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Andreas Rupp, Michael Plitzner (Hrsg.)

3. Glockensymposium ECC-ProBell®
20.-21. September 2022

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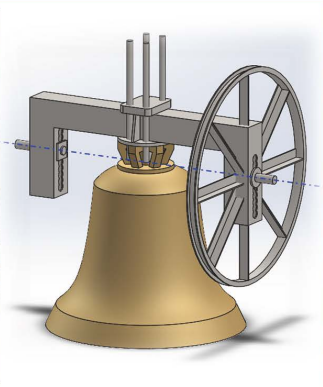

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Andreas Rupp

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The bell ringing cultures in Italy: characteristics, heritage, enhancement and issues

Paolo Bordoni, Romeo Dell'Era

Associazione Italiana di Campanologia

Introduction[1]

Italian bell heritage is extremely rich and varied, but also little known. Important regional differences need to be considered, so it is very difficult to provide general statements about Italian bells. In some regions, a large number of historical bells is preserved: for example, many medieval bells (*Zuckerhutglocken* with inscriptions in uncial script) still exist in Tuscany[2]. Many prestigious families of bell founders arose in Northern Italy especially in the 19th century and cast lots of tuned sets of bells until WWII. The average quality of those foundries was quite high despite the thin profile of their bells. During the war, the fascist government requisitioned a large number of bells especially in the Po Valley, generally the one or two biggest bells of each tower[3]. After the war, the Italian state paid for new bells to churches that had suffered requisitions, but foundries could not always match the quality of the older bells to meet the high demand (many parishes decided to entirely recast their sets of bells). Unfortunately, no *Limburger Richtlinien* were established in Italy. Since the 1950s, demand for new bells has fallen and today less than ten bell foundries are still active in Italy.

It is not easy to classify the numerous traditional bell ringing cultures in Italy: although free-swinging bells are the most common, especially (but not only) in central and southern regions, some territories show different bell hanging styles, which are generally associated with specifically planned sets of bells and particular ringing techniques. Those campanological cultures can be defined as "systems": some ringing techniques are possible only on specific sets of bells with precise hanging styles, which are conceived in order to make those ringing techniques possible. A good parallel for this concept could be the British *change ringing* culture. Along with some well-defined bell ringing systems, in Italy one may count so many regional variations in hanging styles and ringing techniques that their enumeration and classification still need to be carried out in a more objective manner.

