

## **2.13 The Sordellina, a Possible Origin of the Irish Regulators.**

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### **Introduction**

The most striking aspect of the Irish pipes is the regulators. No other bagpipe has parts that are played the way they are, and they give the instrument a unique sound. Did some older instrument inspire the regulators? In the previous issue of this journal Ken McLeod suggested, pending new evidence, that their origin was the petit chalumeau of the French musette. Here I propose that they came from the sordellina, a 17<sup>th</sup> century bagpipe developed in Naples.

The sordellina was bellows-blown and had a single stock holding three or more melody pipes. These had double reeds and cylindrical bores, and allowed the instrument to play polyphonic music. The similarity of the extra pipes to the Irish regulators provides evidence for a connection. One or more of them were completely closed until their keys were depressed, like the Irish regulators. Whereas the petit chalumeau was played with the fingers and thumbs, the sordellina's extra pipes were played with other parts of the hand according to a 17<sup>th</sup> century source, and this description also fits the regulators.

Another important similarity appears in one etching that has been published only recently. It shows a small knob protruding from the end-cap of one of the closed pipes, in appearance just like the button on an Irish regulator (Figure 1). A pipe whose holes are covered by keys cannot be fine-tuned in the usual way of inserting or removing wax from the holes, and the picture suggests that the sordellina solved this problem as in the Irish system, with a knob connected to a movable rod that altered the cross-sectional area of the bore. I know of no other instrument than these two that is tuned by this means.

The timing was right since the sordellina continued at least to the later 1600s. There were many of them built - it was not one of a kind like the earlier phagotum seems to have been. It is plausible that some traveller came upon a specimen and noticed its keyed pipe and its manner of tuning and playing. Final evidence is that the form of the instrument that seemed to be 'prototypical' had only one closed pipe, similar to the earliest Irish pipes, which had only one regulator.

Perhaps the Irish regulators were entirely new, but these factors plus the lack of another candidate with such similar features suggest that they were inspired by the sordellina.

Aside from any connection to the regulators, the sordellina is of interest because it is the only bagpipe that rivals the Irish pipes in complexity. Both instruments were taken up by the wealthy, so that their design and manufacture went into the hands of professionals with the skill and resources to add new elaborations to them.

The first section will describe the information available about the sordellina. The next part will suggest how it might have operated, combining my own conclusions and the interpretations of some musicologists. The final section will address the complexity of the sordellina and Irish pipes, describing how the features of each formed a coherent system, and how the closed pipes played different roles within each system.

### **The sordellina's development**

The sordellina flourished in Naples from the late 1500s into the 1600s, then faded, perhaps due to a change in musical styles or the invasion of a competitor, possibly the French oboe as improved by the Hotteterres. No specimen of the instrument survives. In fact we have no references to it past the 1680s when, ironically, it was depicted on a commemorative booklet for the funeral of a famous maker. Our knowledge is based on several surviving depictions and several dozen written references to it, most of which were published by John Henry van der Meer, a noted Dutch historian of musical instruments, and Maurizio Taurini, a music historian and organ specialist now at the Genoa Conservatory. Their very careful research is included in a facsimile edition of a 1600 manuscript of sordellina music (Baldano, 1995) and is the main account of the instrument's history.<sup>1</sup>

I will describe the more significant references to the sordellina in order of the time of their writing. This is not necessarily the order of the instrument's development since early forms may have been put onto the record well after their first appearance, but a simple temporal order will avoid my interpretations of which form led to which. Full references to the primary sources can be found in Tarrini's article (1995).

### **Origins and early references (before 1600)**

In van der Meer's judgment, the sordellina descended from either or both of the piva and the sordina, two Italian peasant bagpipes with multiple melody pipes. (The feature of multiple chanters survives in the large zampogna of Sicily and many other bagpipes.) References from the 1400s and 1500s suggest an instrument that was associated with the peasantry but known to the gentry. Sporadic written evidence from this time indicates that a more refined instrument was evolving, one giving sweeter tones, equipped with bellows, made by professional instrument builders and played by professional musicians.

The first possible record of it in the hands of the elite appears in 1472 in the Naples state archives, where one Antonio Ambrosio, "master builder of bagpipes," asks the sum of four ducats for two cornemuses and a sordina. It is not clear that "sordina" referred to an instrument like the sordellina or even a set of bagpipes at all, as the word's denotation included whistles. However in a 1521 reference, "sordina" is glossed as meaning a small

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<sup>1</sup> The book is stocked by Editrice Liguria, Via dei De Mari, 4r., 17100 Savona, Italy, tel. 019 829917, fax. 019 8387798, <http://www.editriceliguria.it/catalogo/musica.html>.

piva. The instrument is characterized as making a harsh and strident “bilirum”, an onomatopoeic word.

