieur Rameau [(a) Generation Harmonique add. infra lineas], who presume that the lengths of the vibrations of the sounds that make up the chord with the minor third with the continuous arithmetic series 1, 5/6, 2/3, 1/2, 1/3, 1/6, which is equivalent to the following one in whole numbers, namely, 6, 5, 4, 3, 2, 1. Were this the true form of our accompaniment, it should produce an excellent impression on the ear. However, who shall be that master of the chapel that would lay it out in this fashion by scoring it so that the minor third is assigned to the violone and to the violoncello, the fifth to the second violetta, the octave to the first one, the twelfth to the second violin and the nineteenth to the first violin? Were such disposition be allowed, one would encounter in descending from the high to the low register that same excellent sequence [-37-] of intervals, 1, 2, 3, 4, 5, 6, by which one precedes from the low register to the high one in the accompaniment with the major third, as if the highest sound occupied the most worthy place in the chord with the minor third, so that the other sounds

should have to be compared mainly with it. What was said a [signum] 4 persuade us that, if the primary comparisons are made with the bass, one must not change the most elegant disposition of the aequisonances and of the perfect consonances in relation to it.

I have stated at [signum] 8, that one can assign to the accompaniment with the minor third a similar disposition to the one of the chord with the major third, which, in relation to the duration of the vibrations, is the following one: 1,  $1/2$ ,  $1/3$ ,  $1/4$ ,  $5/24$ ,  $1/6$ . If we consider on this occasion that the fraction  $5/24$  becomes simpler if one transposes it one or more octaves downwards, there ensue two very elegant distributions of the consonant chord with the minor third, namely, 1,  $1/2$ ,  $5/12$ ,  $1/3$ ,  $1/4$  and 1,  $5/6$ ,  $1/2$ ,  $1/3$ , the last one of which is characterised by the property that the minor third  $5/6$  is equally contra-harmonic median bother between the octave 1:  $1/2$  and the twelfth 1:  $1/3$ .

[signum] 12. Two accompaniments are derived from each of our perfect consonant accompaniments and they are also consonant, but not perfect. However, before I place the in front of the eyes of the Reader, I note that, omitted the first three terms 1, 2, 3 in the two series [-38-] 1, 2, 3, 4, 5, 6 and 1, 2, 3, 4,  $24/5$ , 6, that represent the fundamental accompaniments with the minor and with the major third, I shall elect as base of said accompaniments the sound 4 which is aequisonant to the sound 1. The reason why I do this is that the fifth and the third (major in one accompaniment and minor in the other one) relate to the sound 4 in their most reduced ratios. Moreover, the division of the octave into the two perfect consonances fifth and fourth is contained in the sole octave 4:8, as well as the division of the fifth 4:6 into the two thirds. Also, in order that the relation of a sound to another one may be highlighted more easily in the accompaniment with the minor third as well, divided all the terms by 4, I shall represent the two accompaniments with the major third and with the minor third by employing fractions in the following way, electing the letter C as the base of the former and the letter A as the base of the latter. I did this with good reason, as it will be clear ad the appropriate time. I presume that the Reader knows that the ancient masters assigned the first letters of the alphabet, A, B, C, D, E, F, G, a, b, c, d, e, f, g, to the seven distinct and non-aequisonant diatonic sounds. The letters written in lower case indicate the sounds that lay an octave above the corresponding capital letters.

[signum] In order to avoid any misunderstanding, I inform you that it is necessary to distinguish the superior fractions, placed under the letters, from the inferior ones, that are placed between a letter and another one, and that are separated by vertical lines perpendicular to the lines. The superior fractions indicate the value of the high sounds in relation to the fundamental that is expressed with the number one. In the established C1, one finds consequently E  $5/4$ , G  $3/2$  and c 2. Now, the fractions  $5/4$  and  $3/2$  indicate clearly that the ratio 4:5 intervenes between the sound C and the sound E, while the ratio 2:3 intervenes between the sound C and the sound G. As [-40-] to the inferior fractions, they mark the proportion of the sounds between which they are placed. If I stop to consider the accompaniment with the major thirds, one can see the fraction  $6/5$  between the sounds E  $5/4$ , G  $3/2$ , included within the two vertical lines of the letters E and G. Therefore, such a fraction teaches us that the sound E  $5/4$  and the sound G  $3/2$  are represented by the ration 5:6. It was necessary to make the Reader aware of a method that I shall employ constantly and that, once it is understood, is very simple, as it shows us at sight the reciprocal relations of the sounds that are close and of those that are far removed, if it is convenient. If we consider the accompaniment with the major third, for instance, the fractions  $3/2$  and  $4/3$ , of which the first one is placed between the letters C and G, and the second one between the letters G and c, teach us that the octave C c divides into the two perfect consonances, namely, the fifth  $3/2$  and the fourth  $4/3$ . Then, the fractions  $5/4$  and  $5/6$  placed respectively between the letters C e and E G re, warn us

that the same accompaniment divides the fifth C G into the two thirds C E and E G, that are respectively major and minor.

[signum] 14. In both of the perfect consonant accompaniments between the letters C c and A a that answer each other at the octave, one find two intermediate ones, namely, E G, in the first one, and C E in the second one. If the intervening letters are employed in the role of bass, we are presented with the four derivative accompaniments that it is necessary that we should investigate.

I advise the reader to consider the two short tables written here [-41-] beneath.

[Riccati, The laws of counterpoint, 41; text: *Accompagnamento consonante fundamentale, e per Terza maggiore. C, E, G, c, e, g, 1, 5/4, 6/5, 4/3, 2, 5/2, 3/2, 3, di minore, e Sesta derivato dal fondamentale, presa per base la prima lettera di mezzo, Quarta, e Sesta, seconda, A, a, 12/5, 5/3*]

[-42-] The accompaniments of the first middle letter, namely, E G c, derived from the perfect C E G and C E a derived from the perfect A C E are less exquisite than the fundamental ones that produce them, since their bases consists only of imperfect consonances [and because the two sixths, the minor one E c, and the major one C a, cannot belong to the bass of a fundamental chord (see [signum] 4). add. in marg.] Furthermore, if one compares the accompaniments of the second inner letter G c a and E a c with the perfect ones C E G c e and A C E a c from which they are derived, one finds out clearly that, when the fourths G c and E a are assigned to the bases of the former and the fifths C G and A E to the bases of the latter, the former are as much less elegant than the latter, as the fourth, inversion of the fifth, is less pleasant than the fifth itself. Apart from the fourth, the major sixth G e  $5/3$  in the chord G c e is assigned to the bass, and, [according to the quoted [signum] 4 it can never perform the role of fundamental, and] it is less pleasant to the ear than the major third C E that corresponds to the fundamental note C of the perfect accompaniment C E G expressed through  $5/4$  or  $5/1$ , ratios that share a sort of harmonic identity, given the aequisonance of the octave. It remains for us to compare the two imperfect consonances that are assigned to the low notes of the accompaniments A C E, which is the perfect one of the minor third fifth and E a c, which is the derivative of the fourth and minor sixth. If we consider that the minor sixth E C is the inversion of the fundamental ration  $1/5$ , while the minor third  $6/5$  [[is the inversion [[completion of the octave add. supra lin.]] of the ratio  $5/8$  that does not belong to the number of the fundamental ones  $2/1, 3/1, 4/1, 5/1$  etcetera]] [is not the inversion of any interval, it is easy to conclude, especially on the basis of what was said at [signum] 10, that, while the ratio  $6/5$  can be regarded as fundamental, the same can never be said of the ratio  $8/5$ .

[signum] 15 Therefore, since the accompaniments E G c, G c e and C E a, E a c are less pleasant than their respective fundamental ones, the ear hears them as consonant but not perfect, because it notices clearly that if a high note c in one case, and a in another one were transposed an octave lower, the accompaniment would become more elegant, as it would become fundamental from derivative and since said note provides it with the true and best bass, which it lacked before. Let us see the same truth in a different light. It is not only the perfect accompaniment that contains another two within itself, namely its derivatives, but, equally, each derivative contains the other derivative and the perfect one, so that any consonant accompaniment consists of three chords, and any perfect chord and its two derivatives consist of all the same three chords combined in different ways. Proof of my assertion will be found if one simply considers one or the other of the perfect accompaniments and its derivatives accompanied by their necessary compounds.

Therefore, the fact that the perfect accompaniment and its two derivative consist of the same three chords enables the ear to discern how superior the first accompaniment is to the other two. In the [-44-] fundamental accompaniment the most elegant chord is allotted to the bass, and the less elegant ones to the inner parts. Conversely, in the derivative accompaniment the most elegant chord is assigned to a sound that is not the lowest, and consequently a chord that is not the best is assigned to the bass. The exact disposition of the perfect accompaniment and the inversion of their derivative produce as a consequence the fact that the ear is completely content with the former, but not with the latter, which, however pleasant they are, they leave it incomplete and hanging, and are not suited to conclude a composition.

[signum] 16. Consonant accompaniments have another not less valuable property, which consists in the fact that when each of them is played, all the consonances are heard, namely, [besides add. supra lin.] the octave, the fifth, the fourth, the two thirds and the two sixths. I shall concentrate my reflections solely on the fundamental accompaniments. In fact, if they contain all of the consonances, this is also proven with regard to their derivatives that consists of the same sounds, with the only difference of some letter transposed an octave higher. In the accompaniment with the major third the major third and the fifth belong to the base, to the first inner sound the minor third and the minor sixth and to the second inner sound the fourth and the major sixth. All of the aforesaid consonances are found in the accompaniment with the minor third, although [-45-] they are ordered in a different way, namely, the minor third and the fifth are assigned to the bass, the major third and the major sixth to the first inner sound and the fourth and the minor sixth to the second inner sound respectively. In the perfect accompaniment with the major third, the consonances are ordered in the best way. In the accompaniment with the perfect minor one does not find the best disposition, in truth. Nevertheless, however, the disposition in which the consonances are order is better than the one of the two accompaniments that derive from it, and this is why ear perceives our accompaniment as perfect.

[signum] 17. After we have compared the fundamental accompaniments with their derivative, let us compare a derivative with another derivative briefly. I said [[chapter one]] ([signum] 4.) that, since the ear judges more distinctly the perfect consonances than the imperfect ones, it is more aware of the inversion of the former than or the inversion of the latter. Hence, one can deduce that [[we are going to observe in the present chapter]] the consonant chords that have the fourth in the bass are derived merely from the fundamental accompaniments that are clearly recognised as such, and they are not suited a great deal to be employed very frequently in the *bassi continui*. [[Then, I managed to explain in general]] Conversely, the derivative accompaniments that join to the base only imperfect consonances [[are found]] [deserve to be add. supra lin.] placed more often in the *bassi* [-46-] than the other ones that have the fourth in the base, because the ear discerns the lack of the fundamental bass more clearly in the latter than in the former ones. Now, of the four accompaniments derived from the perfect ones, I find that two belong to a species G c e of the major fourth and E a c of the minor fourth and sixth, and an equal number of the other one E G c of the minor third and minor sixth and C E a of the major third and major sixth. The Reader is invited to consult the *bassi continui* of musical compositions, where he shall note clearly [[much more often the accompaniments]] that the accompaniments of the third and sixth are much more frequent than the other ones of the fourth and sixth, so that one will be able to conclude that practice agrees perfectly with theory when it is deduced correctly from solid principles.

[signum] 18. I shall conclude the topic of the consonant accompaniments by demonstrating that there are only the six species of them that I mentioned, namely, two

perfect ones and four derivative. If we discount the compound intervals, to which one could say that the octave belongs [[as compound interval of the unison]], as we can consider it as a compound interval of the unison, the different types of consonances are six, namely, the fifth, the fourth, the two thirds and the two sixths. These consonances can only be combined in six ways to produce the consonant accompaniments. Do let us take each one by the hand and let us see [-47-] what other consonances can be joined with the one that we selected without producing any dissonance. We have already noted ([signum] 5.) that the fourth and the two sixth produce a dissonance with the fifth, and that, consequently, it can be joined, if we want to preserve the laws of the consonant accompaniments, only to one or to the other third, so that the two perfect consonant accompaniments may be produced, for instance, C E G and A C E. We have just said that the fifth produces a dissonance with the fourth. Moreover, produces an unpleasant result when it is added to the major third or to the minor third, because the former differs from the fourth by a major semitone  $16/15$ , and the latter by a tone  $10/9$ . No inconvenience derives from employing either the major or the minor sixth, which produce the two renown accompaniments of the major fourth and sixth, for instance, G c e, and of the minor fourth and sixth, namely, E a c, which derive from the perfect consonant accompaniments C E G c e with the major third and A C E a c with the minor third, taking as a base, the second inner letter G in one case and E in the other one.

[signum] 19. If the major third is ascribed to the bass, and, if one excludes the minor third that is a minor semitone  $25/24$  flatter, the fourth that is sharper by a major semitone  $16/15$ , the minor sixth that differs by the diminished fourth  $32/25$ , [-48-] which are all dissonances, it is left that they may be joined with the major third or with the fifth, so that the perfect accompaniment with the major third reappears, or the major sixth, which produces the consonant chord of the third and sixth, both major, as in the case of C E a, one of the derivative of the perfect accompaniment with the minor third A C e a, where the middle letter C is employed as the bass. If the minor third is introduced in the bass, I discover immediately that it cannot be added to the major third, to the fourth or to the major sixth, because, in the first case, the result would be the minor semitone  $25/24$ , in the second one the tone  $10/9$  and in the third one the major fourth or tritone  $25/18$ . If I add it to the fifth, I obtain again the perfect accompaniment with the minor third, but, if I employ the minor sixth instead, I am presented with the consonant chord of the third and sixth both minor, as, for instance, E G c, which derives from employing as base the first middle letter E of the perfect consonant accompaniment with the major third C E G c. I said, if I employ the minor sixth instead of the fifth, because both of them cannot occur at the same time in a consonant accompaniment. Both of the sixth form the dissonance of a second with the fifth, since the fifth is exceeded by the minor sixth by the interval of a minor second  $16/15$ , and by the [-49-] major sixth by the interval of a major second  $10/9$ .

[signum] 20. The minor sixth, the fifth and the minor third produce a dissonance with the minor sixth, which, therefore, produces two consonant accompaniments, namely the one of the major fourth and sixth G c e derived from the perfect one with the major third C E G c e from the addition of the major sixth to the fourth, and the one of the third and sixth, both major, C E a, derived from the perfect one with the minor third A C E a by adding it to the major third. If one added the consonance of the fourth and of the major third together, the ear would hear the dissonance of the minor second  $16/15$ , which is their difference, but this goes against the nature of the consonant accompaniments. The only consonance left to consider is the minor sixth. Since that dissonance are produced when our consonance is added with the major sixth or with the fourth or with the minor third, it is left that it may be added to the fourth or to the minor third, but never to both at the same time, since the former exceeds the latter by the tone  $10/9$ . In the first instance, one

would obtain the consonant accompaniment of the fourth and minor sixth, such as E a c, which derives from the perfect one with the minor third A C E a c, when the second middle letter E is employed as the bass. In the second instance, we are presented with the accompaniment of the third and sixth both of them minor, such as E G c that derives from the perfect accompaniment with the major [-50-] third C E G c, when one adopts as its base the first middle letter E.

[signum] 21. Therefore, here we see that the combinatory method employed just now produces only the two perfect accompaniments derived from them, namely,

[Riccati, The laws of counterpoint, 50; text: C, E, G, c, e, A, a].

Consequently, the species of the consonant accompaniments that can occur in music are only six, as I aimed to demonstrate. Therefore, the beautiful prerogative of our two harmonic systems of containing within themselves each one one half of all the possible consonant accompaniments with the major and minor third derives from this. Before we move on, the reader should gather a very important truth from these matters explained at length, namely, that the two fundamental consonant accompaniments are endowed with the most strict unity that can possibly even belong to whatever consists of parts. A quantity consisting of parts shall be endowed with perfect unity when the union of the parts themselves corresponds exactly to the aim for which the union of the parts has been organised. Thus, a clock is [-51-] a single entity because the wheels, the spring and the other devices that constitute it all have the aim to indicate the time with precision. Fundamental consonant chords have the aim to please the ear in an accomplished fashion, and, as they achieve this aim with the uppermost perfection, they contain within themselves a rigorous unity. And, in truth, any alteration that occurs to them works certainly to their detriment. If I vary essentially the disposition of the sounds, they turn from fundamental sounds into derivative sounds; if I remove the fifth and its compounds or the third with its compounds, I deprive them of the perfect or of the imperfect consonances, and, finally, if I add a new non-aequisonant sound to the ones from which they derive, I turn them into dissonant accompaniments. This reflection suggests to us the true character of the musical dissonances that are nothing but new sounds added to a consonant accompaniment. For now, let this brief explanation be sufficient, while I pledge to deal with dissonances in the third book.

[signum] 22. The harmonic systems, or, if I call them with their usual name, the consonant accompaniments that I have described for you up to now, observe the necessary precaution to assemble the consonances in relation to the base that do not produce any dissonance with each other, because these consonances must be struck at the same time. [-52-] However, since it is the property of the melody to let the sounds reach our ear not simultaneously, but one after the other, the melodic system must not obey the aforesaid precaution, since it is sufficient that the notes that constitute them with the first one should answer it in consonant ratios. I noted ([signum] 1) that the ear judges harmony more clearly than melody. So, moving on to the harmonic consonant accompaniments derived from perfect and imperfect consonances, and since the uneven numbers 1, 3, 5 occur in them, it is clear that the system of the melody should take a step back, and, omitted the number five and the imperfect consonances with it, it will require to consist only of perfect consonances. On this basis, one shall gain the advantage that the harmonic and melodic systems are endowed with an equal degree of unity in relation to their nature. We shall see (chapter 4 [signum] 4) that the passages of the third and sixth that would be provided to us by the melodic system once the imperfect consonances we introduced into it, move from a mode to the other, or a principle to another, and they prove successful

only then such principles are mostly closely related to each other. This provides satisfactorily evidence that the introduction of the imperfect consonances would deprive the melodic system of the prerogative of one and of the other.

[signum] 23. From the aforesaid principles [-53-] there follows the clear consequence that the melodic system must consist of the two perfect consonances, fourth and fifth, or, in other words, of three notes, namely, the first, fourth and fifth, whose sounds are expressed through the values 1,  $4/3$  and  $3/2$ . On the basis of what shall be said later on, I put n front of the Reader's eyes the melodic system in two forms, taking as the principal note first the letter C and then the letter A.

[Riccati, *Le leggi del Contrappunti*, 53; text: Sistema di melodia assunta C come prima corda. C, F, G, 1,  $4/3$ ,  $3/2$ ,  $9/8$ , A, D, E]

The most perfect note is the first one, as it is the principal of the system. The fifth holds the second place and the fourth the last one. In fact, albeit the fifth and the fourth are both perfect consonances, nevertheless the former is more exquisite than the latter, since it is expressed by the ratio  $3/2$ , which is simpler than the ratio  $4/3$ , which indicates the fourth

[signum] 24. The great elegance of our [-54-] melodic system will be apparent in all its light when we consider that the fourth, C F for instance, is equivalent to the fifth F C taken beneath C. Therefore, we can express the melodic system in the following way.

[Riccati, *The laws of counterpoint*, 54; text: F, C, G,  $2/3$ , 1,  $3/2$ ]

It is plainly clear that, if one wants to move from the sound C to another non-aequisonant sound, which is different from itself, the best passages that one can employ are to rise by a fifth from C to G or to descend by the same interval from C to F, since the fifth possesses the highest degree of perfection after the aequisonances.

[signum] 25. The definition of the melodic system provided above suggests to me a new way to prove that the fifth note must be preferred to the fourth. Let us imagine that the perfect consonant accompaniment, in which the note G occurs specifically, is applied to the first note C. So, when I move from the sound C to the sound G, which are both fundamental, I choose as fundamental the note G that appeared directly after C in the accompaniment of C. Therefore, one discovers clearly that the fifth note G considered as fundamental works perfectly, as it should, in the accompaniment of the principal note C. However, if one moves from the sound C to the sounds F, the [-55-] latter is not included in the accompaniment of the first one, but, on the contrary, the sound C is contained in the accompaniment of F, as it forms the fifth with it. Therefore, instead of the note F working as the accompaniment of C, the opposite takes place and the note C works as the accompaniment of F, which defers considerably to the first note in relation to the fourth. Therefore, one understands that the first note is more important when one moves from it to the fifth and less when one moves from the first to the fourth. The fifth note, therefore, maintains a greater closeness to the first one than the fourth one does, and, consequently, the former is more perfect than the latter.

[signum] 26. The passages suggested to us principally by the melodic system are from the first to the fifth note, from the fifth to the first and from the fourth to the first. See what I say about this (Book2, chapter 1[signum] 5, 6, 7) where I discuss in detail their reciprocal perfection. Moreover, two other passages are practised, namely, from the fourth to the fifth note and from the fifth to the fourth, that arise as a consequence of the fact that the melodic system consists of the two perfect consonances, the fourth and the fifth. One

ascends or descends in these passages by a major second  $9/8$ , also called otherwise major tone, which is the difference that lays between the two perfect consonances, the fourth and the fifth. [-56-] although the ration  $9/8$  used in harmony is always a dissonance, nevertheless there are instances in which it can not said to be such, when it is used melodically. The two mentioned movements that please the ear provide complete evidence of what I say. The main sound of the melodic system leaves such a permanent impression on the ear, that it maintains its memory lively and sharp. Let me take as evidence the desire that feel that the melody should end on its main note, as its principle and origin. Hence one deduces that the two notes that are not principal in the melodic system are always sung as related to the first one, one at a fourth and the other at a fifth, as one preserves a deep trace of the first one in one's mind. For instance, if one sings the fourth C F, the memory that persists in me of the sound C directs me to sing the sound G after the sound F, which is in the relationship of a fifth to C. Thus, bearing in mind the consonances C F and C G, consequently, I sing next the major second F G, which I like not in itself, but because I can move it through it from a perfect consonance to the other.

[signum] 27. I shall explain (book 2, chapter 1. [signum] 6.) the reasons why the passage of the major second upwards F G or D E is more elegant of the opposite one G F or E D of the major second downwards, but for now I note [-57-] what is relevant at present. When I move from F to G, the sound C, which performs the function of the fifth in the perfect accompaniment F, leads me securely and by stepwise motion to sing the sound G that must answer the lower octave of the c itself at the fifth. However, when, conversely, I descend from G to F, the note C does not belong any more to the accompaniment of G, and, consequently, I can used the the memory of the sound C as a benchmark to tune the sound F, it is true, but its memory is a little less recent. This consideration that I adduced as well proves that the passage F G must be preferred to the opposite one G F.

Third Chapter.

On the two modes, with the major third and with the minor one.

[signum] 1. All modern practical musicians agree with each other that it is exceedingly important to allow only two primary modes, one called with the major third and the other one with the minor third, and they base their compositions always on one or the other of them. They were drawn to this by now commonly shared opinion, despite the opposed teachings of their own teachers, by the very perceptive judgement of the ear. In fact, if one listens to it, it does not allow us to lose our way and it is effective in dislodging from the mind the most deeply rooted prejudices. It proves such an assured guide that, albeit music theorists [(a) With the exception of Monsieur Rameau in his work entitled *Generation harmonique*, and Signor Tartini in his *Treatise on music*. add. infra lineas] ignore the true [-58-] origin of the modes mentioned above, and, consequently, they are in the dark with regard to their most essential properties, nevertheless one finds an excellent application of them in the good compositions. Now, I investigate in the present chapter the origin and the applications of the two modes with the major and with the minor thirds. What ensures that I am not wrong in my theoretical findings is the fact that they always agree with experience that it must be considered of the highest importance in an art that is the object of so much study and on which such a vast number of people labour throughout their entire life, some of whom are endowed with rare talent.

[signum] 2. Therefore, the origin of the two modes with the major and with the minor third is merely a corollary of the principles exposed in the previous chapter. As I have already noted (chapter 2 [signum] 3.), an accomplished musical system must be created by the union of two systems, a harmonic and a melodic one, and, since there are two harmonic systems, or perfect consonant accompaniments, and a single melodic

system, one can note at first sight that the origin of the two modes that we investigate derives from applying to the three notes that constitute the melodic system either the perfect accompaniment with the major third or the accompaniment with the minor third. Since the two modes in the melodic system and in the perfect consonant accompaniments are in agreement [-59-] as to the fifths, and only the thirds vary, which are major in one case and minor in the other, from this single difference they derive their character and their name, as the mode that is named with the major third is happy and tranquil, just as the character of the major third, while the mode that is called with the minor third, is soft and emotional, according to the character of the minor third. If one applies the accompaniment with the major third to the melodic system C, F, G and the accompaniment with the minor third A, D, E to the melodic system, we shall be presented with two modes, the first one with the major third and the second one with the minor third, that I propose as models of all the others, either similar to the former or to the latter, that are employed in counterpoint, as this occurs for the mere reason that their scales consist entirely of the seven natural letters A, B, C, D, E, F, G without any alteration of sharp or flat signs. Therefore, here is the true spring from which flows the so very famous diatonic genus that was and shall be always the most important foundation of music.

[-60-] [Riccati, The laws of counterpoint, 60; text: Origine del Modo C per Terza maggiore modello di tutti gli altri Tuoni, C, E, G, F, A, c, G, B, d, 1,  $5/4$ ,  $3/2$ ,  $6/5$ ,  $4/3$ ,  $5/3$ ,  $6/5$ , 2,  $15/8$ ,  $9/4$ , Scala nascente dall'aggregato dei tre soprapposti accompagnamenti col solo artifici di trasportare il suono d all'Ottava bassa.  $9/8$ ,  $10/9$ ,  $16/15$ , seconda maggiore, minore]

[-61-] [Riccati, The laws of counterpoint, 61; text: Origine del Modo A per Terza minore modello di tutti gli altri Tuoni. A, C, E, D, F, a, E, G, [sqb], 1,  $6/5$ ,  $3/2$ ,  $5/4$ ,  $4/3$ ,  $8/5$ ,  $9/4$ , Scala nascente dall'aggregato dei tre soprapposti accompagnamenti col solo artificio di trasportare il suono [sqb] all'Ottava bassa. 2,  $9/8$ ,  $10/9$ ,  $16/15$ , seconda maggiore, minore]

[signum] 3. I note first of all that both of the modes divide the octave C c or A a into seven diatonic elements called seconds, five major [-62-] and two minor, with extreme precision and without any gaps. Three of the five major seconds are represented by the ratio  $9/16$  called specifically major tone, while two are represented by the ratio  $10/9$  called specifically minor tone. Meanwhile, Both of the aforesaid ratios deserve the name of major second because they differ between each other by the comma  $81/80$ , which is such a small difference, that is almost voided by the natural temperament of the voice and the artificial one by of the musical instruments [[as it is chopped up and shared among several intervals]] by employing a medium tone that takes the role of one or the other of them according to the situation. Both the minor seconds, that are also called major semitones, are expressed by the ration  $16/15$ . Since the diatonic elements are of two species this works marvellously to vary the division of the octave. However, if we consider that our different sorts of seconds differ from each other by a diesis or a minor semitone, that, as experience teaches, is so close to being the same note that it earned the name of augmented unison, we shall draw from this the consequence that all the diatonic elements are in some way unisons, and that the distribution of the octave enjoys the privilege of being varied and uniform at the same time. The major second  $10/9$  exceeds the minor  $16/15$  by a minor semitone  $25/24$ . Now, when a note is played, the other one, tuned [-63-] to the aforesaid diesis vibrates strongly as if it were in unison with it. Therefore, the same name is assigned to both intervals that differ only by a diesis, although they are distinguished as major, or, augmented or diminished. Thus, since the

name of major second is applied to the ratio 10/9, the name of minor second is ascribed to the ratio 16/15, and, while the ratio 5/4 is called major third, the ratio 6/5 is called minor third.