1 Thanks to Simone Margnelli (president of the Associazione Italiana di Campanologia) for his important suggestions.

2 Lera 1972; Lera – Lera 1998; Cantini 2006.

3 Requisition of bells had been also particularly intense during WWI in Austro-Hungarian Trentino and South Tyrol.

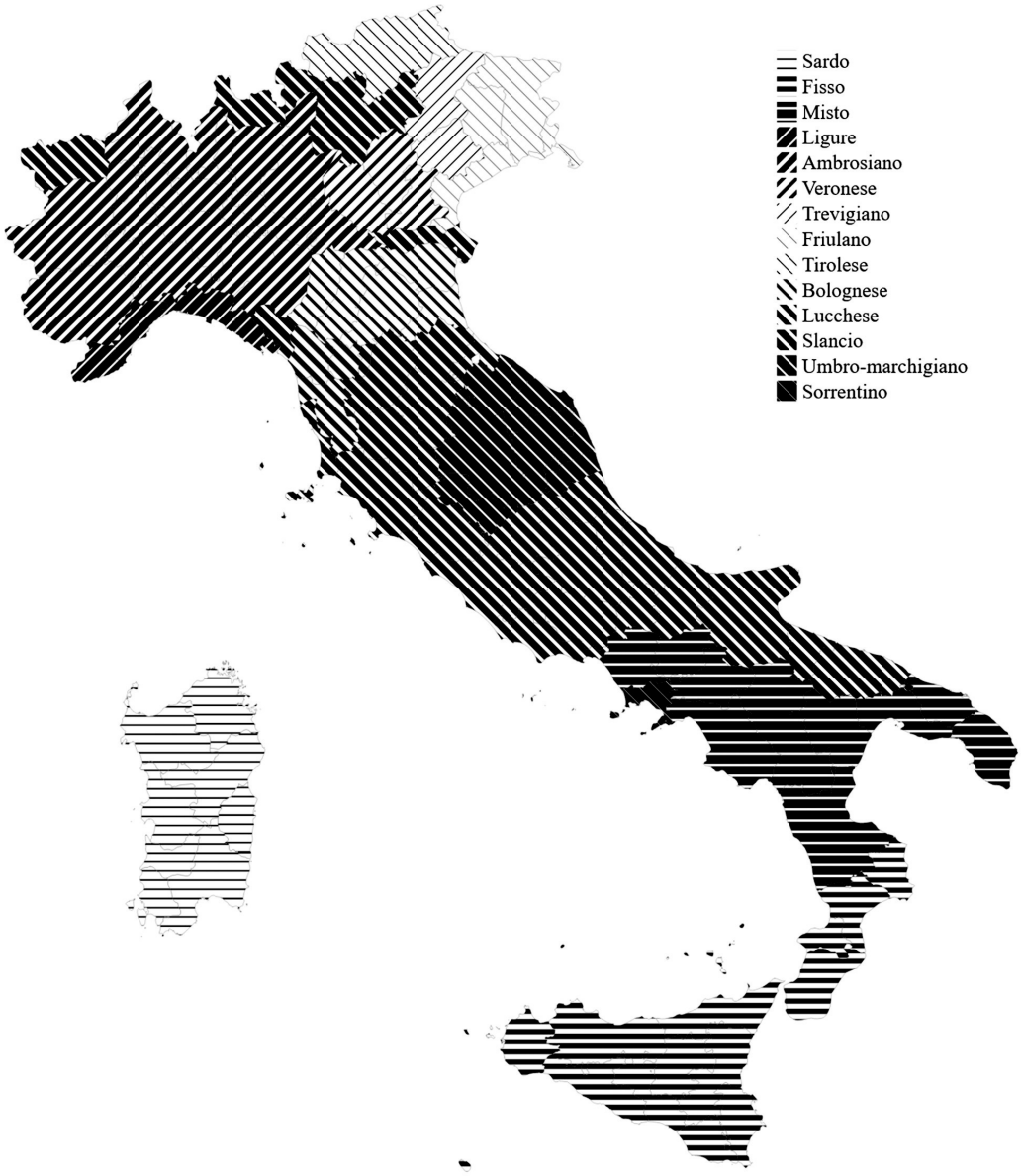


Fig. 1: Map of Italy showing the diffusion of the main bell ringing cultures. A colorized and more detailed version of the map is available via the QR-Code

The preservation of Italy's bell heritage is an important and difficult challenge. Since the second half of 20th century, large-scale uncontrolled motorization has modified traditional bell hanging styles and deleted traditional bell ringing techniques in large territories. The result is the loss of both material heritage – original wooden installations have been removed and replaced by industrial steel frames and yokes – and intangible culture – local traditional daily and special

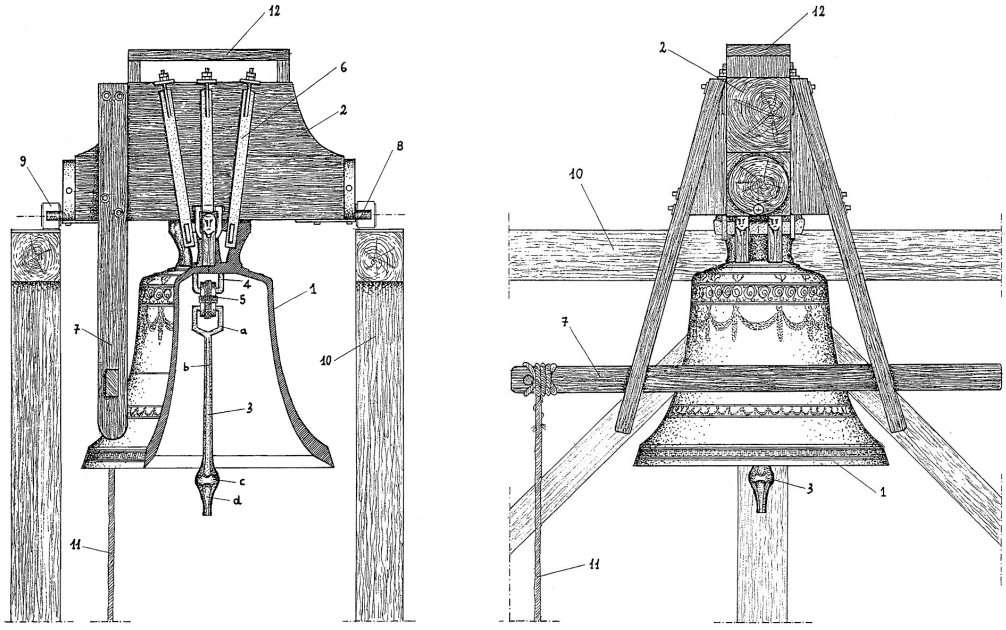
signals have been forgotten, and bells are now automatically rung or chimed according to premade models. Even today, maintenance and servicing carried out by the numerous professional bell hangers can be of very different quality. Since there are generally no bell experts in the provincial fine arts superintendencies or in the diocesan art commissions, all responsibilities are placed on the parish priests, who do not have the necessary preparation to plan and supervise the work, so decisions are often made on an economic basis (i.e. the lowest price). For those reasons, Italian bell heritage and cultures may be considered as potentially or effectively endangered. Nonetheless, some bell ringing cultures have been preserved over time for different reasons. Three of them have been chosen as examples for the current paper: the Bolognese, the Ambrosian and the Veronese systems.

