



From Violone to Violoncello: A Question of Strings?

Stephen Bonta

THREE puzzling questions intrigue the student of the early history of the violoncello. The first arises from the fact that as early as the 1560's and 1570's such instrument makers as Gasparo da Salo and Andrea Amati were producing what many in our century call the violoncello¹ and yet it is not until a century later that the term *violoncello* appears and, furthermore, that the instrument seems to emerge as something worthy of serious artistic consideration. One answer to this riddle is, of course, that Gasparo and Amati were obviously not making a violoncello but rather some other sort of bass violin, known by a different name, which, subsequently altered (as was common practice with members of the violin family well into the present century), turned out to be a violoncello. And--this answer would continue--such alteration was just one manifestation of continued experimentation with the bass violin, which ended with its emergence in finished form as the violoncello in the 1660's. But the fact remains that some sort of bass violin--called by some sort of name--was being produced by the late sixteenth century. And given the existence of such an instrument, it hardly seems reasonable that composers would ignore it for a full century, considering the attention they lavished on its smallest brother during the same period. If it were unworthy of a composer's attention, like the Novachord in the 1930's for example, makers would surely have ceased producing it, which they did not. In fact, one can adduce a good deal of evidence to suggest that composers were writing for a bass violin shortly after they began wiring for the violin. And they were producing not simple continuo parts,² but rather, sophisticated concertante parts that approached in difficulty those being composed for the fledgling violin.

Our first question was concerned with time; the second involves place: Why is it that the violoncello is first encountered in Bologna, a city not known for its instrument making? Our third: Why did the early bass violin have a different name (or names) from the violoncello?

The present study is an attempt to shed some light on the situation in seventeenth

century Italy, to provide answers to our three questions, either fleshing out with documentation the one already suggested for the first question, or proposing an alternative. We shall draw on evidence of many sorts: etymological, physical, organological, archival, and musical. One should be warned at the outset that the quest will be difficult. For one thing, we lack trustworthy physical evidence--that is, either early instruments that are known not to have been altered, or maker's templates, such as those used by Antonio Stradivari for the alto and tenor viola, and that survive. For another, partbooks contain a multitude of names for stringed instruments that employ the bass clef during this period. So, too, do archival records. The sheer variety of names strongly suggests continued experimentation as well as lack of standardized terminology.³ However, it might equally suggest local usage, either in time or place--or both. We shall attempt to show that there are discernible patterns of usage in Italy that reduce this multiplicity of names to some four instruments, one of which can be called the proto-violoncello. And although we shall have more to say on this matter presently, almost without exception none of the names encountered in either partbooks or archival records carries the suffix *da gamba*, indicating a member of the viol family.

We shall bear in mind during our search that any one of these names might be used in a generic sense--that is, to refer to any one of a number of instruments. And in our use of archival and musical evidence we shall see the necessity of considering the context within which a term is found--that is, what do we know about other terms or names that are found at the same time in the same place? And what do we know about those who used the terms? Were they bookkeepers, notaries, or musicians?

We must also keep in mind the physical facts of instrument making: for example, what are the factors that determine how large or small an instrument must be? We shall discover that one of our most important concerns will be the strings that were in use in the seventeenth century--the material used, its properties, and the laws governing the vibration of strings.

We shall also have to deal with one of the vagaries of our notational system, the fact that the F clef serves for both bass and contrabass instruments. As a result we have been deprived of certain evidence as to whether or not any of the printed parts we encounter in the seventeenth century was intended to be read at pitch or an octave lower. But it seems safe to make two assumptions in this regard. First, good composers of any age are constantly concerned with sonority; they do not knowingly hold to a *Klangideal* that is weird or ugly. And this is especially true of the seventeenth-century Italian composers with whom we shall be particularly concerned. The second is that a composer who specifies a particular instrument can be expected to write music that will employ the full resources of the instrument. If the instrument has four strings, for example, he can be expected to use all four. Clearly this is true for all seventeenth-century Italian composers that write for the violin; it is also true of later composers that write for the violoncello.

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Although we do not presently know--and may, in fact, never know--what name or names Gasparo da Salo' and Amati attached to their bass violins, there are several treatises from the late sixteenth and early seventeenth centuries that refer variously to the *Bas de violon* (Jambe de Fer),⁴ *Basse de violon* (Mersenne),⁵ *Basso di viola da braccio* (Zacconi),⁶ and *Bass Viol de Braccio* (Praetorius),⁷ an instrument with four strings, tuned in one of the following ways:

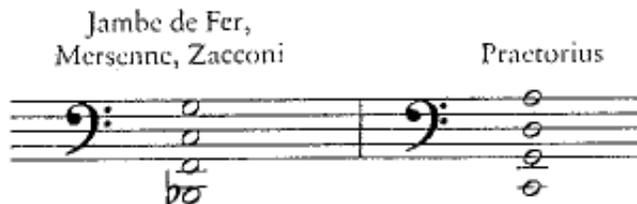


FIGURE 1

Praetorius gives another tuning a fourth higher for an instrument of the same name.⁸ This instrument we shall ignore, concentrating instead on the one required to play those pieces from seventeenth-century Italy--in the majority--that descent below F.⁹ The lower of Praetorius' tunings is surely the one in use in seventeenth-century Italy, as Kurt Stephenson points out;¹⁰ for with three known exceptions (all from Modena),¹¹ no Italian composer from this century, regardless of instrument specified, calls for the notes below C. (We are taking into account instruments requiring octave transposition, a point to which we shall return.) Furthermore, Zacconi's tuning, if it were used, would necessitate moving beyond the first position to handle the d' regularly called for in this music, and seldom exceeded until after 1650.

The search for music written for the Italian *basso viola da braccio* proves to be disappointing. Few composers employed this name in their prints. In fact, with instrumental prints from 1615 through 1640 a common practice was to publish works for a bass wind, or for an unspecified bass instrument, even though the violin is clearly called for as the soprano instrument in these same prints.¹² A notable exception is found in the works of Claudio Monteverdi, significantly a Cremonese by birth, a contemporary of several of the Amatis, and a string player. (Cremona was, of course, from the latter half of the sixteenth century on, one of the two important centers for the production of members of the violin family; Brescia was the other.) Monteverdi calls for the *basso viola da braccio*--either explicitly by name or implicitly through instructions and the clef employed--in thirteen pieces scattered through four publications stretching from 1609 to 1638: *L'Orfeo* (1609), *Vespers of the Blessed Virgin Mary* (1610), and the *Madrigali*, Books VII (1619) and VIII (1638). In only three of these pieces, however, does the compass of the part require an instrument with Praetorius' lower tuning (our professed concern): the ritornello at the end of Act IV in *L'Orfeo* (D-a); the *Sonata sopra Sancta Maria* from the Marian Vespers (C-d')--which calls for a *vivola da braccio*;¹³ and *Il Combatimento di Tancredi e Clorinda* (D-c') in Book VIII of the *Madrigali*.¹⁴

The *basso viola da braccio* used by Monteverdi was clearly not an octave-transposing instrument. In *L'Orfeo* it is used in conjunction with a *contrabasso*, in *Il Combatimento* with a *contrabasso da gamba*. In the *Sonata sopra Sancta Maria* Monteverdi offers as an option for the *viola da braccio* a trombone, which must be nontransposing since there is also a part for *trombone doppio*, or contrabass trombone, in the same piece.

Later composers using a similar term for their bass violin are Giovanni Battista Buonamente, who doubtless worked with Monteverdi in Mantua, and who calls for a *basso da braccio* as one option in his sonata print, Book 6, of 1636; and, some thirty years later, Giovanni Legrenzi, who calls for the *viola da braccio* in his opus 8 of 1663. Sonatas in both prints descend to C, and in a context that makes it clear we are dealing with a bass, not a contrabass instrument. Hence the instrument under consideration is probably the one described by our four theorists. In the intervening years between Monteverdi's and Legrenzi's prints the term *viola* appears from time to time in association with a bass string part; but it is not always certain whether *gamba* or *braccio*--or both terms--was understood.¹⁵ (We shall return to the *viola* presently.)

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Since the term *basso viola da braccio*, and its variants, were so infrequently used in the seventeenth century, we are obliged in our search to look elsewhere for other clues, on the assumption that there was some other name (or names) in use for a similar--if not the same--instrument. From 1609 on, the year of publication of Monteverdi's *L'Orfeo*, and in increasing numbers after 1635, instrumental prints appear with a new term associated with bass concertante parts: *violone*. The first composer to employ the *violone* with any regularity was Tarquinio Merula, also a Cremonese by birth.¹⁶ He called for it to be used in conjunction with the violin beginning with his opus 6 (1624). We include a sample of his writing for the instrument in Figure 2.



FIGURE 2. Tarquinio Merula, *Canzona la Vesconta* from *Pegaso*, opus 11 (Venice, 1640) [first edition ca. 1633-1637]

It is obvious, first of all, that the technique required of violinist and violonist is

equal, except in the use of higher positions, and we shall return to this point. It is also obvious that from Merula's point of view the violone is a well-established instrument. Never once does he suggest that the violone part is *a beneplacito*, a phrase normally found in early prints calling for the violoncino, violoncello, or bassetto.¹⁷

Here we have encountered a troublesome term--*violone*--for it would appear that the term was applied--with certain care--to at least three different instruments in Italy in the seventeenth century, of differing sizes, octave-transposing and non-transposing, viol and violin.