[signum] 4. Since each of the aforesaid scales is produced by the union of three fundamental consonant accompaniments, each formed of three sounds, they contain only seven letters because the first and the fifth note are shared between two accompaniments. In the mode with the major third the note C belongs to the two perfect accompaniments of C and F, the note G [g ante corr.] to the two perfect accompaniments of G and C. Similarly, in the mode with the minor third the note A occurs both in the accompaniment of A and in the one of D, while the note E occurs both in the accompaniment of E and in the one of A. If we consider then that two derivative accompaniments corresponding to the two inner letters are deduced from every fundamental accompaniment, our scales can be considered as an aggregate of nine accompaniments, of which three are perfect and six are derivative. Two chords are allotted to the letters that are shared by two perfect accompaniments, and only one to the [-64-] others. I place in front of the Readers' eyes the accompaniments that, on the basis of the origin of the modes, belong to each letter. I do this in two ways, namely, firstly by expressing them with letters and ratios according to the way employed so-far, and then with notes accompanied with numbers that indicate said accompaniments. The number 3 indicates a third, the number 4 a fourth, the number 5 a fifth and the number 6 a sixth. I shall write its original bass under each note, from which one shall learn at sight on which of the three perfect accompaniments a given particular depends.

[signum] 5. Consonant accompaniments that, on the basis of the origin of the mode C with the major third, belong to the letters that consist the scale of said mode. C, as its fundamental note, requires the accompaniment of the major third and of the fifth

[Riccati, The laws of counterpoint, 64,1; text: C, E, G. 1, 5/4, 3/2, 6/5];

as fifth of F it requires the accompaniment of the major fourth and sixth

[Riccati, The laws of counterpoint, 64,2; text: C, F, A, 1, 4/3, 5/3, 4/5, 5/4].

[-65-] D [[as]] fifth of G requires the accompaniment of the major fourth and sixth.

[Riccati, The laws of counterpoint, 65,1; text: D, G, B. 9/8, 3/2, 15/8, 4/3, 5/4, 5/3]

E, as third of C, requires the accompaniment of the third and sixth, both of them minor.

[Riccati, The laws of counterpoint, 65,2; text: E, G, C. 5/4, 3/2, 2, 4/3, 6/5, 8/5]

F, note of the melodic system requires the perfect accompaniment of major third and of the fifth.

[Riccati, The laws of counterpoint, 65,3; text: F, A, C. 4/3, 5/3, 2, 5/4, 6/5, 3/2]

G, as a note of the melodic system requires the accompaniment of the major third and of the fifth,

[Riccati, The laws of counterpoint, 65,4; text: G, B, d, 3/2, 15/8, 9/4, 5/4, 6/5, 3/2]

but, as fifth of C, it requires the accompaniment of major fourth and sixth.

[Riccati, The laws of counterpoint, 65,5; text: G, c, e.  $3/2$ ,  $2$ ,  $5/2$ ,  $4/3$ ,  $5/3$ ,  $5/4$ ]

A, third note of F, requires the accompaniment [-66-] of the minor third and minor sixth.

[Riccati, The laws of counterpoint, 66,1; text: A, c, f.  $5/3$ ,  $2$ ,  $8/3$ ,  $6/5$ ,  $8/5$ ,  $4/3$ ]

B, being the third of G, also requires a similar accompaniment.

[Riccati, The laws of counterpoint, 66,2; text: B, d, g.  $15/4$ ,  $9/4$ ,  $6/5$ ,  $4/3$ ,  $8/5$ ]

[Riccati, The laws of counterpoint, 66,3; text: Gli stessi accompagnamenti espressi con note, e con numero conforme l'uso comune.  $5\ 4$ ,  $6\ 4$ ,  $6\ 3$ , Basso fondamentale.]

[signum] 6. Consonant accompaniments, that, on the basis of the origin of the mode A with the minor third, suit the letters that constitute the scale of said mode. A, as the first note of the melodic system requires the accompaniment of the minor third and of the fifth;

[Riccati, The laws of counterpoint, 66,4; text: A, C, E, 1,  $6/5$ ,  $3/2$ ,  $5/4$ ]

[-67-] as fifth of D, it requires the accompaniment of the minor fourth and sixth.

[Riccati, The laws of counterpoint, 67,1; text: A, D, F. 1,  $4/3$ ,  $8/5$ ,  $6/5$ ]

Since B is the fifth of E, it requires the accompaniment of the minor fourth and sixth.

[Riccati, The laws of counterpoint, 67,2; text: B, E, G.  $9/8$ ,  $3/2$ ,  $9/5$ ,  $4/3$ ,  $6/5$ ,  $8/5$ ]

C, as the third of A, requires the accompaniment of the major third and sixth.

[Riccati, The laws of counterpoint, 67,3; text: C, E, a,  $6/5$ ,  $3/2$ ,  $2$ ,  $5/4$ ,  $4/3$ ,  $5/3$ ]

D, as note of the melodic system, requires the perfect accompaniment of minor third and fifth.

[Riccati, The laws of counterpoint, 67,4; text: D, F, a.  $4/3$ ,  $8/5$ ,  $2$ ,  $6/5$ ,  $3/2$ ,  $5/4$ ]

E, as a note of the melodic system, requires the perfect accompaniment of the minor third and of the fifth,

[Riccati, The laws of counterpoint, 67,5; text: E, G, [sqb];  $3/2$ ,  $9/5$ ,  $9/4$ ,  $6/5$ ,  $5/4$ ,  $3/2$ ]

[-68-] but, as fifth of A, it requires the derivative accompaniment of the minor fourth and sixth.

[Riccati, The laws of counterpoint, 68,1; text: E, a, c.  $3/2$ ,  $2$ ,  $12/5$ ,  $4/3$ ,  $8/5$ ,  $6/5$ ]

F, third of D, needs the accompaniment of the third and of the sixth, both of them major.

[Riccati, The laws of counterpoint, 68,2; text: F, a, d.  $8/5$ ,  $5/4$ ,  $5/3$ ,  $4/3$ ,  $8/3$ ]

G, finally, since it is also the third of E, it requires a similar accompaniment.

[Riccati, The laws of counterpoint, 68,3; text: G, [sqb], E.  $9/5$ ,  $9/4$ , 3,  $5/4$ ,  $5/3$ ,  $4/3$ ]

[Riccati, The laws of counterpoint, 68, 4; text: Gli stessi accompagnamenti espressi con note, e con numeri conforme l'uso comune. 5 3, 6 4, 6 3, 5 3]

[signum] 7. When I move from a note to another one of the same scale, it always occurs that either I move from one sound to another one, both of whom belong [-69-] to the same perfect accompaniment or from a sound to another one that belong to two perfect accompaniments. In the first case, the movements are contained within the boundaries of the same consonant accompaniment and they are nothing but harmonic consonances used melodically, therefore, it is easy to tune them. In the second case, in general I am helped by the close link that binds on one side the three sounds that constitute the perfect accompaniment, and, on the other, the three sounds that constitute the melodic system. If one moves from A to B in the mode of C with the major third, it will occur that the ear will imply unwittingly the fundamental passage F G under the derivative melodic passage A B. Now, it is easy to sing the passage F G, because F and G are notes of the melodic system. However, once the sound F is sung, it is easy to sing the sound A, which is one of the components of the harmonic system F A c, and, once the sound G is sung, it is easy to sing the sound B, as it is one of the components of the harmonic system G B d. Therefore, once the sound A, major third of F, is sung, it is not difficult to sing the sound B, major third of G. I have chosen the passage A B deliberately, which is not one of the most simple, as the only help that available to the ear is the one mentioned just now.

[signum] 8. However, when the melodic passages derived from the fundamental ones that move from the first to the fifth note, [-70-] or vice versa, or from the first to the fourth note, or viceversa, are realised, the ear has a further element of support to help it sing them correctly. The Reader should recall that the accompaniments of the first and of the fifth note and those of the first and of the fourth note share a sound with which all the sounds of one and of the other accompaniment are consonant. Therefore, while I put into practice the said derivative passages, I move from a consonance to the other, both of whom belong to the same sound. This is something that facilitates our movements and makes the intonation very pleasant. Among the others, I begin to examine the ones that rise or descend by a second in order to draw some important reflections on the basis of them. I start first of all from the Mode C with the major third.

[signum] 9. Mode C with the major third.

[Riccati, The laws of counterpoint, 70; text: Terza maggiore, Quarta, Quinta, Sesta, Semtuono, Tuono, Suono comune, Basso fondamentale, 5 3]

[-71-] [Riccati, The laws of counterpoint, 71,1; text: Terza maggiore, Quarta, Quinta, Sesta, Semtuono, Tuono, Suono comune, Basso fondamentale, 5 3]

After observing the four sounds

[Riccati, The laws of counterpoint, 71,2; text: B, c, d, e,  $15/8$ , 2,  $9/4$ ,  $5/2$ ,  $16/15$ ,  $9/8$ ,  $10/9$ ],

that regularly ascend or descend on the scale, I observe that, as I move from one to the another one adjacent to it, I always move from the perfect accompaniment of the fifth note G to that of the first note C, as the fundamental bass shows clearly, or vice versa, which are accompaniments that share the sound G. Similarly, if I move from a sound to an adjacent one of these four:

[Riccati, The laws of counterpoint, 71,3; text: E, F, G, A,  $5/4$ ,  $4/3$ ,  $3/2$ ,  $5/2$ ,  $16/15$ ,  $9/6$ ,  $10/9$ ],

it happens that I move from the perfect accompaniment of the first note C to the one of the fourth note F or vice versa, both of which contain the common sound C within themselves. Now, G B, G c, G, d, G e or C E, C F, C G, C A are in [-72-] succession a major third, a fourth, a fifth and a major sixth. Therefore, if I move through the following passages:

[Riccati, The laws of counterpoint, 72,1; text: B c, c d, d e,  $15/8$ , 2,  $9/4$ ,  $5/2$ ,  $16/15$ ,  $9/8$ ,  $10/9$ ];

or through these:

[Riccati, The laws of counterpoint, 72,2; text: E F, F G, G A,  $5/4$ ,  $4/3$ ,  $3/2$ ,  $5/3$ ,  $16/15$ ,  $9/8$ ,  $10/9$ ],

I appear to be moving from the major third to the fourth through the minor second  $16/15$ , from the fourth to the fifth through the major second, or minor tone  $10/9$ , and I have the advantage that each couple of consonances share the same sound, which is G in one case and C in the other one.

[signum] 10. The seconds (minor  $16/15$  and major  $10/9$ ) prove pleasant in the melody when they work as a conduit from a perfect consonance to an imperfect one or vice versa, of which they are the difference. One should apply to them what I said (chapter 2. [signum] 26.) with regard to the major second  $9/8$ , difference between the two perfect consonances of the fifth and of the fourth, bearing mind however that it is superior in rank, as it is the difference between two consonances that are both perfect.

[signum] 11 The four sounds B c d e, [-73-] as also the four E F G A, the former of which derive from the two perfect accompaniments G B d and C E G, that have as their base the fifth and first note and share the sound G, and the latter from the accompaniments C E G and F A c, that have as base the first and fourth note and share the common sound C, are nothing but the two tetrachords of the ancient Greeks, namely, the Hypaton, and the Meson. Of the seven stepwise movements, or Seconds, as we want to call them, contained in the diatonic with the major third, three, B c, c d and d e, that are the differences between consonances that belong to the common sound G, are offered to us by the tetrachord B e. The same number of seconds, namely, E F, F G, G A, that are the difference between consonances that share the sound C, occur in the tetrachord E A. Only the major second A B, that was employed to move from the highest note of the Meson tetrachord to the lowest of the Diezeugmenon, which was aequisonant to the Hypaton, does not occur in any one of the mentioned tetrachords, and it is the one that lacks the aforesaid property of deriving from two chords that share a sound and whose bases lay at the distance of a perfect consonance. The origin of the diatonic system that Greek masters believed not to be primitive, does not induce me to believe that they had

knowledge of the perfection of the two tetrachords, Hypaton and Meson, that I explained above. Therefore, it is necessary to state that the ear taught mankind the diatonic system in the first place, and that only afterwards it showed the music theorists, who have meditated on it, [-74-] the link that ties the four sounds of the same tetrachord.

[signum] 12. From what was said it is easy to draw the conclusion that, if one wants to rise by step from the first note of the mode C with the major third, the most agreeable accompaniments that one can assign to the diatonic notes in sequence are the ones originate and are provided by the properties of the two tetrachords B E and E A. I added the seventh to the consonant fundamental accompaniment of the fifth note G, which covers more adequately the inversion of the fifth in the derivative chord of the fourth and sixth that suits the note D, and renders more necessary and more conclusive the passage B C from the seventh to the eighth note. I shall explain more in detail what I merely sketch here when I deal with the seventh [(a) Book third, chapter 2. add. infra lineas]. I warn the Reader that I wrote the number that indicate the dissonance above the two that indicate the consonant accompaniment.

[Riccati, The laws of counterpoint, 74; text: Basso fondamentale, 53, 3 6 4, 6 3, 6 4, 5 6, 3, 7 5 3]

Once one has examined the example placed above, one shall discover [-75-] that, except in one instance, the fundamental bass moves always with perfect consonances, in accordance with the main scope of the melodic system, from the first to the fifth note, from the fifth to the first one, from the first to the fourth, from the fourth to the first one etcetera. In all these instance the two adjacent accompaniments share a sound that works as their connection.

[signum] 13. Anyone who tried to employ the same progression of accompaniments descending from the eighth note to the first one would encounter the passage B A, that proves harsh to the ear, as both notes B and A require the accompaniment of the minor third and of the minor sixth. Said passage derives from the fundamental passage G F, and I shall discuss its imperfection produced in comparison with B and F further on (Book 2. chapter 1. [signum] 8.). Father Francesantonio Vallotti, excellent master of the chapel of the Church of Saint Anthony in Padua, avoids the mentioned passage, by introducing the sound B b between B and A, to which he assigns the accompaniments B b c e g of the second, fourth and sixth derived from the fundamental C E F, to which the dissonance Bb is added, that is a minor sevenths from the base C. In order to avoid the major fourth F B, that is called tritone, since it consists of three tones, the ancients allowed the diatonic notes the B b, on which they based the Synemmenon tetrachord [-76-] nel Sistema Diatonico. Thanks to the described device Padre Vallotti obtains the very attractive effect by which the fundamental bass moves always across perfect consonances. I warn the reader that the chord C E G B b belongs to the tone of F with the major third, to which the passage B B b moves. As to the tones that are subject to the principal tone, I shall discuss them in the fifth chapter. Padre Vallotti emmployes the same series of accompaniments also to ascend from the frist note to the octave, as the minor seventh can ascend by a minor semitone in certain instances, as I shall show you in the appropriate place. [(a) Third book, chapter 2. add. infra lineas]

[Riccati, The laws of counterpoint, 76; text: Basso fondamentale. 5 3, 5 6 3, 5 4 2, 6 3, 6 4, 5 3, 3 6 4, 7 5 3, 7b 5 3]

One can also avoid the bad relationship between B and F by rising the sound F with a

sharp sign. Therefore, the lauded Padre Vallotti also employs the following succession of chords descending from the eighth note to the first one. The accompaniment D F # A c belongs to the tone G with the major third, from which one returns to the principal tone through the accompaniment G B d f. Although, when the principal tone is with the major [-77-] the modulation to the subordinate tone, which is based on the fifth note, is more elegant than the one that leads to the one based on the fourth note [(a) chapter 5. [signum] 5. add. infra lineas], it will follow that, of the two series of chords descending from the eighth to the first note, the one placed in the second placed is encountered much more frequently in musical compositions. In it as well the bass moves across perfect consonances throughout. What I shall say on the cadences [(b) Book 2. chapter 1. add. infra lineas], shall clarify even further the perfection of our series.

[Riccati, The laws of counterpoint, 77,1; text: Basso fondamentale 5 3, 6 3, 3 6 # 4, 6 4 2, 3 6 4, 7 5 3#, 7 5 3]

[signum] 14. Mode A with the minor third.

[Riccati, The laws of counterpoint, 77,2; text: Basso fondamentale, Terza minore Quarta, Quinta, Sesta minore, Tuono, Semituono, Suono comune. 5 3]

[-78-] [Riccati, The laws of counterpoint, 78, 1; text: Terza minore, Quarta, Quinta, Sesta minore, Tuono, Semituono, suono comune, 5 3, Basso fondamentale]

In the mode A with the minor third one finds two tetrachords,

[Riccati, The laws of counterpoint, 78,2; text: C, A, [sqb], c, C, D, E, F, 9/5, 2, 9/4, 12/5, 10/9, 9/4, 16/15, 9/8, 6/5, 4/3, 3/2, 8/5],

that were unknown to the ancients, in which the seconds proceed from the high to the low register with the same order in which they rise from the low to the high register in the two of the mode with the major third. The first tetrachord derives from the accompaniments E G [sqb] of the fifth note E and A C E, that share the sound E. G and E form a minor third. Ascending by a major second 10/9, one reaches the sound a, that forms the interval of a minor third with E. If one ascends by a major second 9/8, we are presented with the sound [sqb], that forms a fifth with E. Finally, if one moves by a minor second 16/15, one arrives to the note c, that is at the distance of a minor sixth from E. One must note that the second 10/9 occurred to us in the tetrachords of the mode with the major third [-79-] as the difference between the fifth and the major sixth, and here, in a different form, it appears as the difference between the minor third and the fourth. One must make the same reflection on the minor second 16/15, that was the difference between the fourth and the major third in the tetrachords of the major mode, and in our case occurs as the difference between the fifth and the minor sixth. The second tetrachord C D E F derives from the accompaniments A C E of the first note A and D F a of the fourth note d, in both of whom one finds the sound A. Produce an analysis of the tetrachord C F similar to the one that we have concluded just now of the tetrachord G c.

[signum] 15. While one descends by stepwise motion from the eighth note to the first one, the most simple series of accompaniments belonging to the notes of said mode is the one that one deduces from the origin of the two tetrachords G C and C F. I warn the Reader that, if the passage B A derived from the fundamental E A has to satisfy te ear, it is necessary to rise the third of the accompaniment E G [sqb], which is also the sixth of the

derivative accompaniment B E G, with a sharp sign, by transforming them from minor to major by introducing the seventh artificial note G #. See what I say on the matter (Book 2. chapter 1. [signum] 11.12). There I demonstrate that, without the appropriate aid of the [-80-] seventh artificial note, one cannot employ the mode with the minor third either as the basis of a musical composition or as a subordinate mode in the middle of the composition.

[Riccati, The laws of counterpoint, 80; text: Basso fondamentale, 5 3, 6 3, 6 4, 3 6# 4, 7 5 3#]

One shall use the same chords also to rise from the first note to the octave, as long as one substitutes the seventh artificial note to the natural one, not only in the accompaniment B E G, but also in the other one, G [sqb] e. If one makes room in this accompaniment to the artificial sound G # and considers that there is the passage of the augmented second F G ' from the sixth natural note F to the artificial seventh, whose intonation proves rather difficult, one shall discover easily that the sixth artificial note F #, that exceeds the natural note F by a minor semitone, is also necessary. Thanks to this note, one shall achieve the beautiful result of being able to rise from the fifth note to the octave in the mode with the minor third across the same steps of two tones and a major semitone, that are easy to tune, through which one ascends similarly from the fifth to the octave in the mode with the major third. The Reader must note that the sixth artificial note implies the presence of the artificial seventh note as well, in such a way that the former must be preceded or followed necessarily by the latter. If one does not employ the seventh artificial note, there is no reason to alter the sixth note. Therefore, it would be redundant to employ the artificial sixth note, which, consequently, would prove unpleasant to the ear. If we substitute the sixth and seventh artificial notes instead of the natural ones, we are presented with the following artificial scale of the mode with the minor third.

[Riccati, The laws of counterpoint, 81; text: Basso fondamentale, 5 3, 3 6# 4, 6 3, 5 3, 6 4, 5 6 3, 7 5 3 #, 5 3#]

[signum] 16. Here it seems appropriate to me to explain a truth that, however entirely supported by experience, nevertheless appears to be a paradox. It consists in the fact that, if one transfers a melody from the base of a perfect accompaniment to the basis of another one with a fundamental passage, the derivative passages that belong to the higher parts are more pleasing when they move by step than when they leap, albeit the leap is consonant. One should understand that this is said under equal conditions and if there is no particular reason that opposes it. I have informed the Reader (chapter 2. [signum] 26. chapter 3 [signum] 10.), [-82-] that the seconds 9/8, 10/9 and 16/15, when they are employed in a melody, please the ear if they are employed to move from a consonance to another consonance. Now I add that, if we try to employ them as a means to move from a consonant to a dissonance, they shall always sound harsh, sometimes to an extent that they shall deserve to be banished entirely from counterpoint. For instance, the major second 9/8 would be such were it employed to move by major third from c, fifth of F to d Ninth of C. The derivative passages of the melody are subject to the same law, albeit they are consonant. If the consonance leads from a sound that belongs to the preceding perfect accompaniment to a sound that belongs to the following perfect accompaniment, in that case, it shall please the ear. However, if it is used as a conduit to move from a consonance to a dissonance, it shall prove bitter in nature and the ear will not suffer it on many occasions. I take as an example the unbearable passage from G, base

of the accompaniment G B D in the mode with the major third to B, major seventh added to the accompaniment C E G. One should deduce the consequence that, as the derivative passages of the melody are not considered much per se, one judges them mainly as pleasant or harsh against the point from which they start and against the point where they finish. I said that they are not considered much [-83-] per se because one cannot deny that, everything else being equal, the leap of a consonance is more pleasant than the leap of a dissonance.

[signum] 17. On the basis of the explanations provided so far, one can report little benefit in the melody derived from the consonant leaps compared to the passages that move by step, and this is greatly exceeded by the particular prerogatives of the latter. In the first place, one must not ignore that, as far as singers are concerned, stepwise motions are comfortable for them, as they produce very slight modification in the production of the voice, that appears to be even and graceful for this reason. However, to we move on to reasons that concern any type of music, when a part moves by step, it passes from a sound of the preceding perfect accompaniment to to the immediately adjacent one of the following one without omitting any intervening one that may be touched upon by another part. Because of this, the ear can follow its steps easily, pleasantly and without being confused. Moreover, when stepwise motion is employed, a great pleasure surges inside us as a consequence of the fact one moves from a fundamental harmony to another one with the slightest modification of the higher parts, so that one may achieve the desired effect with the greatest ease. These are the reasons that can be adduced at present to illustrate a truth supported by experience and by the common opinion of the masters of the chapel. [-84-] Moreover, we shall observe on the matter of the dissonances (whether harmonic, regular and chiefly regarded in counterpoint, or used in passing in the form of appoggiaturas) [(a) Book third, chapter one add. infra lines], that they always require to be resolved by step, as the resolution by leap proves always very unpleasant, even if the leap is consonant. This concurs to establish that in the derived melody the movements by step are to be preferred to those by leap, all circumstances being equal.

[signum] 18. The only difference between consonances that does not take place in the modes with the major and with the minor third is the minor semitone  $25/24$ , which is the difference between the two thirds and between the two sixths. This must be ascribed to the perfection of our two modes. In fact, the minor semitone  $25/24$  is the difference between two imperfect consonances, while the diatonic seconds have the property of being the difference between two perfect consonances or at least between two consonances, one perfect and the other one imperfect. Moreover, we noted ([signum] 3) that the minor semitone is such a small element that one can ascribe to it the name of augmented unison with good reason. If two notes that answer each other [-85-] in said element are struck at the same time, we can hear clearly an off-pitch that proves [[extremely]] unpleasant to the ear. Therefore, the minor semitone must be excluded [[absolutely]] from harmony. It may be allowed in the melody, but not in the most perfect sort, because, although it is used in such cases as the difference between two consonances, and the two notes that constitute the semitone are struck one after the other, nevertheless, when one hears the second sound, a trace of the first one persists in the ear, and an idea of this off-pitch unison, albeit confused. At Bologna, where music flourishes so well, to produce some semitones is equivalent to act in a mawkish way. If the sign #, which is called a sharp or diesis, is placed before a note, it makes it rise above the natural note by a minor semitone. The opposite effect is produced by the sign b, called flat (b molle) that, when placed before a note, performs the function of lowering it a semitone below the natural note. Therefore, both signs indicate the minor semitone that is added in the first instance to the natural note, while in the second instance it is removed. The act of

rising by a diesis and falling by a flat means nothing but the act of rising or lowering the voice by a minor semitone.

Fourth Chapter.

On the modes that share the same scale.

[signum] 1. We have observed (chapter 3. [signum] 2.) [-86-] that the scales of the two natural modes C with the major third and A with the minor third consist entirely of the seven natural notes A, B, C, D, E, F, G without any alteration of sharp or flat signs. Therefore, said modes accept the same scale with the only difference that the first one has its base on the letter C, and the second one on the letter A. In order that the relationships of all the sounds to the sound of the base A may be placed more clearly under the eyes of the Reader, I considered it appropriate to express this sound as the unit. Therefore, ascribed to the letter A the sound  $5/3$ , as in the major mode C, and established the other sounds in relation to this one, namely, established the minor mode on the sixth note A of the major one, the following scale is produced.

