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A truly lost voice?

By paraphrasing the title of a well-known text on the castrati¹ the question we would like to ask is: should we extend the list of lost voices to include – along with the castrato singers – also the more general voices of the Renaissance choir? Or stated in other words: will we ever be able to have a reconstruction of the sound of a Renaissance choir that is sufficiently reliable? While the removal of the plaster covering a Renaissance fresco will restore the original colours and authentic brushstrokes, the dust of an ancient music manuscript conceals only a few traces of ink immersed in profound silence. How can one reconstruct those lost voices? Are they really buried with their owners and irremediably decomposed? Or have they left some trace that can enable us to reconstruct them?

One unavoidable necessity, obviously, is that we must continue to pursue the paths of research, the exploration of the repertoire and the study of the contemporary treatises. It is above all in this last field that we hope to find opportunities for reconstructing the former sound. But there is a difficulty that we must not underestimate. For if we think about the matter seriously, we have to admit that any attempt at reconstructing a *lost* sound² by reading a description on paper may arouse the same nebulous perplexities as those of anyone wishing to study singing by correspondence.

Moreover the writers of the Renaissance treatises could not have had the slightest suspicion that their musical aesthetics was to be separated from ours by the tempestuous passage of Romantic music, with the consequent enormous changes in musical aesthetics, vocal technique and instrumental technique.³ Perhaps this explains why they were satisfied with saying: “singers

¹ SANDRO CAPPELLETTO, *La voce perduta. Vita di Farinelli, evirato cantore*, Torino, EDT, 1995.

² We must still wait to call it such, so this adjective appears in italics. In any case it seems more reasonable to speak of an “attempt to get as close as possible” rather than of genuine reconstruction.

³ The two techniques are not separable. The orchestras became bigger and bigger, and the strings passed definitively from the velvety sound of the soft gut strings to the more powerful sound of the metal strings. The bridge was forced to support increasingly great pressures, and this forced the instrument makers to strengthen the whole structure of the instrument, to the detriment of the lightness of sound and colour. In the meantime the sound of the brass was also

will also have the following recommendation: that one way is that of singing in churches and in public chapels, and any another way that of singing in private chambers, for there one sings in full voice [...]”⁴ without knowing that in the meantime their idea of *voce piena* would be completely modified by the technique of the vocal passage and by the covering of the sounds that took place in the Romantic period.⁵

When speaking of voices and vocal timbres we must also add that – over and above the ‘church’ and ‘chamber’ distinctions, which were apparently more a matter of different densities of sound than of any specific characteristics of timbre – the Renaissance period could count on a cohesive unity that made any possibility of misunderstanding unlikely. We can therefore imagine the contemporary treatise writers intent on describing the characteristics of the voices of their time without any specific explicative or applicative intention, but above all without perceiving the need to specify the characteristics of the contemporary sound plainly and unequivocally. This complicates our task enormously.

In spite of this necessary premise (which underlines the need to be cautious and reflective when approaching the historic texts), it is worth seeing what help we can draw from their consultation. In this perspective we can comment on a very important passage by Biagio Rossetti (known as *Rossetto*), in which the Veronese theorist uses four adjectives to define the parameters of timbre that constitute the ideal of a fine voice of his day:⁶

much greater than before, and above all these instruments were increasingly used in orchestral scores owing to the improvements brought about by the adoption of cylinders and especially valves. The same happened with the woodwind with the introduction of a greater number of keys. All of this did not just change the sound of the instruments, as one can well imagine: the irresistible need for balance between voices and instruments did the rest.

⁴ GIOSEFFO ZARLINO, *Le Istitutioni harmoniche*, Venezia, 1558, terza parte, cap. 45, p. 204 (facsimile reprint New York, Broude Brothers, 1965 (Monuments of Music and Music Literature in Facsimile. Second Series: Music Literature; 1).

⁵ The earliest inklings of the vocal passage and the covering of sounds date to the 18th century, but the most evident episode seems to be the high C with full chest tone adopted by the tenor Gilbert Duprez in the part of Arnold in Rossini’s *Guillaume Tell*. It is not so much the episode in itself, as much as the astonishment that the sound aroused when it exploded and raged in a world still accustomed to the flourishes of the castrati and the falsetto sounds of men. The legendary *c*” is a note that can be easily emitted in falsetto by any male singer in any amateur choir. In this case it surely does not arouse the same mass admiration as when it is emitted in ‘full voice’ and assumes the features of a thundering high C.

⁶ BIAGIO ROSSETTI, *Libellus de rudimentis musices*, Verona, Stefano Nicolini di Sabio e fratelli, 1529, p. [4]: «La voce perfetta è alta, soave, forte e chiara; alta perché sia sufficiente all’acuto, chiara per riempire le orecchie, forte perché non tremi né manchi, soave perché non

Perfecta vox est alta, suavis, fortis et clara. Alta ut in sublime sufficiat, clara ut aures impleat, fortis ne trepidet, aut deficiat. Suavis, ut auditum non deterreat, sed potius, ut aures demulceat et ad audiendum [=audientium] animos blandiendo ad se alliciat et confortet. Si ex his aliquid defuerit, vox perfecta (ut dicit Ysidorus) nequiquam erit.