References to the sordellina appear from time to time over the subsequent decades, most often with peasant or comical associations. At a masque in Naples in the 1550s a musician dressed as a farmer comes out to play the sordellina, and is accompanied by a lyre player. At a 1568 masque a buffoon with an onion in his mouth performs on it. A musical piece in 1574 calls for a shepherd playing a sordellina with bellows. This seems to be the first reference to its bellows, although the Phagotum, the elaborate bagpipe designed by a native of Pavia, had them as early as the 1520s.

### **Baldano’s book of tablature (c.1600)**

That the instrument was becoming more genteel is clear from a manuscript collection of sordellina tunes in tablature, set down around 1600. The compiler was Giovanni Lorenzo Baldano, who included 89 pieces mostly for the sordellina and some more for the buttafuoco, a stringed dulcimer-like instrument (van der Meer, 1995; Bär, 1996). Many of the tunes seem to be dances; others have lyrics and romantic titles like “When I think of times past.”

The sordellina had chanters for the right and left hands, and a tune was written as a sequence of pairs of numbers, vertically aligned, clearly corresponding to the positions of the fingers on each chanter. This method of notation has not been found elsewhere. Van der Meer has attempted to decipher Baldano’s manuscript (Baldano, 1995), and Horst and Barbara Grimm, contemporary German performers, have reconstructed the sordellina (B. Grimm, 1995) and issued some of Baldano’s pieces on a compact disk (H. Grimm, 1999), a sample of which can be heard at the website <http://www.spielleute.de/grimmcd.htm>.

Baldano’s sordellina seems to have had only two chanters, and there is no indication whether it had a drone. A 1606 document in the Florence archives implies that some sordellinas by then had a third pipe, either a melody pipe or drone, and also that they had become elegantly crafted. Antonio Naldi, a curator of a state collection, lists some of the items in his care, including “a sordellina with three ebony bagpipes and brass decoration with its bag of simple skin and bellows of leather decorated with gold arabesques [scrollwork] and with a similar strap.” He mentions that the collection contains three other sordellinas without bellows. Later, in 1621, the group includes “a pair of sordellinas, one of walnut and one of blackwood . . .” This description is repeated more or less in the same form over the next decades, with notes that certain instruments are out on loan. In later years two sordellinas are described as damaged.

As an elite instrument the sordellina had its detractors. In 1635 Giambattista Basile, a Neapolitan poet, compared the sound of its chanters to stinking armpits. In 1628 Vincenzo Guistiniani criticizes it more gracefully, writing that it was invented in Naples and introduced in Rome, “but it has not continued there on account of its being a defective

instrument, in that it pleases only the first time that one hears it” as it easily becomes boring for lack of tonal variety.

### **The portrait of Manfredo Settala (1630 or before)**

Our first look at the instrument is from an etching (Figure 1) produced in the late 18<sup>th</sup> or early 19<sup>th</sup> century. It is a copy of a painting, now lost. Manfredo Settala (1600-1680) of Milan is shown gesturing towards a collection of objects including a sordellina of his own construction, which hangs from the wall.

The instrument has two chanter in front with at least one key on them, and a third pipe behind with six long keys. It appears that a strut connects the two chanters. The third pipe runs down from the block then folds back up in a V to terminate in a small cap with an apparent tuning pin. Unlike the typical Irish double-bass regulators, keys are affixed to both the descending and ascending segments of the V. Two keys appear on the descending part and three on the ascending, and there is another key with two semicircular forks protruding on either side like a menorah or the Greek letter psi, making it accessible to either hand. (A later depiction from 1680 seems to indicate that this key opens a hole at the vertex of the V.) One of the upper branches of the key seems to pass in front of the right hand chanter and the other branch goes behind the left hand one, an arrangement that we will see again in two later depictions, and one that gives, possibly, two different ways to sound the same note.

There may be a fourth pipe – that is at least not ruled out by the picture – but however many there are, they all are inserted in a single stock. Assuming three pipes, for comparison with other versions their pattern can be written as I-I-V.

Bellows lie on the table and seem to have an attachment that fits them comfortably to the curve of the body. Next to the bellows sits a cup on legs with a cover, which seems like a German pokal, a trophy vessel often presented in guilds. Also there is an armillary sphere, a scientific or astrological device that shows the circular earth surrounded by the important celestial orbits, an object often appearing in paintings of scientists and sorcerers.

Portraits like this were usually commissioned by their subjects and were expensive. Tarrini’s interpretation is that Settala made these objects and the painting was advertising his skill as a lathe-turner. I would tend to another viewpoint, that the sphere and cup were symbolic ways of saying, “I am a man of culture and science, and highly awarded.”

Settala was in fact a remarkable and noted citizen. He studied at Pavia, then at Siena, and was canon of the College of St. Nazaro in Milan, near the site of the present university. He founded the Museo Settala in Milan, which is now recognized as an important link in the history of the conception of a museum. It connected the cabinet of curiosities of his time, which would be no more than a simple collection, with the modern museum where objects are systematically gathered, documented, presented to the public and preserved for

scientific study. Settala went on to develop more complicated versions of the sordellina and displayed them in his museum, as described below.