[Riccati, The laws of counterpoint, 86,1; text: A, B, c, d, e, f, g, a,  $5/3$ ,  $15/8$ , 2,  $20/9$ ,  $5/2$ ,  $8/3$ , 3,  $10/3$ ,  $9/8$ ,  $16/15$ ]

Transposed the letters c, d, e, f, g, a an octave lower, we are presented with the scale

[Riccati, The laws of counterpoint, 86,2; text: C, D, E, F, G, A, B, C, 1,  $10/9$ ,  $5/4$ ,  $4/3$ ,  $3/2$ ,  $5/3$ ,  $15/8$ ,  $10/9$ ,  $9/8$ ,  $16/15$ ],

which, in the values of the sounds belonging to the letters C, E, F, G, A, B, C is perfectly congruent with the one of the mode with the major third. The only difference consists in the value of the sound D that rises [-87-]above C by a major second  $9/8$  in the major mode, and by the second, which is also major,  $10/9$  in the minor mode. I have said already (chapter3. [signum]3.) that the major second  $9/8$  exceeds the other one  $10/9$  by a comma  $81/80$ , which is such a small difference that, as we shall see, both the natural temperament of the voice and the artificial one of the musical instruments resolves by adopting a major second of medium size that, according to the circumstances, performs the function of one or the other. Hence, one discovers clearly that the two modes with the major third and with the minor third embrace appropriately the same scale, since the latter is based on the sixth one of the first one in such a way that the principal sound A corresponds to the note a major sixths above C, and, consequently, a minor third below c. Once the temperament is put into place, the correspondence becomes absolute equivalence, since any instrument employs the same scale in the modes C with the major third and A with the minor third.

[signum] 2. The agreement of the two modes C with the major third and A with the minor third in accepting the same scale ties fundamental elements, that differ in other ways, to such an extent that it proves simple and very elegant to move from one mode to the other one. Since each diatonic letter draws its origin from the major mode C or from the minor mode A, it will be able to produce the accompaniments that depend on both of of the modes, and I shall be able to move from one mode to another one by assigning to a particular note first an accompaniment [-88-] that suits one of the modes, and then by assigning to the same note or to a different one one of the accompaniments that the other mode requires. If I am composing in the major mode C, I shall employ the accompaniments of the minor mode A in the less prominent places, as the most noticeable ones are reserved for the accompaniments specific of the major mode C. On the contrary, if the composition is based on the mode A with the minor third, I shall have to employ

some accompaniments that are suited to the mode A at the beginning, at the end and in any principal positions. However, in less prominent positions I shall employ the accompaniments suggested to me by the nature of the mode C with the major third, in order to endow my composition with gracefulness and variety.

[signum] 3. The following observations shall illustrate even more the tight connection that exists between our modes, which depends from the fact that the accompaniments of one mode have some sounds in common with the accompaniments of the other one. If I move from the accompaniments of the major mode to the ones of the minor one or vice versa, I distinguish three species of fundamental melodic movements. Some consist of perfect consonances, other occur by stepwise motion either upwards or downwards and the last one, finally are produced by employing imperfect consonances. As to the first species, there are only the two passages G D and D G, that are one the opposite of the other. The Reader should remember [-89-] that I noted earlier (chapter 3. [signum] 4.) namely, that two fundamental accompaniments whose bases answer each other as a perfect consonances, have a sound in common. It is a fact that the two perfect accompaniments G B d, D F a, from which the aforesaid passages G D and D G are created, have the sound D in common. The movements of the second species are six. Three of them, C D, G A, E F correspond to the rising second, but the perfect accompaniments based on the notes that constitute those passages have no sound in common. The passages mentioned so-far are only imitations of the ones that, either in the major mode, or in the minor one, move from one to the other one of the three notes first, fourth and fifth that constitute the system of melody. Moreover, if I must state my opinion, I believe that the two accompaniments that produce one of our passages must be ascribed properly to the same mode of the number of the mixed, secondary and derived that I shall explain quite soon. For instance, the passage C D moves from the fourth note C towards the fifth D of the mixed mode G, that ascribes the consonant accompaniments to its melodic system G c d, two of which are with the major third, namely, G B d and c e g, and one with the minor third d f a.

[signum] 4. The passages that [-90-] move from one mode to the other one without contrast are the ones of the third species that I have yet to consider. Five of them, C A, F D, G E, A F, C E rise by a third or descend by a sixth. The passage that descends by a sixth or ascends by a third is considered one and the same, as third and sixth together produce the octave. Equally, the passage that ascends by a third and descends by a sixth appears to be the same. For instance, when I descend through the minor third F D and I ascend through the major third F d, I move in the first instance from low F to low D, and in the second one from F to high d. Now, between the movements F D and F d there is the same aequisonance that occurs between the sounds D d that answer each other at the octave. Therefore, in future I shall mention only the passages of the third that moves downwards and upwards, that are easier to tune than the correspondent ones of the sixth and are employed more commonly in counterpoint.

[signum] 5. Therefore, when the passages of the third that moves upwards and of the one that moves downwards move from one beginning to another, if they must please the ear considerably, as it occurs in practice, it is necessary that the accompaniments that constitute them are linked closely between each other. We have observed that the passages that are the main concern of the system of melody, namely, [-91-] those of the fourth and of the fifth both upwards and downwards, consist of two accompaniments that have a sound in common. Therefore, in order to remedy the lower degree of perfection of the movements of the upward and downward third, it proves appropriate the property according to which not one but two sounds are shared by the chords that constitute the aforesaid passages. Now, since one counts three different and non-aequisonant sounds in

the consonant accompaniment, and, since the chords of our passages have two sounds in common, it is clear that, when I move from one to the other chord, I shall have to change only one sound, and, consequently, the passage shall prove singularly easy and elegant. In order to understand completely the reason of the mentioned sharing of two sounds, one must observe that in any perfect accompaniment, either with the major third or with the minor third, the fifth is divided into two thirds. I shall call lower third the third that answers to the bass, while I shall call the other one higher third. In the passages with the downward third, the lower third of the previous accompaniments becomes the higher third of the following one, while the exact opposite occurs in the passages of the upward third, where the higher third of the preceding accompaniment becomes the lower one of in the following accompaniment. Of the six thirds that occur in the three accompaniments C E G, F A C and G B d, that constitute the major mode C, five, C E, E G, F A, A c and G B are found in the accompaniments [-92-] that belong to the minor mode A, namely, A C e, D F a, E G [sqb], and this is the reason why the movements of the downward third amount to only five and no more than five, which is the same number as those of the upward third. Only the third B d, that belongs to the chord G B d of the major mode does not occur in the accompaniments of the minor mode, nor, equally, does the third D F, that is the lower one in the accompaniment D F A that belongs to the mode with the minor third is found in the accompaniments of the major mode. The Reader must not believe that they are to remain fruitless - I am not discussing at present the function that such thirds perform in the major or minor modes to which they belong. We shall see what position they occupy in the derivative modes that also accept the natural diatonic scale.

[signum] 6. One moves from an accompaniment with the major third to one with the minor third through the leap of the minor third downward or of the major third upwards, while the complete opposite occurs with the opposite leaps. See the four examples placed beneath.

[Riccati, The laws of counterpoint, 92; text: basso fondamentale, 5 3]

[-93-] These examples shall demonstrate also that one moves from one sound to another one that is not shared by the two accompaniments through a second. The Reader shall remember that I dealt with the great goodness of the stepwise movements in the melody derived by the upper parts (chapter 3. [signum] 16. 17.). When the leap is of a minor third, for instance, C A or A C, one ascends or descends from one sound to the other one that is not in common between the two accompaniments C E G, A C E through a major second, namely,  $10/9$  G A or A G. In the tetrachords of the major mode, we have found it to be the difference between the fifth and major sixth, while in the tetrachords of the minor mode we have find it to be the difference between the minor third and the fourth. Here our second  $10/9$  takes on both these roles, as it appears in front of us as the difference between the fifth C G and the major sixth C A, and as the difference between the minor third A c and the fourth E A. If the leap is of the major third A F or F A one moves from a sound to a sound that is not in common between the two accompaniments through a minor second  $16/15$  E F, or, in truth, F E, which appears to be the difference between the fifth A E and the minor sixth A F, according to what we noted in the tetrachords of the minor mode, and also between the major third C E and the fourth C F, as we have noted in the tetrachords of the major mode. It is clear that the double comparison of the sounds G and A with the [-94-] sounds C and E, common to the two accompaniments C E G and A C E facilitates greatly the intonation of the major second G A, or A G, and adds elegance to the fundamental passages of the minor thirds that we have mentioned. A similar reflection ought to be applied to the minor second E F or F E

and to the fundamental passages of the major third.

[signum] 7. Besides the two principal and regular modes, namely, C with the major third and A with the minor third, we count five other secondary and derivative modes that also agree in employing the natural diatonic scale. If we take away the two letters C and A from the seven natural letters that are the base of the two regular modes C with the major third and A with the minor third, we are left with the five letters D, E, F, G, B, on which our derivative modes are based and from which they derive their name. In the two regular modes C major and A minor, the common diatonic scale is produced by the sum of two systems one of harmony and the other one of melody. On the contrary, in the five derivative modes, it is the diatonic scale that determines in each of them individually the system of the melody and the accompaniments of the third and of the fifth that suit the three melodic notes. The only scope of the modes that I am discussing is to serve the principal ones, C major and A minor and to agree with them in accepting the same [-95-] scale, so that, thanks to the unity of the beginning the ear is pleased when it hears some variation both in the systems of melody and in the perfect accompaniments, while it is happy with the fact that the accompaniments that belong to the same mode are varied in nature and that sometimes the most perfect ones are allotted to the most perfect notes. These are all features that would prove unpleasant in the modes that can be used as principal and as the foundation of a musical composition. The properties mentioned here briefly will be understood clearly with the support of the notes that I shall add to each of the five modes.

[signum] 8. Origin of the derivative mode D produced by applying to the system of melody D G A three accompaniments of the third and fifth entirely composed of natural notes.

[Riccati, The laws of counterpoint, 95: D, F, A, G, B, d, A, C, e, Scala naturale diatonica, che risulta dai soprascritti accompagnamenti]

Our mode D is endowed with a perfect system of melody D G A. The reader must know that in my present research I do not consider the comma 81/80, as I consider it already dissolved by the temperaments, so that the two scales, of the major mode C [-96-] and of the minor one A, coalesce into a single temperate scale in which all the consonances, both melodic and harmonic, are adequately exact. So, having considered the three perfect consonant accompaniments applied to the melodic system D G A, I find that the minor third and the fifth correspond to the notes D, first, and A, fifth, and that then a more exquisite accompaniment of major third and fifth is ascribed to G, fourth note.

Because of the varied character of these accompaniments the name of mixed suits the mode D, since it is not entirely with the major third nor with the minor third.

Considered the mode D as subordinate to the principal ones C major and A minor, there is nothing to object. However, who wanted to employ the mode as principal and perfect would fall straight into the inconvenience as it would imply treating the fourth note G, that is the less worthy of those that make up the system of the melody, better than the other two. Reduced the sound B with a flat sign, so that the accompaniment with the minor third may correspond to G, our mode D becomes regular with a minor third.

[signum] 9.

Origin of the derivative mode that depends on applying three accompaniments of the third and fifth entirely composed of natural notes to the system of melody E A B.

[-97-] [Riccati, The laws of counterpoint, 97; text: E, G, A, C, e, B, D, f, Scala naturale diatonica risultante dai sovrapposti accompagnamenti. E, F]

The system of melody of the Mode E is equally exact, and the accompaniments of the minor third and fifth corresponding to the first note E and to the fourth one A are similar between them. One can see that the accompaniment B D f of the minor third and minor fifth is applied to the note B, that nevertheless is more perfect than the fourth A, and, as this accompaniment is not really consonant, it would render our mode much more irregular than the derivative mode D, while one wanted to consider them as perfect. Altered the note f with a sharp sign, the accompaniment B D f# becomes consonant with the minor third, and the mode E, abandoned the role of subject and derivative, becomes a regular mode with the minor third. However, going back to the derivative mode E, this is the first time that the chord B D f appears in music. Three of the seven notes that constitute the natural diatonic scale, namely, C, F, and G, have the perfect accompaniment with the third and the fifth of the major mode C, and another three, A, D and E, receive it from the minor mode A. Only the note B, which is the seventh in relation to the mode C and second in relation to the mode A, is the one that is left deprived, since no perfect accompaniment is can be ascribed [-98-] to it, because of one mode or the other. In order to remedy such shortcoming and provide it with an accompaniment that could be employed at least in the role of a perfect one, the aforesaid modes are united, and from the intervention of both of them the sound B of the chord A D f of the minor third and minor fifth is provided. In fact, it is created from the two minor thirds B D, D f, the first of whom is loaned from the perfect accompaniment G B d, one of the three that constitute of the mode C with the major third, and the second one by the accompaniment D F a, one of the three that constitute the mode A with the minor third. I pointed out ([signum] 5.) that the third B d does not take place in the accompaniments of the minor mode A, nor the third D f in the accompaniments of the major mode C. Now, since the accompaniment A D f belongs to both of the modes, the aforesaid two thirds are united through it and the musical link between them is reinforced even more.

[signum] 10. The minor fifth B f does not differ from a perfect fifth except for a semitone, hence it is explained through the nature of that element (chapter 3. [signum] 3.) said minor fifth is in some way in unison with the perfect fifth and it can represent it. Therefore, the counterpoint can employ [-99-] B D f as a perfect consonant accompaniment without breaking the rules, as it is not considered in itself, but according to the noted adjustment. I call consonant by representation the intervals that differ from the perfect consonances by a minor semitone, and, consequently, I call consonant accompaniments by representation those in which one of the mentioned altered consonances occur. As the derivative and secondary mode E and other ones of the same sort that I still have to describe have opened the way to the accompaniment B D f, the ear enjoys it a great deal because knows that said accompaniment is employed to avoid touching the natural diatonic note that have been determined by two such perfect models, as the two modes C with the major third and A with the minor third A, to which our derivative mode must be entirely subject. In fact, a very poor effect would be produced if in certain instances where the composition revolves around our modes, two of them original and five derivative, the accompaniment B D f were to be substituted by one truly consonant.

[signum] 11. The accompaniment B D f, if used sparingly and in completely secondary positions, not only pleases the ear, since the minor fifth B f represents a perfect fifth. In fact, the pleasant feeling that we experience has a further foundation, namely, that the ear believes it to be expressed by the proportion, [-100-] which it approaches closely. One gathers from the two regular modes C with the major third and A with the minor third, that the minor fifth is represented by the ratio 64/45, and according to this theory it

consists of two minor thirds, one of which lacks a comma. If one considered the minor fifth as consisting of the two exact minor thirds B D and D f, one would presume that it would employ the ratio  $36/35$  as its own. Since the best temperament produce rather narrow minor thirds, they produce a minor fifth that half-way between the two ratios provided,  $64/45$ ,  $36/25$ , whose difference consists of the comma  $81/80$ . The fraction  $10/7$  is half way between these two,  $64/45$  and  $36/25$ , and, consequently, it is adopted at least adequately in the temperaments. See the following calculation.

[Riccati, The laws of counterpoint, 100; text:  $64/45$ ,  $10/7$ ,  $36/25$ ,  $225/224$ ,  $126/125$ ,  $81/80$ ]

One gathers from this that the ratio  $10/7$  exceeds the ratio  $64/45$  by the difference  $225/224$ , equivalent to a third of rising comma, and that the same ratio  $10/7$  is lower than the  $36/25$  by the difference  $126/125$ , which is equivalent to two descending thirds of a comma. We shall observe (Book 4. chapter 4. [signum] 30.) that in the keyboard instruments commonly used the minor fifth B f is lower than the ratio  $10/7$  by a quantity [-101-] that is intermediate between a third and a fourth of a comma. Therefore, one can consider the ratio  $10/7$  as composed of two minor thirds that are nearly perfect.

[signum] 12. I provide herewith the illustration our fundamental accompaniment of the minor third and minor fifth with its derivative, placing the ratios in which the letter correspond to each other between a letter and another one, according to the judgement of the ear.

Accompaniment of the minor third and minor fifth employed as perfect consonant accompaniment.

[Riccati, The laws of counterpoint, 101,1; text: B, D, f, [sqb], d,  $6/5$ ,  $10/7$ ,  $7/5$ ]

Accompaniment of the minor third and major sixth derived from the one written above, taking as base the first intermediate letter D.

[Riccati, The laws of counterpoint, 101,2; text: D, f, [sqb],  $6/5$ ,  $7/5$ ,  $5/3$ ]

Accompaniment of the major fourth and major sixth derived from the consonant perfect by representation B D f, taking as base the second intermediate letter f.

[Riccati, The laws of counterpoint, 101,3; text: f, [sqb], d,  $7/5$ ,  $6/5$ ,  $5/3$ ]

[-102-] Among the truly consonant accompaniments the fundamental ones are those that please the ear more than the derivative ones, as they consist of a better aggregate of harmonic proportions. For a similar reason, in the instance at hand, the entire opposite occurs, and the derivative chord D f [sqb] shall prove considerably more pleasant than the fundamental B D f, which is confirmed by experience as a matter of fact. It is enough to reflect that two true consonances  $6/5$  and  $5/3$  correspond to the bass D of the derivative accompaniment D f [sqb], whereas a true consonance  $6/5$  and another one merely by representation  $10/7$  correspond to the bass B of the fundamental accompaniment.

[-103-]

[-104-] [signum] 13. Origin of the derivative mode F based on applying to the system of melody F B C three accompaniments of the third and fifth entirely consisting of natural notes.

[Riccati, The laws of counterpoint, 104; text: F, A, C, B, D, f, c, e, g, Scala naturale diatonica, che risulta dai soprascritti accompagnamenti.]

The system of melody of the mode F consists of the fundamental note F, of the B, that forms a major fourth or a tritone instead of a perfect fourth, and, finally, of the note C, that is a fifth removed from F. The consonant accompaniment with the major third corresponds to the first note F and to the fifth note C, while the accompaniment of the minor third and of the minor fifth, explained by me just now in several paragraphs belongs to the fourth note B. So, going back to the system of the melody, the major fourth F B is employed to represent the perfect fourth, and it flows from it that the minor second B C, which is the difference between the the major fourth and the fifth, is employed to represent the major second, which is the difference between the perfect fourth and the perfect fifth. One finds frequently in musical compositions the fundamental melodic passage F B, of the major [-105-] fourth upwards or of the minor fourth downwards, intervals that, added together, constitute the octave. The moderate harshness that one hears in it works as a condiment and does not prove unpleasant to the ear. We shall see in the appropriate place (Book 2. chapter 2. [signum] 6.) that the sum of several imperfection excludes completely from counterpoint the opposite passage of B f of the minor fifth or of the augmented fourth upwards. It follows from this that, if the composition is on the note B ad I do not want to leave the mode of F, I cannot move with a fundamental movement to any other note except to C. This is the reason why we are pleased to a considerable degree by the melodic passage B C, since the ear is pleased to hear a movement that is the only one that can please it and for which it waits with anticipation. I believe that the great horror felt by the ancients towards such interval derived from the considerable distaste felt by the ear when it hears the forbidden leap B F of the tritone or of the major fourth downwards. Therefore, as I noted (chapter 3. [signum] 13.) they resolved to admit the note B b among the diatonic notes, in order to soften its harshness. Because of it they added the Sinemmenon tetrachord to the other four. [[All of this alteration]] Once the sound B is modified with the flat sign, F is no longer a derivative mode and becomes a regular mode with the major third,[-106-] similar to the Mode C.

[signum] 14. [[Meanwhile]] The admitted leap of F B, major fourth upwards or minor fifth downwards provides us with the following very attractive property. Once the perfect consonant accompaniment, either major or minor, is heard on the first note, and once one moves by seven steps of the fourth upwards or by the corresponding downwards, the entire composition returns to the original accompaniment with a kind of circular movement. See the example.

[Riccati, The laws of counterpoint, 106]

in the series of these seven leaps we are presented with all the seven natural diatonic notes endowed with the accompaniments of the third and of the fifth that are also natural, among whom one finds the accompaniment B D f of the minor third and minor fifth. Who wanted to avoid the mentioned leap F B and the accompaniment B D f, would abandon immediately the original principle of the diatonic scale, would move to keys that are very far removed from the two original ones (C with the major third and A with the minor third) and would lose the advantage of being able to return through the aforesaid circular movement to the accompaniment heard earlier. All of these matters are illustrated clearly in the intolerable example that follows.

[-107-] [Riccati, The laws of counterpoint, 107,1]

The absurdities contained in the second example highlight the perfections contained in the first one and convince us openly of a truth explained above ([signum] 10.) in relation to the accompaniment B D f. In other words, the ear hears willingly both the aforesaid accompaniment and the leap F B because it knows that they are employed in order not to alter the scale of the regular mode, either with the major third or with the minor third on which the entire composition or a section of it is based.

[signum] 16. origin of the derivative mode G that depends on applying to the system of melody G C D three accompaniments of the third and fifth entirely consisting of natural notes.

[Riccati, The laws of counterpoint, 107,2; text: G, B, D, C, E, g, D, F, a, Scala naturale diatonica che risulta dai soprascritti accompagnamenti]

The mode G is found to be endowed with a perfect system of melody G C D. The first note G and the fourth one C occupy the perfect accompaniment with the major third, while the accompaniment with the minor third corresponds to the fifth note D. [-108-] If we consider our mode as subordinate to the two perfect modes C major and A minor, everything works correctly, but, should anyone want to consider it as principal, they would find in it a notable fault. We mentioned (chapter 3. [signum] 15.) and we shall demonstrate (Book 2. chapter 1. [signum] 11. 12.) that the mode with the minor third, where the chord of the minor third and fifth is allotted to the three melodic notes, cannot satisfy the ear unless, thanks to the cadences, one does not ascribe the accompaniment with the major third to the fifth note. The Reader is invited to apply this to the mode G, and one shall see how insipid it proves when it is employed in the role of a main mode, as it ascribes the minor third to the fifth note D while the other chord with the major third is assigned to the other two notes. If one widens the sound F by employing a sharp sign, it would form a major third with the note D, and the mode G would abandon its character of subordinate and derivative to become exactly a mode with the major third.

[signum] 16. Origin of the derivative mode A that depends on applying to the melodic system B E F three accompaniments of the third and fifth consisting entirely of natural notes

[-109-] [Riccati, The laws of counterpoint, 109; text: B, D, F, E, G, A, c, [sqb], Scala naturale diatonica, che risulta dai soprascritti accompagnamenti.]

The mode B, that I still have left to examine, would outdo in irregularity all of the other modes considered above, should one want to employ it as a principal mode. The fourth modes D, E, F, G are reduced to modes with the major third or with the minor third by changing only a single natural note. The mode B requires the alteration of two notes and, in addition, it is equally resistant to being transformed either into a major or into a minor one. If the two sounds C and F are enlarged with the aid of a sharp sign, our mode transforms into a mode with the minor third, and, conversely, if the natural signs B and E are reduced with a flat sign, our mode turns into a mode with the major third. However, if one enacts the same checks in relation to the mode B, in the system of melody B E F, that proceeds in relation to the first and fourth note, the fifth note F compared with the first one produces the minor fifth B F instead of a perfect fifth, which, nevertheless is represented by the minor fifth itself. Therefore, the minor second E F, which is the difference between the fourth B E and the minor fifth B F, is employed to represent the

major second, which is the difference between the perfect fourth and fifth. The [-110-] fundamental passage B F from the first to the fifth note is forbidden completely, as I said ([signum] 14.) and, consequently, the movement B E, the only one among the ones that are allowed, does not prove unpleasant, when the composition is in the first note of the mode B and one does not want to move to another mode. As to the harmony, one must note that the accompaniment with the minor third and minor fifth is ascribed to the first note instead of the perfect accompaniment. This one can be used as perfect consonant, although it is not such. However, it is never allowed to conclude a composition or a section of it on it. Such restriction excludes our mode b from the number of regular and original tones, because in such modes the conclusions that are more pleasing occur precisely in the first note, which is foundation of the mode.

The accompaniment with the minor third is ascribed to the fourth note E, while the one with the major third is assigned to the fifth note F. Therefore, the three notes B, E and F accept three different chords of the third and fifth, and, consequently, if one wants to consider our mode B as principal and original, one can never assign to it the virtue of coherence and unity.

[signum] 17. In each of the derivative modes one finds two tetrachords comparable to the ones that I described in the two regular modes, both of which derive from two accompaniments of the third and fifth whose base notes respond either in a true perfect consonance, [-111-] or at least such by representation. The less irregular modes D, E, F, G share a tetrachord and the accompaniments that constitute it, the first two with the minor mode A and the last two with the major mode C. Only the mode b lacks this property. In short, the tetrachords newly introduced are three. These, added to the four provided to us by the two modes C major and A minor reach the number of the seven natural diatonic notes, to each of whom an individual tetrachord is assigned.

[Riccati, The laws of counterpoint, 111; text: Tetracordi introdotti dai Modi derivati D, E, F, G, B. Tetracordo comune. Terza minore, Quarta, Quinta Sesta maggiore, Suono comune, Tuono, Basso fondamentale, Semituono]

[-112-] In the tetrachords placed above, which in this are the same as those of the regular modes, we are presented with several seconds as differences between consonances related to a common sound, but it is not necessary to discuss them again. However, I shall mention some seconds through which one can move from a true consonance to a consonance by representation or vice versa. Such are, in the tetrachord D G, the minor second E F, difference between the fourth B E and the minor fifth B F, and the major second F G, difference between the minor fifth B F and the minor sixth B G. In the tetrachord A D the minor second B C takes the role of the difference between the major fourth F B and the fifth F C, while the major second A B is found to be the difference between the major third F A and the major fourth F B. The descending second B A and the ascending one B C are used very little in counterpoint, as they derive from the fundamental forbidden leap B F. Nevertheless, we shall see an example of the former (Book 2. chapter 2. [signum] 6.) and one of the latter, or, to be more precise, the example of a [-111-] passage similar to it (Book 3. chapter 2. [signum] 5.).

[signum] 18. [19. ante corr.] Reflecting on the nature of the derivative melodic passages, that are not judged in themselves but in relation to the term from which they start and the one to which they lead, it is easy to discover that the seconds just mentioned shall be more pleasing, as long as there is any contrary reason, when they move from a consonance by representation to a perfect one than when, conversely, are employed as a conduit to move from a perfect consonance to one by representation. After the perfect

consonance has been heard and given that the idea of the consonance by representation that must follow it is not clear, the idea of the difference by which I must rise or descend in order to tune perfectly the consonance by representation shall also be unclear. This does not occur when, tuned first a consonance by representation, one has to move on to an exact consonance moving through the difference between them. Moreover, when I move from a perfect consonance to one by representation the melodic derivative passage that I employed is harsh on the ear because it introduces into the composition an interval that, albeit it is used as consonant, nevertheless is truly dissonant. For the opposite reason [-114-] the movement that leads from the consonance by representation to the perfect consonance pleases the ear, because thanks to it the ear is freed from hearing a combination of sounds that is dissonant in substance.