The perfect voice is high, sweet, strong and clear: high because so that it is sufficient in the high register; clear to fill the ears; strong so that it is neither tremulous nor feeble; and sweet so that it does not disturb but rather caresses the ear and, blandishing the souls to listen, binds them to itself and comforts them. If any of these qualities are missing, in no way can the voice be perfect.

High. As we well know, because women were prohibited from entering the organ gallery, the particular structure of the Renaissance choir imposed the use of men's and/or boys' voices for the higher parts. For this reason certain limits in the upper range could not be exceeded. The result is that when today a modern choir – with the two higher parts given to the women – performs a piece from the Renaissance period, it sings it a third or fourth higher than would have been the practice five hundred years ago. To state the matter more clearly, we should say that a Renaissance choir sang the pieces a fourth below the pitch customary today. The concept of a *high* voice therefore assumes a considerably different connotation from that commonly referred to.

And that is not all. In practice the absence of the technique of the vocal passage prevented a change in timbre within the sections and limited the emission to a characteristic range: low for the lower voices and high for the higher ones, with the former always using chest resonance, the others always head and falsetto.⁷ In the modern choir, on the other hand, when the voices are

spaventati l'udito, ma piuttosto perché accarezzi le orecchie, e con il blandire gli animi degli ascoltatori li attragga a sé e li conforti. Se manca qualcuno di questi elementi la voce non potrà essere in alcun modo perfetta, come afferma Isidoro.» It is worth noting that in PIETRO AARON, *Thoscanello in musica* [...] *nuovamente stampato con l'aggiunta da lui fatta et con diligentia corretto*, Venezia, Bernardino e Matteo de Vitali, 1529, Libro I, cap. V, p. Bii, we find a passage of almost identical content: «Voce perfetta, alta, suave e chiara: alta accio che in sublime sia sofficiente; suave accio che gli animi degli audienti accarezzi; chiara accio che empia gli orecchi. Se di queste alcun mancherà, non sarà detta perfetta voce». The author of this text is in fact Isidore of Seville (560-636), as mentioned by Rossetti: «Perfecta autem vox est alta, suavis et clara: alta, ut in sublime sufficiat; clara, ut aures adimpleat; suavis, ut animos audientium blandiat. Si ex his aliquid defuerit, vox perfecta non est» (ISIDORO DI SIVIGLIA, *Etymologiarum sive originum libri*, Libro III, cap. 20). Aaron's version corresponds to Isidore's original; Rossetti's version, instead, is more complicated, with the addition of the adjective *forte*.

⁷ We should clarify the adoption of this simplistic (and in certain respects inexact) cataloguing

required to sing notes in the higher reaches of their range, they seem to add a new section to the choral group, given that the timbre and tone are so different from that of the central notes, which seem to be of a completely different general sonic substance.

There is also another matter, this time of a strictly physical-acoustic nature. How can we relate the adjective *high* to the seventh rule suggested by Camillo Maffei of holding “the mouth open and correctly, no more than when is done when one converses with friends”?⁸ Though apparently unrelated to our reflections, this statement is instead extremely relevant if viewed in connection with Helmholtz’s Law,⁹ which relates the frequency of sounds to the resonance chambers and the section of their aperture. Here we are not interested in calculating the real numerical values; we are merely satisfied with observing the relations between the factors. Hence we can notably simplify the mathematical equation, depriving it of the square root and the constants,¹⁰ and define the frequency f of the sounds with the equation $f = s/v$, placing the section of the resonator at the numerator and its internal volume at the denominator. If we consider the human voice and attribute to it the relevant parameters, we should schematically consider the volume v of the resonators as consisting – in decreasing order – of the chest, the mouth and the cavities in the area of the so-called *mask*.¹¹ Instead we shall consider the section s as the aperture that puts the resonator in communication with the outside environment, i.e. the mouth. The result is that, to obtain the high frequencies of the

of the early voices. But a more valid identification of the resonances would take up too much space in this paper, so an adequate treatment of the subject is not possible here.

⁸ GIOVANNI CAMILLO MAFFEI, *Delle lettere del Signor Gio. Camillo Maffei da Solofra, libri due* [...], Napoli, Raymundo Amato, 1562, p. 34. The suggestion that Maffei gives to singers, that they keep their mouths half open – which he categorically defines a *rule* – seems an isolated instance, but almost all the treatise writers are conspicuously united in criticizing too open a position of the mouth. In this sense we can deduce that everyone is in agreement (Maffei directly and all the others indirectly) that singers should not open their mouths too much.

⁹ German physiologist and physicist who lived from 1821 to 1894 and wrote an interesting treatise on the physiology of music: HERMANN VON HELMHOLTZ, *Die Lehre von den Tonem-pfindungen als physiologische Grundlage für die Theorie der Musik*, Braunnshweig, Vieweg, 1863.

¹⁰ Per completeness we give here the law in full: $f_{Hz} = v \times s / 2\pi \sqrt{U \times v}$, where v = speed of sound; s = section of the resonator; $2\pi = 6,28$; U = volume of the resonator; u = volume of the resonator’s mouthpiece. As we shall see, the constants v , 2π and the square roots (which for the purposes of the actual calculations must obviously be considered) have been omitted and the two factors ‘ U ’ and ‘ u ’ unified to form a single value v .