The etching was done by an unknown artist and is now in the Courtauld Institute of Art at the University of London. It was published for the first time by Tarrini in 1995 in the Baldano facsimile volume, although Guizi and Leydi (1985) gave a roughly drawn copy of it in their book on Italian bagpipes. The original was painted by Daniele Crespi, and the date of 1630 for it is an upper bound, as he died that year when a plague struck Milan. The rough dating of the picture indicates that Settala was only in his twenties when he built his instrument.

### **Mersenne's *Harmonie Universelle* (1636) and Trichet's *Traité des Instruments de Musique* (c. 1640)**

The next depiction of the sordellina (Figure 2) is the best known one although perhaps not the most reliable. Marin Mersenne includes it the original 1636 French edition of his *Harmonie Universelle*. The original drawing contained letters on various parts to which he referred in his textual description, but I have excised these here to give an uncluttered view.

The instrument is not played in France, he states, but he will describe it for the benefit of French builders who may want to reproduce it. Between his diagram and his text, Mersenne describes three versions of the sordellina. One he attributes to the Italian peasantry, with pattern I-I-I, two chanter pipes with keys and a drone, as shown in the lower left of the figure; another, which is not shown, has pattern I-I-V, and has all melody pipes, with the V-pipe closed at the end and by keys; and finally, prominent in the figure, is a set of form I-I-I-N.

The I-I-I-N instrument is the most complex yet, with four pipes. Two at the front of the block have holes and keys. The pipe for the right hand has two more holes than there are fingers, so these must be vent-holes and the chanter must be effectively open-ended. The left-hand chanter may be open or closed. The text is silent on that issue; the diagram indicates it is open, but that is not to be trusted since it also shows the fourth pipe as open, contrary to the text. Evidence below will indicate that it in fact was open. The two rear pipes are most probably both closed and keyed, with about twenty keys in all, although it is still possible for all that is said and shown that the third pipe is a drone.

Mersenne includes a cutaway showing that the block is hollow and has four double reeds. In Italy a piece of thin cloth is placed above the reeds, he says, to prevent goat hairs from the inside of the bag from falling into them. He notes that he has replaced the rectangular bag of the Italian players with a more circular bag in the French style.

Regarding the three-pipe version, I-I-V, Mersenne states that the third pipe has fifteen keys. A later author, Pierre Trichet, whose manuscript on musical instruments was

finished about 1640, specifies fifteen keys also – nine on the descending part and five on the ascending. Either this is poor arithmetic or he has not included a key that goes to the bottom bend, as appears to have been used on Settala's pipes.

The sordellina was invented, according to Mersenne, by Giovanni Battista Riva, Don Guilio and Vincenzo, about whom nothing is now known, and the fourth pipe was added by the Duke of Braschane, whom Barassa (1995) and van der Meer (1995) identify as Paolo Giordano II Orsini (d.1645 or 1656), a military specialist and sometime musical instrument maker of Bracciano, whose ancestral castle still stands in that town. A later author, Pietro Scarabelli, gives the honor of adding the pipe to Canon Settala, although there may be no contradiction if there were two kinds of fourth pipes with different keying systems.

Mersenne was a gifted scholar – in his mathematical work he defined a group of integers that are still studied, the 'Mersenne primes.' However, some aspects of his diagram are hard to believe. The large N-pipe seems too wobbly for a player to be continually pressing its keys. The portrait of Settala, in contrast, suggests a sensible brace between the pipes. Other unrealistic parts are the roundness of the bag, the infinitesimal width of the bellows plate, the very sharp folding of the bellows, and the lack of an air inlet for the bellows. They signal an artist who took liberties or perhaps did not have the actual instrument in front of him as a model. The other drawings in Mersenne's book are generally not as faithful as those in other musical instrument books of the day.

On the other hand, many of his details are repeated by Trichet who had the opportunity to hear a sordellina player, Francois l'Anglois, in Bourdeaux in 1626. In the end, however, the greater care taken to depict the instrument by Settala's artist, and the fact that later depictions are more similar to that form than to Mersenne's, suggest that the engraving of Settala is a better representation of the real thing.

### **The Vignon-David portrait ( before 1638)**

A portrait of an anonymous sordellina player (Figure 3) survives in the German National Museum in Nuremberg. It is an etching by Charles David after a painting, now lost, by Claude Vignon. Both probably worked in Paris in the early 1600s, and the date of the etching is bounded by David's death, which was not later than 1638. A French inscription at the bottom declares that there was neither organ or other instrument that the sordellina did not surpass under this person's touch.