[signum] 19. With similar arguments to the ones that I explained in relation to the original modes C with the major third and A with the minor thirds, and in certain cases with even more stringent arguments, one proves that the passage from said modes C major and A minor to the five derivative modes D, E, F, G, and B, or vice versa, and, similarly, from one to the other of the five modes mentioned just now. I said that in certain circumstances the reasons are even more powerful because some of our modes have their entire accompaniments in common. If the bases between two of the seven diatonic modes form the interval of the fourth or of the fifth upwards or downwards, two notes of the system of melody with the relative accompaniments of the third and fifth are found to be in common between the two modes. For instance, if one examines the two modes D and G, whose bases form a fourth, I find that the both melodic notes D and G are in common with both the melodic notes D and G together with the suitable perfect accompaniments D F A and G B d. In fact, if the fundamental sounds of two modes are at the distance of a second, either upwards or downwards, the modes will occupy the same accompaniment. Therefore, the natural modes [-115-] C, D, whose bases are at the interval of a second, both accept the accompaniment G B d based on the note G, which is the fifth in relation to the mode C and fourth in relation to the mode D. If the modes fall under the two mentioned species, the most elegant way to move from one to the other is to consider a common accompaniment firstly as belonging to one mode and then as belonging to another one, and with this device one moves from one mode to another one without changing the accompaniment. See the following figured bass by the Minorite Father Vallotti (whom I praised elsewhere) in the mode C with the major third. I notated underneath the fundamental bass, so that one may see clearly the perfect accompaniments from which those in the figured bass are derived. I have taken care to mark [[the modulations]] all the modulations from a natural diatonic mode to another one, as one does not find modulations of another sort in the present bass, so that the reader may note with greater ease that the bass is written with such artistry that the accompaniments that work as boundaries between two modes are always in common between those modes. For instance, the accompaniment C E G, at the end of the first bar, belongs equally to the preceding mode C and to the following one G.

[-116-] [Riccati, *The laws of counterpoint*, 116; text: 6 3, Basso fondamentale, Modo C, G, F, E, D, 6 4, [signum]]

[signum] 20. I believe the consideration of the five modes D, E, F, G and B derived from the first two C with the major third and A with the minor third to be extremely important in the art of counterpoint. In the first place, one can account through them of the introduction in music of the accompaniment A B F of the minor third and minor fifth, which, without the knowledge of our mode, would appear to be used

arbitrarily and at random. Secondly, one understands that the fundamental passages of the fifth, fourth and second employed in the notes of the derivative modes are nothing but imitations of the most exquisite passages that occur from a note to another of the system of melody either in the major mode C or in the minor mode A. These imitations produce an excellent effect in musical compositions because, since the ear receives them for what [-117-] they are and it is not satisfied completely by them, it desires to hear the passages that they imitate, whose sweetness is made to stand out marvellously from the comparison with the previous passages, which are less perfect. I invite the Reader to observe in the figured bass four passages from the fifth to the first note in the modes F, E, D and C contained between the signs [signum]. The first three allow the ear to hear fully the perfection of the fourth one, which deserves rightly the last place, because, once the ear has heard, as it cannot expect anything better than that one is, calls itself completely content. I inform the Reader that the five derivative modes D, E, F, G and A are so perfectly dependent on the modes C with the major third and A with the minor third and tied to them with a bond so tight that moving from the latter to the former ones is not considered changing the tone. Therefore, all the masters of counterpoint shall state that that figured bass is written entirely in the tone C with the major third. Therefore, when in future I use the expressions 'to change the tone' or 'to modulate from a tone to another one' without any other specification, I shall refer always to the passages from a principal or original tone to another one.

[signum] 21. With the exception of the natural diatonic mode B, the other four, namely, D, E, F, and G are employed as the basis for the ecclesiastical chants, in reference to which, abandoned their character of derivative and subordinate, they assume the improper role of principal modes. This appearance [-118-] does not match the origin that I ascribed to them, which highlights all too clearly their subordinate position, especially when one does not employ in the main passages to the appropriate aid of some artificial note. The first and the second tone have as their base the letter D, the fifth and the sixth the letter F. When they are used without the alteration of the flat sign on the note B, they coincide with our natural diatonic modes. The third and the fourth tone are based on the letter E, the seventh and the eighth the letter G. These are employed without altering any natural note. It is worthy of note that, since the two regular modes of C with the major third and A with the minor third, they escaped the sight of those who established the ecclesiastical chants. It is true, however, that, when the tones D and F with the flat sign on B are put into practice, as it happens often in the holy chants, the first of them turns into the perfect mode with the minor third and the second one in the perfect mode with the major third. The ancient masters both Greek and Roman placed the B b among the diatonic notes, and, if they did not employ the modes C major and A minor, they employed instead the modes F and D that are similar to them, as they were contained in the diatonic of those time just as the first two.

[signum] 22. The ecclesiastical tones E and G [-119-] are employed correctly if one considers them derived, the first one from the three perfect accompaniments that constitute the mode A with the minor third and the second by the three perfect accompaniments that constitute the mode C with the major third. It is necessary to imagine that the ecclesiastical tone E is none other than the mode A with the minor third that starts and ends on its fifth note E. Thus, equally, the ecclesiastical tone G has to be treated as the same as the mode C with the major third starting and ending on the fifth note G. We shall see in the appropriate place (Book 2. chapter1 [signum] 15.) that there are certain cadences or conclusions that conclude in the fifth note of the modes with the major third or with the minor third. The organists play the ecclesiastical tone E according to this concept, and the ecclesiastical tone G would require to be treated in the same way,

so that the organ is entirely in agreement with the choir. As to the tones D and F without the flat sign, one should use the former in a similar way to the mode A with the minor third that begins and ends in the fourth note D, and the latter as the mode C with the major third, which begins and ends on the fourth note F. Now, since neither the mode A with the minor third or the mode C with the major third have cadences that end on the fourth note, there follows that it is necessary either avoid finishing on the notes D and F, [-120-] with which one started, by directing the last cadence onto the note A in one case and C in the other of the respective diatonic tones D and F, or, when one ends the melody, it is necessary to abandon the mode on which it is based, to move either to the tone D with the minor third or to the tone F with the major third and to borrow their cadence from them. These considerations allow us to experience in practice the imperfection of the ecclesiastical tones D and F when the flat sign is not used in front of the note B.

[signum] 23. The compositions of the best music masters of the sixteenth century, which was very fortunate for the arts, are held in great esteem even in our day for several reasons and their style is observed diligently by the masters of counterpoint. Nevertheless, when our ear listens to them, as it is used to better things, it finds them devoid of beauty and there is something that one can find within them that does not satisfy the listener perfectly. I shall explain the reason of this effect, in as much as they suit our current discussion. First of all, what renders the aforesaid compositions not very tasty is the fact that they are often based on the ecclesiastical tones, which are not entirely major or minor. When they write in the ecclesiastical tones E and G or in tones similar to those, they do not employ them in accomplished way according to the concept that I explained at [signum] 22, but, [-121-] had they employed them even so with the utmost rigour, they would satisfy the ear a little rather than completely, as the listener finds out very easily that those tones have a better foundation.

[signum] 24. Secondly, since the composers of that lauded century were not aware of the true origin of the modes, they were unable to highlight the principal degree of those three notes through which, once they are enriched of their consonant perfect accompaniment, the mode is produced. If assign the accompaniment of the three notes of the system of the melody to the most notable points of the composition, and especially at the beginning and at the end, while I ascribe the derivative accompaniments to the other notes of the scale, the ear shall distinguish which ones are the principal notes and which ones are the secondary notes, and it shall form a clear idea of the mode on which the composition is based. However, if I do not have this aim, the ear shall be confused and shall not know precisely at which point the composition is and the scant satisfaction it shall feel will be proportional to the confusion of its judgement. Adriano Willaert makes the bass enter in this way at the beginning of a composition of his written in the ecclesiastical tone G.

[Riccati, The laws of counterpoint, 121; text: 6 3, 6 4, 5 4 3, 5]

The accompaniments of the third and of the sixth B E and of the third and fifth A C E do not satisfy the ear very much [-122-] because they are inadequate to produce the idea of the tone on which the counterpoint is based. The same author concludes a composition written in the tone D with the minor third in the way that the Reader can see herewith.

[Riccati, The laws of counterpoint, 122; text: 6 3, 5, 5 3, 5 4, 3, 7 5 3]

The tone D is expressed so little in the first four bars, since there is in the fourth bar a

cadence on the tone F with the major third, that the final cadence in the tone D with the minor third proves completely unexpected. From the same scarce understanding of the origin and of the nature of the modes derives the fact that sometimes the perfect accompaniment is assigned to more than two notes that proceed by step. At the beginning of the last example written above, Willaert gives the fifth to four notes that proceed by step, namely, A, B b, C and D.

[signum] 26. I shall limit myself to mentioning some of the other main imperfections, since they depend on principles that have not been explained yet. These consist in the too great frequency of certain passages from an accompaniment to another one that are not of the most perfect, in the restrained use of alterations, [-123-] and in the few modulations, which are sometimes also irregular, from a tone to another one. When the occasion presents itself, I shall invite the Reader to reflect on these details, as at the moment I could only touch on them in passing.

Fifth Chapter.

On the subordinate tones.

[signum] 1. If a musical composition created entirely in a given tone, it would prove very soon to be boring, as it would be devoid of variety. Therefore, a reason why modern composition please the listener, is the constant movement from the principal tone to the subordinate ones or vice versa that is employed in them. If one chooses as basis of the musical composition a tone either with the major third or with the minor one that performs the function of the principal one, I call subordinate the tones that can be reached through a direct modulation. Now, in this chapter I discover the laws of this direct modulation from a tone to another one, and these laws shall be demonstrated entirely with the aid of experience.

[signum] 2. The second, fourth and fifth note have such a perfect relation with the first fundamental note of the tone with which they constitute the system of the melody, that, without compromising the so very necessary requirement of the unity of the musical composition, I am allowed to modulate from the principal tone based on the first note to the subordinate ones that are similar to [-124-] the main one that are based on the fifth and fourth note. If the composition is written in the tone C with the major third, because of the tight unity of the system of melody C F G, I shall be able to move elegantly to tones that are similar to the principal ones, namely with the major ones, that accept as their fundamental the fifth note G and the fourth F. Similarly, when I compose in the tone a with the minor third, I shall be allowed to modulate to the tones that are also minor and based on the fifth note E and on the fourth one D.

[signum] 3. Let us put in front of our eyes the three systems of the melody of the principal tone and of the two subordinate ones similar to it and based on the fifth and on the fourth note, whose systems of the melody are accompanied by their consonant accompaniments.

[Riccati, The laws of counterpoint, 124; text: Sistema melodico-armonico, onde trae l'origine il Tuono principale C per Terza maggiore C, F, G, 5 3, d, 5 3 #, B b, A, minore, D, E, a, [sqb], 5 # 3, 5 3 b]

[-125-] If I compare the melodic-harmonic system of the subordinate tone G with the major third with the one of the principal tone C that is similar to it, I find that they have in common not only the accompaniment G 5 3, but also the chord C 5 3. The same accompaniment C 5 3 belongs also to the two tones F, subordinate, and C, principal, that both involve the chord F 5 3. Therefore, the principal tone C has in common with the subordinate tone G the accompaniments based on the fifth and first note, and with the

subordinate tone F the accompaniments based on the fourth and fifth note. I invite the Reader to consider how the shared accompaniment C 5 3, based on the note C, which is the fundamental of the tone on which the composition is supposed to be written, firms up the union of the subordinate tones G and F with the principal one C. At any rate, when one moves from the tone C to the subordinate ones G and F, [-126-] one hears little by little the chord C 5 3 and maintains fresh, as it must, the memory of the sound C, base of the fundamental tone. The considerations that I confined to the tone C and to its subordinates G and F, all of them with the major third, can be applied entirely to the tone A with the minor third and to its subordinate tones E and D, also with the minor third. The two common accompaniments noted render the move from the principal tone to the subordinate ones or vice versa very easy, since it can be achieved very elegantly without changing chord and simply by considering common accompaniment firstly as belonging to one tone and then as belonging to the other one.

[signum] It is left to us to provide some considerations on the perfect accompaniment that our subordinate tones do not share with the principal tone. In this third accompaniment I find the property of containing within itself two sounds belonging to the scale of the principal tone and a single one newly introduced that, since it does not differ from a particular sound of the principal tone except for a minor semitone, it sounds in some way at the unison with it. The accompaniment that the subordinate tone E with the minor third does not share with the principal tone A, which is also with the minor third, is B D F #, where the notes [-127-] B and D belong to the scale of the principal tone, and only F # rises above the note that belongs to the tone A by a semitone. Thus, the chord G Bb d as well, that is not shared by the tones with the minor third D subordinate and A principal, consists of three notes that occur in the scale of the principal tone A, among which the first and the third one belong to the scale of the principal tone A, while the second one B b is lower than the note B that belongs to the principal tone A by a minor semitone. The Reader must note that, when I state that a sound is in common between two scales, I do not take into account the difference of a comma that occurs sometimes, which, as I said elsewhere, is dissolved by the temperaments.

[signum] 5. The described perfect modulations from the principal tone to the subordinate ones based on the fifth and the fourth note depend on two elements that I set out to explain now. Firstly, since the fifth note is more perfect than the fourth one, it is clear that because of it the tone of the two subordinate ones similar to the principal that is based on the fifth note has a rather closer relationship with the principal tone. Therefore, if one compares the two modulations, the one from the principal tone to the one based on the fifth note and the one from the principal tone to the one based on the fourth note, [-128-] one must prefer the first to the second. Secondly, the move from the principal tone to a subordinate one proves to be all the more elegant the less obvious is the difference between the scale of the latter and the one of the former. Such effect is achieved when the note by the subordinate tone occupies in it a less prominent position. For this reason as well the move from the principal tone C with the major third to the subordinate one G based on the fifth note needs to be preferred to the one from the same tone C to the subordinate tone F that is based on the fourth note, since the sound f# altered by the tone G refers to the fundamental note d of the accompaniment d f # a with the major third, namely, in the relation of an imperfect consonance, while the sound B b altered by the tone F serves as the bass of the accompaniment B b d f. If I turn to the tone A with the minor third and to the subordinate E and D that are similar to it, I find, conversely, that the alteration of the note f # introduced in the scale of the tone E is more prominent than the alteration of the note B b introduced in the scale of the tone D, because f # forms the perfect consonance of the fifth in the accompaniment B d f#, while B b in the

accompaniment G B b d forms the minor third, which is an imperfect consonance. Therefore, because of this the modulation to the tone D based on the fourth note [-129-] has some advantage on the one that leads to the tone E, where the fifth note serves as the base. So, both the elements that I considered favour, in the tones with the major third, the modulation from the principal tone to the subordinate based on the fifth note. As to the tones with the minor third, an element is in favour of it and the other one is opposed to the aforesaid modulation. Experience must correspond perfectly to a well founded theory. In fact, in the tones with the major third, there is no doubt that the passage from the principal tone to the subordinate based on the fifth note is more pleasant in comparison with the passage that moves to the tone based on the fourth note. As to the tones with the minor third, the judgment of the ear is ambiguous, as it would not resolve to decide in favour of one modulation than of the other one.

[signum] 6. We have learned ([signum] 4. 5.) that, in the scales of the subordinate tones of which we speak, only a single note of the scale of the principal tone is altered. If the subordinate tone is based on the fifth note of the principal one, the altered note rises a minor semitone above the one that is indicated by the same letter in the principal tone. On the contrary, if the subordinate tone is based on the fourth note of the principal one, the altered note is a semitone lower [-130-] compared to the one marked with the same letter. As to the two tones C with the major third and A with the minor third whose scales consist of only natural letters without any alteration of sharps or flats, the subordinate tones G with the major third and E with the minor third based on the fifth note of their principal ones admit in their scale the letter F #, while, conversely, the subordinate tones D with the major third and D with the minor third, based on the fourth note of their principal ones, require the letter B b in their scale. Following the thread of the discussion started, the tones D with the major third and B with the minor third, that are based, the former on the fifth of the tone G with the major third, the latter on the fifth of the tone E with the minor third shall both heighten the sound C with a sharp, and shall require the letters F #, C # in their scales. The tones B b with the major third and G with the minor third place a flat sign in front of another letter and accept in their scales the letters B b and E b, because they are based, the former on B b, fourth note of the tone F with the major third, the latter one G, fourth note of the tone with the minor third B. As the rise in fourths continues, the number [-131-] of the notes altered with the flat signs also increases gradually. If the tone is principal, the sharps or the flats that we are discussing at the moment must be written near the clef once and are intended to be applied throughout, because they are not accidental alterations, but they are necessary to the nature of the tone.

[signum] 7. Since ascending in fourths is equivalent to descending in fifths, the following series that proceeds by intervals of the fifth shall illustrate the number and the order of the sharps and of the flat signs that have to be written next to the clef in the tones with the major third and in the ones with the minor third, and the order of the flat signs that have to be written next to the clef in the tones with the major third and in those with the minor third: F b, C b, G b, A b, E b, B b, F, C, G, D, A, E, B, F #, C #, G #, D #, A #, E #, B #. The number of the fifths taken upwards that the base of a tone with the major third from C and the base of a tone with the minor third from A shall be the same as the number of sharps required by said tones. Since A is three fifths upwards from C, the tone A with the major third requires three sharps. For the same reason, the tone F# with the minor third requires also three sharps, because F# is three fifths removed from A towards the high register. The number of the fifths taken towards the lower register starting from C in relation to the tones with the major third and from A in relation to the tones with the minor third determines the number of the flats that belong to a given tone in one and in

the other genus. Therefore, the tone F with the major third shall embrace one flat in its scale, and the tone with the minor third shall embrace four of them. I said that the series of the fifths shown above teaches us the order of the [-132-] sharps and of the flats that must be written next to the clef. If the tone requires a sharp, it will be F #; if two, they are F # and C #; if three, F #, C # and G # etcetera. Conversely, if it requires a flat sign it has to be B b; if two, they must be B b and E b; if three, B b, E b and A b etcetera. One must draw from this as well the consequence that two tones, one with the major third and the other with the minor third, whose bases are equally distant and on the same side in relation to the letters C and A, require the same sharp or flat signs, as to their number and species, and they accept the same scale. This must be occur in the way that I explained (chapter 4. [signum 1]) because in the instance adduced the tone with the minor third is always based on the sixth note of the tone with the major third.

[signum] 8. Since I was provided with the chance, I did not want to overlook the considerations contained in the last two paragraphs. However, going back to the subordinate tones, that are the subject of this chapter, I say that, apart from the two that we have described, each principal tone recognises another three that, compared with the principal tone and with the two subordinate similar to it and based on the fourth and fifth note, accept in pairs the same scale. If the principal tone is with the major third, the three subordinate ones to which we refer are with the minor third. Conversely, give that the principal tone is with the minor third, the mentioned three [-133-] subordinate tones are with the major third. Take as the principal tone the tone C with the major third. Our three subordinate tones with the minor third will be the following, A, D and E. If one compares these with the tones with the major third, the principal C and the subordinate F and G, one shall find that A and C, D and F, and E and G accept the same scale. If one takes the tone A with the minor third as the principal one, whose subordinate tones also with the minor third are D and E, and, considered that the following tones, one with the minor third and the other one with the major third, A, C, D, F and E, G share in pairs the same scale, we conclude that the tones with the major third C, F and G are the three subordinate tones to the tone A with the minor third that we are looking for.

[signum] 9. I have dealt amply in the previous fourth chapter with the frequent and elegant move from a tone to another one that accept the same scale, as, for instance, from C with the major third to A with the minor third or vice versa. Moreover, the identity of the scales of the tones C with the major third and A with the minor third has as a consequence the fact that the tones that are subordinate to one are equally subordinate to the other one. So, the tones with the minor third D and E are subordinate to their similar tone A; the tones F and G with the major third are subordinate to their similar tone C; therefore, the tones with the minor third D and E are [-134-] subordinate to the tone C with the manor third, while the tone with the major third F and G are subordinate to the tone A with the minor third. The same consequence would occur to us if we consider the identity of the scales of the tones F with the major third, D with the minor third, and G with the major third and E with the minor third, which has the power to obtain that E should be equally subordinate to the same tone to which G is subordinate and vice versa.

[signum] 10. One must deduce from this premise in the first place that, whether the musical composition is based on a tone with the major third, for instance, C, or on a tone with the minor third, for instance, A that accept the same scale, I am left with the same combination of sixth tones, three with with the major third, namely, C, F and G, and as many with the minor third, namely, A, D and E, through which I am allowed to roam. Of the seven diatonic natural notes, only the note B, which is the seventh in relation to the tone C with the major third and second in relation to the tone A with the minor third, does not serve as the base of a subordinate tone, and it is the one that cannot have a consonant

accompaniment that is really as such. Therefore, a tone with the major third has as its subordinate tones the two tones similar to itself based on the fourth and fifth note. The seventh must be subtracted [-135-] from the remaining notes, and we shall be presented with the second, third and sixth note, that are the bases of the three subordinate tones with the minor third. As to a tone with the minor third, if we eliminate the second note, the fourth and fifth note are the bases of the subordinate tones also with minor third, while the three remaining notes, third, sixth and seventh provide the foundation for the three subordinate tones with the major third.

[signum] 11. The method that I propose now to move in the most elegant way from a tone with the major third to the two subordinate ones with the minor third based on the second and third note or vice versa from a tone with the minor third to the two subordinate ones with the major third based on the sixth and seventh note and to return from it to the principal tone rests entirely on the decision that I make to move from one tone to another one that share the same scale and on the also on the device that I described a little earlier ([signum] 3.) thanks to which one can move very simply from a given tone, either with the major third or with the minor third, to the two similar subordinate tones and then back following the same path from those tones to the same principal one.

[-136-] [Riccati, The laws of counterpoint, 136; text: *Accompagnamenti generanti il Tuono C per Terza maggiore e id ue subordinati simili F, G. B b, F, C, G, D, 5 3, 5 3 #, A, minore, E. B, 5 3 b, 5 # 3*]

For the same reason thanks to which I can move from the three accompaniments of the major third that generate the tone C to the three with the minor tone that form the tone A or vice versa, since they admit the same scale without any alteration of sharp or flat signs, I am allowed to move from the three accompaniments that belong to the tone F with the major third to the three that belong to the tone D with the minor third or vice versa, and, similarly, from the three accompaniments that belong to the tone G with the major third to the ones that belong to the tone E with the minor third or vice versa, since pairs of the said tones accept the same scale composed of six diatonic natural notes and by B b in the first instance and by F # in the second. Let us attempt to move, in the most simple way of all, from the principal tone C with the major third to the [-137-] subordinate tone with the minor third based on the second note D of said principal tone. The tones F and F, both with the major third share the accompaniments F 5 3, C 5 3. However, from the three chords that belong to the tone F with the major third I can move to the three chords that belong to the tone D with the minor third. Therefore, from the two accompaniments F 5 3, C 5 3 that the tone C with the major third recognises as its own I am allowed to move to all the three accompaniments G 5 3 b, D 5 3 and A 5 3, that produce the tone D with the minor third. Moreover, since the passage from the three accompaniments F 5 3, C 5 3, G 5 3 of the tone C with the major to the three D 5 3, A 5 3 and E 5 3 of the tone A with the minor third, of which two, namely, D 5 3 and A 5 3, belong to the tone D with the minor third, is permitted, consequently, the passage from the three accompaniments F 5 3 C 5 3 and G 5 3, that form the tone C with the major third, to the two D 5 3 and A 5 3, that produce the tone D with the minor third, is allowed. If one wants to return from the tone D with the minor third to the tone C with the major third, I shall follow two considerations similar to the previous ones. One is allowed to move from the three accompaniments G 5 3 b, D 5 3 and A 5 3, that belong to the tone D with the major third, to the three B b 5 3 and F 5 3 and C 5 3 belonging to the tone F with the major third. Two of these, however, F 5 3 and C 5 3 belong similarly to the tone C with the major third. Therefore, from the three accompaniments G 5 3 b, D 5 3 and A 5 3 that make up the

tone D with the minor third, I can move to the two F 5 3 and C 5 3 belonging to the tone C with the major third. [-138-] Moreover, since the two chords D 5 3 and A 5 3 are in common to the tones with the minor third D and A, and on the premise of the fact that I am allowed to move from any chord of the tone with the minor third to any chord of the tone C with the major third, I shall be allowed, consequently, to move from the two accompaniments D 5 3, A 5 3 belonging to the subordinate tone D with the minor third to all three of the chords from which the principal tone C with the major third originates. With a similar method I shall move in the most elegant way from the tone C with the major third to the subordinate with minor based on the third note E, and from this one I shall return to the first one. By adopting a similar device, I shall be presented with the most simple passages from the tone A with the minor third to the two subordinate ones with the major third based on the sixth note F, and on the seventh G. If I want to return to the principal from them, I shall have to follow the steps that I left.

[signum] 12. I do not want to omit to explain a wider method that embraces the two of the third and eleventh paragraph and that teaches us to move in the most simple way from the principal and subordinate tones that share the same scale to any subordinate tone that does not accept the same scale or vice versa. All of the seven fundamental accompaniments composed entirely of the notes of the natural notes of a particular tone [-139-] belong to it. Three of them belong to it in a strict sense, as the tones that generate said tone, while the remaining ones belong to it more loosely, as they have been borrowed from the tones that share the same scale. Therefore, two tones, one with the major third and the other one with the minor scale that accept the same scale recognise as their own the sum of the same seven natural accompaniments, with the only difference that those three accompaniments, that have a primary role in relation to one tone because it derives from them, become secondary in respect of the other one. For instance, the two tones C with the major third and A with the minor third unite in admitting the same scale and the same seven fundamental accompaniments, namely, F 5 3, C 5 3, G 5 3, D 5 3, A 5 3, E 5 3 and B 5 3. Since the tone C is produced by the accompaniments F 5 3, C 5 3 and G 5 3, they occupy in it the higher position, while the remaining fourth are left with a lower rank. The scene changes in the tone A, and, since the accompaniments D 5 3, A 5 3 and E 5 3 that generate it have the function to hold the main position, it is necessary for the others to be satisfied with the secondary role.

[-140-] [Riccati, The laws of counterpoint, 140; text: *Accompagnamenti comuni ai Tuoni F per Terza maggiore, D per Terza minore accettanti la stessa Scala, B b, F, C, G, D, A, E, 5 3, 5 3 b, 5 b 3, 5 3 #, 5 # 3, F #*]

One should consider that the tones C with the major third and A with the minor third share the four accompaniments F 5 3, C 5 3, D 5 3 and A 5 3 with the tones F with the major third and D with the major third, and the four accompaniments C 5 3, G 5 3, A 5 3, E 5 3 with the tones G with the major third and E with the minor third. By employing said common accompaniments one can practice the most usual passages from the tones C with the major third and A with the minor third to the subordinate tones F, D, G and E, the first and the third of which are with the major third and the second and fourth with the minor third, or, conversely, from the four tones named last to the two first ones, C with the major third and A with the minor third, both of which can act as principal tones.