The confusion as to size appears as early as 1629 in Italy, when both a *violone piccolo* and a *violone* were employed for the same feast in Bergamo.¹⁸ That the confusion persists into the eighteenth century can be seen in numerous places, including the preface to Georg Muffat's *Auserlesene Instrumentalmusik* of 1701, a most valuable source for the study of instrumental practice around the turn of the century. His preface appears in German, Italian, Latin, and French, and is most informative because of the slight modifications in instructions and terminology that appear in the different translations.¹⁹ Here, although the partbook for the bass of the Concerto Grosso is labelled violone, Muffat feels it necessary to be more explicit in his instructions on the instruments to be used in the Concerto Grosso, saying in the German version, "In this case, to make the harmony of the bass more majestic, a large Violone will prove most serviceable,"²⁰ implying thereby the existence of a small violone. In another spot, in referring to the best bass member for the concertino, he says, again in the German version, "The bass [part] however will go better on the small French bass than on the Violone used hereabouts,"²¹ implying that different *violoni* are used elsewhere. But even given the confusion that both we and the seventeenth-century musician experience in trying to sort things out, it seems hardly likely that publishers would have been willing to produce partbooks with a specific name, such as *violone*, unless a suitable instrument existed, and, more important, was widely used. Publishers being pragmatists, if such an instrument were not widely used, they surely would have insisted that composers continue their earlier practice--that is, labelling the partbooks simply *basso*.

The logical next step in our search is therefore to examine the available evidence on what the violone could be in Italy in the seventeenth century, in an attempt to identify, if possible, the instrument Merula had in mind. As a background to this search we should first state that it is generally accepted today that in the sixteenth century the term *violone* was used generically to refer to all members of the viol family.²² And although the term was in use from the 1520's on,²³ on only one occasion in the sixteenth century was it identified with specific examples of music, in Diego Ortiz's *Tratado de glosas* of 1553. Otherwise it appears only in discussions by theorists, in correspondence, or in inventories.²⁴ This situation stands in marked contrast, therefore, to that in the seventeenth century, wherein the violone, as in the case of Merula, can be identified with specific pieces of music.

In Italy it is only in the first decade of the seventeenth century that one encounters theorists that mention the violone.²⁵ And only two of them, both Bolognese, give sufficient information to allow us to identify the instrument they discuss: Francesco Prandi and Adriano Banchieri. Prandi, in his *Compendio della musica*,²⁶ gives a fingering chart that is designed to include information on a bass, tenor, and soprano instrument, and that is entitled *Noti di far ne' violoni*. From the chart it is clear that these were six-stringed viols, and therefore that Prandi continued to use the term *violone* in a generic sense. Three years later, however, Banchieri restricts the term to the lowest members of the viol family, citing two instruments with the following names and tunings:



FIGURE 3

In assessing the value of this evidence from Bologna, however, we must keep three things in mind. First, Banchieri drops the term *violone* from all subsequent discussions of members of the viol family.²⁷ Second, he is the last known Italian theorist to identify the violone with the viol family. And thirdly, one of Maurizio Cazzati's main contributions in Bologna some fifty years later in 1657 appears to have been to bring the musical establishment at San Petronio, the center of Bolognese musical life, up to date with respect to the use of instruments.²⁸

Banchieri does however confirm one important point, for a survey of the music designated for violone that survives from the seventeenth century fails to reveal a single piece that employs something other than the bass clef, and hence anything other than either a bass or a contrabass instrument.²⁹ Other sources provide confirmation as to the names of his instruments and their tunings. His *violone da gamba* is doubtless the same instrument cited by Johann Walther in Germany over a hundred years later.³⁰ Similarly, the *violone in contrabasso* must be the one pictured by the German Praetorius in Plate VI of his *Theatrum Instrumentorum*³¹ under the name "Violone, Gross Viol-de-Gamba Bass," a six-stringed, fretted instrument--clearly a viol. His index to the plates lists the same instrument as "Gross Basseig, Violone."

The next question is which--if either--of these two instruments is the one intended by Merula. Let us begin with the *violone in contrabasso*. Given the tuning this was clearly an octave-transposing instrument.³² As such it seems a highly unlikely instrument to be performing the sonata of Merula excerpted above, for four reasons. First, as a transposing instrument it would be quite incapable of handling what would be the CC regularly called for by Merula--or by such later composers as Cazzati, Legrenzi, Giovanni Maria Bononcini, or Corelli, all of whom specify the

violone and call for this note.³³ Secondly, the top string, notated as d', would only be used as an open string, since d' is the highest note called for in most of this music.³⁴ Thirdly, the sonority resulting from its combination with one or two high-sounding violins--especially in the works of the sonority-conscious Corelli (who specifies the violone as the bass instrument in *all* his sonata prints)--would be, to say the least, weird.³⁵ Finally, the character of these violone parts, with their extensive use of octave leaps and scale passages suggests not that a contrabass player "mussten damals ein nicht geringe Gewandheit in der Handhabung dieses plumpen Instrumentes besessen haben,"³⁶ but rather that another, nontransposing instrument was intended.

Banchieri's *violone da gamba* would appear to be a more likely candidate for Merula's intended instrument.³⁷ It has the requisite compass and is nontransposing. But it, too, has a problem. As a nontransposing instrument the lowest string, GG, would never be used. This runs counter to Merula's use of the violin, which regularly encompasses all four strings--even the lowest one (see Figure 2). But, more important, it is an improbable choice on several counts. If as early as the 1560's Charles IX of France, not even an Italian, ordered what amounted to a complete orchestra of members of the violin family,³⁸ thereby apparently anticipating the *Klangideal* that we generally associate with the seventeenth-century Venetian opera, it is hardly probable that the Italians, who after all developed the violin family, should have tenaciously clung to the bass gamba for a period of a hundred years.³⁹ Moreover, if one of the reasons advanced by the Italians for using the violin in church was the amount of sound it could produce,⁴⁰ it hardly seems logical that they would have avoided using the loudest bass string available, a bass violin, along with it.⁴¹ We can document the fact that they did so--even to the exclusion of the bass viol--but no earlier than 1657, in which year Thomas Hill, writing home to England, said: "the organ and violin they are masters of, but the bass-viol they have not at all in use, and to supply its place they have the bass violin with four strings, and use it as we do the bass viol."⁴² But it is reasonable to suggest that the use of the bass violin in Italy--even if not as the sole bass string--predates this letter by many years.⁴³ Finally, we should recall our earlier reservations as to the value of this Bolognese evidence,⁴⁴ in particular that the term *violone* was not associated with the viol family by any Italian theorist after 1609.

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If, as we have suggested, neither one of the instruments described by Banchieri is fully satisfactory for Merula's work, we must search elsewhere. But before we do, let us introduce several further pieces of evidence to confirm that at least one form of the violone was a nontransposing instrument. It was a common seventeenth-century practice to offer a choice between "violone o fagotto"⁴⁵ or "violone o trombone"⁴⁶ for bass concertante parts.⁴⁷ In Cazzati's opus 35 (1665a) the titles of two of the partbooks provide perhaps the most compelling evidence: "Violone" and

"Tiorba o Contrabasso." Particularly interesting is the contrast in character of parts found in one sonata in this collection, "La Casala" (Figure 4).

The image displays a musical score for a sonata by Maurizio Cazzati. It consists of two systems of four staves each. The first system includes staves for 'violino 1', 'violino 2', 'violone', and 'tiorba o contrabasso organo'. The second system continues the same instrumentation. The notation is in a historical style, featuring various note values and rests. The 'tiorba o contrabasso organo' part is notably lower in pitch than the other instruments.

FIGURE 4. Maurizio Cazzati, *Sonata a 3, La Casala* from *Sonate a due, tre, quattro, e cinque*, opus 35 (Bologna, 1665).

Evidence that the term *violone* was applied to a member of the violin family can be found in several sources from the 1620's on.⁴⁸ The first known example is in a piece by Giovanni Ghizzolo, significantly a Bresciano by birth. The piece, *Quem terra pontus*, was scored for "due canti o tenori con due violini et chitarrone o violone da braccio," and was published in a collection in 1624.⁴⁹ Some twenty-five years later Kircher pictures a cello-like instrument under the title "violone."⁵⁰ The bass partbook of Cazzati's opus 15 (1654)⁵¹ is labelled "Basso Violone da Brazzo." And finally, Giovanni Battista Vitali describes himself as a "suonatore di violone da braccio" in his opus 1 (1666) and later works.⁵² Less conclusive as evidence, but still worthy of note in this regard, is the fact that in Legrenzi's opus 8 (1663), the terms *violone* and *viola da braccio* are used interchangeably: in five of the sonatas the instrument called for in the tavola is the violone, whereas the viola da braccio is specified in the music. In no instance is there any difference in the lowest note required. The value of this evidence is however enhanced by the knowledge that Giovanni Battista Vitali, mentioned above as a "suonatore di violone da braccio," is referred to in documents in San Petronio, Bologna, as "sonatore di violonlino" (1664),⁵³ and "sonatore di violoncello" (1674).⁵⁴ It is possible, of course, that Vitali, like many other musicians of his time, was proficient on several string instruments.⁵⁵ It is more likely in this instance, however, that we are dealing with the same, or very similar instruments, all nontransposing. Archival evidence supports this suggestion, for in the same year that Vitali was hired at San Petronio, 1658, a Don Vincenzo Colonna (who ca. 1680 calls himself a "suonatore di contrabasso")⁵⁶ joined the cappella. Colonna's instrument is variously labelled *violone grosso*⁵⁷ and *contrabasso violone grosso*,⁵⁸ until 1681--never as simply *violone* during Vitali's years. From 1681 on, however, the word *grosso* is dropped, and Colonna and his successors up through at least 1771 are referred to as

"suonatori di violone."⁵⁹ And thus we arrive at the eighteenth century meaning of the term *violone*: contrabasso.