The portrait shows no third pipe, and van der Meer suggests that this must be a two-pipe version, that is, one with pattern I-I. However, other evidence implies that there was a third pipe, which the artist left out for simplicity. A close look shows the same psi-shaped key that appears in Settala's portrait, again with one fork passing in front of the right hand chanter. Indeed, we know the artist was prone to simplification since there is no bellows, and even if one argued that it is hidden by his flouncy shirtsleeve, there is still no strap on his right arm to hold the bellows. (Van der Meer concludes that this is a bellows-less pipe

and infers that it is a primitive form, but one cannot see how else he could be filling the bag.) The presence of the psi-key and the fact that the instrument is compared favorably to an organ in particular suggest that it is the same kind of I-I-V sordellina shown in Settala's portrait.

### **Todini's Musical Machine of Polyphemus (c.1670)**

While the next representation shows an instrument of primitive form, the story around it reflects the technological exuberance of the Italian city states at the time, and how their technology and the skill of their craftsmen were applied to musical instruments, including bagpipes. Figure 4 is a beautifully-executed statue of Polyphemus, the mythical one-eyed giant who threatened Ulysses. It is as large as a person. He is playing a sordellina, and one can see a bellows strap on his forearm, almost at the wrist, and a belt around his waist. An inspection of the original, now in the Metropolitan Museum of Art in New York, shows a bellows under his wrist with an inlet hole rather low on the bellows plate.<sup>2</sup> His pipes have two chanters of the same length, and a longer drone, in a pattern I-I-J.

The man who commissioned the work was Michele Todini. He was born in Saluzzo in Piedmont around 1610-1615 and moved to Rome in 1636. In 1650 he set up a musical instrument gallery near his home on the Arco della Ciambella, near the Roman ruins of the Largo Argentina. He was fascinated by apparatuses involving several instruments connected together to be playable by one person. (Two other examples of his work are pictured by Winternitz, 1967.) He seems to aimed for complexity and an impressive appearance more than musical quality, and in his descriptions he seemed proud that some visitors to the gallery were convinced that his machines operated by satanic arts.

One elaborate exhibit in his Galleria Armonica depicted the tale of Polyphemus and Galatea, a mythological theme of the monster and his desire for a shepherdess, which has often been repeated in art and music. Before he saw her, if anyone would encounter the giant it would be to his misfortune, the myths states, but now Polyphemus has combed his hair, cut his beard and adopted a normal visage. Gilded wooden statues, now in New York's Metropolitan Museum, show the pair holding musical instruments: Galatea plays a lute, now missing, and Polyphemus sits on a rock playing pipes. Although the *Metamorphoses* of Ovid state that Polyphemus fashioned giant pipes from a hundred reeds and put them in his mouth, Todini interprets his instrument as a sordellina. Behind him are sculpted mountains, which have also been lost. Between the figures is an elaborate harpsichord supported by sea creatures, whose sides carry reliefs showing story of Polyphemus' pursuit of the shepherdess.

The scene was in reality a large composite musical instrument – the operator sat at the harpsichord and played a keyboard to sound its strings, probably to simulate her lute. A second keyboard went to pulleys attached to a form of sordellina set up behind the mountains. The operator pumped bellows at his feet to feed the hidden bagpipes. As

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<sup>2</sup> Van der Meer also suggests this instrument has no bellows.

much of the assemblage as survives is shown in Figure 5. A model of the scene made of lead has survived but does not provide any more information (Winternetz, 1967).

Todini published a description of his Galleria Armonica in 1676, and, although it is not fully clear, it gives some interesting details about the sordellina scene of his day and his own quest to build the machine and put it into operation. “If I were to tell you how difficult it was, you would not believe me,” he writes, but he does tell us of a person of high birth, with a level of ability that matches his birth, who set out to improve the sordellina. Traveling to Naples where the instrument flourished, he studied under two brothers, one a craftsman and the other a skilled player. He spent 14,000 scudi, a large sum, and returned to Rome with the items necessary for the construction of the instrument. He did in fact improve it, but in the end he was the only one who could play the instrument he had built.

A major difficulty in constructing the mechanical device, Todini relates, was making the two keyboards accessible to the player, and another was getting sufficient harmonies. If two holes on one pipe are opened, of course, it gives only one note. This had to be fixed in a way that did not require too much air. He is vague about his solution but he seems to have added more pipes, extending the range downwards in particular, so Galatea and Polyphemus were able to play their duet and amaze the gallery’s visitors.

### **Sordellinas in the Museo Settala (1660s)**

In 1633 Canon Manfredo Settala, who had recently been painted with his sordellina, inherited a collection of artifacts from his father, a wealthy doctor. He enlarged the holdings and set up a museum in Milan with craftwork of South American Indians donated by missionaries, fossils, medals, statues, zoological specimens, and other objects, but especially musical instruments (Tavernare, 1979). Settala made woodwinds of various types in innovative designs and many of the instruments in the museum were his own construction. A catalog was published in Latin in 1664 and translated into Italian in 1666, one of the first examples of a museum catalog describing the items in the collection, as opposed to simply giving an inventory.