[signum] 13. since the great perfection of the reciprocal passage from the tone C with the major third to the tone of A with the minor third [-141-] depends on their sharing their scales, thus the considerable elegance of the modulation from the tone C with the major third to the two subordinate ones with the minor third D and E and from the tone A

with the minor third to the two subordinate tones with the major third G and F derives from the fact that the mentioned subordinate tones do not alter but a single note of the scale of the principal tone. In order to evaluate the respective goodness of said modulations I use as a guide the principle that the passage from a principal tone to a subordinate one of a different nature that does not accept the same scale is all the more pleasant the lower the degree occupied in the scale by the altered note. Therefore, the passage from the tone C with the major third to the tone D with the minor third shall prove rather more natural than the one from the said tone C to the tone E with the minor third, because the sound altered sound B b altered by the tone D forms a minor third, or an imperfect consonance in the accompaniment G B b D, while the sound f # altered by the tone E forms a fifth, which is a perfect consonance in the accompaniment B d f #. Accordingly, the modulation from the tone A with the major third to the tone G with the major third appears to be somewhat preferable when it is compared to the other one that moves from the same tone A to the tone F with the major third, because, between the notes f # and B b, by which the scales of the subordinate tones G and F differ from the one of the tone A, [-142-] the first one (f #) is an imperfect consonance in the accompaniment d f # a, while the second one (B b) is an aequisonance in the accompaniment B b d f, as it serves as its base.

[signum] 14. I inform the reader that the subordinate tones are used not only to provide variety in a composition that is perfectly coherent and is not divided into separate parts, but they have also another very beautiful use in relation to the compositions that consist of several sections. Let us take as an example a psalm that consists of several *versetti*. Since the psalm is one, it is necessary that the various *versetti* that make up the psalm should form a kind of musical unity with the principal tone. This shall be achieved admirably if, once the tone chosen as principal is assigned as foundation to the first one, to the last one and also to some intermediate *versetto*, all the others are based on one of the subordinate tones. Once a principal tone suited to the character of the entire psalm is chosen, then one must aim to interpret the particular mood of a given *versetto*, so that one may assign to it one tone rather than another one of the sixth remaining, of which one is principal and five are subordinate. When one matches the subordinate tones to adjacent *versetti*, one must consider the variety of the modes so that the tones that immediately adjacent are not only subordinate to the principal one, but [-143-] are also subordinate one to the other. For instance the tones F with the major third and E with the minor third are both subordinate to the tones C with the major third and A with the minor third, but this does not mean that that F is subordinate to the tone E or E to the tone F. Therefore, who, taken either the tone C with the major third or the tone A with the minor third as the principal one, composes one of the inner *versetti* on the tone F with the major third and the following one on the the tone E with the minor third, shall not gain any praise.

[signum] 15. The modulation from the principal tone to its subordinate ones has its degrees and its extreme limits both on the side of the sharps as on the side of the flats. I have mentioned briefly (chapter 3. [signum] 15.) that the mode with the minor third cannot act as principal or subordinate without the appropriate help of the seventh artificial note that exceeds the natural by a minor semitone. I also noted that, once one allows said artificial note, the sixth artificial note, that exceeds the natural note by a sharp, becomes equally necessary in order to avoid in some passages the interval of the augmented second from the natural sixth note to the artificial seventh or vice versa. Of the two tones that share the same scale, the one with the minor third leans [[rather more]] on the side of the sharps rather more than the other one with the major third [-144-] thanks to the two artificial notes sixth and seventh, that are higher than the natural ones by a minor semitone. It is true that two tones that share the natural scale must be marked near the clef

with no alterations or with the same alterations of sharps and flats. It is true that the artificial notes are recognised by the ear as such. It is true also that, for instance, the two artificial sharps [F #, G # add. supra lin.] employed in the tone A with the minor third make a less significant impression on the ear than the one produced by the single F # that belongs to the natural scale of the tone G with the major third. One cannot deny, meanwhile, that if the aforesaid tone A employs the sixth note F # now and then, and the seventh note G # more frequently, both of which are artificial, highlights the fact that, at least artificially, the tone A with the minor third leans more towards the sharps than the tone C with the major third. Therefore, here is the series of the six tones, a principal one and the other subordinate, considering only the flats: F major, D minor, C major, A minor, G major, E minor. Here one can see that, in relation to the tones C with the major third and A with the minor third, the last boundary towards the flats is the tone F with the major third, while the last boundary towards the sharps is the tone E with the minor third. An expert master of the chapel must ensure that the modulation from one tone to another one has a span, and this span must have a limit, so that, [-145-] after the modulation reaches it, it goes backwards and ends up in the principal tone. If one composes in the tone C with the major third, the subordinate tone based on the third note E of different nature compared with the tone C, namely, with the minor third, and most further removed than any other from it in the series presented above, represents the limit that the modulation can reach. If the composition is written in the tone of A with the minor third, the tone with the major third based on the sixth note F will be able to serve as limit of the modulation for the two reasons adduced just now.

[signum] 16. The first and most important introduction of the chromatic system into the counterpoint is the result of the use of the artificial notes. Apart from the sixth and seventh artificial note, the second artificial note, which is lower by a flat than its corresponding natural note, belongs to the minor mode. In the tone of A with the minor third such note is B b. Moreover, both the major and minor modes admit the fourth artificial note that is a sharp higher than the natural one, so that F # and D # are the fourth artificial notes in the modes C with the major third and A with the minor third. The artificial notes open the door to a number of intervals that belong to the chromatic genus, namely, the minor semitone, for instance, D D #; to the augmented second, for instance F G #, with which the [-146-] diminished seventh, for instance, G # f completes the octave; to the diminished third, for instance, D # F, to which the augmented sixth F d # corresponds in completing the octave; and, finally, to the diminished fourth, for instance, G # c, that forms the octave with the augmented fifth. I noted (chapter 3. [signum] 14.) that the minor semitone is banished from harmony and is accepted only in the melody. The other intervals can be used successfully both in the melody and in the harmony. We shall learn in the second book (where, while dealing with the subject of the musical passages from an accompaniment to another one, I shall demonstrate the true origin of the artificial notes and chords) that said notes enrich the minor mode with three accompaniments of the third and fifth that are consonant by representation, and with the accompaniments that derive from them. If I employ the usual example of the tone A with the minor third, the mentioned chords of the third and fifth are D # F a, of the minor third and diminished fifth, and C E G #, of the major third and of major fifth. We consider also two chromatic dissonances, namely, the diminished seventh and the diminished fourth or eleventh, of which I shall speak in the third book.

[signum] 17. If the four artificial notes, second, fourth, sixth and seventh, are added to the natural scale of the minor mode, the result shall be an [-147-] incomplete chromatic scale, namely, in relation to the tone A with the minor third:

[Riccati, The laws of counterpoint, 147,1; text: A, B b, B, C, D, D #, E, F, F #, G, G #, a Semituono maggiore, minore, Tuono]

Thus, if anyone wanted a perfect chromatic scale, one would be completely satisfied by considering the chromatic genus as deriving from the union of the principal tone with the five subordinate ones and by collecting into a single scale the natural scales of said tones with the addition of the sevenths, artificial notes of the three tones with the minor third, without which they cannot perform the role of principal or subordinate tones.

[Riccati, The laws of counterpoint, 147,2; text: Scala Cromatica nascente dall'unire in una sola le Scale naturali del Tuono principale, e dei subordinati, aggiungendo parimente le settime corde artificiali dei tre Tuoni per Terza minore. C, C #, D, D #, E, F, F #, G, G #, A, B b, B c, Semituono minore, maggiore]

Among the five sounds introduced by the chromatic system the two sounds, the two F #, B b are natural notes, the former of the tone G with the major third and E with the minor third, and the latter of the tones F with the major third and D with the minor third. The three remaining ones, namely, C #, D # and G #, belong as artificial sevenths to the tone D, E and A with the minor third. Since when I compose in [-148-] the tone C with the major third or A with the minor third, I have always the same group of six notes suited to providing variety to the composition, from whose union the chromatic scale presented above is created, there follows that those two tones C with the major third and A with the minor third share the chromatic scale, as long as the origin described above is ascribed, which is a property worthy of the Reader's notice before any other one.

[signum] 18. The chromatic division of the octave C c into two elements called semitones, seven major and five minor, is extremely elegant. The major semitones, that are also called minor seconds, lead from a letter to a different one, as, for instance, from E to F or from F # to G. The minor semitones occur between two and the same letters, one simple and the other altered by the sharp or by the flat sign, as, for instance, between the letters C C # or B b B. Two elements of the first species, E F and B C occur in the diatonic system. It is the chromatic system that introduces into music the elements of the second species, by dividing the five diatonic tones, namely, C D, D E, F G, G A and A B, into two semitones, one major and one minor. The chromatic division of the octave is varied and uniform at the same time: [-149-] it is varied, because the chromatic elements are of different species; uniform, because the elements of different species are very close to being in unison. The minor second differs from the minor semitone by a diminished second, which is nearly half of said minor semitone. Since, if we subtract the minor semitone from the major second one, obtains a minor second, thus, if one subtracts from the latter the minor semitone, one finds the diminished second. For instance, if one subtracts from the minor second E F the diesis E E #, the remainder is the diminished second E# F, which is an element that belongs to the enharmonic system, as we shall see soon.

[signum] 19. The chromatic systems that are found in the books on theory owe their creation more to art than to nature and they do not explain to the reader how one may employ the chromatic system in a regular fashion. The two ways in which I produced the chromatic systems are rich of consequences, since one can deduce from them how one ought to employ our system in counterpoint. When I deal with the origin of the notes and of the artificial accompaniments and I assign the reason of those passages from an accompaniment to another one, in the second book, I shall illustrate fully the primary use of the chromatic system. It is useful to consider it also as the product of the union [-150-]

of the principal modes with the subordinate ones, since it is employed frequently according to that idea. See the following example taken from an *Adagio* by Arcangelo Corelli written in the tone A with the minor third.

[Riccati, The laws of counterpoint, 150; text: 6, 6 4, 3 #, Basso fondamentale. Tuono C. D. E.]

The chromatic movements C C #, D D # lead us, the former from the tone C with the major third to the tone D with the minor third, the latter from the tone D to the tone E, both with the minor third, and all these tones are subordinate to the principal tone A with the minor third. These movements follow the law of the other derivative passages of the melody. The semitone C C# pleases the ear as a path through which the high part moves from C, fundamental note of the previous accompaniment C 5 3 to C #, major third of the following accompaniment A 5 3 #. Were the sound C not raised with a sharp, it would form a minor third with the base of the chord A 5 3. Now, the clear idea that we have [-151-] of the two thirds, major and minor, facilitates the intonation of the diesis, their difference, that in our case produces the effect by which we hear the major third A C # instead of the minor third A C. If we apply similar reflections to the minor semitone D D #, one ought to not only in relation to the semitone C C #, that the two accompaniments, the preceding one C 5 3 and the subsequent one A 5 3 #, share the sound E, that produces a major third with C and a fifth with A. Therefore, if I move from C to C #, I employ the common sound E as a benchmark, as C must refer to it as a major third and C # as a minor third. The property of the common sound is not found in the two accompaniments D 5 3, A 6 # 3 #, because in the first place the F is natural and in the second one it is sharpened. Therefore, in the example noted above the intonation of the minor semitone C C # proves to be much easier than [[D D #]] the one of the semitone D D #.

[signum] 20. One can also employ the chromatic system in a secondary way that is not considered by counterpoint, but with great gracefulness and beauty, by placing an altered note between two accompaniments, so that it allows us to hear some chromatic melody. I shall take as an example a passage taken from the cantata Tra voi taciti boschi by Signora Contessa Donna Teresa Agnesi, who was so excellent in the art of counterpoint, as much as her sister, Signora Contessa Donna Maria excelled in mathematics and in the most [-152-] sublime calculations.

[Riccati, The laws of 152]

In the sequence of the notes F, F #, G, that contains within itself the minor semitone F F#, an element that belongs to the chromatic system, the passage that concerns counterpoint is D 6 b 3 E b 5 3 b, which derives from the fundamental one B b 5 3 E b 5 3 b. The sound F #, intermediate between the two, F and G serves as a mere transition and has no effect on the harmony.

[signum] 21. Following in the steps of the chromatic system we pursue the enharmonic system so celebrated by the ancients. If we add to the three pairs of tones F, D, C, A and G, E (in each of whom there is a tone with the major third and another one with the minor third, from the union of which the chromatic system can arise) another seven, four on the side of the flats and three on the side of the sharps according to the following series,

[Riccati, The laws of 153; text: Tuoni colla unione dei quali si genera il Sistema Enarmonico, che partisce l'Ottava in diciannove elementi, er Terza maggiore.

Tuoni per Terza maggiore, minore, D b, A b, Eb, B b, F, C, G, D, A, E, B b, F, C, G, D, A, E, B, F #, C #]

[-153-] including the sevenths, artificial notes of the tones with the minor third, we shall be presented with the enharmonic system that divides the octave C c into nineteen elements of two different species, namely, into twelve minor semitones and into seven diminished seconds.

[Riccati, The laws of 153; text: Scala Enarmonica dividente l'Ottava in diciannove elementi. C, C #, D b, D, D#, E b, E, E #, F, F #, G b, G, G #, A b, A, A#, B b, B, B #, C, Semituono minore, Seconda diminuita]

The minor semitone is an element which also belongs to the chromatic system. The diminished second worms its way into the enharmonic thanks to the division that it produces of the minor second, which is a diatonic and chromatic element, into a minor semitone and a diminished second.

[signum] 22. Since the origin that I ascribed in second place to the chromatic system has demonstrated its correct application that occurs in music in relation to it, thus, conversely, the origin of the enharmonic system allows us to understand clearly that it has to be [-154-] excluded completely from counterpoint, especially since it is not possible to discover any other source of any use in counterpoint from which it may derive. Why is it possible to employ legitimately a system that springs from adding to the principal tone C with the major third or A with the minor third many tones that, since they are not subordinate, do not observe the due link with the principal both in relation to harmony and to melody? We shall see in the seventh chapter that certain modulations that are unpleasant to the ear that lead immediately from a given tone to another one that is not a subordinate one, rely the enharmonic system. I know that to banish absolutely the enharmonic system from counterpoint shall appear strange to the lovers of antiquities. However, as we live in a century in which authority is ascribed to reason, I beg them to consider that the ancient writers affirm unanimously that the use of enharmonic system was abandoned because of its excessive difficulty. Now, is not the fact that the elements, or enharmonic dieses, are difficult to pitch, a tacit warning from the ear that attempts to persuade us that the system is irregular? Let us consider a general and infallible law the fact that the melody, that can be tuned with difficulty by those who are endowed with a fine and practised ear, must be considered faulty.

[signum] 23. I add [-155-] that the exclusion of the enharmonic system from the counterpoint remains confirmed even more by reason, that can allow us to experience that it is not possible to employ at all the diminished second, an enharmonic element. The minor second, which is a diatonic and chromatic element is used both in harmony in the melody. I have talked about the minor second as melodic passage (chapter 3. [signum] 9. 10. 14.) and also in chapters 4, 5, 6, 15 and 18. In the third book, where I shall deal with the dissonances, I shall explain that the minor second is employed also in harmony. Let these two examples suffice for now. If the major seventh is added to the fundamental consonant accompaniment, it forms a minor second with the octave. If the note is added to the consonant accompaniment with the minor third, it shall answer to the minor tenth of said accompaniment at the minor tenth. From the minor second, the diatonic and chromatic element, I move on to the minor semitone, which is a chromatic and enharmonic element equivalent roughly to two thirds of a minor second. We observed (chapter 3. [signum] 18.) that the minor semitone needs to be completely banished from harmony, since, as it is an excessively small element, it is judged by the ear as an off-

pitch unison. Similarly, it was pointed out in the same passage that the minor semitone must be accepted in the melody, but not in the most perfect and majestic. In fact, even when it is employed in this way, it contains within itself something [-156-] affected, that shows clearly that the ear is somewhat aware of the off-pitch unison. The clear consequence flows from the previous true considerations that the diminished second or enharmonic diesis, which is roughly one third of the minor second and very close to half of the chromatic diesis, is a very small element, and, even if it is employed in the melody, the ear distinguishes an off-pitch unison clearly and with great displeasure.

[signum] 24. Those who would like an enharmonic system entirely composed of elements that are entirely its own, should add to the ten pairs of tones that produce the enharmonic system of nineteen elements another twelve, seven on the side of the flats and five on the side of the sharps, according to the progression written here beneath.

[Riccati, The laws of 156; text: Tuoni colla unione dei quali si genera il Sistema Enarmonico, che partisce l'Ottava in trentuno elementi. per Terza maggiore. minore. D 2 b, A 2 b, E 2 b, B 2 b, F b, C b, D b, A b, E b, B b, B 2 b, F b, C b, G b, D b, A b, E b, B b, F, C, G, D, A, E, B, F #, C #, G #, D #, E #, B #.]

By doing so, he shall come across the enharmonic system that divides [-157-] the octave C c into thirty-one elements of two different species, namely, into nineteen diminished seconds and into twelve seconds doubly diminished.

[Riccati, The laws of 157; text: Scala Enarmonica dividente l'Ottava in trentuno elementi. C, D 2 b, C #, D b, C 2 #, D, E 2 b, D #, E b, D 2 #, E, F b, E #, F, G 3 b, F #, G b, F 2 #, G A 2 b, G #, A b, G 2 #, A, B 2 b, B b, A 2 #, B, C b, B #, C, Seconda diminuita, doppiamente]

For instance, if I subtract the minor semitone F F b from the diminished second E # F, I shall encounter the second doubly diminished F b E #. Since the elements of a different species of our scale are very close to equality, it serves as a basis to the general temperate system of the famous Cristiano Ugherio, which divides the octave in thirty-one equal parts and enlarges the major thirds by a very small quantity and reduces the fifths by a little less than a fourth of a comma and the minor thirds by a little more than a fourth of a comma. Ugherio widened Giuseppe Zarlino's participation with the aforesaid system, since Zarlino's system left the major thirds [-158-] perfect and lowered the fifths and the minor thirds by a quarter of a comma. However, the subject of the temperaments needs to be treated with accuracy and I shall strive to do so in the fourth book.

[signum] 25. Since the enharmonic system has been excluded from counterpoint, I shall conclude the present chapter by warning that in the performance of some compositions one may employ some enharmonic embellishment. I have observed several times that, when accomplished singers or players want to rise or lower the voice by a minor semitone, they do not do this in one stage, but they reach the sound that they want to achieve through minimal steps. For instance, if one has to descend from F to F #, and, given that the orderly lowering of the voice does not allow me to hear any sound between F # and F that is distinctly articulated, the ear centres its attention on the note F #, from which the voice starts, and to the note F, onto which it moves. Therefore, the minor semitone maintains the nature of the other melodic passages even in this way, and it pleases the ear as a path to move from a chord to another one. However, it is true that the mentioned enharmonic enlargement or reduction renders the mawkishness of the minor semitone more noticeable, and for this reason it needs to be employed at the appropriate

time, in the appropriate place, sparingly [-159-] and where the expression of the emotion requires it. We shall see further on in the fourth chapter of the fourth book, when I talk about the keyboard instruments, that there are seven thirds in them three of whom should be called semi-diminished, strictly speaking, and four semi-augmented, since the former are smaller than the minor third, and the latter are larger than the major third by a kind of enharmonic element. The semi-diminished and semi-augmented represent the minor third and the major third so closely that they are not recognised by average players of keyboard instruments but as minor thirds and major thirds. Now, when one composes in the tones that contain the aforesaid semi-diminished or semi-augmented thirds, one is drawn to use the enharmonic system in some way. The good masters of the chapel who recognise well the variety of the tones commonly named with the major third or with the minor third that are contained in organs and harpsichord, choose them appropriately to express the sentiment of the words and to awaken various feelings in the soul of the listener. I shall discuss at length the varied nature of the tones contained in the keyboard instruments in the passage quoted.

[-160-] Sixth Chapter.

On certain irregular modulations.

[signum] 1. After I discussed the subordinate tones and the correct modulation from the principal tone to them or vice versa, I believe it also appropriate to mention certain irregular modulations that lead us to tones that are not subordinate to the principal one, so that the reader may learn how imperfect they are and that it is appropriate to avoid them. In the first place, since the subordinate tones similar to the principal, for instance C with the major third (the same considerations have to be applied to a mode with the minor third) are two, namely G and F, whose bases are at the distance of a fifth downwards or upwards from C, it is easy to discover that the two tones similar to the principal C that are more closely linked to it, are D, on one side, that is at the distance of two fifths upwards from C, and, on the other, B b, that is at the distance of two fifths downwards from C. See the series placed herewith.

E b, B b, F, C, G, D, A.

I base my considerations on the tones D and B b, and I shall explain through them how much praise may deserve a composition based on the tone C with the major third that modulates to them. Since the modulation to the tones D and B b has been discovered to be imperfect, perhaps one [-161-] shall forbid with greater reason to move to tones that are similar to the principal one and whose bases are removed from C by a greater number of fifths, such as the tones A and E b both with the major third.

[signum] 2. The bases D and B b of our two tones do not answer the fundamental note C of the principal tone in a good melodic proportion, and, consequently, between C and D and between C and B b the link that is necessary to render the immediate modulation from the tone C to one or the other one of the mentioned tones is lacking. We observed (chapter 2. [signum] 22. 23.) that, if the system of the melody has to be one, it must contain only perfect consonances. Now, the double fifth, for instance C d, or, subtracted the octave, the major second C D, are not perfect consonances, but dissonances, since the former one is expressed by the ratio 4:9 and the latter with the ratio 8:9. The Reader is invited to recall what I said on this matter (chapter 1. [signum] 9.). If one moves a step further to the tones A and E b, whose fundamental sounds are removed from C by three fifth, the proportion between the bases C, A and C E b becomes even more dissonant, since the triple fifth is expressed by the ratio 8: 27. To sum up, the ratio between the bases of the two tones shall be all the less elegant the greater is the number of the fifth that one counts between one and the other base. Meanwhile, [-162-] it is necessary to admit that the trebled fifth 8:23 is so close to the major third above the

octave 3:10 that, when one hears the former, the ear perceives the idea of the latter. As a matter of fact, in any musical instrument the double fifth and the major sixth above the octave are considered one and the same, as they differ by one comma, which is distributed by the temperaments in such a way that the ear is not displeased by it. On this premise, the melodic passages C A and C E b perform the role of consonances and are equivalent, either in descending or in ascending through a minor third. Nevertheless, this advantage that the tones A and E b have over the tones D and B b does not compensate the much greater drawbacks that I am about to discuss.

[signum] 3. The subordinate tones similar to the principal one share with it two notes of the system of melody endowed with the relevant consonant accompaniments, among which there is the basis of the principal tone. I invited the courteous Reader to consider (chapter 5. [signum] 3.) how the sharing of the mentioned note strengthens the union of the subordinate tones with the principal one, as this note has the beautiful property of reviving in our mind the memory of the principal tone even when the composition passes through the subordinate tones. In this situation, the tone D and B b that are at the distance of two fifths from C, reject the melodic note C, base of the principal tone, but borrow [-163-] from it a single note of the system of melody together with the appropriate consonant accompaniment. The tone D has the note G in common with the tone C, while the tone B b has the note F in common with it. The exclusion of the note C illustrates the very slight connection that exists between the tones D and A and the tone C. If we now move on to the tones A and E b that are at the distance of three fifths from C, they have no note of the system of melody in common with it, and, consequently, they are not linked to it in any way.

[signum] 4. I noted in the preceding fifth chapter ([signum] 4. 5. 6. 8.) that the subordinate tones modify one note of the principal tone at the most. I have also informed the reader, in the sixth paragraph of the quoted chapter, that two tones, for instance D and B b, whose bases are at the distance of two fifths from the base of the given tone C similar to them, modify two notes of the principal tone. The tones A and E b contains a further altered note, since they are removed from C by three fifths. Therefore, I stated ([signum] 2.) that, although the bases of the tones A and E b form imperfect consonances with the melodies C A and C E b that are perceived as perfect consonances, this advantage does not compensate for the great drawback that consists in the fact that they have no accompaniment in common with the principal tone and in the fact that the altered signs reach the number of three.

[-164-] [signum] 5. The observation that I am about to make, which is based on experience, shall clarify the truth of the fact that the two tones D and B b, whose bases are at the distance of two fifths from the base of the principal tone, cannot be counted among the subordinate tones to the principal one. The subordinate tones have this property that consists in the fact that it one is allowed to move from the principal tone to any tone immediately subordinate to it or vice versa. Therefore, if the composition is written in the tone of C, the ear is displeased if I move directly to the tone D or to the tone B b that are similar to it. Therefore, said tones are not subordinate to the principal. The masters of counterpoint, since they know the truth of this matter, if they want to employ the modulation from the tone C to the similar tone D, they accomplish it in an indirect fashion moving first, for instance, from the tone C to the tone G and then from the tone G to the tone D. Thus, although the tone D is not subordinate to C, nevertheless it is true that G is subordinate to C and D subordinate to G. Therefore, by modulating first from C to G and from G to D, with this device I move always from a tone to another subordinate one, and I prevent the ear at least in part from realising that the modulation has moved outside the due boundaries. Now, if one has to return from the Tone A to the principal C, on

which the composition is based, [-165-] it shall have to follow the same path, or at least an equivalent one, backwards.

[signum] 6. Now that I proved that the tones D and B are not subordinate to their similar tone C, as each one of them alters two notes of it, one has to deduce the consequence that the tones similar to the principal one that alter more than a note of it cannot be considered among the subordinate ones. This truth can be extended also to the tones of a different nature, except at the most one, which I shall discuss in the fifteenth paragraph and in the following ones. In truth, if the tone D with the major third is not subordinate to the similar tone C, the tone B with the minor third cannot be subordinate to it either, as it alters two notes of the tone C and accepts the same scale of the tone D with the major third. The Reader shall remember that I demonstrated (chapter 5. [signum] 9.) that a tone that is not similar to the principal is also subordinate to it in as much it adheres to the same scale of another tone that is similar and subordinate to the principal, or because it is subordinate to a tone similar to itself that admits the same scale as the principal tone. Thus, the tone E with the minor third is subordinate to the tone C with the major third because its scale and the one of the tone G with the major third that is similar to the principal consist of the same notes, or because said tone E with the minor third [-166-] is subordinate to the similar tone A, whose scale and the one of the tone C with the major third consist of the same note. Therefore, since the relation of the tone B with the minor third to the tone C with the major third depends on the relation of the tone D with the major third to the aforesaid tone C, or on the one of the tone B to the tone A both with the minor third, and since I demonstrated that the tone D with the major third is not subordinate to the similar principal tone C, the tone B with the minor third is not subordinate to the similar tone A. It shall also be clear that the tone B with the minor third cannot be counted among those that are subordinate to the principal tone C with the major third. Moreover, since a more ample discussion is required to uncover the correspondence of the tone B with the minor third to the principal tone C with the major third than the discussion required to determine the correlation of the tone D with the major third to the similar tone C, it follows that, if one compares the two modulations, namely, the one to the similar tone to the principal one, which modifies two notes of the scale of the principal tone, and to the dissimilar one, which also modifies two notes, the second modulation, in the absence of any particular circumstances that may favour it, shall be considerably less laudable than the first one, which matches our experience entirely.