Records of musical activities in Rome from the 1660's through the 1730's provide further examples of the progression of events we have just observed in Bologna--that is, both the use of the violone in the context of a contrabasso, and its replacement at some point by the violoncello, played by the same performer. A certain Don Gasparo, for example, played the violone at the Oratorio San Marcello with a good deal of regularity from 1667 to 1693,⁶⁰ twice in the company of a contrabasso.⁶¹ Since Cardinal Pietro Ottoboni was one of the patrons of San Marcello, it is not surprising to find Don Gasparo also playing violone with some regularity at Ottoboni's court from 1689 to 1694, again in the company of a contrabasso.⁶² In this latter year, however, he is also listed as playing the violoncello at San Marcello.⁶³ Another violonist at Ottoboni's court from 1694 to 1700, Nicola Haym,⁶⁴ was known later in London as a violoncellist.⁶⁵ Finally, the two lowest string instruments employed at the Ottoboni court from 1689 to 1722 were the violone and the contrabasso. In this latter year, however, the term *violone* was replaced once and for all by the term *violoncello*,⁶⁶ the term *contrabasso* being retained until at least 1737. Since the eight violonists suddenly all emerge as violoncellists, Professor Hansell may be right in suggesting that the change in terminology in this instance is due to a change in scribe, not to a change in the instrument.⁶⁷ But there may be more to it than that, as we shall see presently.

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We have established therefore that in Italy, from the 1620's--and probably earlier--through the 1660's--and certainly later--the term *violone* may apply to a nontransposing member of the violin family. We have further established that--at least in Bologna--the contrabasso during these same years is regularly identified by some name other than simply violone.⁶⁸ We have seen the same usage in Rome with regard to the violone up through the 1730's. We have also seen that German and Bolognese usages appear to agree after 1681: *violone* in the eighteenth century--outside Rome until 1737--means *contrabasso*. In other words, the violone as a bass instrument seems to disappear. There is also a strong suggestion, based upon the circumstantial evidence found in Legrenzi's opus 8 (1663) and the terminology used with both Vitali and at Ottoboni's court in Rome that *viola da braccio* and *violone* were simply earlier names for the violoncello.

But things are not so simple. Let us return for a closer look at Legrenzi's opus 8. Two other sonatas in this same collection, "La Buscha"⁶⁹ and "La Basadona," suggest that the *viola da braccio* and the *violone* are not the same instrument. In these essentially polychoral works Legrenzi specifies both *viola da braccio* and *violone*, each to serve as the bass member of one of the two three-voice choirs. In general his part for *violone* lies lower than that for *viola da braccio*, especially at cadences, although the overall compass for both is not significantly different,

especially at the lower end, and in neither case does it extend below C. A similar practice is encountered for several later Bolognese composers, who include in their music parts for both violoncello and violone--as well as contrabasso--and who write for them in the same way as Legrenzi. One example, giving only the parts in the bass clef, will demonstrate the point (Figure 5).

The image shows a musical score for three instruments: violoncello, violone, and contrabasso. The score is written in bass clef and shows a complex rhythmic pattern across four measures. The violoncello part is on the top staff, the violone part is on the middle staff, and the contrabasso part is on the bottom staff. The music consists of eighth and sixteenth notes, with some rests and accidentals.

FIGURE 5. Giacomo Perti, *Kyrie* from *Messa a 5 concertate con instrumenti* (ca. 1675-1685) [Bologna: Archivio Musicale di San Petronio, MS. P.XII.1].

Let us investigate therefore what organological evidence we have on the violone as something other than a viol, keeping in mind that if it were a bass instrument it could not have been much larger than the modern violoncello, which removes it from the category of the contrabass.⁷⁰

One suggestion, made by Sachs,⁷¹ is the "Gross Quint-Bass," a five-stringed member of the violin family, with tunings given by Praetorius [11,26]:

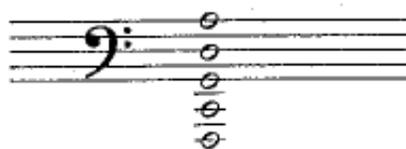


FIGURE 6

Rühlmann⁷² suggests that the "Gross Quint-Bass" is the instrument pictured by Praetorius as the "Bass-Geig da Braccio" in Plate XXI,⁷³ an instrument whose body size was some ten centimeters larger than the present-day violoncello.⁷⁴ The connection with the term *violone* would appear to be made about 1722 by Johann Christoph Weigel in his *Musicalisches Theatrum*,⁷⁵ which includes an instrument called the *violon* in Plate XXIII, showing it as a five-stringed member of the violin family, held vertically by a seated performer, and apparently somewhat larger than the violoncello.

This instrument clearly meets our requirements in a number of ways. It is, first of

all, a violin. Secondly the four top strings are capable of handling without difficulty any of the music we have been discussing. There is one problem, however: the bottom string tuned to FF. Was this instrument transposing or nontransposing? If it were transposing, none of the music we have been discussing would require using the a string. It barely needs the d string, in fact, since the highest note called for in violone parts is f', which by octave transposition becomes f. This runs counter to our evidence on both the violin and viola, where the higher register was the one favored--and for good reason, as we have mentioned,⁷⁶ because of the problem of producing a good sound on the lowest string. Furthermore, we again encounter our earlier problem of weird sonorities when used with violins in a trio-sonata setting. On the other hand, if it were nontransposing, the lowest string would again never be used, which also runs counter to the practice found for the violin and viola (see Figure 2). And if it were so used, how would the player read his part, if our lowest clef is the bass clef? Possibly the instrument could be treated as either a bass or a contrabass depending on the music at hand. But if so, what signs does the performer have to this effect? But there is another, equally important consideration: it is hard to conceive of the sort of sound that would have been produced by the lowest string, given the size of the instrument illustrated by both Praetorius and Weigel--markedly smaller than a contrabass--and the problem that existed before the days of wire-wound strings.⁷⁷ Hence this five-string violone, even though it fulfills a number of requirements, must reluctantly be rejected as an unlikely choice for the music of Merula, Legrenzi, and Corelli.

What then was the violone for which these men wrote? The most reasonable suggestion is that it was the larger form of the violoncello that is known to have been produced by the early Italian makers,⁷⁸ similar therefore to the one just considered but minus the bottom string. The etymology of the term *violoncello* alone suggests its connection with the violone as well as the size relationship between the two.⁷⁹ And since a difference in body size of only five centimeters was sufficient to engender different names for two other related instruments, alto and tenor violas, it is not unreasonable to suggest that a similar difference here--the exact measure of which is presently unknown, and will probably remain unknowable--could lead to two different names, violone and violoncello, in order to help keep matters straight. To suggest, on the other hand, that the violoncello (as a violin) developed from the violone (as a viol) seems not to make sense.⁸⁰ Nor is there any evidence that the term *violone*--any more than *violino*--was ever applied to a member of the viol family, at least from the sixteenth century on.

Our interpretation of the term *violone*, a rather obvious and simple one, is confirmed by the *Vocabulario degli Accademici della Crusca*, in the fourth edition, published in 1729. Here the violone is defined as "a large low-pitched viola, which is also called basso di viola, and violoncello when of smaller size."⁸¹

The fact that violone and violoncello doubtless had the same tuning⁸² (as did alto and tenor violas⁸³ as well as both sizes of violins)⁸⁴ explains the interchangeable use of the two terms, *violone* and *violoncello*, by a number of Italian composers

late in the seventeenth century.⁸⁵

The violoncello, like the smaller viola, must have been increasingly favored because of a desire for greater versatility in the bass part--a desire, in effect, to employ the rapidly developing violin style on a suitable bass instrument. The larger instrument, requiring more extended finger positions in the left hand (and more sheer strength) was less suited to passage-work and large leaps.⁸⁶ Evidence to support this suggestion can be found in the common practice, among the earliest composers to use the term, of specifying the violoncello (along with the organ) for the *sonate da chiesa*, with their more active bass parts, reserving the violone (and/or the spinetta or cembalo) for the less demanding *sonate da camera*.⁸⁷

The violone began to disappear--as a bass, not a contrabass, instrument--at just about the same time as the tenor viola. It was increasingly displaced by the violoncello after 1700. Italian makers, with few exceptions, ceased making the larger violoncello--what we call the violone--at about the same time. And since many of the older instruments were cut down in size,⁸⁸ not only the term but also the instrument vanished. Hence the difficulty encountered by Sir John Hawkins in 1776 when he attempted to define what a violone was. He said "it seems that this appellation [that is, violone] was formerly given to that instrument which we now call violoncello."⁸⁹

For several reasons, then, we have come to reject as improbable the notion that the term *violone*, when encountered in seventeenth-century Italian publications, was being used in a generic sense--that is, that it means any appropriate bass string, viol or violin. First, there is a lack of corroborating evidence that the term *violone* was ever used in this fashion after the first decade of the seventeenth century. On the contrary, all evidence for two terms, *violone* and *viola*, points in just the opposite direction, towards increasing particularization.⁹⁰ Second, even if one assumes that the term *violone*, when it first appears in Italian music prints, is being used in a generic sense, one is still faced with the fact that there are a finite number of possible instruments that can be subsumed under such a name. And, as we have seen, for a variety of reasons, tuning or size, most of these must be classified as unsuitable and therefore improbable. And if this is so, it is unreasonable to suggest that composers and publishers would have abandoned their earlier generic term, *basso*, in favor of another, *violone*, of doubtful usefulness.