¹¹ This consists of eight small suprapalatal cavities: two frontal, two maxillary, two sphenoid and two ethmoid. They perform only two functions associated with phonation: that of warming-humidifying the air and that of permitting the emission of high sounds. The attribution of other roles such as the insulation of the cranium and the cushioning of the brain do not seem to be sufficiently justifiable.

high sounds, the factor placed at the numerator (section = mouth) must be big, while that at the denominator (volume of the resonance chambers) must be small.¹² At this point, leaving aside the due timbral and expressive features of Renaissance vocality, we can assert that the above-quoted pose of the contemporary singer, who is described as holding his mouth “open and correctly, not more than when talking to one’s friends”, must have prevented the emission of sounds higher than those possible in the middle or, at most, middle-high register. Our conception of a *high voice*, therefore, can lead us in a direction that differs from the Renaissance situation.

Sweet. First of all we could wonder how sweet were the voices of the basses (*bassus*) and baritones (*tenor*), which we imagine were intense and resolute in structure when sung a fourth lower than the equivalent sections of a modern choir. A glance at the frequent criticisms of the theorists and their harsh condemnations of the sounds made by singers may help us to understand the situation better and to imagine that the ideal of a sweet voice was in many cases very far from being achieved. The voices showed many defects and the list of failings, long and varied, is found in almost every early treatise. The defects ranged from nasal sounds to those emitted “with impetus and fury, beast-like”,¹³ from “raucous sounds, similar to those of a hornet trapped in a leather bag”¹⁴ to “barbaric cries”,¹⁵ right down to those emitted with imprecise tuning. According to Luigi Dentice, as expressed through one of the two characters in his *Duo dialoghi della musica*, Paolo Soardo and Giovanni Antonio Serone, “everyone makes mistakes in some thing, either in intonation, or in pronunciation, or in playing, or in making divisions, or in recovering and reinforcing the voice when the need arises...”.¹⁶ Particularly interesting is the reply of the other character in the dialogue, who concludes “At this rate no one would be to your liking”,¹⁷ implying that no singer is free of at least one of those faults; or that his companion is too perfectionist and that should not complain so much... We can imagine that all sweetness must reasonably have been disturbed by the imprecisions, failings and errors (or horrors) of the singers.

¹² This second condition is ensured by the lowering of the palatine veil, resulting from the advancing-raising of the tongue owing to the positioning of the tongue itself, which the early singers kept in contact with the gums of the lower arch (see the paragraph containing footnote 23).

¹³ ZARLINO, *Le Istitutioni harmoniche*, terza parte, cap. 45, p. 204.

¹⁴ HERMANN FINCK, *Practica musica*, Wittemberg, G. Rhau Erben 1556, p. Ss iij, (facsimile reprint Bologna, Forni, 1969).

¹⁵ *Ibidem*.

¹⁶ LUIGI DENTICE, *Duo dialoghi della musica* [...], Roma, Vincenzo Lucrino, 1553, dialogo secondo, p. [2] (facsimile reprint ed. Patrizio Barbieri, Lucca, Libreria Musicale Italiana, 1988 (Musurgiana; 3)).

¹⁷ *Ibidem*.

Strong. Regarding secular music we know that it was performed by a very small number of singers and that, as Zarlino said, “in chambers one sings with a more restrained and sweeter voice, without making any clamour”.¹⁸ The musical chapels, on the other hand, were formed by about a dozen singers and their sound was evidently destined to get dispersed and lost inside the big churches. Another thing worth stressing about sacred music is that the sonic density of the voices was also dampened by the fact that the choirs sang facing the altar, in conformity with a strongly theocentric theological approach to the liturgy. The focus of the sacred action was the altar; besides, it was there that sat the person who paid for the musical chapel. As one notes from the abundant surviving musical iconography, the singers turned their backs on the congregation-public, and their sound was focused within the presbytery (see the figures). One had to wait for the birth of poly-chorality before the *perceptive importance* of the congregation was acknowledged as a relevant factor for the performers. But again, even in this case one can well imagine the impact made by a small group of singers placed on a small platform inside a large basilica,¹⁹ or perhaps even made to climb up to the high balustrade of the lantern of the dome of St Peter’s in Rome.²⁰

Furthermore, the falsetto voice used by Renaissance singers, owing to its physiological characteristics, was generated only by a partial vibration of the vocal chords, which vibrated either only on the outer edge, without the involvement of the whole *conus elasticus*, or only with the front longitudinal portion. In both cases the density of sound, above all in the middle of the range, is much smaller than that obtained by the complete vibration of the chords, as was standard practice in the sounds emitted by the *bassus* and *tenor*. The result was also that within the overall choral structure the sound of the falsetto voice would have not only been scantily present, but that the other singers would have had to adapt to it, by regulating and balancing the levels of sound, to make the different polyphonic lines audible. This search for balance was (significantly) among the most important requirements and duties that the contemporary theorists attributed to the singers. For the same reason,

¹⁸ ZARLINO, *Le Istituzioni harmoniche*, terza parte, cap. 45, p. 204.

¹⁹ One can also imagine that the presence of a large audience in these large unheated places could create an ascending current of air, and that this contributed to the upward dispersal of the sound.