[signum] 7. Of the two modulations, namely, either to the tone D similar to the principal C with the [-167-] major third, whose base is at the distance of two fifths upwards, or to the tone B b, similar to the principal C, whose base is at the distance of two fifths downwards, the second one is very rarely encountered in musical compositions. It will be useful to explain such practice first of all the consideration that, since one employs the modulation from the principal tone with the major third to the tone based on the fifth note above more often than the other modulation from the principal tone to the tone based on the lower fifth note, which is equivalent to the fourth above, for the reasons explained in the fifth chapter ([signum] 5.) consequently, we have a greater opportunity to move from the tone that is based on the fifth above to the one that is based on the double fifth or major ninth also upwards, which is equivalent to the major second, and a less frequent chance to move from the tone based on the lower fifth note to the one that is based on the double fifth or lower major ninth that is equivalent to the major second downwards or to the minor second upwards. I shall not fail to omit the circumstance that favours the modulation to the tone D. This consists in the fact that the two notes F #, C #, altered by said tone, preserve in it the place of imperfect consonances, since the one that belongs to D and the one that belongs to A are major thirds, while the notes B b, E b, [-

168-] altered by the tone B b, occupy in it the position of aequisonances, as they are the base of the accompaniments of the first and of the fourth note.

[signum] 8. Moreover, we shall see (Book 2. chapter 1. [signum] 17. chapter 2. [signum] 7.) that in both the tones with the major third and in those with the minor third, the fourth artificial note occurs often, which is a minor semitone higher than the natural one. If the fourth note of the scale of a tone with the major third, for instance C # instead of the natural C in the mode of G, said scale becomes entirely similar to the natural scale of the tone D with the major third that is based on the fifth note D of the aforesaid tone G, since both scales contain five notes that an altered, and two, F #, C #, altered with the sharp sign. Therefore, not all the passages in which one finds the note C # belong to the tone D with the major third, since some are regarded as belonging to the similar tone G, as the two fundamental passages C # 5 3, A 5 3 # D 5 3 # together with the derivative that derive from them, when such passages are employed as artificial cadences that end in the fifth note D of the tone G with the major third. The union of the preceding and consequent accompaniments is the benchmark used by the experts to establish if the passages mentioned belong to one or [-169-] to the other tone. It is true, however, that if the ear is used to listening to said artificial passages, it grows less displeased in listening to them when they are employed in the role of the natural ones and it learns to tolerate the fact that, although the composition is written in the tone C with the major third, sometimes it moves to the similar tone D based on the ninth or second note of the principal tone.

[signum] 9. This property can facilitate the modulation to the tone D with the major third even when the composition is based on the tone A with the minor third, to which the tone G with the major third is subordinate. Similarly, two circumstances similar to the ones that I noted in the seventh paragraph benefit said modulation. I established (chapter 5. [signum] 13.) that, of the two modulations from the tone A with the minor third to the tones G and F with the major third, the first must be preferred to the second one. Therefore, the opportunity to move from the tone G to the tone D shall arise more often than the one to move from the tone F to the tone B b, all four of them with the major third. Who tried to move from the tone A with the minor third to the tones D and B b with the major third through the tone E and D similar to A, would find find that, even through this path, the modulation from the tone A with the minor third to the tone D with the major third is rather better than the other one from the tone A to the tone B b with the major third. [-170-] In truth, since the modulations from the tone A with the minor third to the similar tones E and D based on the fifth upwards and downwards deserve equal consideration (chapter 5. [signum] 5.), and since the passage from E with the minor third to D with the major third proves easier than the one from D with the minor third to B b with the major third (chapter 5. [signum] 13.), it follows that, of the described mediated modulations from the tone A with the minor third to the tones D and B b with the major third, the one from A to D must be avoided less than the other one from A to B b. Given that the tones A with the minor third and C with the major third share the same scale, the same reflection takes place with which I established in the seventh paragraph that the altered notes F #, C # of the tone D with the major third are less harsh on the ear than the other two B b and E b that are modified by the tone B b with the major third.

[signum] 10. Now, let us compare the modulations that move from the tone A with the minor third to the similar tones B and G based on the double fifth upwards or downwards. Since the passage from the tone A with the minor to the similar tones E and E is equally perfect, and, similarly, the passages from E to B and from D to G, all tones with the minor third, are to be placed in the same degree of perfection (chapter 5. [signum] 5.), the modulations from A to B via the tone E and from A to G via the [-171-] tone D are

equally good. The melodic movements A E and E B, that are better than the other ones, namely, A D and D G, are compensated by the alterations of the tone A that are more audible in the tone G, since one finds that in these the sounds altered by the flat sign, namely, B b and E b, correspond to the first and fourth notes G and C at the minor third, and in that one the sounds altered with the sharp sign, namely, F #, C # produce a fifth in the chords B 5 # 3 and F # 5 # 3, while the second accompaniment is based on others above F #. The detail that the note E b, in which the natural scale of the tone G differs from the one in the tone D, is in it the second artificial note is equally useful to the two modulations that we are discussing. One would find that the modulations from the tone A with the minor third to the similar tones B and G are of the also of the same value when they move through the intermediate tones G and F with the major third. In fact, (chapter 5. [signum] 13.) one moves from A minor to G major with greater elegance than from A minor to F major, and, conversely, the passage from G major to minor proves less pleasant than the other one from F major to G minor, so that the result of the match is a draw.

[signum] 11. Among the many considerations [-172-] through which one could illustrate our modulations, I choose one, because it is similar to the one of the eighth paragraph, where I stated that the passages C # 5 3 D 5 3 # and A 5 3 # D 5 3 # belong artificially to the tone G and naturally to the tone D, both with the major third, and I have drawn the conclusion that this sharing renders the mediated passage from tone C with the major third to the similar tone D less noticeable. In the tone E with the minor third, the passages that correspond to the ones mentioned, where sixth artificial note C # is also employed together with the fourth artificial note A #, are A # 5 3 # B 5 # 3, F # 5 # 3 # and B 5 # 3 #, and they require necessarily that the accompaniment of the note B is of the major third and fifth. Were the composition in the tone B with the minor third, one would have to assign the chord with the minor third to B necessarily. Therefore, the ear derives a secure indication to judge if said passages belong to the tone E or to the tone B both with the minor third from the difference between the consonant accompaniment on B either with the major third or with the minor third. Therefore, since the composition is written in the tone A with the minor third, and, since the ear can never become used to hearing the passages A # 5 3 # B 5 # 3 F # 5 # 3 # B 5 # 3 in the subordinate tone E, since they belong only to the tone B, it follows that the modulation to that tone similar [-173-] to the principal, whose base is at the distance of two fifths, namely, a ninth or as second both major upwards from the base of said principal tone, will be even rarer than the one that one would find also because of the reason adduced, where the principal tone is with the major third. This observation can be applied to the modulation of the tone B with the minor third even when the composition is based on the tone C with the major third, which admits the same scale as the tone A with the minor third removed from the similar tone B by the distance of two fifths. The famous Signor Giuseppe Tartini, in the eighth Sonata of his Opus one, written in the tone of C with the minor third, provides me with the following example.

[Riccati, The laws of counterpoint, 173; text: 6 4, 5 [sqb] 3 #, 7 5 [sqb] 3 #, 5 3 #, 6 b 4, 5 3 [sqb], 6 [sqb] 4 # 3, 6, et cetera]

After Signor Tartini has moved from the principal tone [-174-] C to the similar subordinate tone based on the fifth note G of the principal tone, he then modulates to the tone D, also with the minor third, that is subordinate to the tone G, as it is based on its fifth note D, which is the ninth of the principal tone. After this, having considered that the accompaniment D 5 3 belongs also to the tone of G with the minor third, he considers it

as belonging to this last tone and he returns through the passage D 5 3 G 5 3 [sqb] to the tone G, subordinate to the principal C. These considerations shall prove useful to begin to form a correct idea of the orderly modulation from a tone to another one. In the third Sonata of the collection mentioned above, which is based on the tone of C with the major third, one finds the modulation to the tone B with the minor third, which consists, however, in the single passage A # 5 3 # B 5 # 3.

[signum] 12. I must not fail to compare the modulation mentioned last with the one that moves to the tone G with the minor third, in the same circumstance where the principal tone is C with the major third. If I adopt the intermediate tones E and D with the minor third, I move less naturally from the tone C with the major third to tone E than to the tone E with the minor third (chapter 5. [signum] 13.). Nevertheless, the passage from a tone to another one with the minor third E, B and D, G is endowed with the same perfection (chapter 5. [signum] 5.). Therefore, if one pursues the described path between the [-175-] two passages from the tone C with the major third to the tones B and G with the minor third, the second one must be preferred to the first one. The same passages shall appear almost of the same value, if one employs the intermediate tones G and F with the major third. In practice, the modulation from the tone C with the major third to the similar tone G is better than the other one from the same tone C to the similar tone F (chapter 5. [signum] 5.), while the modulation from the tone G with the major third to the tone B with the minor third is worse than the other one from the tone F with the major third to the tone G with the minor third (chapter 5. [signum] 13.). In the following thirteenth paragraph I shall adduce another reason in favour of the passage from the tone C with the major third to the tone G with the minor third.

[signum] 13. If we add to the sixth tones, a principal and its subordinates, the four tones (two with the major third and two with the minor third) that alter two notes of the scale of the principal tone and that I have discussed so-far, said ten tones, if one considers only the flats and the sharps, must be ordered in the following way, according to what I said at chapter 5. [signum] 15., namely, B b major, G minor, F major, D minor, C major, A minor, G major, E minor, D major and B minor. Chose as the principal the tone C with the major third, the tone not subordinate and closest to it considering only the flats [-176-] and the sharps is G with the minor third. Add that the two notes E and B of the principal tone C, modified by the tone G with the minor third with the flat sign, produce in said tone G the imperfect consonances C E b and G B b. Moreover, the tone G with the minor third does not differ from the tone G with the major third based on the fifth note of the principal tone except for the detail that the former is with the minor third and the latter with the major third. We shall consider just now that the link between the two tones, one with the minor third and the other one with the major third based on the same note. I believe that the frequent use that I find in Signor Tartini's Opus one of the modulation to the tone with the minor third based on the fifth note of the principal tone with the major third depends on the circumstances that we considered here. If the tone A with the minor third performs the role of principal, it would appear that the modulation to the tone of D with the major third should be as frequent as the one mentioned just now, not only because of the tones that are not subordinate is the closest in relation to the flats and the sharps, but also because it alters the sounds F # and C # that correspond to the first note D and to the fifth note A in an imperfect consonance, and also because it does not differ from the tone D with the minor third based on the fourth note of the principal tone but to the fact that the first one is with the major third and the second one with the minor third. Nevertheless, this is not true. I shall observe [-177-] in the fifteenth paragraph that the connexion that links two tones, one with the major third and the other one with the minor third that share the base note works well in order to employ the tone with the minor third

instead of the tone with the major third, but never to employ the latter instead of the former.

[signum] 14. It is the whole sum of the circumstances noted so-far, whether favourable or unfavourable, that facilitates or prevents more or less the modulation to our four tones that are subordinate but that retain still some sort of connection to the principal tone. In the lauded body of work of Signor Tartini, from which I quote frequently not only because of its perfection, but also because it is the only one I have at hand, I find that he never employs the modulation to that tone with the major third whose base answers at the minor second to the one of the principal tone with the minor third. An example shall clarify the matter. If the principal tone is A with the minor third, the mentioned modulation that that is not practised is the one that should move to the tone B b with the major third. Now, all the circumstances side in favour of the exclusion of said modulation. The tone B b with the major third is not similar to the principal tone; it is placed on the side of the lower fifths and the sounds B and E reduced by the flat sign retain in it the most principal place of first and fourth note; it is the most distant from the principal A [-178-] with the minor third in relation to the flats and to the sharps; and, finally, there is no tone that is subordinate to the principal that shares the base with our own.

[signum] 15. Secondly, I move on to talk about the modulation that moves from a tone with the major third to the tone with the minor third founded on the same base. Such modulation is rejected by the most serious compositions, namely, the sacred ones, especially by those *a cappella*, where a greater rigour is observed. However, the composers of sonatas, operas, motets and others, do not have so many scruples and employ the modulation of which we are talking. I discuss it in this way. This modulation is employed by this sort of composers because it is enjoyed by the listeners, and such enjoyment must have its reason. In order to investigate it, I observe first of all that the two tones, one with the major third and the other one with the minor third based on the same base occupy the same system of the melody, and in this respect they are linked mutually in perfect unity. Thus, the tones C with the major third and C with the minor third share the system of the melody C F G. Meanwhile, the entire origin of a tone depends on applying to each [-179-] melodic note, for instance C, F, and G, the system of harmony, namely the perfect consonant accompaniment of the third, fifth and octave. This also deserves a reflection, namely, that, the two tones with the major third and with the minor third founded on the same base agree up to a point and in what is most essential. In fact, they match the octave and the fifth, intervals that are the simplest of those that constitute the perfect consonant accompaniment, to each of the three common notes of the system of the melody. Therefore, both the tone C with the major third and the tone C with the minor third assign to the system of the melody the accompaniments that I shall call incomplete, namely, C G C, F c f and G d g.

[signum] 16. The entire disagreement between the two tones, one with the major third and the other one with the minor third based on the same sound, consists in the thirds, since the first one requires them to be major and the second one minor, so that their scales differ in three sounds. I invite the Reader to peruse the two scales of the tones C with the major third and C with the minor third.

[Riccati, The laws of 179; text: Scala del Tuono C per Terza maggiore. C D E F G A B c, minore, E b, A b, B b]

This variety of three sounds arises at [-180-] first sight in our mind a valid opposition against the practice of modulation that I am discussing. If there is a difference of two sounds between the natural scales of two given tones, on one of which the composition is

based, and I cannot move from one to the other if not indirectly as a last option, how is it that I shall be allowed to move directly from the tone C with the major third, for instance, to the tone with the minor third founded on the same base, if there is a difference of sounds between their scales?

[signum] 17. One may answer this question thus. The springs of the mutual subordination of two tones are two, namely, either the identity of the scales or the sharing of the accompaniments. If the shared accompaniments are two, a tone is subordinate to the other, albeit one notes the difference of a sound between their scales. The sharing of two whole accompaniments is nothing but the sharing of two aequisonances, of two perfect consonances and of two imperfect consonances. Now, two tones, one with the major third and another one with the minor third based on the same note have closer relationship between each other because of this, since one counts three aequisonances and three perfect consonances as shared by both of them. The aforesaid closer relationship remedies sufficiently to the defect that derives from the difference of three sounds and makes it such that, at least [-181-] in an imperfect way, two tones, one with the major third and the other one with the minor third based on the same base may be considered as subordinate to each other. I said 'at least in an imperfect way', because who adopts the tones really subordinate as the benchmark, considers that the tone E b with the major third has no accompaniment in common with the tone C with the major third any accompaniment except those incomplete and that, when I move from the tone C to the tone E b, the difference of the three sounds proves unbearable to the ear, would commit a very grave mistake. This is all the more true, since the three altered notes create in the tone E b the system of melody E b A b B b and, consequently, hold the place of aequisonances in said tone.

[signum] 18. The following consideration can also support the modulation that we are discussing. It is true that the natural scale of the tone C with the minor third alters three notes of the scale of the tone C with the major third. However, it also occurs that, if one compares the altered scale of the tone C with the minor third to the scale of the tone C with the major third, they do not differ except in one note.

[-182-] [Riccati, The laws of 182,1 ; text: Scala artificiale del Tuono C per Terza minore. C, D, E b, F, G, A, B, c]

Now I compare the Scale of the tone C with the major third with the two scales of the subordinate tone E with the minor third, the natural one and the artificial one.

[Riccati, The laws of 182,2; text: Scala del Tuono C per Terza maggiore. C, D, E, F, G, A, B, c, minore. F #, e, artificiale, detto Tuono, C #, D #]

Just as in the second one I find only the single alteration of the sharp to the note F, thus I see that the third one alters three notes of the first scale by adding the sharp sign to the letters F, C and D. The tone E with the minor third, whose natural scale alters one note of the scale of the tone C with the major third, is truly subordinate to it, albeit one notes three alterations in the artificial scale of the aforesaid tone E. Similarly, one shall be able to say that there is some subordination between the tones C with the major third and C with the minor third, because, if the scale of the former compared with the natural scale of the latter is different in three sounds, if one compares it with the artificial one, they are found to coincide in every note except only one. If one employs the sixth artificial note A and the seventh B instead [-183-] of the natural notes A b and B n, the tone C with the minor third has the two accompaniments F 5 3 [sqb] ad G 5 3 [sqb] entirely in common

with the tone C with the major third. The first accompaniments is employed sparingly, but not so the second, which, as it is employed in several cadences, occurs more frequently than the natural one G 5 4 6.

[signum] 19. Here are all the reasons on which, in my opinion, the practice of modulatin from the tone with the major third to the tone with the minor third based on the same note can rest. I derive from these the following opinion. The modulation shall prove very well justified if I use only the artificial scale of the tone with the minor third. The example here beneath is taken from the Signor Tartini's Opus one, from the Sonata written in the tone of G with the major third.

[Riccati, The laws of counterpoint, 183; text: 7, 6 4, 5 3, 6 b 4, 5 4]

Who moves from the tone with the major third to the tone with the minor third, which share the same fundamental note, and employs the sixth and seventh natural notes of this last tone shall take a greater liberty. The following example is by Signor Benedetto Marcello. The [-184-] Giga from which I have taken it was written by this important Author in the tone D with the major third.

[Riccati, The laws of counterpoint, 184]

However, if a master who employs the aforesaid modulation were not happy to introduce in his composition the three notes that differentiate the natural scale of one tone with the minor third from the scale of the tone with the major third that is based on the same sound, but introduced instead the second artificial note with the minor third, that is a semitone lower than its natural, I believe it to be clear that he would deserve little praise on this account. Corelli concludes with the passage that I quote herewith a Giga contained in his Opus five and written in the tone C with the major third.

[-185-] [Riccati, The laws of 185,1; text: et cetera]

[signum] 20. There are some composers, who, after modulating from the principal tone with the major third to the tone with the minor third based on the same note, consider it legitimate to move to the tones that are subordinate to it. These modulations displease the ear because the tones subordinate to the tone with the minor third that share the base with the principal one are all far removed from the principal one, although some more and other less. The device employed in certain passages by Signor Tartini is attractive. Here is an example contained in the first Sonata of his Opus one.

[Riccati, The laws of counterpoint, 185,2; text: 6 4, 5 3, 4 2, 3 b, 3 #, 4 2, 6 6 #, 7 b, 4, 3 6 5]

[-186-] Once one has moved from the tone A with the major third, on which the composition is based, to the tone A with the minor third, and one wants to modulate to tones that are connected with the latter, you must consider that, were the tone E with the minor third principal, based on the fifth note of the similar tone A, we would have the following six tones through which a modulation could circulate, namely, C major, A minor, G major, E minor, D major and B minor. Now, what does Signor Tartini do? He directs the modulation to the extreme tones on the side of the sharps, D with the major third and B with the minor third, and thus he achieves a double and most beautiful effect. In fact, on one hand the tones D with the major third and B with the minor third are

related to the tone A with the minor third, since the passages contained in the second and third bar, where the tone A with the minor third is employed, are irreproachable and visited on the basis of the principal tone E with the minor third, to which the similar modes A, B and the tone D with the major third are subordinate. Then, on the other hand, [-187-] the aforesaid tones D and B are subordinate to the truly principal tone A with the major third, to which the modulation returns in the fourth bar, as it must. In short, all the tones contained in the above example not only are perfectly or imperfectly subordinate to the principal tone A with the major third, but also they hold with the principal tone A with the minor third the relationship that is necessary to bind together the tones that are subordinate to a given one.

[signum] 21 Another passage contained in the twelfth Sonata of the quoted Opus one by Signor Tartini is worth considering. This Sonata is written in the tone F with the major third. After modulating to the tone with the major third based on the fifth note of the principal tone, he moves to the tone with the minor third based on the same fifth note. I have discussed in the paragraphs twelfth and thirteenth the relationship that the tone with the minor thirds based on the fifth note of the principal with the major third has with the principal tone itself, as well as the indirect modulation from the principal to said tone with the minor third or vice versa. By employing such a modulation, Signor Tartini returns to the principal tone, as one can observe in the *Adagio* of the quoted Sonata, a section of which I transcribe here,

[-188-] [Riccati, The laws of 188; text: #, 6, 9 8, 6 5, 7, b, et cetera]

In order to avoid being too prolix in these research, I invite the Reader to study well the compositions of the lauded Signor Tartini, where, since their Author is an accomplished master of counterpoint, one shall find everything that can be employed reasonably in the matter of irregular modulations, which we are discussing.

[signum] 22. Before concluding the present chapter, I add an observation that shall be not without use, since I believe, and it is true, that the tone with the minor third is employed well instead of the one with the major third based on the same note, but never vice versa. If the composition is written in a given tone with the major third, one shall find often that composers employ often the passage to the tone with the minor third base in order to return later to the first one. However, if, conversely, [-189-] the composition is written in a tone with the minor third, one shall find no example in which an expert of counterpoint, even less punctilious, shall dare to modulate to the tone with the major third that shares the fundamental note with the principal tone, in order then to return to said principal tone, so that the composition may be endowed with the necessary unity. The reason for this practice, which is governed by the ear, depends from the fact that when one moves from the tone with the major third to the tone with the minor third that shares the fundamental note with the former one, the ear is immediately conscious of the lack of perfection of the tone with the minor third compared with the one with the major third. However, such small distaste is compensated immediately by the pleasure that the ear feels when the compositions returns to the original tone with the major third. In fact, were the composition written in a tone with the minor third, and I shall deem it legitimate to move to the tone with the major third based on the same fundamental note, it is sufficient that the ear tastes the sweetens of this latter tone that it cannot stand any longer that the composition should return to the less perfect, which will appear unsuccessful.

Seventh Chapter.

On certain defective modulations.

[signum] 1. The practice of the irregular modulations so far examined has its

reasons, as we have seen, [-190-] and it is defended sufficiently by the approval of the ear. However, the modulations that I am moving on to discuss displease the ear openly and are employed by the composers to court the admiration of those who are less expert and to deceive musicians in the performance. I shall start by inviting the Reader to consider a spring from which some incongruous modulations derive. Certain composers take the opportunity to move directly from a tone to the other one from an accompaniment shared by two tones that are not reciprocally subordinate but not natural to both, and to move sometimes to tones that are even more remote. The following example taken from a recitative by Signor Benedetto Marcello contains two of our modulations. In the fourth bar the accompaniment D F# A is employed first as artificial accompaniment of the tone G with the minor third, and then as natural accompaniment of the tone D or of the tone A, both with the major third. This is done in order to move gradually to the tones with the minor third F # and C #. Now we arrive to the other modulation. In the eighth bar, the accompaniment G # B # D # is also employed as artificial of the tone C # with the major third. I invite the Reader to observe that, in the space of a few bars and through the application of our two modulations, our [-192-] very famous Author has moved from the tone G with the minor third to the tone C # with the major third, which shares the scale with the tone A # with the minor third. The bases of the similar tones G and A # are separated one from the other by no less than nine fifth. This consideration is directed to clarify the imperfection of the modulations that we are discussing.

[Riccati, The laws of 192; text: perchè sdegnati girate contro me sempre gli sguardi? a così fieri e sì frequenti dardi non ha l'anima mia tempre bastanti, et cetera]

[-193-] [signum] 2. Moving on to the second and more ample category of the defective modulations, I observe that, albeit the chromatic systems divides the octave into twelve semitones, eight major and five minor, and that, consequently, in a chromatic instrument, such as for instance the organ and the harpsichord, each note has its particular letter, either without alteration, or modified with the sharp and with the flat sign, nevertheless, because those instruments are employed widely, and in order to be able to perform any Sonata written in any tone, according to the need the major semitone is made to absolve the function of the minor one and vice versa, considering their difference of the minor second as nil or at least overlooking it. For instance, E F is a major semitone, and, nevertheless, often it occurs that it is employed as a minor semitone, either by using the higher note as E #, or the lower one as F b. Moreover, one also deduces from the tuning of the organs and of the harpsichords that the black key between A and B has to be called B b, and, consequently, that the tone A B is divided in such a way that the larger semitone A B b lays beneath and the minor one B b B lays above. Now, since the said black key performs very often the role of A A #, the division of said tone is inverted, so that the semitone that was larger becomes smaller or vice versa.

[-193-] [Riccati, The laws of 193; text: C, D, E, F, G, A, B, C, B #, C 2#, F b, E #, F 2#, G 2#, C b, B #, C #, E b, F #, G #, B b, C #, D b, D #, G b, A b, A #]

The illustration above represents the way in which the keys of the organs and of the harpsichords are more commonly employed. The lower note names are the true ones and the ones above are the presumed ones.

[signum] 3. Our second category of modulations have been derived from the two different names of the same key, which are separated by the difference of a diminished second. If two accompaniments employed in counterpoint differ in one or more sounds,

so that two different notes answer each other in pairs at the diminished second and employ the same key, if one employs the key firstly as representing one note and then as representing the other one, so that the accompaniment is changed, and, if one then moves to the accompaniments that are related to the last one, one produces the modulations that we are discussing. The examples that I shall insert at the appropriate time and place shall clarify the matter appropriately.

[signum] 4. First of all, look for the accompaniment that performs the function of consonance without the addition of any dissonance and that, by changing the name of one or more notes or keys turns into another consonant accompaniment also by representation, complete [-194-] and without the addition of any dissonance. In the consonant accompaniments, the intervals smaller than the octave that can be divided are the fifth and the sixth, while those that remain undivided are the fourth and the third. Now, so that the desired change may follow, it is necessary that the fifth may become sixth, or vice versa, and that the fourth may become third, or vice versa. If, for instance in the consonant perfect accompaniment with the major third C 5 3, that can be ascribed naturally to the third note C of the tone A with the minor third, I substitute the seventh natural note G with the artificial note G #, the result shall be the accompaniment C 5 # 3 of the major third and of the augmented fifth, which, as we shall see in the second book (chapter 2. [signum] 19. 20. 21.) works well sometimes. However, the same key that produces the note G # also produces the note A b, and the same key that produces the note C also produces the note B #, so both C A b and B # G # are minor sixth. Therefore, the augmented fifth C G # can change both into the minor sixth C A b or into the minor sixth B # G #. The transformations of the diminished fourth G # C into the major third A b C or G # [sqb] # and of the major third C E into the diminished fourth B # E depend on the transformations of the augmented fifth C G # into the minor sixths C A b and B # G #.