The 1664 catalog by Paolo Maria Terzago lists six sordellinas. In his description, there is:

1. An ivory sordellina, with 42 keys of gilded silver, the work of Manfredo Settala, also called organo portativo; see Father Mersenne, Book 2 on musical instruments, Proposition XIV.
2. Another sordellina of which no other in existence is more perfect; in the leather bag is inserted four pipes provided with 56 keys; the fourth pipe was an invention of the same Settala, through which the instrument achieves a consonance of celestial harmony.



3. Another sordellina that plays a second octave, an invention of Settala, provided with 42 keys.
4. Two other choral sordellinas with 42 keys. (“Choral” suggests a matched pair to be played together.)
5. Another sordellina without keys with five pipes of horn of buffalo.

An engraving of Settala’s Museo shows a room separated into large corridors with vertical cabinets, grand pillars, and animal likenesses hanging from the ceiling (Tavernare, 1979). Pietro Francisco Scarabelli prepared an Italian catalog in 1666 and gave it a more popular and sensational tone. He describes the same instruments but with some different details, including some information significant for the origin of the regulators, on how the keys on the rear pipes are played. In the first room, the walls are covered with musical instruments, he says. His catalog describes fifty-eight of them, and he adds that many have been omitted so as not to tire the reader. Paraphrasing:

Set before one’s eyes are four sordellinas. One has pipes made of ivory, with rose-shaped decorations and with forty rod-like keys, and these are made of gilded silver, each with the head of a lion. Another has ebony pipes, and another is of horn of buffalo and also made by this gentleman. It is similar to that shown in Father Mersenne’s book but one cannot judge its value without examining and listening to it closely. To play these, under the right arm one holds a bag covered with black velvet laced with gold, and under the left arm a small bellows embroidered with silver. Lifting one arm and depressing the other makes the pipes of the sordellina sound, and one touches the silver keys with the ends of the fingers and with their segments, and with various parts of the palm of the hands (“e con varie parti del palmo delle mani.”) Measured movements of one’s fingers produce a harmony, not at all common, which permits the instrument to sound higher notes.

Scarabelli continues that a fifth sordellina is of black buffalo horn and has five pipes without keys and makes a very pleasing symphony. The sixth and last one is the most perfect with four sturdy pipes supplied with 56 keys; the fourth pipe giving a second octave was the invention of Signor Manfredo, who has found a way of producing an inexplicable harmony from the sordellina, so that it seems impossible to achieve a greater perfection. (Note that a “second” octave here does not necessarily mean a higher one.)

In a publication that appeared since the Baldano facsimile volume, Bær (1996) reproduces a picture of another instrument that gives a clue to the sordellina’s design. After the canon’s death and the extinction of his male line in 1716, a family dispute arose about the disposition of the museum’s collection, and by the time it was settled in 1751, all the musical instruments had disappeared. Surviving however in the Modena library is a series of drawings from the Museo, one showing two instruments, a ‘sextuple flute a bec’ and a

‘double flute a bec’ (Figure 6). The double instrument appears to be recorder-like pipes joined with a strut. The sextuple version has a barrel stock with an inlet tube, two fingered pipes, and what appear to be four drones. It gives the impression of a bagless sordellina. It may well have been a design of Settala himself, and it may have never been constructed. If it was really built, one hopes for the sake of the player’s lungs that there was a way of shutting off some of the drones, perhaps selecting some depending on the key being played. An interesting aspect of these two instruments is that the numbers of front holes on each are four and six, exactly as in Mersenne’s figure. It is clear that the former must be played with one hand on each pipe, rather than a single finger straddling both chanters, so they seem to be played in the same manner as the sordellina, and they confirm some aspects of Mersenne’s drawing. Also, since the instruments are flue-operated, and since the flues of the sextuple flute are isolated from the mouth, both pipes would be sounding constantly during playing, so that there would be no purpose in stopping their ends. The premise that the larger instrument operated like a sordellina suggests weakly that neither of the two open-holed pipes of the sordellina itself was stopped.

### **The commemorative for Settala’s funeral (1680)**

Settala died in 1680, and a booklet produced for his funeral survives. It includes a series of drawings, one showing the scene inside the cathedral, and others with the figure of death performing various symbolic deeds, with appropriate Latin mottos on human mortality (Tavernare, 1979). One drawing (Figure 7) has an inscription taken from two biblical psalms “Deficit spiritus meus” – my spirit fades away. This seems like a pun: “spiritus” can also be translated “breath,” and a sordellina lies deflated on the table. The instrument seems to be like the one in Settala’s youthful portrait, except that there is a tangle of keys underneath the two front pipes. The double-ended “psi” key appears again, and now there seems to be a second smaller version of it. The pipes appear to number three, with pattern I-I-U and the large psi-key going right to the bottom of the U. Both of the I-pipes appear to be open at their ends.