1 Bolognese system[4]

The Bolognese system was invented in the city of Bologna in the 16th century and spread to a large part of Emilia in the 19th century[5]. It is a full-circle ringing culture, since bells perform 360° rotations during the ringing in solemn occasions. The hanging style recalls, in its essential characteristics, the free-swinging style. The bell is generally installed to be completely external to the yoke and to the rotation axis. The yoke, usually made of wood, is quite light: its weight is equal to about 1/9 of that of the bell, therefore the swinging is very fast. Above the yoke there is a horizontal board, slightly spaced, which protects nuts and bolts and prevents the rope from getting tangled in the screws during rotation. The rope is attached to a sawhorse-shaped element on the side of the yoke. The flying clappers have short flights for full-circle ringing. A clapper of this type, however, would not allow ringing at low oscillations, used for everyday peals. To overcome this inconvenience a wooden weight is applied to the clapper flight by means of a through pin, which is removed by the bellringers while performing full-circle peals.

4 Thanks to Tommaso Sorrenti (member of the Associazione Italiana di Campanologia and the Gruppo Campanari Padre Stanislao Mattei) for sharing precious information.

5 Fanti 1992.



1: bell
2: yoke
3: clapper (a: handle, b: stem, c: ball, d: flight)
4: handle
5: leather belt
6: fittings
7: sawhorse
8: rotation pin
9: bushing or ball bearing
10: beam frame
11: driving rope
12: top board.

Fig. 2: Schematic representation of the mechanical parts involved in the Bolognese bell hanging style (from Matteo Padovani's drawing).

The Bolognese system bell ensembles are almost always composed of 4 bells following the major scale without the fourth grade (example: C, D, E, G). Some sets of bells are tuned on the major sixth chord (example: C, F, G, A), or the minor chord (example: C, Eb, F, G). Less often, belltowers host 5 or 6 bells, tuned according to the major diatonic scale or obtained as the combination of different chords that can be used together or separately (e.g., major sixth chords with the addition of the upper octave). The bells are positioned inside the belfry, usually aligned and with the same direction of oscillation. The solemn peals are performed in the bell chamber and the bellringers are in contact with the bells.

The full-circle peal is called *doppio* (italian word meaning "double"). It consists of three phases: *scappata* (bells are rung up), *pezzo in piedi* (the proper peal), and *calata* (bells are rung down). During these phases the bells ring in a looped and perfectly synchronized sequence. The proper peal is based on a starting matrix, known by heart by the bellringers, and on subsequent variations historically encoded in repertoires. The number of musical notes involved is small, however the peals are lively thanks to the speed of movement.

The bellringers usually handle the bells on the bell chamber floor, by means of a short rope. If the bells are too heavy, the main bellringers are helped by assistants standing on the frame beams. During the *scappata*, these assistants use their feet to push the yoke down and help the bells reach the "up" position more quickly. During the *pezzo in piedi*, however, they help to control the rotation of the bells by handling the yoke's "sawhorse". A different ringing technique consists in the *tirata bassa* or *tirabassa*, in which the bells are swung with a quite short angle of oscillation, and the bellringers controls the strokes by catching the clappers by hand, speeding up or slowing down their swinging, once more according to predefined musical sequences; the rhythm of the *tirabassa* is much faster than the *doppio*, but the intensity of the resulting sound is lower[6]. A chiming technique is also used.

Fig. 3: Bells of Bologna Cathedral (Italy). Between two subsequent peals, bells can be left in the "up" position by shoring up the bells with special beams.

The success and spread of the Bolognese system is strictly linked to the production of sets of tuned bells, and therefore to Bolognese bell foundries, such as Rasori and Brighenti, whose owners were also bellringers and used to design the bells' installations (frames, yokes and special structures necessary for Bolognese bell ringing). The manual ringing tradition reached its maximum level between the two World Wars[7]. Bolognese sets of bells have almost never been