[signum] 5. One can observe [-196-] that the accompaniment C E A b of the major third and minor sixth derives from the fundamental A b c e, and that the accompaniment B # E G # of the diminished fourth and of the minor sixth derives from the fundamental E G # [sqb] #, so that both said fundamental chords are similar to the accompaniment C E G # of the major third and augmented fifth.

[Riccati, The laws of 195; text: Accompagnamento di Terza Maggiore e Quinta [[ambo]] [[maggiore]] [superflua. add. supra lin.]

Since it is possible to turn the major third into a diminished fourth, or vice versa, and since the octave consists of two major thirds and a diminished fourth, it is clear that any of the three aforesaid intervals that constitute the octave is able to assume the role either of the major third or of the diminished fourth. The same species of intervals that I find in the accompaniment C E G # c e g # with the major third and the augmented fifth, namely, firstly two major thirds and then a diminished fourth, I can find it, therefore, if I take as bases the notes E and G # that are non-aequisonant to C and by changing appropriately only the name of one key, so that the diminished fourth turns into a major third, [-197-] or vice versa, as it occurs in practice in the following accompaniments.

[Riccati, The laws of counterpoint, 196; text: C, E, G #, c, e, g #, A b, a b]

[signum] 6. Since the accompaniment of the major third and augmented fifth corresponds to the third note of the tones with the minor third, it is clear that the accompaniment E G # B # e belongs to the tone C # with the minor third and the accompaniment A b c e a b belongs to the tone F with the minor third. Therefore, if we

considers the as B # note C in the accompaniment C E G # c belonging to the tone A with the minor third, one moves immediately from the aforesaid tone A to the tone C # with the minor third, although its base is at the distance of four upward fifths from the base of the tone A. Similarly, if we take G # as A b, one moves immediately from the tone A to the tone F both with the minor third, whose base is at the distance of four downward fifths. If one changed two letters in the accompaniment E G # B # e and employed G # as A b and B # as C, one would move from the tone C # to the tone F, both with the the minor thirds and whose bases are at the distance of eight fifths. Finally, if one changes the name of all three the non-aequisonant notes that constitute the accompaniment E G # B # e, so that it becomes the following F b A b c f b, [-197-] one would move from the tone C # with the minor third to the similar tone D b, whose fundamental sounds are at the vast distance of twelve fifths. In an enharmonic instrument our modulation would prove absurd and intolerable. As to the chromatic instruments commonly used, such as the organs and the harpsichords, the same keys are involved in the tones with the minor third C # and D b and the corresponding accompaniments of both these tones consist of the same tones. The chords E G # B # e and F b A b c f b, [[which]] which contain the same keys, are similar and correspondent, because both are based on the third note of the tone and both consist of a major third and an augmented fifth. Now, albeit the same keys are called E G # B # in the first instance and then F b A b c f b, when one then moves to the accompaniments that belong to the tone D b, which is the same in our instruments as the tone C #, the ear cannot perceive this mutation, and, notwithstanding the sudden passage from the sharps to the flats introduced by the composer into the notes, the listener shall continue to believe that the composition carries on in the original tone. What I said on he accompaniments E G # B # e, F b A b c f b has to be applied in general to all the chords that employ the same keys. Moreover, these are similar one to the other because one derives from raising all the notes of the other by the harmonic element of a diminished second, or, vice versa, [-198-] the first derives from reducing the notes of the second by the same amount.

[signum] 7. However, if we go back to consider the less faulty modulations produced by changig the name to a singe note, I am able to discover in them a second very grave error that deserves to be highlighted. We shall observe (Book 2. 4. [signum] 16.) that, albeit the augmented fifth is employed as a consonance, nevertheless it sounds rather harsh on the ear and it needs to be resolved in a way by ascending to the sixth. Once one has sounded the accompaniment C E G# c, and has employed, for instance, G # as A b in order to move to the chords required by the new tone, the ear realises with displeasure that, instead of rising to A, the augmented fifth G # was changed into A b, base of the accompaniment A b c e a b. In the example placed below, the Reader shall consider firstly the passages from E 5 3 # to E 6 3 #, and then those from E 6 3 # to F 5 3 b. When I move from E 5 3 # to E 6 3 # I take the first accompaniment in the form in which it is written. However, when I move from E 6 3 # to F 5 3 b, I presume that the chord E 6 3 # has changed tacitly into the chord E 6 4 b that, as far as the instruments are concerned, consists of the same keys. Therefore, those that appear to be two passages, are in fact three, namely, dire E 5 3 #, E 6 4 b and E 6 4 b 7 5 3 b. Under [-199-] the figured bass I write the fundamental one, so that the Reader may note at sight the fundamental accompaniments from which the derivative ones contained in said figured bass derive.

[Riccati, The laws of counterpoint,199; text: Tiranno iniquo svenarmi un Figlio, 8, 7, 5 4, 3 #, 6, 5 3 b, 5 \ 3, 6 b 4, 5 3, 7 5 3 #, 5 3 #, 5 # 3#]

In order that the Reader may not be mistaken, I observe that the accompaniment C 6 b 4 ath the beginning of the third bar must considered among the fundamental ones, since in

said instance the fourth and the sixth are two dissonances added to the consonant fundamental chord C 5 3. I shall deal fully with the dissonances in the third book, which is devoted [-200-] to such topic.

[signum] 8. Once one finds the fundamental accompaniment by representation that it can be turned only into complete accompaniments that are employed as consonant, consider the addition of the seventh, the dissonance most elegant of all, to the consonant accompaniment, and look for the accompaniments of the third, fifth and seven from which one can derive other complete accompaniments also of the third, fifth and seventh by changing the letter of one or more keys. First of all, let us ascribe to ourselves the law what these deduced accompaniments must be similar to the given one. Added the seventh to the consonant fundamental accompaniment, the octave is found to be divided into three thirds and a second. If the thirds are all three minor, and, consequently, the third is augmented, if one considers that the same keys are employed in the minor third and in the augmented second, it is easy to understand that every sound of the given accompaniment can become the base of an accompaniment similar to the one given. In fact, starting from any sound one can always count three minor third and an augmented second in order, if the device of changing appropriately the name of one or more keys. The accompaniment of the major third, fifth and minor seventh can suit naturally the seventh note [-201-] of the tones with the minor third. If the tone with the minor third is A, its seventh note G accepts the accompaniment G B D F g, which is of the major third, fifth and minor seventh exactly. Substitute the artificial seventh G # to the natural seventh note G, and we shall encounter the accompaniment G # B D F g # with the minor third, minor fifth and diminished seventh, where one counts in sequence firstly three minor thirds, namely, G # B, B D, D F, and then an augmented second, F g #. The same chord can belong also to the tone D with the minor third, which is considered derived from exchanging the artificial fourth note G # and sixth B to the natural ones G and B b in the accompaniment G B b D.

[signum] 9. In the short table placed beneath one can see the transformations of the chord G # A D F g #, when one changes the name of one or two notes.

[-202-] [Riccati, The laws of 202; text: Accompagnamento fondamentale]

For reasons of greater clarity, I shall consider firstly the accompaniment G # B D F and the fundamental ones into which it changes as being based on the seventh artificial note of the respective tones with the minor third to which they belong. Changed the note F into E #, the fundamental accompaniment E # G # B D that is born of that alteration and its derivative ones belong to the tone F # with the minor third, and, consequently, through said mutation one moves from the tone A with the minor third to the similar tone F #, whose base is at the distance of three fifths upwards from A. Should one call the note G # A b, one would modulate from the tone A to the similar tone C that is three fifths downwards from A, since the fundamental accompaniment B D F A b and its derivative produced by said mutation [-203-] belong to the tone C with the minor third. If one considers G # as A b, and B also as C b, this would produce the fundamental accompaniment D F A b C b, that together with its derivative belongs to the tone E b with the minor third, and thus the composition would move immediately from the tone A to the tone E b both with the minor third, whose bases are at the great distance of sixth fifths one from the other. If one alters three notes of the given accompaniment, which occurs in the chord D F A b C b when it is compared with E # G # A D, one leaves a tone to move on to another one at the distance of nine fifths. Finally, if one changes the name to all four of the notes of the accompaniment placed above, one moves from one tone to another one whose fundamental sounds are at the distance of twelve fifths. The accompaniments D F

A b C b and C 2 # E # G # B have such property. The first one belongs to the tone E b and the second one to the tone D # both with the minor third, which are separated one from the other by twelve fifths and are based on the same note in our instruments.

[signum] 10. Given that the accompaniment G # B D F and the fundamentals into which it changes have as their base the fourth artificial note of the respective tones with the minor third, according to the law just described one would move from the tone D with the minor third to another one at the distance of three, sixth, nine and twelve fifths, according to whether one, two, three or four [-204-] notes of the aforesaid accompaniment are altered. In fact, if in our passages the preceding and subsequent accompaniments were based, one on the seventh, and the other one on the fourth note, both artificial, of their respective tones with the minor third, in that case the tone to which one moves approaches or distances itself from the given one by a fifth more than the law established in the previous paragraph requires. If the modulation proceeds from the sharps to the flats, the two tones shall approach each other if the preceding accompaniment is based on the fifth note and the following one on the seventh. If the preceding accompaniment is based on the seventh note and the following one on the fourth, the opposite effect occurs and the two tones move further away from each other. If the modulation moves from the flats to the sharps, it is beneficial that the preceding accompaniment is based on the seventh note and the following one on the fourth, while, on the contrary, it is inconvenient that the first accompaniment is based on the fourth and the second one on the seventh.

[signum] 11. I invite the Reader to observe the following examples composed by Signor Benedetto Marcello. I have taken the first one from a Cantata that begins Lungi lungi speranze, while the second one comes from the thirty-ninth psalm, page 90 of the seventh book of *L'Estro poetico-armonico*.

[-205-] [Riccati, The laws of 205; text: formava a poco a poco il tradimento eran bugiardi i pianti menzogneri i sospiri falsi gli affanni e fraudolenti i sguardi, Basso fondamentale, 7 5 3 #, 7 b 5 [sqb] 3, 4 3, 5 3 b, 7 b 5 3 [sqb] 5 [sqb] 3, 7 b 5 [sqb] 3, 7 [sqb] 5 3, H, K]

[-206-] [Riccati, The laws of 206; text: nè por mai sua fidanza volle sopra di queste frali terrene cose. Basso continuo dell'Autore, Altro, fondamentale, 7 5 3 #, 7 bb 5 3, 6 bb 4 2, 7 b 5 b 2, 5 b 3, 5 3 b, 5 3, I]

The two fundamental accompaniments B D F A b and G # B D F that constitute the passage marked H are based on the seventh artificial note of the respective tones with the minor third C and A. Moreover, the second accompaniment derives from changing to G # the single note A b of the first accompaniment. [-207-] So, when one moves from the preceding to the subsequent accompaniment, one shall modulate from the tone C to the tone A, both with the minor third, whose bases are at the distance of three fifths, according to the law established in the ninth paragraph. So that the passage marked I may be understood more clearly, I have written another bass under the figured bass of the composer, where one can see that the key of our instruments that is used firstly as C #, is then used as D b. Considered the fundamental bass, [one discovers add. in marg.] that, altered C # to D b, one moves from the sharps towards the flats, from the fundamental accompaniment C # E G A b the the equally fundamental one E G B b D b. The first of them belongs in our case to the fourth artificial note C # of the tone G with the minor third and the second one to the seventh artificial note of the tone F with the minor third. These two tones are only at the distance of two fifths one from the other, according to what has been observed in the tenth paragraph. The complete opposite occurs in the

passage marked K. In fact, given that the modulation moves from the sharps to the flats, the preceding accompaniment E # G # B D is based on the seventh artificial note of the tone F # with the minor third and the following accompaniment B b D F A b, which alters two notes of the previous one, is based on the fourth artificial note of the tone F with the minor third, the two tones F # and F will be found to be separated not by six fifths, [-208-] as the law established in the ninth paragraph would require, but by one more, namely, seven. The passage L, in truth, if is sung by an able singer and is presented to the judgement, shall enable it to form a correct idea of the distaste that one feels in modulating directly from one tone to another one that is at the distance of seven fifths from the first one.

[signum] 12. The accompaniments that are consonant by representation, the first one with the major third and augmented fifth without the addition of any dissonance, and the second one of the minor third and fifth with the addition of the diminished seventh, turn into accompaniments of the same nature based on a different fundamental note once the device of changing the name of one or more notes is applied.

Let us move on now to consider two different accompaniments, one with the major third, fifth and minor seventh, and the other one with the diminished third, minor third and diminished seventh based on bases that correspond to each other at the interval of a diminished third, which, changed the name of only one note, change one into the other and vice versa. For instance, to the fifth note G of a tone C with the major or minor third belongs naturally or artificially the accompaniment of the major third and fifth, to which one can [-209-] add the minor seventh in order to produce the chord G A D F. The accompaniment of the minor third and fifth E G B, to which we are allowed to add the minor seventh D, belongs to the fourth note E of the tone with the minor third B. If one substitutes the artificial note E # to the natural one E, we are presented with the accompaniment E # G B D consisting of the diminished third, diminished fifth and diminished seventh. The two accompaniments G B D E, E # G B D share the three notes G B and D, and the notes F and E # are produced by the same chord. See the table placed here beneath that contains our fundamental chords and their derivative, where all their reciprocal transformations are indicated clearly.

[Riccati, The laws of counterpoint, 209; text: Accompagnamento fondamentale]

[-210-] [signum] 13 If the accompaniment of the major third, fifth and minor seventh belongs to the fifth note of a tone with the major third, our modulation moves from a tone to another one between whose natural scales one finds the difference of two notes. In fact, if aforesaid accompaniment is based on the fifth note of a tone with the minor third, applied the transformation that we are discussing, one moves from a tone to another one both with the minor third, whose scales, based on notes that are at the distance of five fifths are not the same except in two sounds, while they differ by a minor semitone in the five remaining ones. The first modulation is found with some frequency in the works of the authors who delight in this sort of transformations. The second one occurs very rarely. Therefore, I believe it appropriate to produce an example of it transcribed from the Cantata *Cantata Udite amanti udite* by Signor Benedetto Marcello.

[Riccati, The laws of counterpoint,

210; text: e pur fra tanti congiurati a mio danno acerbi affanni par che l'alma s'inganni, 5 3 [sqb], 7 b 5 3, 7 5 3 [sqb], s [sqb] 5 3 #, Basso fondamentale, L]

[-211-] In the previous passage, the first accompaniment F A C E b if the major third,

fifth and minor seventh, belongs to the tone B b with the minor third. The following accompaniment, D # F A C, of the diminished third, minor fifth and diminished seventh belongs to the tone A with the minor third. The bases of these tones are removed from each other reciprocally by five fifths, and, where the natural scale of the first tone requires five flats, the one of the second does not admit any alteration of sharps or flats.

[signum] 14. It is worth pointing out that, while it has happened to me to encounter occasionally in musical compositions the passage G B D F, E # G B D, I happened to witness only twice a passage similar to the opposite one E # G B D, G B D F.

The transformations that we are discussing as well as those of the accompaniment of the minor third, minor fifth and diminished fifth [-212-] considered above are endowed with the property according to which the sound that was the seventh in the preceding chord becomes consonant either in reality or by representation in the consequent accompaniment. We shall see at the appropriate place (Book 3. chapter 1. [signum] 3.) that there are certain consonant that are so harsh that they would not be tolerated by the ear if used deliberately and without preparation. Therefore, the sound that added to the perfect consonant accompaniment produces the dissonance is made to occur in the preceding consonant accompaniment, either so that it corresponds to its base at the unison or at the octave, or so that it forms a third or a fifth or one of their compounds. Therefore, since the dissonant sound does not present itself as new, the ear does not notice it as much as it would notice it deliberately and without preparation. So, if the described preparation helps to reduce the natural harshness of a dissonance, one has to deduce that, if one follow the opposite method and allows the dissonant sound to be heard in advance and then to be transformed itself into a consonant sound in relation to the following accompaniment, such handling shall increase considerably the harshness of the dissonance. If the seventh becomes a consonance by representation, the ear shall not rest at all, because these consonances by representation are in truth dissonances. This shall not occur if [-213-] the seventh turns into a true consonance, because such consonance shall allow the ear to distinguish more clearly the harshness of the seventh. Now, here is a reason which the passage G B D F, E # G B D turns out to be less harsh than the opposite one E # G B D, G B D F. As to the first passage, the seventh F turns into the artificial sound E # is consonant merely by representation. The artificial note E # is employed instead of the natural note E and renders that the truly consonant accompaniment E G B turns into the accompaniment E # G B that is consonant by representation. If one turns to look at the second passage E # G B D, G B D F, the seventh D becomes a fifth in the following accompaniment G B D E, namely it becomes not only a consonance, but a perfect consonance.

[signum] 15. Moreover, another circumstance renders the first passage less imperfect than the second. Realised the first passage, the sound E #, fourth artificial note of the tone B with the minor third, is allowed to rist to F #, fifth note of said tone. This is the only reason why the fourth artificial note was introduced in music. [(a) Second book, fourth chapter, [signum] 18. add. infra lineas] In the second passage the fourth artificial note E # becomes F, the seventh of the following accompaniment, instead of rising to F #. The accomplishment of the aim for which the artificial notes seeped into the art of counterpoint, especially when said notes occur in consonant accompaniments by [-214-] representation suggested to us only by the chromatic system, is used by the aforesaid notes as a sort of resolution. I invite the Reader to remember what I said ([signum] 7.) about the augmented fifth.

[signum] 16. I do not omit to present you the examples of the second passage that I remember to have seen. One is contained in the Cantata by Signor Benedetto Marcello entitled Lungi, lungi speranze. I transcribe it firstly as dictated by that famous composer, and then I repeat it removing some ambiguity of the notation, so that the Reader may understand more clearly that the second passage is contained in said example.

[Riccati, The laws of counterpoint, 214; text: fraudolenti i sguardi: dunque che tardi vilipeso mio cor?]

[-215-] [Riccati, The laws of counterpoint, 216; text: Lo stesso esempio del Signor Marcello levati gli equivochi di scrittura. fraudolenti i sgcurdi: dunque che tardi vilipeso

mio cor? 5 3, 5 # 3 #, 7 5 3 [sqb], 7 [sqb] 5 3, 7 5 3 #, 5 3 #]

The accompaniment F 2 # A C # E of the diminished third, minor fifth and diminished seventh belongs to the tone C # with the minor third. The following accompaniment A C # E G is appropriated by the tone B with the minor third by borrowing it from the tone D with the major third that accepts the same scale. The bases of the two tones with the minor third C # and B are at the distance of two fifths one from the other, and the natural scales of the said [-216-] two tones differ in as many sounds.

[signum] 17. I have been able to find another example of the second passage in the very lauded Miserere composed by Signor Giannadolfo Hasse, the Saxon, for the l'Ospitale degl'Incurabili of Venice. While the words Docebo iniquos etcetera are sung, the *basso continuo* moves in the following fashion.

[Riccati, The laws of counterpoint, 216; text: Basso continuo dell'Autore, Altro, fondamentale, 7 5 3 [sqb], 6 5 b 3, 9 4 b 8 3, 6 b 4 # 3, 6 5 b 3, 7 5 3 b, 7 b 5 3]

I have written another bass under the *basso continuo* written by that famous composer, from which one can glean the transformation employed by Signor Hasse from the accompaniment G 6 b 4 # 3 b to the adjacent G 6 b 5 b 3 b, that consists of the same four notes and keys. Thus it is possible to provide the reason why the four sounds that create our chords can follow the accompaniment F # 7 b 5 3 and precede the accompaniment A b 5 b 3. When we discuss the seventh (Book 3. chapter 2.) we shall see that the passage F # 7 b 5 3 G 6 b 4 # 3 b is allowed in the Tone G with the minor third. As to the passage G 6 b 5 b 3 b A b 5 b 3 belonging to the tone A b with the major third, it is [-217-] used so frequently that it is not necessary to discuss it. Therefore, all the irregularity of Signor Hasse's passage consists in the quiet transformation of G 6 b 4 # 3 b into G 6 b 5 b 3 b, that are derivative accompaniments, the former from the fundamental one C # 7 b 5 3 b, and the latter from the equally fundamental E b 7 b 5 b 3, as the third bass indicates. Said transformation, [[that]] namely, the second passage that we are discussing, achieves the effect that one moves immediately from the tone G with the minor third to the tone A b with the major third, which modifies two notes of the natural scale of the tone G with the flat sign, and it is not counted among the tones subordinate to it.

[signum] 18. I supposed in the twelfth paragraph that the accompaniment with the major third, fifth and minor seventh is based on the fifth note of the major mode or of the minor mode. In truth, all the examples that I encountered of the last two passages that we have considered abide by this supposition. On the other hand, since said accompaniment cannot belong artificially to the second note of the one and of the other mode, and also to the fourth note of the mode with the minor third, any of the three mentioned suppositions has some drawback, if it is compared to that one, that ascribes it to the fifth note of the major mode. For instance, if in the passage E # 7 5 3 [sqb] 7 7 4 2 the second accompaniment belongs naturally to the tone C with the major third, one modulates from the tone [-218-] B with the minor third to the aforesaid tone C, whose scales differ by two sounds. Moreover if the following chord is employed as artificially belonging to the tone D with the minor third, one moves in that case from the tone B to the tone D both with the minor third, whose scales differ in three sounds. If we compare our three hypothesis with the one that assigns the accompaniment of the major third, fifth and minor seventh to the fifth note of the minor mode, one shall discover that the first and the third are useful, while the second one has a negative effect. In the adduced passage E # 3 5 [sqb] F 5 4 2 the composition shall modulate from the tone B with the minor third to the tone F with the major third or to the tone F with the minor third, according to whether the

accompaniment G 7 5 3, from which F 6 4 2 derives, shall belong to the second note of the tone F or to the fourth one of the tone D. The tones F with the major third and D with the minor third are removed from the tone B with the minor third less than the similar tone C. Conversely, the tone F with the minor third is further removed from the tone B with the minor third than the said similar tone C is.

[signum] 19. I have to add a fourth sort, which I have mentioned incidentally in the sixth paragraph, of transformation to the ones explained so-far. This consists in enlarging or reducing all the sounds of any accompaniment by a diminished second, [-219-] so that the accompaniment give and the one transformed are the based on the same note and maintain their similarity between them. Such are, for instance, the two chords C # E # G # C # and D b F A b d b, that not only contain the same four notes, but are based on the same black key half-way between C and D, and are similar one to the other, or, in other words, both consist of the major third, the fifth and the octave. I said in the quoted passage that, as to our instruments, the ear cannot perceive the modulation that we are discussing, although they jump from a tone to another one whose fundamental sounds lay one from the other at the distance of as many as twelve fifths. Since these tones are one and the same in the instrument commonly used, the mutation does not reach the ear but is confined to the mere notation and consists of a mere difference of expression. Now, why certain masters of counterpoint employ this sort of transformations? They employ them to avoid cluttering the notation with an excessive number of sharps or flats, when they want to move the modulation to tones that are too far removed from the principal, and they employ it to return, through a sort of circular modulation, to the principal tone or to a tone close to the principal one from tones that are too far removed. In a recitative that begins in the tone of E b with the major third, Signor Benedetto Marcello, after moving to tones that require three or four sharps in the key signature, and after reaching the accompaniment [-220-] E # G # C # of the third and sixth both minor, changes it tacitly into the similar accompaniment F A b D b, from which he moves to the tone F with the minor third. After a few bars he concludes the recitative with the tone of E b with the major third that was the tone of the beginning. The recitative belongs to the Cantata that begins Il so begli occhi amati.

[Riccati, The laws of counterpoint, 220; text: e non vagliono i pianti, che fuor per gli occhi miei distilla in larga vena il cor dolente, Basso fondamentale, 5 # 3 #, 7 b 5 b 3 [sqb], 5 3 b, 3 [sqb], 7 5 3 [sqb]]

[signum.] 20. all of the transformations that one encounters in the musical compositions can be reduced to the four classes that I discussed in the [-221-] previous paragraphs. Meanwhile, I do not omit to warn you that composers employ some transmutations sometimes either for pure whim or for lack of knowledge, because they are not aware of all the accompaniments that can be employed in counterpoint. Signor Benedetto Marcello employed the accompaniment A b C E b instead of the similar one G # B # D # in the example of the sixteenth paragraph for mere caprice, the second of which according even to the strictest rules of counterpoint can follow the previous fundamental chord A C # E of the tone A with the major third. One cannot achieve the aim mentioned in the previous paragraph to clear the composition of the excessive number of accidentals by means of the aforesaid change. The following passage shall introduce an example of a transformation introduced because the composer was not aware of all the accompaniments that can cater to one's needs in the musical compositions. The following passage presented itself to a master of the chapel who was accompanying an aria on the harpsichord. I write it herewith.

[Riccati, The laws of counterpoint, 221; text: Basso fondamentale 6 3, 5 3, 6 4 2, 5 4, 3 #, 7 b 5 3]

[-222-] He remained surprised in seeing the accompaniment A b B b D F belonging to the tone E b with the major third approached without reason by accompaniments belonging to the tone D with the minor third. He was all the more surprised because once he performed the passage it produced a very good effect to the ear. Is it possible, he was saying to himself, that a blunder should please? His amazement vanished very soon after he considered that the author of the aria had written mistakenly A b instead of G # and substituted the accompaniment that was known to him instead of the unknown one G # B b D F. Therefore, the passage must be corrected in the following way, according to which, since it consists entirely of accompaniments that belong to the tone D with the minor third, one see clearly the reason why it pleases the ear.

[Riccati, The laws of counterpoint, 222; text: Basso fondamentale, 7 5 3 b, 5 4, 3 #]

[signum] 21. In the example that I add by Signor Benedetto Marcello taken from the Cantata *Quanta pietà mi fate*, it appears, at first sight, that he follows one of our transformations. From the accompaniment G B D based on the first note of the tone G with the major third [-223-] one can move both to the chord F G B D leading to the tone C with the major third or to the tone A with the minor third, and to the chord E # G B D leading to the tone B with the minor third, which tones are subordinate to said G. Once it has heard the four sounds that constitute said two chords and are common to both, the ear shall not refer them more to an accompaniment that to the other one before hearing the following chord. In the following passage the ensuing accompaniment F # A # C # convinces the ear to believe that the previous accompaniment is E # G B D rather than F G B D. The repeatedly lauded knight used the second chord instead of the first one only to embarrass the players concentrating on accompanying the recitative.

[Riccati, The laws of counterpoint, 195; text: e con essa il mio bene il mio conforto, e mentre senza lei mesto rimango, 6 4 2, 5 # 3 #]

[-224-] Eighth Chapter.

On the bar.