Thus after several decades the sordellina seems to have generated many more keys and sometimes an extra pipe, but its basic form remained the same.

### **The prototypical sordellina and its operation**

Trying to reconcile these pieces of information, I conclude that there was a prototypical form of the sordellina through most of the seventeenth century. The more elaborate types we read about were likely to have been museum pieces or requested by rich owners who wanted extra parts on their instruments for the sake of conspicuous consumption. They were not responses to the needs of a musician.

The same pattern of a common prototypical form and a few elaborate versions arises in the history of the Irish pipes. Some sets show a proliferation of pipes and keys, and some Irish sets have been made of ivory instead of blackwood, like the *sordellina* in the Museo Settala. In the Irish case, double-bass regulators appeared at least by the early 1800s as evident in the Moloney set in the Boston Museum of Fine Arts (Besaroboff, 1941.) Taylor added a complexity as in the sets that Captain O'Neill (1913) shows in the hands of John Beatty and Nicholas Burke, where two of the regulators have four bores and four reeds in each reeds in each (see 2.11.) But who could play these pipes in a way that really enhanced the music? O'Neill makes it clear that Beatty could not, and it is telling that the pipers who inherited his set, Eddie Mullaney and then Joe Shannon, were very successful while ignoring the extras on their pipes and focusing on chanter work. Burke's set was of ivory and Beatty's had a double-bore chanter. We may covet pipes like these, but the prototypical design of a single chanter with three drones and three regulators is the ideal for the musician.

Similarly, I believe there was a prototypical *sordellina*, and that many of the elaborate variations are due to a bias in the written record which emphasized museum pieces. The prototypical instrument was like the ones pictured in Settala's 1630 portrait. It had the form I-I-V – two open chanters and a closed, keyed lower pipe.

Concerning its tuning, we can accept provisionally the judgement of van der Meer, whose arguments are based considerably on Mersenne's description and on the Baldano music manuscript. The first and lower I-pipe, played by the left hand, had four front finger holes and a thumb hole, and went from D (around 292 Hz) up to G, with some keys for chromatic notes. The right hand pipe had four finger holes – two lower vent holes and a thumb hole, plus some keys, and the second went from G up to D' in the next octave (c. 586 Hz) with a higher note or two attainable by keys. This is the first octave of an Irish concert chanter. The *sordellina*'s chanters appear shorter than our own, but a cylinder must be cut about half as long as a cone to produce the same pitch. Even though the effective acoustic length of the right hand pipe was shorter than the left hand one, it was built the same length for visual symmetry.

The third or V-pipe, closed with keys and an end-cap, had a range that overlapped the chanter but went quite low. It was finely-tuned with a pin shown in the early Settala portrait (Figure 1). Of course, only half of the notes could be adjusted in this way, the ones on the final, ascending segment. If the notes on the descending segment of the V went out of tune, perhaps this was simply tolerated as they were also available on the front chanters, or perhaps there was another way of tuning them, such as a further pin at the base of the V.

### **The Irish pipes and the *sordellina* as coherent systems**

The regulators may be the most salient part of the Irish pipes but they are not its core feature. That position belongs, most players would hold, to its chanter. The ability to

play two octaves by overblowing seems to be a unique feature among bagpipes, and it adapts the Irish pipes to the characteristic tunes of Ireland, whose range is well over an octave. Achieving a second octave by overblowing (rather than by keys as in a Northumbrian chanter) allows a greater variety of ornamentation.

The chanter can play this large range thanks to a series of features, all of which interact to produce the second octave. One is the conical bore, rather than a cylindrical one. Overblowing a conical bore raises the pitch an octave, whereas a cylindrical gives a twelfth, leaving a gap of several missing notes.) The ability to play staccato is also a requirement, as the second octave requires a momentary stopping of the chanter, and this in turn usually implies a seated posture with the chanter stopped on the knee. I suspect that a thin dry reed is also necessary, which implies the use of bellows.

Where do the regulators fit into this system? It seems that they are not essential to the double-octave chanter, but are simply allowed by its associated features – the bellows and the seated position. They complement the chanter, but they are not necessary for its special properties among bagpipes. The extra pipes on the sordellina lay much more at the core of the instrument's function, as they allowed the instrument to play the polyphonic music of its time.

For both instruments the usefulness of many of its parts depended on the existence of other new parts, and the ingenuity of their inventors was their imagination in making these innovations all at once. Both instruments have features that formed coherent systems, but the role of fully closed pipes within the two systems is quite different. If the extra pipes on the sordellina did indeed inspire the Irish regulators, it was in their construction and appearance more than in parallel function.

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**Figure 1.** Manfredo Settala and his sordellina, c. 1630.