6 Sarti – Paltrinieri 2004; Padovani 2007, "Il sistema bolognese"; Montanari 2007; Avenali 2019, 33–45.

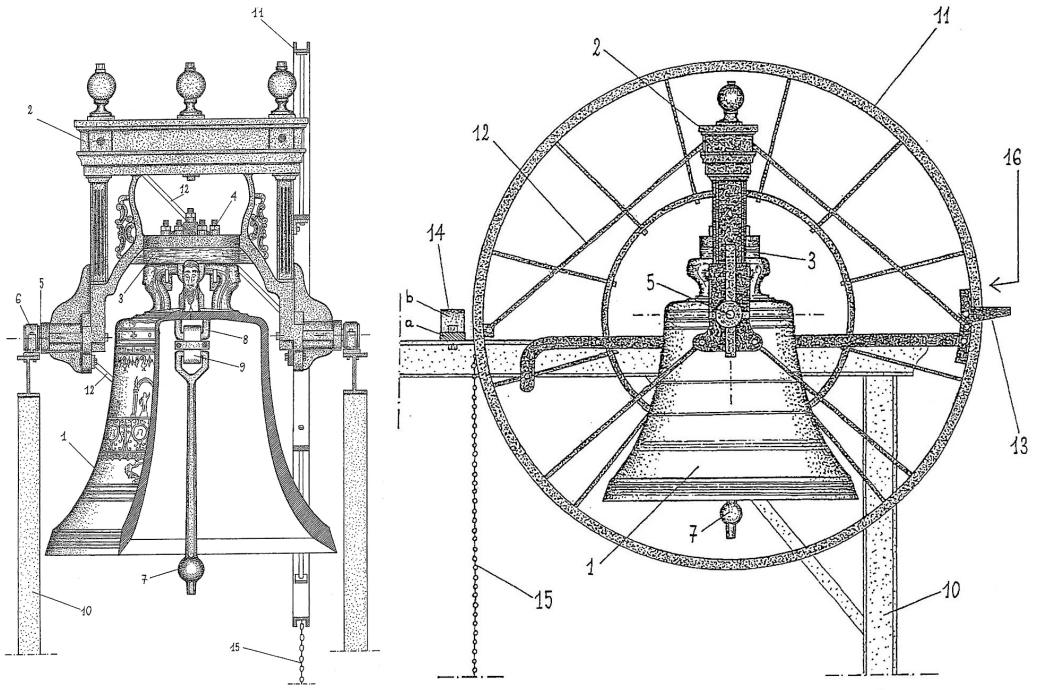
7 Cf. Bonacini 1934.

entirely motorized, due to the difficulty of fully reproducing the movement given by the bellringers with electrical motors and controllers. For this reason, even during the 20th century, most sets of bells were left without an electric movement system and belfry structures were left or rebuilt according to the traditional rules. The ringing tradition is still alive thanks to the presence of many associations of bellringers, some of them founded more than 100 years ago, gathering the bellringers in charge to perform traditional peals in several belltowers and teach the technique to the new generations. The three main associations are the "Unione Campanari Bolognesi" (founded in 1912), the "Gruppo Campanari Padre Stanislao Mattei" (1934), and the "Unione Campanari Modenesi" (formally founded in 1969 but still existing since the second half of 19th century). Those and other associations have recently signed an important agreement with the Fine Arts Superintendency of Bologna for the protection of the local bell heritage. Thanks to that agreement, bellringers are involved in any operation of restoring and maintenance, sharing their knowledge regarding not only the bells themselves, but also the essential equipment and structures of Bolognese manual bell ringing. Motorization must involve only one or two bells per tower in free-swinging movement, for everyday peals, and automatic installations must not prevent or hinder manual ringing[8].

2 Ambrosian system

The main bell ringing system in Lombardy, eastern Piedmont, western Emilia, western Trentino and Swiss Canton Ticino is known as Ambrosian. Its hanging style is characterized by a heavily counterweighted cranked yoke, a large wheel (having a diameter approximately double than that of the bell's mouth) with a monodirectional traction rope and a short stay corresponding to a leaf spring on the bell frame. Swinging is slow, with falling clapper, and alongside normal swing ringing it is possible to practice a typical almost-full-circle ringing: bells can be blocked in the "up" position only on the handstroke side, so each bell is forced to ring twice before it can be blocked up again.

8 Avenali 2019, 47–184.



1: bell
2: cast-iron yoke
3: wooden isolator
4: fittings
5: rotation pin
6: ball bearing
7: clapper
8: handle
9: leather belt
10: metal frame
11: wheel
12: spokes
13: stay
14: leaf spring (a: support bar parallel to the bell's rotation axis, b: leaf)
15: driving rope or chain
16: rope's attachment point.

Fig. 4: Schematic representation of the mechanical parts involved in the Ambrosian bell hanging style (from Matteo Padovani's drawing).

Although the Ambrosian bell hanging style can be found on single bells or sets of few non-tuned bells, it is generally related to rings of 3, 5, 6, 8, 9 or 10 bells tuned in a major scale. Besides combinations of swinging bells, there can be performed two ringing techniques that are typical of the Ambrosian system[9]. The first one is *concerto* (the solemn peal): it consists in a series of almost-full-circle ringing sequences (with one ringer to a bell) in which the two strokes of each bell are arranged in some sort of musical chains. The bells are first freely rung up, then the *concerto* sequences are conducted by a director who calls the numbers corresponding to each bellringer, in order to get a desiderd sequence of the strokes by considering the rotation speed

9 Migliorini – Biella – Taccagni 2004; Padovani 2007, "Il sistema ambrosiano". In German: Walter 1999; Walter 2008. On local Ambrosian bell ringing traditions: Bernasconi 1982 (Canton Ticino, mainly Genestrerio); Biella 1986; Biella 1989 (province of Bergamo); Motta 2005 (Brianza); Palmieri 2007 (Crema region); Margnelli – Bordoni 2017, 129–164 (province of Brescia, mainly Edolo).

of each bell. At the end of the *concerto*, the bells are rung down – again in a random ringing – until they stop in the rest position. The other typical Ambrosian ringing technique is chimes, played by a single person with a rudimental carillon keyboard placed in the bell chamber and connected to the clappers while the bells are temporarily blocked.