* * *

If, as we have suggested, the violone as a bass instrument began to disappear about 1700, to be replaced by the violoncello, what can we determine about the earlier history of the violoncello? Does it in fact have one before the 1660's? Or did it, as is currently believed, suddenly emerge full-blown in Bologna at that time? There is evidence that such a smaller form of the violone did in fact exist earlier in the seventeenth century. This evidence, together with other names for the bass violin, whether large or small in size, will be examined in a subsequent article in this

Journal.

But before concluding our consideration of the first question posed at the outset of our search, we should give attention briefly to those composers who first employed the violoncello. They can be classified into three groups: (1) those born in all probability before 1650, most of whom came late to the instrument, (2) Bolognese probably born between 1655 and 1670 who either were known as violoncellist/composers even though not publishing for the instrument, or who from the outset of their career were publishing for the violoncello, and (3) non-Bolognese of this younger category whose activities document the rapid spread of the violoncello throughout northern Italy (see Table).

X

Table**Early Composers for the Violoncello**

<i>Names and Dates</i>	First print requiring violoncello	Accademia Filarmonica	San Petronio
Group I: Those born before 1650			
Guilio Cesare Arresti (1610-1701)	1665c	X	X
Gioseffo Maria Placuzzi (?-?)	1667a		
Giovanni Maria Bononcini (1642-1678)	1678a	X	
Giovanni Battista Bassani (ca. 1647-1716)	1683a	X	
Giovanni Paolo Colonna (1637-1695)	1691	X	X
Bartolomeo Laurenti (ca. 1644-1726)	1691d	X	
Group II: Bolognese born after 1650			
Dominico Gabrielli (ca. 1659-1690)	--	X	X
Pirro Albergari (1663-1735)	1683c		
Giovanni Bononcini (1670-1747)	1685f	X	X
Guiseppe Torelli (ca. 1658-1709)	1686a	X	X
Gio. Bat. Degli Antonii (ca. 1670-1698)	1687)		
Filippo Belisi (?-?)	1691c	X	
Bartolomeo Bernardi (ca. 1660-1732)	1692b	X	X

Giorgio Buoni (?-?)	1693f		X
Giuseppe Iacchini (ca. 1670- ca. 1727)	pre-1695	X	X
Group III: Non-Bolognese born after 1650			
Benedetto Vinacessi (ca. 1670- 1719)	1687i	Castiglione	
Dominico Zanata (ca. 1665- 1748)	1689h	Verona	
Dominico Brasolini (?-?)	1689n	Ferrara	
Elia Vannini (ca. 1660-?)	1691a	Ravenna	
Carlo Antonio Marini (1671- ?)	1692g	Bergamo	
Tomaso Antonio Vitali (1663- 1745)	1693b	Modena	
Antonio Caldera (ca. 1670- 1736)	1693j	Venice	
Francesco De Castro (?-?)	1695b	Brescia	
Francesco Bonporti (1672- 1749)	1696c	Trento	
Aurelio Paolini (?-?)	1697b	Vicenza	
Giovanni Bianchi (ca. 1660- ca. 1720)	1697j	Milan	
Angelo Maria Fiore (1660- 1723)	1698a	Lucca	

The Bolognese origins of the violoncello, long known, are strikingly clear from our table. Also clear is the importance of two Bolognese institutions, the Accademia Filarmonica and the basilica of San Petronio. For of our first two groups, comprising fifteen men, all but three were members of the Accademia, and all but seven were active in the basilica. Of those in the first group, next to nothing is known about Placuzzi, except that he came from Forli and at some point between 1667 and 1692 was serving as organist in the Duomo there. Giovanni Maria Bononcini was, of course, active in Modena, and Giovanni Battista Bassani, although working in Ferrara early in his career, was apparently living in Bologna at the time his opus 5 [1683a] was published.

Our second group includes one man, Albergati, who had a connection with San Petronio even though he was not a performer there. An aristocrat, he was the nephew of the man who in 1686 was Presidente of the Fabbrica of San Petronio. This group also contains three violoncellist/composers: Gabrielli, Bononcini, and Iacchini.

The chronology of publications, especially by those in our third group, gives a

picture of a new idea radiating, like spokes of a wheel, in all directions from Bologna--first to nearby towns to the north and west (our first groups included both a Modenese and a Ferrarese), later to more distant ones, and to the east and south. The late arrival in Venice is clear. Significantly missing are any works by Roman composers.

The types of publications for which the violoncello was specified, up through 1700, were overwhelmingly instrumental works, mostly in fact *sonate da chiesa*. But there were also a scattering of sacred works, all however by Bolognese composers:

Pirro Albergati	<i>Messa e salmi</i> , opus 4 (1687)
	<i>Motetti e antifone</i> , opus 7 (1691)
Giovanni Paolo Colonna	<i>Messa e salmi</i> , opus 10 (1691)
Pietro Degli Antonii	<i>Motetti sacri</i> , opus 7 (1696)

* * *

In suggesting an answer for our first question, several others inevitably arise that we should consider briefly: Why was such a cumbersome instrument as the violone ever developed in the first place? And, equally important, why was it abandoned when it was, not earlier or later, in favor of the violoncello?

In answering this latter question we are probably supplying reasons for the similar abandonment of the tenor viola in favor of the smaller alto viola, and for the reduction in size of the contrabass. In order to suggest an answer we must consider briefly the factors that determine the size of a string instrument. They are three: (1) the dimensions of the human body, (2) the pitch-level at which an instrument operates, and (3) the material used for the strings. The size that results represents a compromise between these three interdependent factors.

In considering the limits imposed by the human body, it goes without saying that the maker must maintain human scale or the instrument will be unusable. The length and reach of the arms provide limits, as do also the size of the hand and the reach and thickness of the fingers. For example, the thickness of the fingers will determine how small an instrument may be. The size of the hand and the reach of the fingers will determine, especially for the largest instruments, the tuning employed. The contrabass is tuned in fourths rather than fifths for good reason, in order to allow the performance of a simple scale without shifting the left-hand position. Conversely, the larger the instrument the more difficult it becomes to perform rapid passage-work. The history of instruments contains at least one example of an instrument that failed because it lacked human scale, Vuillaume's octobass from the nineteenth century.

A second factor is the pitch-level at which an instrument operates: soprano, bass, etc. This leads us to a brief consideration of the physics of the violin family. It has recently been determined that in those instruments that are generally acknowledged to be the best there is a careful coordination of the three resonant frequencies of the

instrument: that produced by the back, that produced by the belly, and that produced by the volume of air enclosed therein.⁹¹ As one might expect, the lower the pitch-level of the instrument the larger it must be to produce these resonances. Consequently the problem of size is the most pressing for the larger instruments like the violoncello and contrabass.

But it is the third factor, the material used for the strings, that is of critical importance to us. Until the late seventeenth century strings for the violin family appear to have been made solely of gut--that is, sheep intestines. From a description in Mersenne it is clear that the process of manufacture was essentially the same in the seventeenth century as it is today,⁹² and that the number of gut threads twisted together to form a string was a function of the pitch-level of the string; the lower the pitch, the larger the number.⁹³

Mersenne was also the one who first stated the laws that govern the vibration of strings,⁹⁴ although earlier instrument makers doubtless knew them in a rough and ready fashion. Mersenne discovered that the frequency of a string varied inversely with its length, directly as the square root of its tension, and inversely as the square root of its linear density, or mass per unit length,⁹⁵ as follows:

$$F = \frac{1}{2L} \sqrt{\frac{T}{D}}$$

F = frequency T = tension L = length

D = density, or mass per unit length

For the violin maker one of these variables was nonexistent, since all four strings, even though separated in pitch by almost two octaves (and hence by a factor of 3.4 in frequency),⁹⁶ were of the same length. As a consequence, in order to attain the proper pitch for a string, he could vary only the tension and density of the string. And whereas the difference in frequency between the top and bottom strings was a factor of 3.4, the difference in either tension or density taken alone was a factor of 11.4, viz., 3.4 squared. That is, if the length of the top and bottom string was the same, the bottom string would produce a proper sound at the proper pitch only if its density were some 11 times greater than that of the top, its tension were some 11 times less, or some combination of these two variables was attained that would diminish the ratio of tension to density by a factor of 11.4.