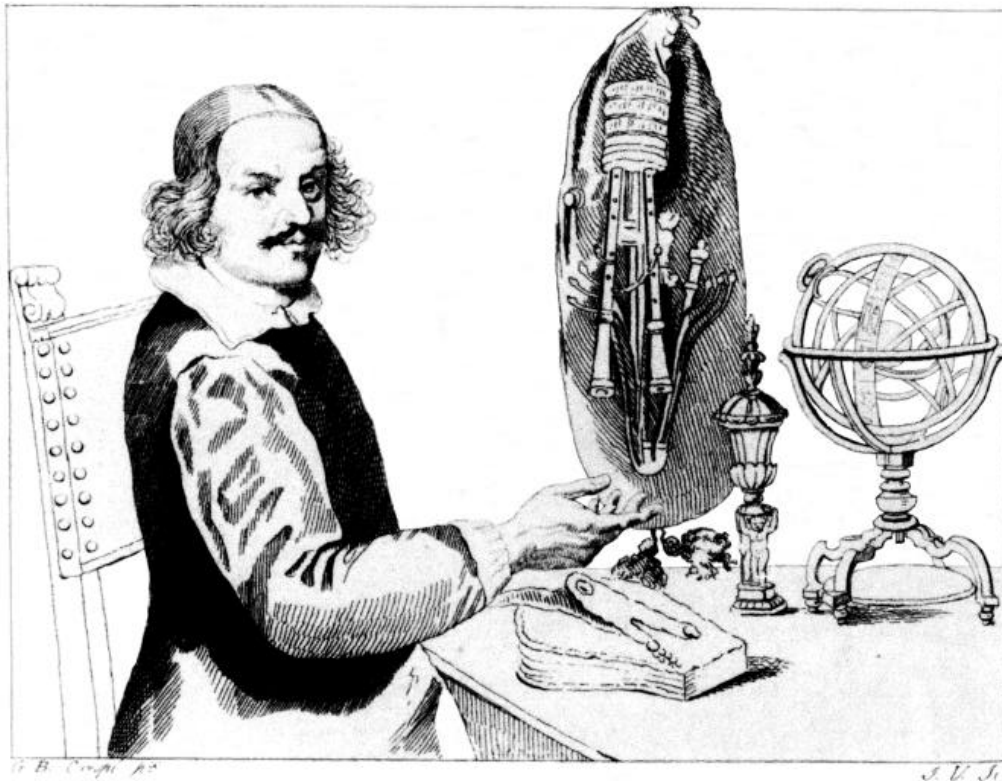
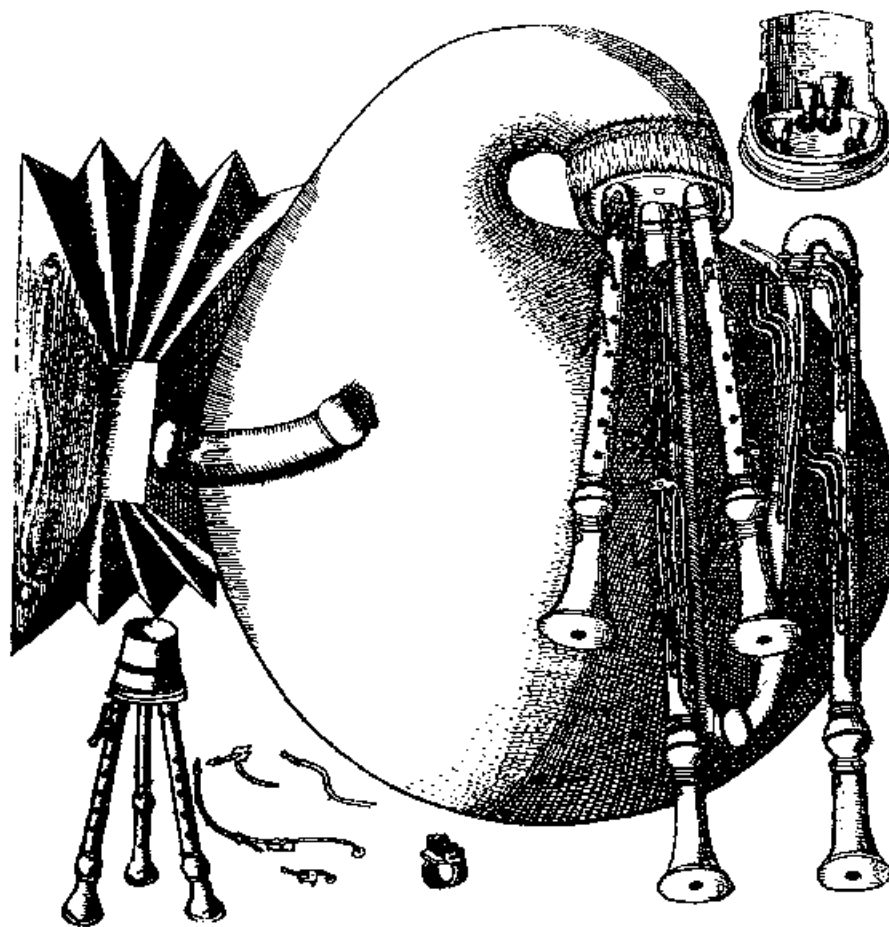


Figure 2. A sordellina in Mersenne's *Harmonie Universelle*, 1636.