The oldest Ambrosian rings of bells date back to the mid-18th century, but the vast majority of them were cast in the 19th and 20th centuries; many rings of bells were partially or entirely recast after WWII. Bells were cast by important Lombard foundries (e.g. Barigozzi in Milan, Ottolina in Seregno, Bizzozero and Bianchi in Varese, Pruneri in Grosio, Crespi and D'Adda in Crema, and Mazzola in Valduggia)[10]. The earliest installations, with wooden frame, yokes, wheels and keyboard, are today extremely rare and mostly limited to Alpine valleys. Industrial cast iron installations for the Ambrosian system have been produced since the late 19th century, were generally supplied with the new rings of bells and are now quite common, but more recent structures are normally made of steel. Electric motors with brakes, external side hammers and a central control unit enable faithful automatic executions of both *concerto* and chimes, and leave the possibility of maintaining the original ropes and keyboard, allowing the bells to be rung by hand without any additional manipulation. Nonetheless, most of the rings have been motorized since the 1960s, removing ropes and keyboards. Even though a high proportion of bell towers are completely motorized and unringable by hand, the tradition of manual bell ringing has always stayed quite strong in some precise places, with a particular density in the province of Bergamo[11]. Manual chimes with traditional melodies can be quite well preserved where keyboards still exist, especially if hammers for automatic melodies are not provided.

10 Botta 2016.

11 Bells and bell ringers in the province of Bergamo are registered in the Intangible Heritage Inventory developed by the Lombardy Region (www.intangiblesearch.eu).

Fig. 5: Bells of Santa Maria del Cerro in Cassano Magnago (VA – Italy) in the "up" position during a motorized concerto peal (photo by Roberto Luigi Botta). The heavy counterweights reduce the forces acting on the structures and allow big bells to be hosted in small towers.

During the last two decades, the interest for manual Ambrosian bell ringing has been growing and some bellringers' associations and groups were created (e.g. the Federazione Campanari Bergamaschi in 2006, the Federazione Campanari Ambrosiani in 2009, and the Federazione Bresciana Campanari in 2012). Double installations (motors and hammers, together with ropes and keyboard) are not the rule, but their number is increasing at least in some regions, reintroducing the possibility of ringing bells by hand.

Ambrosian rings of bells require specific maintenance. Common issues are related to the clappers (unwanted movements like bouncing or horizontal and vertical sliding during *concerto* peals, deformation of the clappers' balls), the frames (unsafe adaptations due to the motorization, excessive vibrations from motors and brakes onto the tower masonry), or the bells themselves (excessive dimpling of the striking points, damage to the crown)[12]. Many Ambrosian

12 Falzoni 2014, 71–85.

rings of bells are not in particularly good condition, especially in the places where no manual ringing tradition has survived: bellringers are also important for the Ambrosian bell heritage because they can constantly verify if the rings of bells are well maintained[13].