²⁰ WOLFGANG WITZENMANN, “Otto tesi per la policoralità”, in *La policoralità in Italia nei secoli XVI e XVII. Testi della giornata internazionale di studi, Messina 27 dicembre 1980*, ed. Giuseppe Donato, Rome, Torre d’Orfeo, 1987 (Miscellanea musicologica; 3), p. 8; see also ARNALDO MORELLI, ““La vista dell’apparato superbo, l’udito della musica eccellente a più cori”. Spazio chiesastico e dimensione sonora”, in *Roma barocca. Bernini, Borromini, Pietro da Cortona*, a cura di Marcello Fagiolo e Paolo Portoghesi, Milano, Electa, 2006, pp. 294-301.

finally, the highly refined improvisational skills of the singers and their stylish embellishments will surely not have met with opposition from the body of sound produced by the other voices, which would have duly made themselves sparser and lighter to leave room for their precious and highly prized evolutions.

Clear. On this point there seem to be few doubts. The conjecture that the Renaissance sound tended to be clear is supported by evidence of an acoustic and physiological nature, which we will examine here.

The practice of singing in front of the *librone* (large book) obliged singers to keep their heads raised, with their necks somewhat bent and tilted upwards, as is shown in numerous prints showing the chapels performing. In this position the hyoid bone,²¹ and particularly the thyrohyoid muscle that connects it to the larynx gives the larynx a higher position, thus reducing the distance of the source of sound from the mouth resonator. The immediate consequence is the emission of a fairly clear sound, which has no possibility of rounding and darkening.²² Moreover, the failure to be able to use the downward elasticity of the cricothyroidal muscle (since it is pulled in the opposite direction, because of the lengthening of the neck), which otherwise could have caused a lengthening of the vocal chords, in practice prevents any possible covering of the sounds, thus leaving them definitively clear in tone.

In this regard it is very interesting to examine the suggestion made by Giovanni Camillo Maffei concerning the position of the tongue. In his Sixth Rule he says that it must be kept distended and forward “in such a way that the tip arrives at and touches the roots of the lower teeth”.²³ This position seems perfectly in line with Renaissance vocal practice (which, as we have already seen, did not contemplate any mechanism for covering the sounds) and it consistently pursues the same objective as the preceding section. The advice to keep one’s tongue distended until it touches the roots of the lower dental arch is in fact also given to modern singers as a fast method for obtaining a clearer tone, without running the risk of crushing the sounds. To enhance the corrective effect one also adds the consonant ‘L’ before the sounds (in a vocalization) or replace all the consonants with an ‘L’ (in a piece). This forces the tongue to touch the roots of the upper arch and lengthens it further: the brightening

²¹ This is a small but very important U-shaped osseous ligament that lies over the larynx through the connection with the thyrohyoid membrane and joins the base of the tongue.

²² One could obtain a certain darkening by using the retreat of the oropharyngeal wall, but the sound would be inexorably coloured by an undesirable guttural component.

²³ GIOVANNI CAMILLO MAFFEI, *Delle lettere del Signor Gio. Camillo Maffei da Solofra, libri due*, p. 34.

effect can be grasped with remarkable clarity.²⁴

Another interesting consideration is once again connected with certain important recommendations addressed to singers by the theorists. Though they are harsh reproaches, we can draw from them interesting material for reflection. Repeatedly we encounter a firm condemnation of the habit of changing the vowels, replacing bright vowels with dark ones. As an example we will here cite a passage from Zarlino on this very subject, though similar examples in the contemporary theoretical literature are numerous and they all convey the same concept:²⁵

[...] But above all (so that the words of the singing be understood) they must avoid an error that is found in many, i.e. not change the vowels of the words, as for example pronouncing A instead of E, I instead O, or U instead of one of the others. But they must state them according to their correct pronunciation. [...] At times we have heard some shriek (I cannot say sing) songs in very uncouth voices, and with acts and manners so artificial that they truly seem like monkeys, and saying things like *Aspra cara, e salvaggia e croda vaglia* when they should say *Aspro core, e selvaggio, e cruda voglia*: who would not laugh? Or rather, who would not be driven to anger on hearing something so harsh, so ugly and so horrid?

Despite the gravity of this practice, which Zarlino describes as “artificial, ugly and horrid”, the singers obstinately continued to collect such criticism rather than abandon the flaw of changing the dark, round vowels with the bright ones, particularly the *A*, the clearest of all.²⁶ Clearly we can conclude

²⁴ Certain procedures of a logopaedic nature, aimed at improving guttural emissions and shifting retroflected resonances forward, call for particular exercises in which the patient must follow the movements of a pencil moved by the operator with the tip of the tongue. The movements on a perpendicular plane outside the patient’s lips help him to flex the tongue outwards, accustoming it to trigger the distant resonances of the retropharyngeal cavity (which are otherwise the cause of guttural sounds) and also those not sufficiently projected outwards.

²⁵ ZARLINO, *Le Istitutioni harmoniche*, terza parte, cap. 45, p. 204 (the italics is added).