**Figure 3.** An anonymous sordellina player by Claude Vignon and Charles David, 1630s.

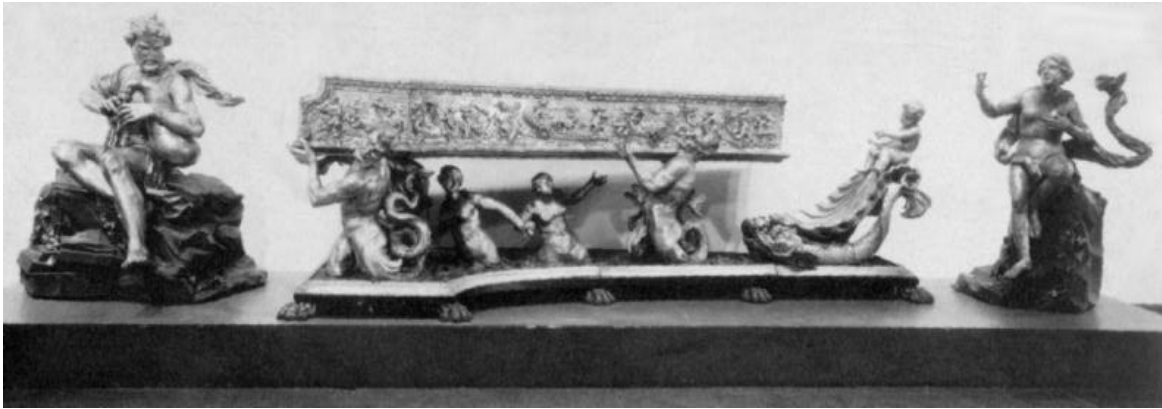




**Figure 4.** Polyphemus playing the sordellina, from Todini's musical machine.



**Figure 5.** The surviving parts of Todini's machine: Polyphemus, the harpsichord, and Galatea.



**Figure 6.** Drawings of sordellina-like flutes from Settala's Museo.

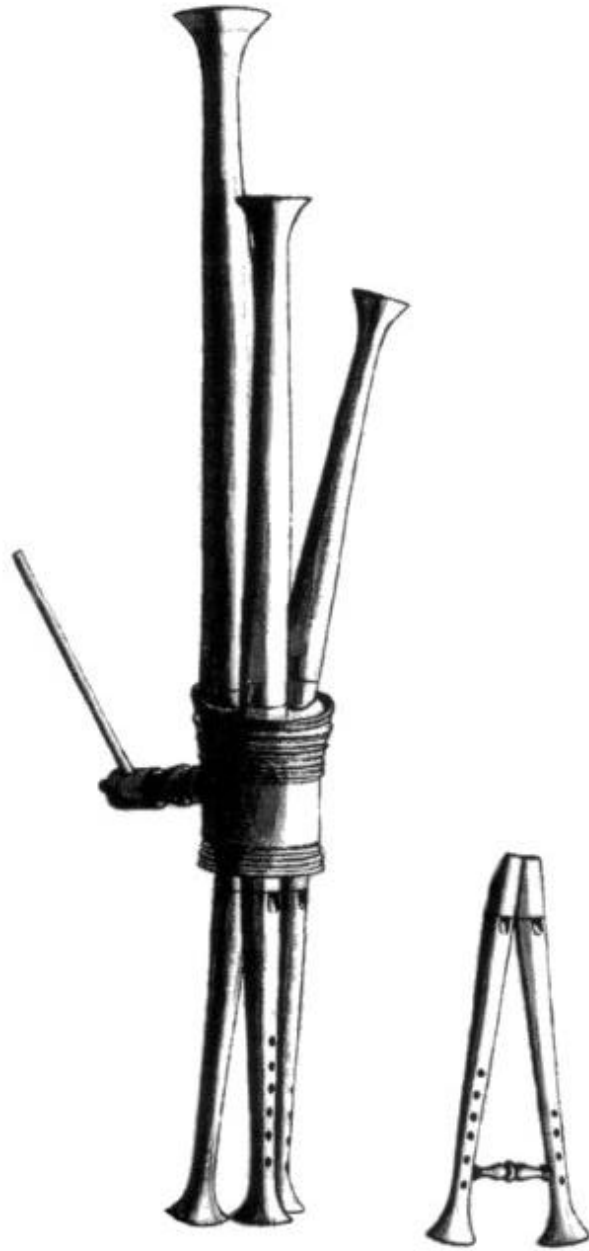


Figure 7. "My spirit fades away", from Settala's funeral brochure.