3 Veronese system[14]

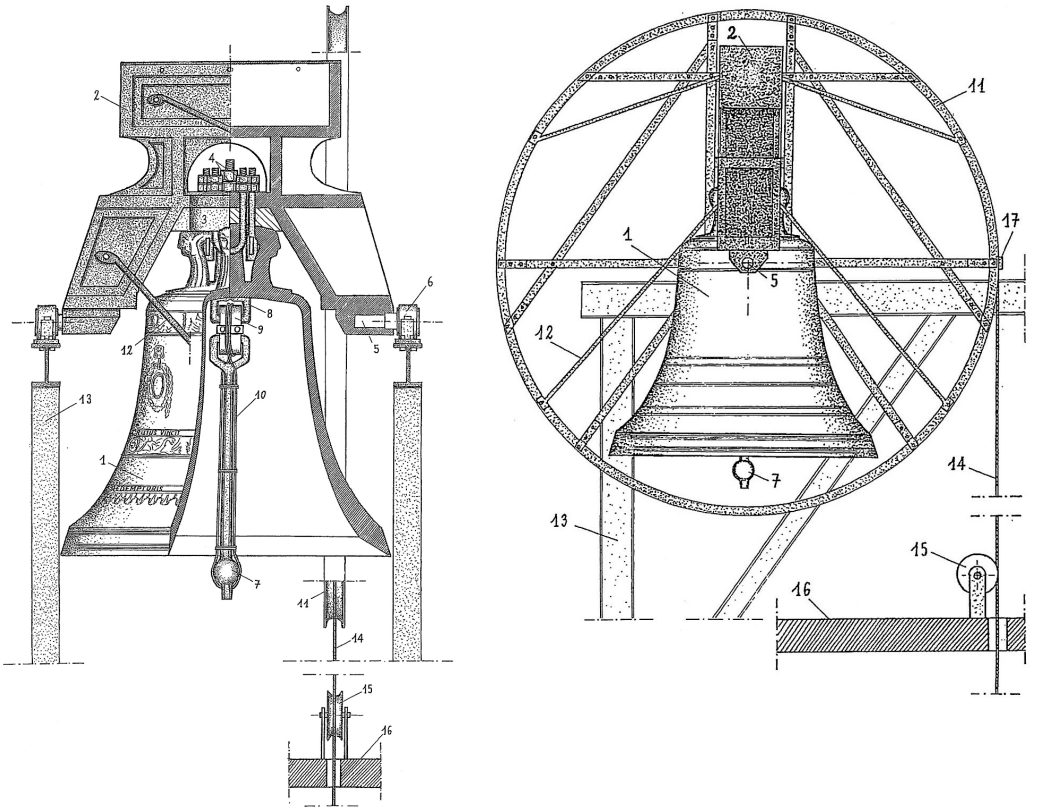
The Veronese System is believed to be developed in the middle of the 18th century in the city of Verona and is now widespread throughout the provinces of Verona and Vicenza, in a large part of the province of Padua, and in various locations in the provinces of Venice, Treviso, Rovigo, Trento, Brescia, and Mantua.

The Veronese bell hanging looks like the Ambrosian system: large counterweight, large wheel, falling clapper[15]. Nonetheless, some significant differences make the two hanging styles well separate. First, in the Veronese hanging there is no device that allows the bell to be blocked in the "up" position, and the rotation speed is significantly higher than that of the Ambrosian hanging, thanks to a less heavy counterweight. The driving rope is attached to the wheel exactly at the point of tangency in the "down" position. A pulley on the bell chamber's floor has the task of guiding the rope during handstroke oscillation. Bell installations (frames, yokes and wheels) were built in wood until the end of the 19th century. Then, iron structures started to be preferred, being less bulky and more adjustable to the architecture of towers. In more recent years, anti-vibration junctions have been introduced in some cases in order to damp the forces originated by the fast rotation of the bells, which may damage the structure of belfries.

13 Falzoni 2014, 88.

14 Thanks to Matteo Padovani (member of the Associazione Italiana di Campanologia, president of the Scuola Campanaria Verona and member of the Associazione Suonatori di Campane a Sistema Veronese).

15 Some features of the Veronese system also match with the British change ringing. The origin of the Veronese hanging style (e.g. whether it descends from the Ambrosian one) is still a topic of debate: Bozzo – Patria 2016.



1: bell
2: cast-iron yoke
3: wooden isolator
4: fittings
5: rotation pin
6: ball bearing
7: clapper
8: handle
9: leather belt
10: safety lanyard
11: wheel
12: spokes
13: frame
14: driving rope
15: pulley
16: belfry floor
17: rope's attachment point.

Fig. 6: Schematic representation of the mechanical parts involved in the Veronese bell hanging style (from Matteo Padovani's drawing).

The bellringers generally perform their peals from the ground floor of the bell towers, sometimes from an intermediate level. The solemn peal requires one bellringer for each bell, or more for big bells. The first phase consists in ringing up the bells. Then, the performance of the musical peal is led by the director (or master), who has the task of calling the number corresponding to each bell (1 is the smallest bell), according to the order provided by the musical score, in which the numbers replace the musical notes. Whenever his own number is called, the bellringer pulls the rope so that the bell leaves its equilibrium position, and it performs a full-circle rotation with the emission of a single stroke. The sequence of the strokes can play any melody, according to suitably coded musical rules; it is also possible to play chords, ringing two, three or even four bells simultaneously.

Fig. 7: Bells of Verona Cathedral (Italy) in the "up" position during a manual solemn peal (photo by Matteo Padovani). The main bell, weighing 4566 kg, is the heaviest bell in the world that can be rung by hand in full-circle rotation.

The Veronese rings of bells are generally tuned in the major scale and can count from 5 up to 8 or 10 elements. Therefore, during a solemn peal, it is possible to play real pieces of music. In general, the repertoire is made of compositions written specifically for bells, but appropriate arrangements of the most well-known liturgical motifs exist and are regularly performed, such as Lourdes' "Ave Maria", "Salve Regina", "Tantum Ergo", "Christus Vincit", and "Regina Coeli"[16].