We have no data on string tension in the seventeenth century, but it is clear from modern practice (and from seventeenth-century practice with gut strings on the lute)⁹⁷ that the intent is not to have too great a variation in tension between the top and bottom strings. Today they usually differ in tension by a factor of anywhere from 1.2 to 2.4, top to bottom.⁹⁸ Let us choose the higher of these two figures in order to calculate the differences in density required to produce the appropriate

difference in pitch between the top and bottom strings. In choosing the larger figure we have, of course, decreased the difference in density necessary for the bottom string, if the ratio of tension to density must be reduced by 11.4. We end up with a factor of 4.7. This increase in density would, however, produce a bottom string with roughly twice the diameter of the top string.⁹⁹

It is possible to test the effectiveness of such a gut string since suitable strings are today readily available commercially. The diameter of a present-day gut A string for the violoncello is approximately 0.11 centimeters. The diameter of a gut D string for the contrabass is approximately 0.25 centimeters, therefore more than twice the diameter of the A string, and is thus an appropriate substitute for the C string on the violoncello. If one mounts such a contrabass string on the violoncello in place of the lowest string, one will discover that the sound is unusable. Then tension is far too low. But to increase the tension we must also increase the density in order to maintain the low pitch. But this increase in density will also increase the diameter of the string, and a new factor will come into play, the flexural stiffness of the string.¹⁰⁰ We will end up altering both timbre and loudness if we increase the diameter by multiplying the number of gut threads twisted to form a string.

This is the problem that confronted the early violin maker, not solely for the lowest string on the violin, but for the lowest string on all members of the violin family: how does one get a bottom string of sufficient density, yet small enough in diameter, to produce a decent sound at the proper pitch?¹⁰² It was a problem faced by composers as well; they tended to underuse the bottom string of all violin-family members until late in the seventeenth century. This problem also probably accounts for the lower placement of the bridge on many earlier instruments.¹⁰³ This was done to gain a little more sounding length for the bottom string, roughly ten per cent more, which meant that a thinner bottom string could be used. And it was also probably the reason for the development of the violone, since as a larger instrument it provided another way--or even an additional way--to obtain longer, thinner gut strings. (Such a problem was obviously not so critical for the violin; but it was for the viola.) Finally, the problem probably accounts for the larger size of the early contrabass.¹⁰⁴

A very simple but radical solution to our problem was found sometime in the last half of the seventeenth century: wind the bottom string with silver wire. This will increase the density markedly without increasing the diameter and thus the stiffness. If one examines a modern wire-wound gut C string for the violoncello, one finds that its gut core, the solid part of the string, has the same diameter as the top A string, and that its overall diameter is only 1.6 times as great.¹⁰⁵ But its mass per unit length is 8.7 times as great. With such a sizeable increase in density the string could of course be shortened and still satisfy requirements, which means that the violone could be made smaller; that is to say, it could be abandoned in favor of the violoncello.

* * *

Now for our final question: Why did the violoncello first appear in Bologna, as we have said, a city not known for its instrument makers? Was this in fact a new instrument? Perhaps we are not dealing with a new instrument at all, but rather with a new way of equipping an older one that would convert it into a violoncello. Is it not possible that the addition of a silver-wound bottom string to a violoncino (or even on occasion to a violone) constituted a change of sufficient magnitude to justify a new name, violoncello? The first known mention of the use of wire-wound strings appears in an advertisement at the back of the fourth edition of John Playford's *Introduction to the Skill of Music*, published in 1664:

There is a late invention of Strings for the Basses of Viols and Violins, or Lutes, which sound much better and lower than the common Gut strings, either under the Bow or Finger. It is a Small Wire twisted or gimp'd upon a gut string or upon Silk. I have made tryal of both, but those upon Silk do hold best and give as good a sound...."¹⁰⁶

Playford's report of this "late invention" appeared one year before the first occurrence of the term *violoncello*, in Arresti's publication of 1665. But since there is no evidence of the widespread use of wire-wound strings in England until the eighteenth century,¹⁰⁷ we can assume that the "late invention" took place in some other country. It was not in France, as is clear from Jean Rousseau's *Traite' de la Viole* of 1687, which notes that it was Sainte Colombe who introduced the practice into France.¹⁰⁸ Is it not possible that it took place in Bologna?

We have two pieces of evidence to support this. First, Bologna was known for its string manufacture--particularly for lower strings--as early as 1610, when John Dowland reported as follows:

The best stings of this kinde [viz., what he earlier calls strings of "the greater sorts or Base strings"] are double knots joyned together, and are made at *Bologna* in *Lumbardie*, and from thence are sent to *Venice*: from which place they are transported to the *Martes*, and therefore commonly called *Venice Catlines*. The best time for the Marchant is to provide his strings at Michaelmas, for then the string-makers bring their best strings which were made in the Summer to *Franckford*, and *Lypzig Martes*. Contrarily at Easter they bring their Winter strings, which are not so good.¹⁰⁹

The Venice Catline (or Venice-Catlin)¹¹⁰ is also recommended by Thomas Mace in 1676 (for the fourth and fifth strings of the lute)¹¹¹ and again around 1690 by Thomas Talbot for all the strings of the bass violin.¹¹² Our second piece of evidence comes from Italy. There is a bill of March 3, 1701, submitted by Andrea Mauritiij, a Bergamasque viola player,¹¹³ to the deputies in Santa Maria Maggiore, Bergamo, that reads as follows:

Lista delle corde p[er] il Violone di S[an]ta Maria¹¹⁴

il Canto	L 2--
la Seconda	L 3--
la Terza	L 5--
la quarta coperta	
d'Argento di Bologna	L 8--

	L 18--

And it is about this time that the violone last appears in Santa Maria. With this last piece of information in mind we are emboldened to propose in somewhat fuller detail a theory of the early history of the violoncello.

The bass violin from its beginnings posed a critical problem as to its proper size. In order for the lowest string to produce a reasonable sound the instrument had to be large.¹¹⁵ On the other hand, it was difficult to accommodate with ease the rapidly developing violin technique on such a large instrument. The earliest solution to this problem--probably arrived at by 1610 after extensive experimentation--was to make the bass violin in two basic sizes. Obviously most composers before the 1670's (Merula, Cazzati, etc.) opted for sonority, choosing the larger instrument--but making inordinate technical demands upon the performer. A few (Fontana, Cavalli, Mazzaferrata), willing to sacrifice sonority for versatility, picked the smaller one. But since neither instrument proved fully satisfactory the search for a solution continued. It was the Bolognese string makers who finally found an answer in the 1660's. Through the use of wire-wound strings it now became possible to produce the sonority of the larger instrument on the smaller. And since there was no longer a need for the larger instrument, makers ceased producing it, composers ceased writing for it, and performers ceased playing it. (Doubtless for exactly the same reasons the tenor viola disappears at this time.)¹¹⁶ Since Bologna was the home of this development, and since the problem was most acute for the bass violin, it was the Bolognese term, *violoncello*, that ultimately prevailed. And the fact that almost all the earliest composers for the violoncello were members of the Accademia Filarmonica, even though not all Bolognese residents, suggests that this institution played a central role in the promulgation of this revolutionary invention--wire-wound strings--as well as in the first extensive cultivation of the instrument that was so radically improved by the invention--the bass violin. But since the first publication to use the term *violoncello* predates the founding of the Accademia by one year, it would seem that the prime mover in the matter may have been one man: Giulio Cesare Arresti.¹¹⁷

The available evidence supports this theory. But much work still lies ahead. *Amami e vivi felice*

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Hamilton College

The present study is dedicated to Professor Nino Parrott, and consists of an expansion and extensive revision of one portion of the author's unpublished doctoral dissertation, "The Church Sonatas of Giovanni Legrenzi" ["Legrenzi"] (Harvard University, 1964), pp. 177-196.

1. See, e.g., Antonio Maria Mucchi, *Gasparo da Salo* (Milano, 1940), p. 97; Edmund Fellowes, "Amati," in *Grove's Dictionary of Music and Musicians*, 5th ed. (London, 1954), I, 132; Willi Apel, *Harvard Dictionary of Music*, 2nd ed. rev. (Cambridge, Mass., 1969), p. 139. David Boyden speaks of the sixteenth-century bass violin as a violoncello in his otherwise invaluable *The History of Violin Playing from its Origins to 1761* [=History] (London, 1965), pp. 7, 15, 30, etc.

2. According to the generally accepted theory advanced by Edmond Van der Straeten for the violoncello as the sole bass member of the violin family. See his *History of the Violoncello* (London, 1915), pp. 130-132. See also Francesco Vatielli, *Arte e vita musicale a Bologna* (Bologna, 1927), p. 125; William Newman, *The Sonata in the Baroque Era*, 3rd ed. rev. (New York, 1972), p. 54; and Apel, p. 139.

3. The situation has not been helped by some organologists in our century who have apparently concocted names for instruments that survive from an earlier time. See, e.g., the *violoncellino* and *contrabassino* in Nicholas Bessarhoff's *Ancient European Musical Instruments* (Cambridge, Mass., 1941). The organologist's task is perforce somewhat different from that of a taxonomist, who can invent a name for a newly discovered bug.

4. Philibert Jambe de Fer, *Epitome Musical* (Lyon, 1556), pp. 61-62. See the facsimile reprint, ed. François Lesure, in *Annales Musicologiques*, VI (1958-1963), 341-386.

5. Marin Mersenne, *Harmonie Universelle*, part II (Paris, 1637), p. 185; see the English translation by Roger Chapman (The Hague, 1957), p. 244.

6. Lodovico Zacconi, *Prattica di musica* (Venice, 1592), p. 218. I follow David Boyden's interpretation of Zacconi, found in his "Monteverdi's *violini piccoli alla francese* and *viole da braccio*" ["Monteverdi"], *Annales Musicologiques*, VI (1958-1963), 395-401.