²⁶ It is worth remembering that Vincenzo Galilei, when it came to discussing the madrigalisms used by composers to emphasize a certain harshness expressed in the text, also refers, like Zarlino, to the same madrigal title: “[...] i nostri pratici Contrapuntisti [...] Aspro core e selvaggio, e cruda voglia [...] haveranno fatto tra le parti nel cantarlo di molte settime, quarte, seconde e seste maggiori; e cagionato con questi mezzi negli orecchi degli ascoltatori un suono rozzo, aspro e poco grato”. See VINCENZO GALILEI, *Dialogo [...] della musica antica e della moderna*, Firenze, Giorgio Marescotti, 1581, p. 88. In the specific case of Zarlino, however, it seems unlikely that the replacement of the vowels with *A*’s was used by the singers solely to underline the harsh meanings of the text. Although it is perfectly plausible in this particular case, this practice, as we shall see below, was often applied also to sacred texts without any intention of colouring the words, but merely for phonic and timbral needs.

that, more than a foible or widespread fashion, it must have been a physiological-phonatory need connected with the factors we mentioned above. The need to sing with a clear timbre must have been so crucial to the singers as to make the subjection to humiliating censures bearable and, above all, induce them even to betray the words and the meaning of the texts uttered (and we know full well how closely rhetoric, dialectics and the *ars oratoria* in general were linked to the art of polyphonic music).²⁷

Given the particular madrigal quoted by Zarlino as his example, one might deduce that all of this occurred exclusively in the secular musical domain, where it would be reasonable to imagine there being greater freedom of expression and behaviour. Instead this consoling idea is contradicted by what can be explicitly read already from the year 1474 in an interesting treatise by Conrad von Zabern.²⁸ He claims to have heard singers sing “Dominos vabiscum, aremus”, then mockingly comments the image of ‘ploughing the fields’.²⁹ In the same passage he adds that from Frankfurt to Coblenz and from there to Trier he very often heard the same thing, above all by students. This means that the habit of falsifying sounds by brightening them is well rooted already in the previous century and appears not to have been restricted to Italy?

It is also interesting to note that things did not change at all over the centuries. After the historical passage of Romanticism certain opera singers still have no compunction about transforming vowels, darkening them considerably by putting into effect an accentuated process of covering the sounds. This is made necessary to obtain a particularly vigorous increase in the resonance of certain harmonic sounds, which occurs around 2500 Hertz and is called a *formant*. In this way the singer can immediately overcome the barrier of the orchestra and reach the audience, alone against 80-120 orchestral players.³⁰ As we know, the situation is tendency can be pushed to the extent of making the

²⁷ A somewhat provocative question: is it not perhaps possible that the vocal practice of the Renaissance favoured clear sounds simply because the ancients were particularly accustomed to this colour, obliged as they were by the restricting and consolidated use of the “large book”? And could this inclination have been pushed to the point of wishing to pursue the aesthetic tendency towards clarity to such an extent as to create the desire for the figure of the castrated singer, who may be considered as the absolute extremization of this tendency towards high pitches?

²⁸ CONRAD VON ZABERN, *De modo bene cantandi choralem cantum in multitudine personarum*, Mainz, Peter Schöffler, 1474, p. 61.

²⁹ *Ibidem*: “[...] ita ut audiverim aliquos cantantes: Daminus vabiscum, aremus..., ut ego dicerem ad mihi proximos: absit a nobis arare. Et revera a Francofortia usque ad Confluentiam, et ab inde usque ad Treverim cognovi hoc praecipue in scolaribus saepissime”.

³⁰ This became absolutely necessary with the increase in the mass of sound associated with the advent of the Romantic orchestra, as mentioned above.

text incomprehensible. As before, this is again done in the name of, and because of, vocal technique.

The tonal organization of the Renaissance choir also contributes to confirm the tendency of our predecessors to pursue the ideal of clarity of sound. While on the one hand we have said that the early choir sang the pieces much lower than a modern choir, on the other we must observe that the various voices of a Renaissance choir extended uninterruptedly from bottom to top in a steady timbral progression featuring ever-increasing clarity. From the dark colour of the *bassus* up to the clear colour of the *cantus*, the early choir clearly showed the nature of its tendency towards a clear tone. The *tenor* was a male voice of baritone timbre,³¹ and above it (and this was a particularly characteristic feature) the voice of the *altus* extended the tendency to clarity. It was entrusted not to the dark voices of the modern alto, but to the clear, ringing voices of falsettists and high voices.³² Naturally this timbral progression was completed by the *cantus*, entrusted to children, high falsettists or castrati.

This particular timbral progression towards clarity is instead completely destroyed by the arrangement of the modern choir. As already mentioned, the fact that the dark voices of the altos follow the clear timbre of the modern tenors is inevitably an inversion of tonal qualities. This forms an unstable progression, passing from the dark sound of the basses to the clear sound of the tenors, then with a return to gloom with the arrival of the altos before once again brightening with the sopranos. It is the rounded and enveloping timbre of the altos that is the factor principally responsible (for good and ill) for the sound of a modern choir: it is excellent and indeed indispensable when performing modern and contemporary music, less suitable for the Renaissance period. It is well known that the performance of a motet using an early grouping is capable of arousing sensations of brilliance and timbral clarity considerably greater than in a performance by a modern group. And this happens in spite of the fact the modern choir could sing the piece even a fourth above the other choir.

Regarding the structure of the early choir it might be useful to reflect on one aspect that could turn out to be significant. There is probably more to it

³¹ In former times the *tenor* held the Gregorian melody in the *cantus firmus*; hence the desirability to entrust it to a voice of the middle range, in such a way that it would not depart from the aesthetic and timbral-vocal canons characteristic of the Gregorian melodies.