Peals are performed nowadays by a thousand bellringers, gathered in a hundred groups. Most of them belong to the two main Veronese bellringers' associations, namely the "Associazione Suonatori di Campane a Sistema Veronese" (founded in 1983) and "Scuola Campanaria Verona" (founded in 2010) which provide courses and lectures for learning the manual bell ringing technique. Those groups are also promoting double installations (electric motors and ropes for manual ringing). In fact, starting from the half of the 20th century, many rings of bells have been fully motorized and local bellringers' groups disbanded. Nowadays, even if almost all belltowers are provided with motors, it is possible to perform manual ringing peals in 78% of them. In

16 Sarti 2004; Padovani 2007, "Sistema Veronese".

modern installations, the electric motors pull the same ropes used by bellringers and can be disconnected in a few minutes. In more recent years, some belltowers adopted linear motors systems providing the same flexibility, while electric motors with chain transmission and double wheels, quite successful for the Ambrosian system, are not welcomed by Veronese bellringers due to the difficulties brought by those components in manual ringing.

4 Conclusion

The problem of protecting Italian bell heritage still remains open. Different bell ringing cultures require diversified approaches. Scientific research is needed about the interaction between the different hanging styles that can be found in Italy and the correct maintenance of manual and especially motorized bells[17]. The preservation of intangible bell heritage, linked to manual ringing techniques, should influence the choices made in the motorization process. However, the same method cannot be applied everywhere: the agreement signed in Bologna between bell ringers and local fine arts superintendency is exemplary, but it is possible only in a reality where bells are still held in high regard. In most parts of Italy, manual bell ringing tradition has completely disappeared. Nevertheless, it is necessary that bell installations are well maintained and safe, both for the population – bells in Italy are often placed on the windows of the towers – and for the bells themselves as cultural heritage and musical instruments. There is a need for dialogue with the responsible bodies (civil and religious) in order to make them aware of the issues raised by the bell installations[18]. The Associazione Italiana di Campanologia, founded in 2007, aims to safeguard Italian bell heritage and is available to provide general guidelines about bell installations or to indicate bell experts able to give advice on specific cases[19].

Bibliography

Avenali, Michele, Linee guida per la tutela del patrimonio storico. Allegato A dell'intesa operativa per la tutela e la valorizzazione del patrimonio campanario storico, Bologna 2019.

Bernasconi, Edy, Le campane di Genestrerio, Lugano 1982 (riedizione digitale 2006).

Biella, Valter, Campane e Campanari nella Provincia di Bergamo, Bergamo 1986.

Biella, Valter, I suoni delle campane. Una ricerca etnomusicale nel Bergamasco, Bergamo 1989.

17 As pointed out by Filippo Falzoni, scientific research about swinging bells focuses on flying clappers and the dynamics of falling clappers is still little known (Falzoni 2015, 67).

18 Falzoni 2015.

19 http://www.campanologia.org

Bonacini, Augusto, Campane e campanari. Storia, tecnica e polemica dell'arte campanistica delle provincie di Bologna e di Modena, Modena 1934.

Botta, Roberto L., "Appunti geografici e storico-religiosi per una mappatura dei maggiori concerti a sistema ambrosiano", in Quaderni Campanologici 2016, Como 2016, 8–14.

Bozzo, Alberto – Patria, Nicola, "Dialogo su origine e sviluppo di alcuni sistemi di suono", in Quaderni Campanologici 2016, Como 2016, 82–90.

Cantini, Sauro, Le campane di Siena nella storia della città, Siena 2006.

Falzoni, Filippo, Problemi di conservazione, manutenzione e valorizzazione del patrimonio campanario, Cilavegna 2014.

Falzoni, Filippo, "Le campane. Conservazione e restauro funzionale tra cultura materiale e cultura immateriale", Kermes – la rivista del restauro 97 (gennaio-marzo 2015), 65–70.

Fanti, Mario (ed.), Campanili e campane di Bologna e del Bolognese, Bologna 1992.

Lera, Guglielmo, "Le antiche campane di Lucca e del suo circondario e i maestri fonditori dei secoli XIII e XIV", Actum Luce 1 (1972), 37–55.

Lera, Guglielmo – Lera, Marcello, Sulle vie del primo Giubileo. Campane e campanili nel territorio della diocesi di Luni, Lucca e Pisa, Lucca 1998.

Margnelli, Simone – Bordoni, Paolo, Le Campane della Pieve di Edolo, Edolo 2017.

Migliorini, Pietro – Biella, Valter – Taccagni, Isidoro, "Il Sistema Ambrosiano", in Suoni di campane. Raccolta dei sistemi di suono tradizionali italiani ed europei, Bologna 2004, 27–41.

Montanari, Claudio, Il campanaro musicista. La tradizione delle campane nell'area bolognese, Lucca 2007.