7. Michael Praetorius, *Syntagma Musicum*, part II (Wolfenbüttel, 1619), *Tabella universalis*, 26.

8. See also Adriano Banchieri, *L'Organo suonarino*, 2nd ed. (Venice, 1611), p. 97, and 3rd ed. (Venice, 1638), p. 125. Banchieri discusses what he calls a *basso violetta da braccio*, which is tuned one octave below the violin. In using the term *violetta* he of course implies that there is a larger instrument, the viola, presumably tuned lower.

9. In the present study the following terminology is employed with respect to pitch:

CC-BB=16' octave; C-B=8' octave; c-b=4' octave; c'-b'=2' octave.

10. See his article, "Violoncellospiel," in *Die Musik in Geschichte und Gegenwart*, XIII (Kassel, 1966), col. 1788. Another example of the lower tuning based on BB-b is given by Pietro Cerone (1613); see Boyden, "Monteverdi," pp. 394-395.

11. According to Tharald Borgir ("The Performance of the Basso Continuo in Seventeenth Century Italian Music" [unpublished Ph.D. diss., University of California, 1971], p. 144) there is a *Toccata a violone solo* by Giuseppe Colombi [Modena: Biblioteca Estense, MS Mus. F. 286] in which BB is used—in his word-sparingly. See also William Klenz, *Giovanni Maria Bononcini* (Durham, 1962), p. 19, n. 14, which mentions a piece requiring BB-b. Finally, Van der Straeten, p. 141, cites a manuscript of 1691 by the Modenese composer Domenico Galli that also requires BB-b.

12. See, e.g., 1615o, 1620b, 1625b, 1629b. Lettered dates in this and subsequent footnotes refer to Claudio Sartori's invaluable *Bibliografia della musica strumentale italiana*, 2 vols. (Florence, 1952 and 1968).

13. *Brazzo* is, of course, the Venetian form of *braccio*.

14. In the other ten pieces, the fact that the compass does not extend below F does not necessarily imply that an instrument with Praetorius' higher tuning was to be used. With only one exception the highest note called for is d'. This means that if the higher tuning were used, the top string, d', would scarcely be used at all, a most unlikely event considering that one problem with members of the violin family lay with the sound produced by the lowest string until it was wound with wire in the latter part of the seventeenth century. See Boyden, *History*, pp. 70, 111, 203, 321, on this point.

15. See, e.g., 1626a, 1626d, 1626m, 1629c, 1639b.

16. The violone is first specified—in the seventeenth century—in two Milanese prints: Catherina Assandra, *Motetti*, opus 2 (1609), and Giovanni Paolo Cima, *Concerti ecclesiastici* (1610). Later users were Giovanni Francesco Capello, *Lamentationi* opus 3 (Verona, 1612), and Alessandra Grandi, *Motetti*, Book 2 (Venice, 1613). Cima and Grandi both call for notes that could not be played on a "tenor violin" with a bottom note of F (Praetorius' higher tuning, that is). Such an instrument could however handle the parts written by both Assandra and Capello. However, all subsequent users of the violone, up through the 1680's, descend to at least D, if not to C. I am indebted to Professor Mary Ann Bonino for calling the Capello work to my attention. For a consideration of earlier uses of the term *violone*, see p. 72, below.

17. See e.g., Cavalli [1656a] for violoncino, Arresti [1665e] for violoncello, Mazzaferrata [1674d] for bassetto.

18. See Jerome Roche, "Music at S. Maria Maggiore, Bergamo, 1614-1643," *Music*

and *Letters*, XLVII (1966), 308. Roche misnames the second instrument *violone basso*.

19. See *Denkmäler der Tonkunst in Osterreich*, Jahrg, XI/2, Bd. 23 (1904), pp. 8-22, for the four versions. An English translation of the German version only appears in Oliver Strunk, *Source Readings in Music History* (New York, 1950), pp. 449-452.

20. *Ibid.*, p.9: "Alsdann wird zu desto Majestätischer *Harmoni* des Bass ein grosser Violone gar wohl taugen." Strunk translates "ein grosser Violone" as "a large double bass."

21. *Ibid.*, p. 8. "Diser Bass aber / wird auff einem [Frantzösischen Basset] besser als auff einem diser Orthen gebräuchigen Violone ausskommen/..." The phrase "used hereabouts," as one would expect, appears in none of the other versions.

22. See Boyden, *History*, pp. 15, 25; Sibyl Marcuse, *Musical Instruments* (Garden City, 1964). P. 579; Borgir, pp. 136-137.

23. See, e.g., the letter of 23 May 1524 from Spataro to Aron, cited in Gustave Reese, *Music in the Renaissance*, 2nd ed. (New York, 1959), p. 370.

24. See the references in Marcuse, *loc. cit.*, and Boyden, *History*, pp. 15, 23, 25.

25. Giovanni Francesco Prandi, *Compendio della musica* (1606), cited in Borgir, pp. 137-140; Agostino Agazzari, *Del sonare sopra il basso* (Siena, 1607), cited in Borgir, p. 139, or see Strunk, p. 429; Adriano Banchieri, *Conclusioni del suono del organo* (Bologna, 1609), pp. 53-54.

26. Bologna, Civico Museo Bibliografia Musicale, MS. E/19.

27. See, e.g., his *L'Organo suonarino*, 2nd ed. (Venice, 1611), p. 97, and 3rd ed. (Venice, 1638), p. 124, in which the bass member is called simply *viola basso*. It is also worth noting that the last use of the term *violone* by a seventeenth-century Italian theorist happens to coincide with its first appearance in published partbooks. See note 16, above.

28. The evidence to support this can be found in Anne Schnoebelen, "The Concerted Mass at San Petronio in Bologna ca. 1660-1730. A Documentary and Analytical Study" [= "Concerted Mass"] (unpublished Ph.D. diss., University of Illinois, 1966), pp. 48-59.

29. This survey was conducted in the rich holdings of the Civico Musco Bibliografia Musicale, Bologna. I am indebted to Signor Sergio Paganelli, librarian, for his assistance.

30. Johann Gottfried Walther, *Musikalisches Lexikon* (Leipzig, 1732), p. 637. See the facsimile reprint, ed. Richard Schaal (Kassel, 1953).

31. See Bessarhoff, p. 354.

32. Borgir's argument (pp. 174-178) that the contrabasso in the seventeenth century was a transposing instrument only when something other than the bass clef was employed is not supported by the evidence he adduces. He gives as the reason for such a practice the need to avoid ledger lines for the lower notes, and cites as one example *Vago augeletto* from Monteverdi's *Madrigali*, Book VIII, which he says includes a part for *viola contrabasso*, notated in the alto clef, and found in the *Alto Primo* partbook. It would appear that he is in error in this matter. The contrabasso part for *Vago augeletto* is found in the *Basso Secondo* partbook (p. 24), is notated in the bass clef, and has a compass of F-c'. There is however another madrigal in the same collection, *Altri canti d'Amor*, which does contain a part for *viola contrabasso* under the conditions described by Borgir. *Altri canti* also contains another part for *viola contrabasso*; this second one notated in the bass clef, found in the *Basso Primo* partbook (p.4), and with a compass of D-a. If we follow Borgir's suggestion, transposing the part found in the *Alto Primo* partbook down one octave, we will encounter some nasty harmonic problems involving second inversions. Since this madrigal also contains parts for two violins, viola (tenor clef), and viola da gamba (tenor clef), it would appear that the term *viola contrabasso* in the *Alto Primo* partbook is a misprint. It should read simply *viola*.

33. If one assumes that this note would have been played by the somewhat casual practice of octave transposition of individual notes encountered on occasion with present-day orchestral contrabass players, the effect, if applied to Merula's sonatas, with their open textures, would be extraordinary. Quantz specifically cautions against such a practice. See his *On Playing the Flute* (1752), trans. Edward Reilly (New York, 1966), p. 249. On the other hand, Praetorius seems to suggest just such a practice for the *Gar-gross Bass-viol*; see Borgir, pp. 174-175.

34. See note 14, above in this connection.

35. Henry Burnett makes this point in "The Bowed String Instruments of the Baroque Basso Contrinuo (Ca. 1680-Ca. 1752) in Italy and France," *Journal of the Viola da Gamba Society of America*, VIII (1971), 31.

36. Hermann Nüssle, "Giovanni Legrenzi als Instrumentalkomponist" (unpublished Ph.D. diss., Munich, 1917), p. 55. Nüssle accepts the violone called for by Legrenzi as being a contrabass instrument. So, too, does Alfred Planyavsky. See his *Geschichte des Kontrabasses* (Tutzing, 1970), pp. 60-61.

37. Borgir apparently believes that this is the instrument that was mainly used throughout the seventeenth century in Italy, even though-as he readily admits-no theorist after Banchieri ever refers to the violone as a viol. See especially pp. 144 and 149.

38. Twelve small violins, twelve large violins, six violas, eight basses; see Boyden, *History*, p. 35.

39. See pp. 64-65 above.

40. See the reasons given for hiring Antonio Beltramin as a violinist in 1586 in Padua (Padua: Archivio Antico dell'Arca del Santo, vol. 8 [old number VII], fols. 157'-158). They read in part: "Essendo molto a proposito haver un musico per sonar il Violino come instrumento acuto et di gran spirito nelli concerti..." (It being very much to the purpose to have a musician to play the violin, a strident instrument and [one] of great spirit, in the concertos...). I am indebted to Professor Pierluigi Petrobelli for this information.