³² The etymology of the word is clear. It was a high-pitched voice derived from the archaic custom of counterpointing the melody of the *cantus firmus* entrusted to the *tenor* with a second, original melody: the *contratenor altus* (if placed above the *tenor*) and the *contratenor bassus* (if placed below the *tenor*). Most likely the present-day names derive from this.

than the problems connected with the parallel question of whether it is a good idea to play early music on modern instruments or not. The Renaissance composer adopted certain compositional solutions or preferred certain contrapuntal figurations to others because he had a clear idea of the sounds of the voices of his day, and above all of the phonic effect that they would have produced in that particular situation. We know that the sonic impact of a dissonance of a harmonic type is more effective if the parts making the dissonance are close in timbre. Taking this as a starting point, it would be interesting, for example, to carry out a statistical enquiry and verify how many times a given Renaissance composer entrusted the dissonances, retardations and harmonic clashes to the *tenor* together with the *altus*, and instead how many other times he distributed them between *tenor* and *cantus*. In other words, one could question which two sections of the early choir received the greatest amount of harmonic dissonance, in order to attempt to deduce that their timbre was presumably somewhat similar. In particular it would be interesting to verify the result in the two situations hypothesized: logic would say that the *tenor-altus* combination should be the one carrying the largest number of dissonant moments, rather than the *tenor-cantus*, which is more appropriate in the case of a modern choir. As we have already mentioned, thanks to the particular timbral arrangement of the early choir there was an interesting assonance of colour between the *tenor* and *altus*. They were entrusted to male voices, the former contiguous to the other in timbre, the second established as a development of the other into the high range. In this respect they are completely different from the *tenor-alto* coupling of the modern choir, in which they represent two timbral situations that are extremely different from one another: a dissonance between them would have no appreciable effect.³³ We can also suppose that the *altus-cantus* pairing may have given questionable results as regards the rendering of dissonance and also that of blend, in cases where one can hypothesize the combination of an alto castrato and a boy soprano, given the greater power of the former over the latter.

It is clear that we could go on endlessly analyzing the numerous possibilities of polyphonic-timbral interplay that were offered to the early composer, but this is not our intention. Instead, given these premises, we merely wish to conjecture a conclusion: the use of modern voices with a timbre different

³³ Let us conjecture a dissonance distributed between the tenors and altos: the former engaged in the high emission of g' (real sound), and the latter comfortably distended on the f' before resolving the clash by descending to e'. In this case the diversity of timbre notably weakens the impact of the dissonance. The same situation entrusted to the *tenor-altus* pair of the early choir would have produced a much more e36q4ent

from that of the Renaissance can falsify the entire construction of a musical work, because it undermines the foundations of the contrapuntal construction, the movement of the parts, the distribution of the dissonances and the entrances of sections: in short, the entire compositional construction. In other words we can reasonably ask ourselves: if Palestrina had had at his disposal the phonic qualities that emerge from a modern mixed choir, would his contrapuntal choices, when creating his many masterpieces, have been different? Would we now have the *Missa Papae Marcelli*, or one very different from that which has survived? We must admit that this is so, and we can (jokingly) say that we have run the risk of losing many masterpieces ...³⁴

But there is also the reverse of the medal. To hear the real effect that the composer had searched for, using the sounds of the voices of the Renaissance, should we use the same voices of the 16th century?

Over and above the said distortions and the (human) exaggerations of the Renaissance singers, and leaving aside the matter of whether one can replace the lost voice of the castrato singer with those of the falsettists and present-day counter-tenors, from the strictly vocal point of view we must perhaps say that the distance between modern performances and the *authentic* Renaissance ones should be considerable on account of certain physiological transformations that have altered certain parameters of the voice during the five centuries that separate us from the Renaissance.

It is reasonable to suppose that the average height of modern man, which so greatly exceeds that of Renaissance man,³⁵ may have had considerable consequences on the timbre of voice. The vocal chords also have evidently become longer on account of the greater impact of the hypophysis – and above all of the hormones commanded by it – on the bones and laryngeal cartilages that determine their size. As a result one imagines that the timbre may have undergone a certain darkening, connected with a lowering of the average frequency of the sounds.³⁶

Not to mention the voices of the *pueri*. Unlike the Renaissance boys, our

³⁴ On the other hand we can absolutely sure that such geniuses of composition would have known how to create as many masterpieces if our own modern choir had been available to them.

³⁵ The evidence includes the length of the tombs, the heights of the doorways in 16th-century palaces, the sizes of armour, and the descriptions and testimony of contemporaries.

³⁶ One could hold that the increase in height may have had repercussions also on the blood pressure and hence on the heart frequency. Indeed the 60 beats a minute of the human pulse, identified in the treatises as the typical speed of the *tactus*, now seem to be over 70 beats. It would be interesting to consider whether this fact may have had an influence also on vocal timbre: for example, connecting it to a likely greater flow of blood to the vocal chords, which may plausibly have caused greater tonicity and greater thickness.

children are voluntarily subjected to a hormonal bombardment caused by the ingestion of foods that are particularly rich in certain substances. This fact profoundly influences skeletal, as well as lymphatic-metabolic, growth. We are in fact aware of a process of transformation of the human voices, which seem to undergo a sort of growing masculinization of frequencies and timbres, so we can state that the crystalline sound of the children's voices of the Renaissance may have been transformed into something different. The voices of children today are in fact somewhat substantial and of a somewhat *woolly* consistency, having lost the brilliant, light and *silky* consistency that characterized their voices even only a few decades ago. Apart from all else, the sexual-vocal break occurs much earlier than the norm, and the period of efficient activity of the child's voice is greatly reduced; in this way the enormous effort needed to bring the emission of a child to effective maturation is scantily productive.