Motta, Francesco, Campane e campanari in Brianza, Galbiate 2005.

Padovani, Matteo, Documenti di Campanologia – I sistemi di suono delle campane, Verona 2007.

Palmieri, Marcello, "Concerti e allegrezze. La musica delle campane", in Campane e Campanér. Rintocchi di storia cremasca, Crema 2007, 153–166.

Sarti, Gabriele, "Sistema Veronese", in Suoni di campane. Raccolta dei sistemi di suono tradizionali italiani ed europei, Bologna 2004, 49–56.

Sarti, Gabriele – Paltrinieri, Giovanni, "Sistema Bolognese emiliano", in Suoni di campane. Raccolta dei sistemi di suono tradizionali italiani ed europei, Bologna 2004, 9–26.

Walter, Werner H., "Ambrosianisches Läuten", Campanae Helveticae 7-8 (1999), 36–41.

Walter, Werner H., "Tessiner Glocken – Ambrosianisches Läuten", in Glocken – Lebendige Klangzeugen / Des témoins vivants et sonnants, Bern 2008, 76–83.

Konferenzprogramm

Dienstag, 20. September 2022

10:00 Uhr Begrüßung

10:30 Uhr Aktuelle Forschungen und Projekte des ECC-ProBell

- Was ist eigentlich ein ProBell-Klöppel?
  Grundlegendes zur Auslegung und Berechnung optimierter Klöppel
  Andreas Rupp; ECC-ProBell
- Klangveränderungen und Glockenschäden – Anwendung und Erfahrungen mit dem musikalischen Fingerabdruck von Glocken
  Michael Plitzner, Andreas Rupp; ECC-ProBell
- Einflüsse von Läutewinkel und Joch auf die Beanspruchung von Glockenkronen
  Ramona Frick, Andreas Rupp; ECC-ProBell
- Glockenantrieb und Läuteverhalten –
  Einfluss von Läuteparametern auf das Läuten
  Andreas Rupp, Michael Plitzner; ECC-ProBell

13:30 Uhr Glockenklang und Kulturerbe

- Aspekte zu Glockenguss und Glockenmusik als immaterielles Kulturerbe
  Michael G. Kaufmann; Hochschule für Kirchenmusik Heidelberg
- Bell chiming as cultural heritage: musical and contextual aspects
  Mojca Kovačič; ZRC SAZU, Institute of Ethnomusicology Ljubljana
- „Signum dare“ - Glockenklang und Kulturvermittlung

  Erfahrungen und Perspektiven aus Kärnten: „Was tut die Glocke?“
  Horst Ragusch; Tourismusverband Klagenfurt

15:45 Uhr Europäische Traditionen des Läutens und Schlagens von Glocken

- Unterschlagen - die Walliser Art des Glockenspiels
  Beat Jaggy; schlagwerkstatt, Verein Carillon-VS Wallis
- Slovenian synchronous ringing and its technical problems
  Tomaž Klopčič; KRN sistemi za avtomatizacijo d.o.o., Moravče
- Läutetraditionen in Österreich und Südtirol
  Jörg Wernisch; Österreichisches Glockenarchiv Wien

- The bell ringing cultures in Italy: characteristics, heritage, enhancement and issues
  Romeo Dell'Era, Paolo Bordoni; Associazione Italiana di Campanologia

17:45 Uhr Workshops

Mittwoch, 21. September 2022

9:00 Uhr Glockentechnik und Turmschwingungen

- Veränderungen in den Anforderungen für Restaurierung und Betrieb von Glocken- und Turmuhrenanlagen
  René Spielmann; Syneos GmbH Aarau
- Bauteile aus Holz - Tradition oder Moderne?
  Patrick Minkus; IngenieurGruppe Bauen Mannheim
- Kreative verlässliche Lösungen bei zu großen Glockenturmschwingungen
  Wolfram Kuhlmann; Technische Hochschule Köln
- Untersuchungen zur Schwinggeschwindigkeit als Bewertungsmaßstab von Glockentürmen
  Karl G. Schütz, Axel Greim; Dr. Schütz Ingenieure Kempten

11:30 Uhr Akustik und Klang

- Vom Lärm zum Wohlklang – Läuteglocken in offenen Türmen
  Christian M. Thesen, Jan Podzorski; H. Rüetschi AG Aarau
- Geläute heute – Automatisch extrahierte Audiomerkmale zur Klangbeurteilung von läutenden Glocken
  Marik Roos, Christoph Reuter;
  Institut für Musikwissenschaft der Universität Wien

14:00 Uhr Glocke – interaktiv – innovativ

Moderierte fachliche Diskussionen zu folgenden Themenbereichen:

- Europäische Läutekulturen
- Glocke & Technik
- Schutz und Erhalt von Glocken
- Klang von Glocken

16:00Uhr Abschluss und Ausblick