41. Before the advent of the violone the commonest bass instrument in the church—at least in San Marco, Venice, and in Santa Maria Maggiore, Bergamo—was the trombone.

42. See his letter from Lucca, dated 1 October 1657, cited in W. Henry Hill et al., *Antonio Stradivari* (London, 1902; reprint, New York, 1963), p. 110n.

43. It is probable that Maugars is reporting the same lack of a bass viol when he writes from Rome in 1639 as follows: "Quant à la Viole, il n'y a personne maintenant dans l'Italie qui y excelle, et même elle est forte peu exercée dans Rome: c'est de quoy je me suis fort étonné...." See André Maugars, *Response faite à un curieux sur le sentiment de la Musique d'Italie. Escrite à Rome le premier Octobre 1639*, included in Antoine Ernest Roquet (*pseud.* R. Thoinan), *Maugars célèbre joueur de viole* (Paris, 1865; reprint, London, 1965), pp. 33-34. However, the violin is the only member of the family he specifically mentions (see pp. 28, 30, and 32). I am indebted to Professor John Hsu for calling this reference to my attention.

44. See pp. 73-74 above.

45. See, e.g., Giovanni Legrenzi, Sonatas 7-9, in *Sonate*, opus 2 (Venice, 1655).

46. See, e.g., the preface to Maurizio Cazzati's *Sonate*, opus 35 [1665a].

47. It should also be noted that a gentle viol would prove a poor option for the bold bassoon or trombone.

48. Anne Schnoebelen also makes this point in her article, "Performance Practices at San Petronio in the Baroque" ["Performance Practices"], *Acta Musicologica*, XLI (1969), 46-47.

49. *Seconda raccolta de' sacri canti a una, due, tre, quattro voci de diversi eccellentissimi autori fatta da Don Lorenzo Calvi* (Venice), 1624 [=RISM 1624²].

50. Athanasius Kircher, *Musurgia universalis* (Rome), 1650, I, pl. facing p. 486. Kircher gives as the tuning for this instrument: G d a e'.

51. See also the second edition of 1667.

52. A distinction between two types of *violoni* appears in the inventories of instruments in the Thomasschule in Leipzig between 1723 and 1750; see Philipp Spitta, *J. S. Bach* (German ed.; Leipzig, 1880), II, 774; (English trans.; London, 1889), II, 678, which reads as follows: "I Violon ao(bar) 1711. I Violon ao(bar) 1735, in der *Auction* erstanden, 2 Violons de Braz." The use of the term *violinen* in the next item on the list indicates that the "violon" is something other than the French spelling of violin. Fuller-Maitland, in the English translation, conjectures that "Violon de Braz" means "Iron Fiddles."

53. See Schnoebelen, "Performance Practices," p. 47.

54. *Ibid.*

55. Benedetto Zavaterij, in petitioning for the post left vacant by Vitali's departure in 1674, described himself as "musico di violoncello, violetta, e violino"-clearly not the same instruments (see Bologna: Archivio della Fabbriceria di San Petronio [=AFSP], *Carteggio della Fabbriceria. Suppliche alla Fabbriceria di musici e impiegati*, Busta 192). Giuseppe Dalmasoni, a *sonatore* in Santa Maria Maggiore, Bergamo, was paid in 1602 for playing violin, viola da braccio, and violone; see Bergamo, Biblioteca Comunale [=MIA], MIA 88/I, *Libro maestro*, fol. 188.

56. AFSP, *Carteggio della Fabbriceria, Suppliche alla Fabbriceria di musici e impiegati*, Busta 192. Colonna petitioned for a raise after twenty-four (sic) years of service.

57. AFSP, vol. 603, *Mandati mensili*, records for the years 1676 through 1680.

58. AFSP, vol. 24, *Decreta congregationis* fol. 99.

59. AFSP, vol. 603, *Mandati mensili*, 1670-1694; vol. 604, *Mandati mensili*, 1695-1771.

60. Andreas Liess, "Materialien zur römischen Musikgeschichte des Seicento," *Acta Musicologica*, XXIX (1957), 144-166.

61. 1676 and 1682; see Liess; pp. 155-156 and 160.

62. Hans Joachim Marx, "Die Musik am Hofe Pietro Kardinal Ottobonis unter Arcangelo Corelli," *Analecta Musicologica*, V (1968), 125-158 and 169. I am also indebted to Professor Sven Hansell for his kindness in allowing me to make use of his materials from the Ottoboni archives.

63. Liess, p. 166.

64. Marx, pp. 171 and 143-156.

65. Charles Burney, *A General History of Music* (1789), ed. Frank Mercer (London, 1935; reprint, New York, 1957), II, 656.

66. Rome: Biblioteca Apostolica Vaticana, *Archivio Barberini*, vol. 1493. Feast of San Lorenzo. In point of fact there is one reversion to the term *violone*, in 1728, when, following a custom used on occasion in the 1690's, both *violone* and *contrabasso* were subsumed by the scribe under the title *violone*. See *Archivio Barberini*, vol. 1499, fasc. 18, for 1728; vol. 1462, fasc. 53, for an earlier example from 1692.

67. Sven Hansell, "Orchestral Practice at the Court of Cardinal Pietro Ottoboni," *Journal of the American Musicological Society*, XIX (1966), 399-400. Further evidence on Roman usage can be found in Ursula Kirkendale, "The Ruspoli Documents on Handel," in the same journal, XX (1967), 257.

68. The same pattern is evident in Santa Maria Maggiore, Bergamo, during the first seventy years of the seventeenth century. The *contrabasso* is labelled *contrabasso*, *violone grande*, *violone doppio*, *violone grosso*, or *violone grande contrabasso*.

69. Printed in A. T. Davison and W. Apel, eds., *Historical Anthology of Music* (Cambridge, Mass., 1950), II, 70-76.

70. Even though there is a wide range in the body size of instruments surviving from the seventeenth and early eighteenth centuries, there appears to be a gap of some 20 centimeters between the largest so-called *violoncello* and the smallest so-called *contrabasso*. The physical reasons for this gap in size will be considered presently.

71. Curt Sachs, *The History of Musical Instruments* (New York, 1940), p. 363.

72. Julius Rühlmann, *Die Geschichte der Bogeninstrumente* (Braunschweig, 1882), p. 246.

73. Bessaraboff, p. 302.

74. Praetorius' discussion of the "Bass-Geig da Braccio" is, to say the least, confusing. In Plate V it is pictured as a five-string instrument. In the text, however, Praetorius (II, 48) speaks of it as having four strings.

75. Modern reprint, ed. Alfred Berner (Kassel, 1961).

76. See note 14, above.

77. See note 101, below, for a further discussion of the problems posed by this instrument.

78. See Hill, pp. 110-115.

79. This point was made by Wilhelm Joseph von Wasielewski in *The Violoncello and its History*, trans. I. S. E. Stigand (London, 1894; reprint, New York, 1968), p. 39.

80. For just this reason Borgir's speculations (p. 165) on the derivation and meaning of the terms *basso viola* and *bassetto di viola* are exceedingly improbable.

81. *Vocabulario degli Accademici della Crusca*, 4th ed. (Florence, 1729), V, 281 (cited by Borgir, p. 148): "Violone, Viola grande di tuono grave, che si dice anche Basso di Viola, e Violoncello, quando e di minor grandezza." Borgir's suggestion (p. 148) that the definition confirms that the violone at this late date, in addition to being a violoncello, could also be a viol, hinges upon his translation of the term *basso di viola* as "bass viol." This interpretation of viola does not agree with his own on pp. 154-159, where he states that by 1640 the term *viola* when used without a qualifier refers solely to the violin family, and furthermore that if the viol is intended around 1700 it is "invariably referred to as *viola da gamba*."

82. See pp. 81-82 and note 74, above.

83. For the existence of two sizes of viola see Hill, pp. 99 and 266. For the identical tuning for both instruments see Adriano Banchieri, *L'Organo suonarino*, 3rd ed. (Venice, 1638), p. 125, as well as any of the writing for alto and tenor violas found in partbooks of the same name by such composers as Giovanni Legrenzi.

84. See Boyden, *History*, pp. 33, 35, 44, for the existence of these two sizes, and for the fact they were tuned alike.

85. See Luigi Taglietti, *Suonate da camera a tre, due violini, e violoncello, con alcune aggiunta a violoncello solo*, opus 1 (Bologna, 1697). This print includes only one bass partbook, labelled *Violone o spinetta*. The partbook contains two lines, one above the other. The top line is labelled *violoncello*, the bottom *cembalo*. A similar practice with respect to different names in title and on partbooks is encountered in Bononcini [1678a], Veracini [1692c], Alghisi [1693a], De Castro [1695b], and Corelli [1697i] (all cited in Burnett, pp. 32-33).