We have rapidly mentioned the possibilities of replacing the castrati with the voices of falsettists. We do not wish to liquidate the complicated question in such a short space, but we must admit that the larynx of a castrato must have been completely different from that of falsettist, which in the majority of cases was that of a baritone. On account of the revolutionary hormonal transformations coinciding with puberty, which were instead almost completely impeded by the act of castration,³⁷ the larynx of a castrated singer remained reduced in size, similar to that of a child in the prepubertal age. Furthermore, it remained at a smaller distance from the mouth resonator than that of an uncastrated singer (even only because of lesser weight), something that gave its owner a very particular timbre, capable of literally electrifying the audiences.³⁸ The vocal chords, shorter and thinner than those of a man, gave the

³⁷ The production of testosterone by the testicles was impeded, but a minimal part of the hormonal substance was secreted by the surrenal glands, which were obviously not removed.

³⁸ However, some of the legends surrounding the castrati can be reassessed. The astoundingly long phrases we sometimes read about were only in part caused by the imbalance between the vocal chords, as small as those of a child, and the chest, as large as that of a man (though more elastic, because the cartilages connecting the ribs to the sternum failed to ossify). The rest was caused by the enormous amount of practising and training to which a castrato was subjected to keep himself at the highest possible artistic levels required of him. Even the ability in vocal acrobatics can be connected to this fact. Finally, one can also question their intense and licentious love lives, and the appeal that was attributed to them: the hormonal imbalance, the absence of testosterone (a hormone for the general development of the organism and metabolism of the proteins) and the consequent almost total elimination of inhibin from their bodies (another hormone that balanced growth by opposing the gonadotropin of the hypophysis) equipped the castrati with a body that was somewhat disproportioned and pear-shaped

castrati an agility not only in their phrasing but also in the actual sound itself, a feature that gained them a place in the Olympus of opera (and not only in opera). The basic fact was that their vocal chords were active throughout their whole length and throughout their breadth, involving in the vibration even the whole mucose of the *conus elasticus*. With the support of very considerable air pressure, sustained by a particularly large lung capacity (due to intense vocal-muscular training), but above all (again thanks to the training) propelled by a considerable diaphragmatic elasticity, the voice came out as full, long, penetrating, appealing and disturbing.³⁹

If we now go back and reread the early treatises, we would be amazed at the number of times the word *offendere* is used with reference to perception (*offendere l'udito; recare offesa all'ascoltatore*). Let us resist the easy temptation to imagine it as a mere archaism and let us try and ask ourselves whether such a repeated use of this verb of such strong and specific meaning may not have a justification of a purely perceptive nature. Let us consider our ear and have a look inside. There we see *tympanum*, the three ossicles of the *stapes*, the *incus* and the *malleus* (the smallest and most delicate of our whole body) which transmit the vibrations to the *fenestra ovalis*; we see the precious *cochlea*, Corti's organ and let us reflect on a very significant point: our organ of hearing, which is so important as to be the first to develop during pre-natal life, of all the organs of the senses it is the only one lacking the possibility of closing itself to protect itself from the outside world.⁴⁰ In short, it has no lids as the eyes do, and in the case of loud noises cannot defend itself. Let's take another step forward, and acknowledge that the world we live in is extremely noisy, or at least much noisier than fifty years ago.⁴¹ We can therefore imag-

(hypophysaric dysfunctions), practically hairless and suffering from numerous lymphatic-hormonal complaints.

³⁹ For this very reason the sexless voices must have been unmistakable. When one hears the famous recording of the voice of Alessandro Moreschi, the castrato singer of the Sistine Chapel, made between 1902 and 1904, if we leave aside the unacceptable aesthetic aberrations, we find that it shows in certain short high passages (and only in that tessitura) a substance and colour that are particularly appealing, that cannot be judged by any of the existing aesthetic benchmarks.

⁴⁰ In case of danger from the outside the eyes can defend themselves by closing their lids, the tongue can protect itself by sealing its lips, the hands can be closed to form a fist and the nose can stop breathing, at least for a short while. The ear, on the other hand, is forced to hear without pause. Is this the reason why we have a field of hearing that is extremely limited compared to the majority of animals? After all, we have no predators to ward off ...