[signum] 1. The ear draws pleasure from simple proportions whatever the way in which they are made audible to it. Not only it compares two sounds in relation to their vibrations, which are slower in the low sounds and faster in the high sound, but it also compares them also in relation to the different amounts of time for which each sound lasts. The ear draws great pleasure from the variety of the amounts of time for which the sounds last, as long as these lengths correspond to each other in simple proportions. Therefore, certain instrument that lack variety of pitch prove also pleasant, such as the drum and the castanets. I said (chapter 2. [signum] 1. 22.) that the ear assesses the ratio of the vibrations produced by the sounds in two way, namely, either from the point of view of harmony or from the point of proportion, and since the first one is more viable than the second one, the two systems of harmony or perfect consonant accompaniments embrace the odd numbers 1, 3 and 5 contained in the series 1, 2, 3, 4, 5, 6, whereas the system of the melody is contained within smaller boundaries, since the number five is excluded and it admits only the proportion contained in the series 1, 2, 3, 4. The ear acts also to discern

the ratios between the duration of the sounds, since experience [-225-] teaches us, as we shall see at the appropriate point, that, just as it enjoys hearing sounds whose lengths correspond to each other according to the ratios 1:1, 2:1, 3:1, 4:1, 3:2, 4:3, thus, conversely, it would be dislike that the lengths of two sounds were expressed by the ratios 5:1, 5:2 etcetera.

[signum] 2. The [[eight]] musical note values laid out by [[Giovanni de' Muris]] [Franco, who lived around the year 1047 add. supra lin.] in order to express the ratios 2:1 and 4:1, geometric series of double proportion, to which two were added at a later time. I list herewith the characters representing those note values together also with a series of rests, each of whom corresponds to the note value above it. Said rests are mix often and gracefully with those note values in the musical compositions.

[Riccati, The laws of counterpoint, 225,1; text: Figure, o note musicali in serie, Massima. Lunga. Breve. Semibreve. Minima. Semibreve 8. 4. 2. 1.  $\frac{1}{2}$ . 2 per Semibreve]

[Riccati, The laws of counterpoint, 225,2; text: pause in serie del valore delle soprapposte figure. Semibreve 8. 4. 2. 1.  $\frac{1}{2}$ . Pausa di Massima. Longa. Breve. Semibreve. Minima.]

[-226-] [Riccati, The laws of counterpoint, 226,1; text: Figure, o note musicali in serie. 4 per Semibreve. 8, 16, 32, 64,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ,  $\frac{1}{16}$ , 132. 164. Semiminima, Croma. Semicroma. Biscroma. Semibiscroma]

[Riccati, The laws of counterpoint, 226,2; text: Pause in serie del valore delle soprapposte figure. 4 per Semibreve. 8, 16, 32, 64,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ,  $\frac{1}{16}$ ,  $\frac{1}{32}$ ,  $\frac{1}{64}$ , Pausa di Semiminima. Croma. Semicroma. Biscroma. Semibiscroma.]

The Reader shall observe that I took the semibreve as a sort of unit and measure of all the other note values. I did this for the reasons that I shall explain soon. Meanwhile, since the ten characters written above are not enough to express the proportions where the number three occurs, it is necessary to resort to two signs, namely, the tie and the dot. The tie [signum] derives its name from the act of connecting or adding together two notes, so that they are made to signify a single one, whose total value is equivalent to the sum of its components. Thus, a note that is equivalent to three semiminims is created by a minim, which equals two semiminims, and by a semiminim connected with the tie. The dot [-227-] increases the note that it follows by half the value of the note itself, so that a minim with the dot next to it is worth a minim and a half or three semiminims. Therefore, to use the dot or to tie two notes together, the second of whom is equal to half of the first, is the same. The following examples shall illustrate how the proportions 3:1 and 3:2 between the lengths of two sounds are expressed by means of the tie and of the dot.

[Riccati, The laws of counterpoint, 226; text: 2. 1. 3.]

I shall illustrate next some other device to indicate the aforesaid ratios 3:1, 3:2, which shall also prove useful to express the proportion 4:3.

[signum] 3. I invite the reader to reflect with me that one cannot employ the ratios written above, namely, 1:1, 2:1, 3:1, 4:1, 3:2, 4:3 indicating the durations between two sounds. It is true that variety is pleasing to the ear, but one cannot deny also that it is much more pleased that a composition should be endowed with unity and coherence also in respect of duration. As I progress, therefore, [-227-] to illustrate the laws that we have to obey in order to introduce correctly said ratio in a composition, I say that, since the

proportion of equality is the simplest of all, it has to be preferred to all the others, choosing first of all a given and constant time that is employed to measure the musical composition, in the same way as the verse is the measure of a poem. A measured composition compared with one without measure has the same advantage that poetry has compared to prose. Said time is called bar (battuta), which comes from the verb to beat (battere), and it describes the action of the master of the chapel who beats with the hand or with a page of the score the music stand next to him, while it covers between a hit and the next one the precise portion of time that he establishes as the basic measure of the composition. This measure must be taken as a rule by each singer and player while they perform their own part.

[signum] 4. In order for a verse to sound harmonious, it is not sufficient that it should consist, for instance, of eleven syllables, but it is necessary that it has the accent on the sixth syllable which should divide it into two halves and balance it, so to speak, or two accents one on the fourth and another one on the eighth syllable. These syllable should contain three syllables between them, so that three are left on one side and another three on the other. Similarly, if the bar has to please the ear, it must be divided into two or three beats. Once the master has chosen the first subdivision of a musical composition, after beating the first beat, he raises [-228-] the hand and spends the first beat between the downbeat and the upbeat, and then the second beat between the the following upbeat and the downbeat. Such bar is called binary bar, because the two portions into which it is divided, one between the downbeat ant the upbeat and the other one between the upbeat and the down beat, are equal. On the other hand, if the bar is divided into three beats, if the number three is divided in the best possible way, two beats are spent between the downbeat and the upbeat, and the last one between the upbeat and the downbeat. This last type of bar is called ternary bar, since its subdivisions are not equal, but correspond to each other according to the proportion 2:1. Therefore, one can see here that the two subdivisions of the bar with two or three beats correspond to each other according to the two simplest ratios, namely, 1:1 and 2:1. WE shall when it is appropriate that the sensitivity of the ear in this sort of assessments is so limited that it rejects any proportion that is different from the ones written above, even if it is very simple, as, for instance, 3:2 or 4:3, according to which one may want to relate the two parts of the bar. If one compares the bar with two beats with one of its parts, one shall be presented with the proportion 2:1. Moreover, from the comparison between the ternary and the binary bar, one obtains the ratios 3:2 and 3:1. Therefore, if we compare the two parts of the bar with each other, [-229-] or the entire bar with one of its sections, up to know we have encountered the proportions 1:1, 2:1, 3:2 and 3:1, all belonging to the series 1, 2, 3. WE shall see later how one may allow also the proportions 4:1, 4:2, that, as I said above, can be admitted between the durations of two sounds as they please the ear.

[signum] 5. If we further the comparison of the bar with the verse, the verse may have the accents in the appropriate places, but it may appear clumsy to the ear nevertheless because of the person who recites it, if they are not able to stress the accents correctly. The same occurs in the bar, when it is not performed correctly. Since it consists of two parts, one of greater value that is called commonly strong beat, contained between the downbeat and the upbeat, and the other one subordinate, normally called weak beat, [contained between the upbeat and the downbeat, add. supra lin.] thus, it is necessary to utter them in a way that the listener may distinguish one as the principal part and the other other one as subordinate, so that it is able to distinguish when the downbeat and when the upbeat occurs. Therefore, the note between the downbeat and the upbeat, equivalent in one case to half of the bar and in the other one to two thirds, stands by itself, as opposed to the note between the upbeat and the downbeat, equivalent to half or one third of the

bar, that has to fall back onto the note that begins the following bar. In [-231-] such a way, not only one shall be able to discern the two aforesaid parts, but the first one, since it is at the beginning of the bar, shall perform the main role. Even if the first part of a ternary bar is divided into its two elements, they will have to be expressed in such a way that both of them should be self-standing, so that the leaning of the third element to the beginning of the following bar shall be highlighted. If one had the first part of the bar fall onto the second one, the instant of the downbeat would become less principal and one would not consider that the bar begins from it. Therefore, it follows that, in order to avoid such error, when a ternary bar consists of two notes, the first of whom is worth one beat and the second two, as in the following example,

[Riccati, The laws of counterpoint, 231]

the second note has to be sung or played in such a way that the ear realises that its second half, on which the upbeat falls, leans onto the beginning of the following bar.

[signum] 6. When I set out to divide a beat of the bar, then said beat itself can be represented as a bar, and the number of the elements into which it can be divided, as well as the way in which said subdivisions are performed depends entirely on the laws of the bar just now [-232-] explained. Since the two parts of the bar called strong and weak beat cannot be expressed by any other proportions by 1:1 and 2:1, it follows, consequently, that there are no primary sort of bars except binary and ternary ones. Similarly, the two parts of the beat of a bar that one wants to divide, which also shall be called strong and weak beat, shall have to correspond to each other only according to the proportion of equality 1:1 or according to the double proportion 2:1, so that said beat is divided into two or three elements. Moreover, I am allowed to consider one of these elements is the same way as a bar, by subdividing it into two or three portions and to move on from it onto smaller subdivision, doing so as long as it is required by the speed of the hand and of the voice and by the character of the composition.

[signum] 7. Just as the two parts of a bar can be compared successfully with each other and with the whole bar, but never with the sum of two or three bar, thus, equally, divided one of the beats of the bar into two elements that are equal or in such a way that one is worth twice the other one, they shall not be compared to the entire bar, but with each other and with the unit of time that represents their sum. The same must be said when half or a third of the bar is divided again and when one moves on to ever [-233-] smaller divisions by applying the same rule. In fact, in all these cases the two portions, equal or one twice as the other one, into which a given quantity considered as a bar has been divided, are compared only with each other and with said quantity itself. Therefore, from such comparisons one derives no other proportions except the ones that are contained in the series 1, 2, 3, as we observed in relation to the binary and ternary bars.

[signum] 8. However, the Reader must not believe that one can employ all the aforesaid subdivisions in any situation. I divide the length of a given sound into two categories: either it is contained into such boundaries of brevity that, considered as a whole and as a unit, the ear forms an exact idea of its measure, or, as it lays outside the mentioned boundaries, it is necessary to consider it divided into its two, three parts and so on, in order to assess it with the due precision. In the first instance, I can put into practice all of the mentioned subdivisions, allowing good taste to direct my actions, and taking into account the needs of the singer and of the player. Then, in the second instance, I shall be allowed to employ a whole sound, because this does not prevent me to count, through my imagination or in by any other means, the two or three elements that constitute it. However, if I want it do be heard subdivided, first of all I shall have to divided into two

halves, if the two halves can be used by the ear [-234-] as a benchmark to measure it, or into three parts, if the judgement of the ear is based on three parts. Then, given one or the other of these subdivisions, I shall be able to move on, as I wish, to smaller subdivisions. As a confirmation of what I state, let not a beginner, but an experience singer or player divide into three sections the note that he was used to measure by dividing it into two equal parts since he could not form a distinct idea from its beat taken as a fundamental unit. He shall feel some repulsion in doing this. However, once he has conquered it, has realised this division and destroyed consequently the basis of the ear to judge with precision, one shall be never satisfied to have maintained within its precise value the unit of time to which the note, divided into its parts, used to be equivalent. One shall incur a similar inconvenience, if one tries to divide into two halves the sound that was measured by the ear by means of three equal parts because it was too long

[signum] 9. The aforesaid divisions into the two or three beats of the original bar into two or three elements and also the further division of said elements produce some bars very commonly used in music that I call derivative bars. Take a binary bar and, if I divide each of them into two equal member, we shall be faced with [-235-] the bar with four beats, that is employed extremely frequently in counterpoint, as one can see. The first two beats must be performed as a binary bar, and the same must be done in the case of the third and fourth beat. One deduces from this that, since our bar can be considered as the sum of two binary bars, the first and third beat shall be strong and the second and the fourth one weak. Were it possible to consider the bar with four beats among the primary ones (which is a property that could be ascribed to it because of a single reason, namely, because another bar, which I shall discuss, derives from it) in that case, if the whole bar is first compared to a single beat and then with the remaining three, we would be presented with the proportions 4:1, 4:3. Moreover, if one takes the bar with four beats as a primary bar, the division of a beat or of the element of a beat into four would be also a primary division. Therefore, divided a given sound first into three elements and then into four, if we compare the whole sound with one of its parts, we shall encounter the ratio 4:1, while we shall obtain the proportion 4:3 from comparing one third with one fourth of it.

[signum] 10. A new bar, called *Dodecupla* derives from dividing into three elements every beat of the bar that consists of four beat. The name refers to the fact that it consists of twelve notes. If one considers it as a bar with [-236-] four beats, I have already said which ones are the strong beats and which ones are the weak ones. However, if one considers it as the sum of four bars with three beats, only the first and the second, the fourth and the fifth, the seventh and the eighth, and the tenth and the eleventh deserve the name of strong beats, while the third, the sixth, the ninth and the twelfth deserve the name of weak beats. I go back to pick up the bar with two beats. The bar commonly called *Sestupla* derives from dividing each of the beats into three elements, since it consists of six notes. If we consider our bar as the addition of two bars with three beats, the first and the second, the fourth and the fifth one assume the character of strong beats, while the third and the sixth assume the character of weak beats. Finally, if one divides every third part of the bar with three beats into three elements, one shall obtain a bar called *Nonupla*, because it consists of nine bars. If one considers it as a bar with three beats, one knows that the first and the second are strong beats, while the third is a weak beat. If one then reflects on the fact that our bar is also the sum of three bars with three beats, the character of strong beat shall be assigned to the first and second, fourth and fifth and seventh and eighth beat, while the character of weak beat shall be assigned to the third, sixth and ninth beat. The reader should not consider redundant this exact enumeration of the strong or primary beats and of the weak or secondary, because [-237-] one shall see how important it is to know such beats well.

[signum] 11. Since one must not allow in music other primitive bars than those with two, three and also with four beats, as I shall prove ([signum] 15. 16. 17. 18.), and since it is arbitrary to express one of these beats with a note value or with another one, for instance, with a minim or with a semiminim, should one have to invent the signs suited to indicate the various bars and the various notes that are equivalent to the beats of the bars, one should certainly embrace the very simple method that I illustrate now. It was indicated first by Father Kircher in the seventh book of his *Musurgia*, and later it was perfected by the famous Monsieur Rameau in his treatise on harmony, second book, chapter XXVII. One should write before the clef the note value through which one wants to indicate one of the beats of the bar. After the bar one should write the number 2, 3 or 4, depending on whether the bar consists of two, three or four beats. If one wants to divide said elements into two, four etcetera, one should employ musical characters without the dot to represent one of the beats itself. The notes with the dot next to them shall be used to express the beats that one wants to divide into three elements. This is, as I illustrated in the previous paragraph, where those secondary and derivative bars called [-238-] *Sestuple*, *Nonuple* and *Dodecuple*, whose specific property is to divide into three beats the two, three or four beats of which they consist. The notes of a greater value shall indicate that the composition must move more slowly; those of medium value shall require a medium speed, while those of small value shall indicate a fast speed. The examples of this way of expressing the various bars can be seen in the passage of the lauded Monsieur Rameau quoted above.

[signum] 12. However, although the method that I explained is worthy of praise, it is necessary, especially in a matter of such great importance, to adapt to current practice, and, since other signs have been invented and accepted commonly in order to indicate the different sorts of bars, it is necessary to provide the Reader with a clear idea of them. Therefore, composers established two types of binary time, which is also called ordinary and perfect. One of them is the greater, where the bar is equivalent to a breve, and the other one is the smaller, where the bar equals a semibreve. In order to indicate the first one, which is called *alla breve*, we use a C halved in the same way [Crvd]. In order to indicate the second one, which is called *alla semibreve*, the C without the line was chosen. These bars are supposed to last the same time, and, consequently, in the greater binary bar a breve, a semibreve, a minim and a semiminim [-239-] etcetera are equivalent to a semibreve, a minim, a semiminim, a quaver etcetera in the minor binary bar, or, to be more succinct, a note of the bar *alla breve* is performed at twice the speed compared to the same note in the bar *alla semibreve*. Therefore, as it often happens, the bar of *alla semibreve* is marked with the sign [Crvd], which belongs to the bar *alla breve*. Said sign indicates that the bar *alla semibreve* must proceed twice as fast as it would move if it were marked with its proper sign. The main current application of the bar *alla breve* is in the style of singing that is called *a cappella*.

[signum] 13. The bar *alla semibreve* is employed much more frequently, and it is the prerogative to be almost the benchmark of all the other bars that I still have to discuss, which, in relation to it, are indicated by two numbers in the shape of a fraction that indicates the ratio between such bars and the one *alla semibreve*. The top number indicates the character of the bar as well. If it consists of two beats, one writes the number 2. If it consists of three beats, one writes the number 3. The number 6 indicates a *Sestupla*, the number 9 a *Nonupla* and the number 12 a *Dodecupla*. The lower number shows us how many notes similar to the [-240-] two, to the three, to the six, to the nine and to the twelve that constitute our bar are contained in the bar *alla semibreve*. For instance, the fraction or indicator  $\frac{3}{4}$  indicates a *tripola*, namely a bar of three beats consisting of three semiminims, four of which are equivalent to a semibreve. The

aforesaid fractions have also another function, namely, to indicate the notes of the upper number are performed in the space of a semibreve, or in the space of time in which one would perform the notes indicated by the number beneath. If I concentrate on the adduced example, the fraction  $3/4$  obliges the three semiminims indicated by the number 3 to last as much as a bar *alla semibreve*, which consists of four semiminims. Therefore, if one needs to rest for one or more of these bars indicated by the fraction, one must employ the rests that indicate one or more semibreves that I showed the Reader earlier on ([signum] 2.). The bars marked by the fraction that were employed by past masters and are found in use among modern composers as well, are the following:  $2/4$  (bar consisting of two beats and two semiminims);  $3/1$ ,  $3/2$ ,  $3/4$  and  $3/8$  (*Tripole*, or bars with three beats consisting, the first one of three semibreves, the second one three minims, the third one of three semiminims, the fourth one of three quavers);  $6/4$  and  $6/8$  (*Sestuple* containing, the former six semiminims and the latter six quavers); [-241-]  $9/8$  and  $9/16$  (*Nonuple* containing one nine quavers and the other one nine semiquavers);  $12/8$  and  $12/16$  (*Dodecuple*, consisting, the first one of twelve quavers, and the second of as many semiquavers).

[signum] 14. One proceeds also with the same method of the fractions, if one wants to divide a note without the dot into three or six elements, or, conversely, if one wants to divide a note with the dot on the side into two or four elements. These divisions cannot be accomplished naturally and without artifice. If one proposes to divide a note without the dot into three parts. I write three halves of said note and write on top of them the number three, under which one must understand that there is written the number two, although in practice it is not written to avoid cluttering the notation. With this device, every half of our note is enabled to express one third of the note, so that three halves altered in this way must be worth the same amount of time that would be spent on two. If one wants to divide the same note into six parts, one would have to write six fourth parts and to write the number six above them, under which we must assume that the number 4 is written. The six notes marked in this way are equivalent to four of the same species without any sign in the same way that the three altered with the number three were equivalent to two written without alteration. The six notes mentioned above must be performed with the bar of a *Sestupla* consisting of two beats, each of which is divided into three parts. One shall be able to [-242-] divide a note followed by the dot into two or into four parts by writing two third parts of said note with the number two above them, under which one must understand that the number 3 should have been written, albeit it is not written in practice, and by writing four sixth parts of the same note with the number four above, under which we must imagine that the number 6 is written. Given that the division of a note with the dot on the side into two or into four parts is encountered very rarely in musical compositions, I produce an example of the division into four elements taken from a Sonata by Signor Benedetto Marcello.

[Riccati, The laws of counterpoint, 242]

[signum] 15. I conclude my discussion of the bar by demonstrating a truth that I promised several times, namely that one must not allow other ratios except 1:1, 2:1 among the two parts contained in the bar, the first one between the downbeat and the upbeat, the second one between the upbeat and the downbeat. The immediate consequence of this is that only the bars with two and three beats are the ones that can be employed as primary in counterpoint. The Reader should be satisfied that I exclude some of the simplest cases. In fact, leaving aside the fact that one shall be able to progress to the most complex instances at leisure [-243-] by following the same method, it is clear that,

once the proportions between two parts of the bar that are the simplest after 1:1 and 2:1, the more complex proportions shall have to be rejected with greater reason. Now, the ratios that in order of simplicity follow immediately the first two, namely, 1:1 and 2:1, are 3:1, 4:1 and 3:2. Therefore, if we make the two parts of the bar correspond to each other in the aforesaid ratios, the first ratio 3:1 produces a sort of irregular bar with four beats, while the second one 4:1 and the third one 3:2 produce two bars with five beats that do not deserve to be accepted in music. Here it is appropriate to consider that the first part of a bar must be equal or larger than the second part, but never smaller. In the same way as the bass performs a primary role and it is a sort of foundation of the composition, because its vibrations last longer than the ones of the upper parts, similarly, since the first part of the bar is the main one, it must be established as greater than the second, if such portions are of unequal length. Because of this, the first part shall be self-supporting, while the second one shall lean onto the beginning of the following bar, which could not happen at all if the second part were to be larger than the first one, in which case the ear would judge that the bar does not begin from [-244-] the downbeat, but from the upbeat.

[signum] 16. However, resuming our thread and starting from the ratio 3:1, I say that, if one models the two parts of the bar on said ration, we find ourself in the situation where the performance dissolves this ill-formed supposition. In order to demonstrate this, I invite the Reader to observe with me that more than two notes of the same value cannot be self-supporting, in such a way that, should these notes be three, it shall be necessary that either the first one leans on to the second one, or the second to the third one, or the third to a fourth one that would follow. If three notes begin a bar, it shall not be allowed that the first one leans on to the second, given what I explained above, namely that it is essential for the bar that the sound from which it starts is self-supporting, without any help from the neighbouring sound. Moreover, two notes that lean onto the next one cannot occur in succession, namely, the note A cannot lean onto the note B and the note be then onto the neighbouring note C, but the principal element erases the secondary one, just as in poetry a strong accent elides a weaker adjacent one, as in that famous verse E fa del braccio al bèl fianco colonna. On this premise, let us perform, if it is possible, our bar divided according to the ratio 3:1. The first part of the bar, namely, the three notes between the downbeat and the upbeat, should be performed certainly [-245-] as a bar with three beats, and for this reason the third note should lean onto the fourth one, which forms the second part of the bar between the upbeat and the downbeat. However, because of the nature of the bar explained at its appropriate place ([signum] 5.) the note between the upbeat and the downbeat must lean necessarily against the beginning of the following bar. Therefore, such leaning excludes the one from the third to the fourth note. Meanwhile, three notes that follow one another cannot do without being supported, while the first note of the bar must be self-supporting. Therefore, it follows that the second note must lean against the third one so that our bar may be performed with lively strength in a way that resembles a binary bar, where each beat is divided into two, or two binary bars [[where one finds that the same occurs]].

[signum] 17. One can draw from this a general conclusion, namely that the number of the beats of the bar that is greater than three cannot be divided in such a way that the unit belongs to the upbeat and the downbeat and the remaining one to the other and more important space between the downbeat and the upbeat. The leaning of the last beat to the beginning of the adjacent bar obtains the effect one or two beats that come immediately before it are self-supporting. Therefore, these two or three beats are performed either as a binary bar or as a ternary bar, [-246-] while the position of the upbeat shall be always referred by the ear rather to the first one of said sounds than to the last one. Therefore, if the number of the beats of the bar is greater than three, one shall not

be able to ascribe fewer than two or three beats to the second part of the same bar contained between the upbeat and the downbeat.

[signum] 18. I move on to examine the bar with five beats. Excluded on the strength of the previous reasons the division based on the ratio 4:1, it remains that it can only be laid out in such a way that three beats are allotted to the first part and two to the second one. Therefore, the first part shall have to be performed as a bar of three beats and the second as a bar of two beats. When the ear hears this continuous series of two bars, one with three beats and the other one with two, it regards it to be a bar rather devoid of unity, and, after it is awoken in it the idea of the first part of the bar consisting of a bar with three beats, it believes it certain that the singer or the player has omitted a beat inadvertently in the second part of it. Allow me to illustrate a personal thought. A binary bar is represented by a man who walks around. The ternary bar is represented by a man who dances. Finally, these bars with five or seven beats etcetera, imitate a man who limps. In fact, they are called [-247-] limp rhythms. Considered this, there follows a natural consequence. Although such irregular bars must be banned from serious and noble music, they may be admitted at the most, albeit very rarely, and as a whim, in some comical piece of music. Since the comical is always coupled with what is defective, it may appear not inappropriate that something defective may occur in a musical composition where something comical and ridiculous is represented.

[signum] 19. Since I have mentioned the musical clefs in the eleventh paragraph as well as in the fifth chapter [signum] 6. 7., I believe it appropriate to provide the reader with a brief account of them. It is common use to write the notes on five lines and in the four spaces interspersed between a line and another one, as well as in the two placed above and below the two extreme lines. Moreover, it was established that, placed the notes, for instance, one on the lowest line, another one in the adjacent space above it, another one on the second line etcetera, the sounds indicated by said note ascend according to a diatonic scale. If the principal tone of the composition requires a note altered with the sharp or with the flat sign, these signs are written near the clef, on corresponding the line or in the corresponding space. On the other hand, if in the continuation of the composition a sharp, a flat or a natural sign, which frees the note from the sharp or from the flat sign, is required, they are placed before the note and [-248-] next to it. Five lines and six spaces allow us to write eleven notes, which are not enough for the voice and even less for the instruments. There is no sufficient advantage in adding a few lines above and below the five original ones, because such a large number would be required to satisfy this need that it would confuse completely the eye of the singer and of the player. Therefore, in order to be able to notate any musical composition, the masters invented the three clefs, namely, [ClefF], [ClefC], [ClefG], the first one of which indicates a note written on the line and makes it mean F, the second one indicates C and the third one indicates G. In the organs with pipes of the length of eight foot the sound F indicated by the first clef belongs to a pipe which is three foot in length. The note C indicated by the second clef is a fifth higher and it is in unison with the sound of a pipe that is two feet long. Following on in the sequence that was started, one ascends another fifth from the sound C of the second clef to the sound G of the third clef that matches a pipe that is one foot and one half long. Consequently, the sounds F, C and G indicated by the three clefs form a geometric series. If the F clef is written on the fourth line, it is called bass clef, while it is assumed the name of baritone clef if it is placed on the third line. The clef that indicates C is [-249-] called either tenor clef, contralto clef, mezzo-soprano clef or soprano clef, according to whether it is placed on the fourth, on the third or on the first line. The clef of G placed on the second line is called violin clef. The same clef is sometimes placed also on the first line. In order to show the Reader that our clefs

embrace a large number of notes, I introduce the following example, where the two C, one indicated by the bass clef and the other one by the violin clef correspond to each other at the octave.

[Riccati, *The laws of counterpoint*, 249]