86. This scenario is also set forth in Hill, pp. 111-112. See also the arguments below based on physical evidence.

87. Although this practice was far from universal during the period (two notable exceptions being Arcangelo Corelli and Giovanni Battista Vitali, both of whom called for the violone in all their collections of trio sonatas, regardless of type), there were eight composers who consistently specified the instrumentation of the two types in this way:

	<i>Camera/Violone Chiesa/Violoncello</i>	
Placuzzi	1682i	1667a
Bassani	1677c	1683a
G. Bononcini	1685d	1685f[+ violone]
	1685e	1686c[+ violone]
Veracini	ant. al 1696	1692c
	1696d	

T.A. Vitali	1693c	1693b
	1695a	
Caldara	1699c	1693j
	1700s	
Bonporti	1698d	1696c
Tonini	1690c	1697d

Most of the above collections are for the common trio setting. Other composers such as Albergati, Torelli, Ruggieri, Carlo Marini, and Buoni show a strong tendency to follow this practice, although there are exceptions among their publications, consisting in all but one instance of the use of the violoncello in chamber works. It would be interesting to see whether the character of the bass concertante parts by those composers in the later seventeenth century, such as G. B. Vitali and Corelli, who specify the violone rather than the violoncello for *sonate da chiesa*, differs from that in the practice outlined above.

88. The following statement is included in Hill (p. 297) in connection with the dimensions given for instruments made by the Amatis: "We are only able to give the approximate dimensions of the Violoncello as made by the successive generations of the Amatis, as no example is known to us, the proportions of which have not been diminished. We believe them nevertheless to be fairly accurate."

89. See *A General History of the Science and Practice of Music* (London, 1776; reprint, New York, 1963), p. 603n. Since one instrument could be mistaken for the other, one can understand why a new scribe at the Ottoboni court (see p. 81, above) would appear to suggest that what may have been a gradual process—the replacement of the violone by the violoncello—happened overnight. Don Gasparo had, after all, played the violoncello at San Marcello in 1664, some twenty-eight years before the new term appeared at the Ottoboni court.

90. See pp. 72-74, above for the violone. The uses of the term *viola* will be considered in a later issue of this *Journal*.

91. See Carleen Hutchins, "The Physics of Violins," *Scientific American*, CCVII (November 1962), 83-88; or see the reprint of this article in Carleen Hutchins, ed., *Musical Acoustics, part I: Violin Family Components* (Stroudsburg, 1975), pp. 17-21.

92. Compare Mersenne (English trans.), pp. 17-18, and Alberto Bachmann, *An Encyclopedia of the Violin*, trans. Frederick Martens (London, 1925), pp. 140-149.

93. Bachmann (p. 148) gives the number of threads in a violin E string as four to six, the number of threads in a contrabass D string as up to eighty-five. Mersenne (p. 17) says "the sixth string of the bass viols [presumably the bottom one] and the tenth string of the great theorbos are made of 48 or of even 50 or 60 guts."

94. I am indebted to Professors Harvey Cameron and Peter Millet of the Physics

Department, Hamilton College, for their guidance and assistance in matters dealing with acoustic theory.

95. See the statement of these laws, in a slightly different form, in Sir James Jeans, *Science and Music* (Cambridge, 1937), p. 64.

96. $(3/2)^3$, viz., three intervals of the fifth.

97. See the advice on stringing the lute given in Thomas Mace, *Musick's Monument* (London, 1676; facs. reprint, Paris, 1958), p. 65; and John Dowland, "Other Necessary Observations belonging to the Lute," in Robert Dowland, *Varietie of Lute Lessons* (London, 1610; facs. reprint, ed. Edgar Hunt, London, 1958), p. 14. Both men speak of the necessity of maintaining a proportionate and even tension between the strings. Mace says that this must be done to facilitate rapid playing. Uneven tension between the strings would surely pose a similar problem on bowed instruments.

98. See Ottokar Cadek, "The Deterioration of Violin Strings in Actual Use," *American String Teacher*, II (Fall 1952), 8.

99. The diameter of a string varies directly as the square root of its linear density or mass per unit length.

100. See John Schelleng, "The Bowed String and The Player," *The Journal of the Acoustical Society of America*, LIII (1973), 30-31, 37-39; or see the reprint of this article in Hutchins, *Musical Acoustics*, pp. 229-230, 236-238. Citing specifically the problem of the gut G string on the violin, Schelleng states that flexural stiffness in a bowed string causes "difficulties in intonation, deterioration in tone quality, reduction in amplitude of harmonics, the need for abnormal bow force, and so on." From Table II (p.38; reprint, p. 237) it is clear that the thickness of a string is the central factor in producing flexural stiffness, regardless of the material used, and furthermore that the problem increases markedly for the bottom string. It is significant that John Playford in 1664 identified the same problems when he said that wirewound strings "sound much better and lowder than the common Gut strings" (see p. 96, below). For a further discussion of the problems of thick, solid strings on the lute, viol, and violin, see the author's article, "Further Thoughts on the History of Strings," *The Catgut Acoustical Society Newsletter*, no. 26 (November 1976), pp. 21-26.

101. The problem of the five-stringed violone mentioned by Praetorius (see p. 83, above) was far more acute. Here the difference in frequency between top and bottom string was a factor of 5.1, which meant—since all strings were the same length—that in order to attain the proper frequency for the bottom string it had to have a density that was 25.6 times (viz., 5.1 squared) greater than the top, or a tension 25.6 times less—or some combination of the two variables that would diminish the ratio of tension to density by a factor of 25.6. And this had to be accomplished with gut strings. No wonder the instrument disappeared!

102. It is curious that although it has long been recognized that the bottom string on the violin was not totally satisfactory so long as it was made solely of gut, it has never been acknowledged that this problem was not peculiar to the violin, but applied to the bottom string of any member of the violin family, from viola to violoncello to contrabass.

103. See Boyden, *History*, pp. 34, 110; Van der Straeten, plates 22, 27, 34; and Planyavsky, pp. 403 and 408. This latter citation is an illustration of the *violon* from Weigel's *Theatrum* (see note 75, above).

104. See Eric Halfpenny, "The Double Bass," in Anthony Baines, ed., *Musical Instruments Through the Ages* (Baltimore, 1961), pp. 153-155.

105. Sébastien de Brossard, in his manuscript *Fragments d'une methode de violon* (ca. 1712)(see Boyden, *History*, p. 321), specifically mentions that the wire-wound string is thinner than the gut string it replaced.

106. See Ephraim Segerman and Djilda Abbott, "Historical Background to the Strings Used by Catgut-Scrapers," *The Catgut Acoustical Society Newsletter*, no. 25 (May 1976). I am indebted to Dr. Robert Fryxell for calling this article to my attention.

107. Thomas Mace makes no mention of wire-wound strings in his *Musick's Monument* (1676). Nor does James Talbot, about 1690. See Robert Donington, "James Talbot's Manuscript II: Bowed Strings," *The Galpin Society Journal*, III (1950), 27-45. This point is made by Segerman and Abbott in "Catgut-Scrapers."

108. See the facsimile reprint (Utrecht, 1965), p. 24: "C'est luy [i.e., Sainte Colombe] enfin qui a mis les chordes filées d'argent en usage en France." It is clear from Mersenne that as early as 1636 the technology of his day permitted the drawing of silver wire that was as fine-as he says-as human hair. See the English trans., pp. 18-21, where he mentions silver wire with a diameter of 0.005 inches.

109. See Dowland, p. 14.

110. Segerman and Abbott argue that since the source of the term *Catline* is nautical-that is, the anchor line that was made like modern rope by first twisting cords into a strand and then twisting the strands into a rope-these strings must have been made in the same fashion. They readily concede however that the only evidence they can adduce for such a practice is the name. But such an unusual method of making strings would surely have been mentioned by the thorough Mersenne, since the Venetian Catline, as we know from John Dowland in 1610, had been in use for at least twenty-six years before Mersenne's book appeared. A more reasonable explanation for the name is that the strings were so fat that they were likened to anchor lines. Mace's comment (pp. 65-66) is also germane: "There is another sort of *Strings*, which they call *Pistoy* {Pistoia?} *Basses*, which I conceive are none other than *Thick Venice-Catlines*...."

111. See Mace, pp. 65-66.

112. See Donington, p. 30.

113. Mauritij was hired at Santa Maria Maggiore for the services of Holy Week and Easter in 1701. See MIA LXXI/II, *Spese della Chiesa*, fol 25.

114. MIA LXXI/II, *Spese della Chiesa* fol. 10'.

115. Is it because of this problem of sonority that early operas appear to have such a preponderance of bass instruments? See Playford's advertisement, p. 96, above, which specifically mentions the wire-wound string as being louder than the gut string. See also Schnoebelen, *Performance Practices*, p. 44.

116. Also significant in this connection is Boyden's observation (*History*, p. 205): "By the end of the seventeenth century, as the violin strengthened its position, there was less diversity in the models that comprised the family. Stradivari's 'classical' model established a standard from 1700 on, and his modification of the size of the cello had a similar stabilizing effect." It would appear that it was the adoption of wire-wound strings that allowed the standardization of both the violin and the violoncello.

117. If the invention of the wire-wound string took place, as we have suggested, in Bologna, it is not unreasonable to speculate that this was so because it was a university town, and that consequently there would have been those in the town who had read and absorbed the import of Mersenne's laws on the vibration of strings, published some thirty years earlier in 1636. (Clearly the problem of thick gut strings had been around for a very long time; it arose, in fact, the first time a bow was put to a string.) It hardly seems likely that a string maker would have been such a reader, or, left to his own devices, would have brought about such a radical change in string design.

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