⁴¹ In this regard it is worth reporting an amusing passage from Grazioso Uberti's *Contrasto musico*, which describes the noises of the city and seems to contradict what has been said above: "Discordanti sono le Campane, offendono l'orecchie li martelli dei Bottegari, fanno

ine our very delicate tympanum as it tries to preserve itself and protect itself from so many outside noises. It can do so only by hardening its fibres and stiffening its tensor muscles to reduce the amplitude of the vibrations. The result: we are equipped with an auditory capacity that is much less refined than that of our predecessors. And this explains the exorbitant number of scales and tunings that existed in Antiquity, whereas we are capable of appreciating and recognizing only two: the major and minor scales.⁴² And if we have also succeeded in becoming so acquiescent and compliant with that set of out-of-tune sounds represented by the tempered scale, that means that our auditory sensitivity has greatly weakened. But how, then, can we enjoy the refinements that nourished early music, if only from the point of view of intonation?⁴³ And how can we grasp the expressive power of a *deuterus*, without limiting ourselves to saying that it “serves to set melancholy texts”?

This is indeed a very serious conditioning if we compare the musical situation with that of painting, as at the beginning of this paper.⁴⁴ The limitation of using only the seven notes of the scale, without being able to adopt any nuance of intonation, is something to which we have now become perfectly accustomed by the use of the said tempered scale; indeed anything else would seem strange. But the dramatic quality of this constriction would be immediately clear to us if we imagined a painter obliged to use only the seven pure

tremare le viscere gli stridi delle Seghe, noiosi sono i tumulti che si fanno per le strade e per le piazze; Introna il capo il corso delle Carrozze e dei Carri”. But when he speaks of life in the countryside, even then he complains of the slightest noise, so one realizes that his words cannot be taken too seriously: “[...] si sentono li cani che abbaiano; altri animali che strepitano; gli Operarij che gridano; le Contadine che cantano; le Cicale che assordano; li Guffi che inquietano; li Grilli che annoiano; le Rane che molestano”. But apart from the laughable presence of owls, frogs and crickets, the successful joke is revealed when he states that “anche gli Amici della solitudine ne gli eremi e nelle caverne soffrono l’importunità dell’Echo”. Besides the speaker, one of the two main characters in the dialogue, is called Giocondo (Cheerful); the other is Severo (Severe). See GRAZIOSO UBERTI, *Contrasto musico, opera dilettevole*, Roma, Lodouico Grignani, 1630, parte prima, pp. 5-6 (facsimile edition by Giancarlo Rostirolla, Lucca, Libreria Musicale Italiana Editrice, 1991 (Musurgiana; 5)).

⁴² It is astonishing how many different tunings were used in the past. For an example, see PATRIZIO BARBIERI, *Acustica accordatura e temperamento nell’Illuminismo veneto. Con scritti inediti di Alessandro Barca, Giordano Riccati e altri autori*, Roma, Torre d’Orfeo, 1987 (Istituto di Paleografia musicale. Serie I: Studi e testi; 5).

⁴³ Eastern musicians and even those from the Middle East (not so distant from us) are capable of performing and appreciating very refined variations in intonation to the order of one or two cents. These very delicate modifications are also applied to the ‘tonic’, which appears with different intonational angles, according to the position in which it appears within the composition.

⁴⁴ This is a concept that I have had occasion to express in the past, but deserves to be raised here briefly. See WALTER MARZILLI, “Musica, pittura e cinema: interazioni”, *Lo spettacolo*, XLVII, no. 3, luglio-settembre 1997, pp. 285-299.

colours of the rainbow without being able to mix them, thus precluding those miraculous shadings that lie behind the great masterpieces of art.⁴⁵ No painter, from any period of history, would agree to be subjected to such punishing conditioning. Hence, while on the one hand we have Rossini, who succeeded in composing his masterpieces using exclusively the seven note-colours (by this time we are fully in the era of temperament), on the other hand we have the Renaissance composers, who instead wrote all their works having in front of their eyes-ears a rich palette of a great variety of note-colours – one that we have unfortunately lost.⁴⁶

The matter, therefore, does not seem to be restricted to individual issues, such as the debate on the presence of women as opposed to the use of falset-tists, or the search for ancient intonation as opposed to modern temperament. In the debate between ancient and modern choirs, between lost voices and sounds to be revived, we would like to conclude with a final provocative reflection. Let us imagine that some cosmic radiation or extreme thermal phenomenon, or even a transformation of the atmosphere, succeeded in altering the cells of wood and hardened its fibres, making it unusable for the building of musical instruments. What would we then do with all the instrumental music? Would we abandon all the orchestras, left without whole families of strings, woodwinds and harps? Would we neglect all the trios and quartets and reduce to silence all the pianos of the world? Would we be prepared to destroy for ever such a huge treasure of culture? Or would we decide to reconstruct the instruments with an excellent synthetic wood, perhaps easily obtained from the polymers of certain particular alloys, and try to get used to the new sounds they emit?

This is precisely what we did when we lost for ever the singers of the Renaissance. And it is what we must continue to do.

⁴⁵ Indeed this is already an advantage of the painter over the musician: of the seven colours of the rainbow some are the result of the fusion of two others, hence already well amalgamated.

⁴⁶ In this sense we wish to add a further consideration. After the affirmation of temperament over the ancient scales we have the evidence of many criticisms of composers, accused of bold modernism, of audacious approaches to the use of dissonance, of harsh harmonies... Could we not attribute this also to the clash between two incompatible factors? On the one hand the composers, who could adopt certain new harmonic-melodic solutions allowed them by the equivalent degrees of the tempered scale (modulations, transitions, dissonant chords, etc.); on the other, the instruments and instrumentalists, who still continued to tune the intervals in accordance with the previous scales.