

Reviews and Meta-Analysis

Modernity in medicine and hygiene at the end of the 19th century: the example of cremation

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Significance for public health

An analysis of the significance for public health in a historical context helps us understand better some current problems of hygiene and public health. If medicine in the second half of the nineteenth century takes on some characteristics of modernity, hygiene, medicine and public health, occupational and social medicine are ideal areas for this new brand, also in relation to the major socio-political and economic changes of the time. One of the topics that was most discussed in the scientific-academic milieu was that of cremation. Hygienists were among the key players in an increasingly close inter-relationship between science and philanthropy. The scientific debate about cremation and operative tests were first developed in the 1870s, particularly in Italy. Soon, in all major European countries, the cremation movement took advantage of the positivist scientific and cultural milieu. Towards the end of the century, this new practice had a strong diffusion even outside Europe.

Abstract

Medicine in the second half of the nineteenth century takes on some characteristics of *modernity*. These characteristics are worthy of our attention because they help us to understand better some of the current problems of hygiene and public health. One of the topics that was most discussed in the scientific-academic milieu of the second half of the nineteenth century was cremation. There was a poetic precedent: the cremation of Percy Bysshe Shelley (1792-1822). The earliest apparatus to completely destroy the corpse was made in Italy and Germany in the 1870s. As far as hygiene was concerned, the reasons for cremation were not to pollute the water-bearing strata and an attempt to streamline the cemetery structure. As in an apparent schizophrenia, scientists of the day worked to both destroy and preserve corpses. There is also the unusual paradox that when the first cremations took place, the corpses were first preserved then to be destroyed later. The catholic world (mainly in Italy) and forensic scientists opposed cremation. It was left to the hygienists to spread the practice of cremation. An analysis of scientific literature shows us that if we leave out the related forensic and ethical problems, recent years have seen attention paid to any harmful emissions from crematoria equipment which have poured into the environment. Another issue is the assessment of inadvertent damage which may be caused by the condition of the corpse. Some topics, however, such as the need for preventive autopsies (first proposed in 1884 in Milan) are still a subject of debate, and seem to pass virtually unchanged from one generation to the next.

An interpretative paradigm of hygiene and medicine of the 19th century: modernity

Medicine in the second half of the nineteenth century takes on some characteristics of *modernity*, characteristics which are more or less evident according to the different disciplines. These merit consideration in a historical context in order to help us better understand some current problems of hygiene and public health. Hygiene, medicine and public health, occupational and social medicine are ideal areas for this new *brand*, also in relation to the major socio-political and economic changes of the times. One of the topics that was most discussed in the scientific-academic milieu of the second half of the nineteenth century was that of cremation.^{1,2} Doctors were certainly key players. But it was particularly the hygienists who were the main protagonists, especially in large cities, of an increasingly close inter-relationship between science and philanthropy. The scientific debate on cremation and operative tests grew in the 1870s, in particular in Italy.³⁻⁸ Soon, in all the major European countries, the cremation movement took advantage of the positivist scientific and cultural milieu. Towards the end of the century, this new practice had a strong diffusion even outside Europe. Considering this debate, we can give ourselves an interpretative paradigm which is useful to analyze certain scientific and public health events of the last quarter of the nineteenth century. The historical context⁹ is of significance in both a relative sense (regarding the history of hygiene, medicine and public health) and also in general terms.

A poetic precedent

On July 8, 1822, the corpse of Percy Bysshe Shelley (1792-1822), the poet of *Prometheus Unbound*, and the husband of Mary Wollstonecraft Godwin (1797-1851), author of *Frankenstein*, returned from the waves of the Tyrrhenian Sea onto the beach of Viareggio after a shipwreck. Only a funeral worthy of the Lydian *Τυρρηνός*, son of Heracles and Ati, or reminiscent of Etruscan mythology could worthily honour the life of the young poet the loss of whom was so devastating. His friends, George Gordon Noel Byron (1788-1824), Edward John Trelawny (1792-1881), and James Henry Leigh Hunt (1784-1859), prepared a pyre to reduce Shelley's corpse to ashes. His remains were then placed in the English Cemetery in Rome while his heart was kept by his widow.^{10,11} It was a symbolic modern representation of an ancient cremation. It gave a romantic dimension to what had been a common practice in the world of classical antiquity before Christianity had relegated it to the margins of Western society. This romantic vision was then handed

down in art,¹² although the artistic record does not fully agree with historical fact; the artist set the scene in winter, but Shelley actually died in the summer.

An ethnic-religious precedent

On November 30, 1870, a 20-year old Indian, H.H. Kshatriya Kulawatasana, Sinhasanadhishwar Shrimant Raja Rajaram I Bhonsle Chhatrapati Maharaj Bahadur (1850-1870), Raja of Kolhapur from 1866 to 1870, of the Bhonsle dynasty, died in Florence while returning to India by road from London after a European tour. He had been a ruler who held modern views and had begun work to improve the living conditions of his subjects, and especially the citizens of Kolhapur. A pyre was prepared at the confluence of the rivers Arno and Mugnone and his body was burned according to the brahminical funeral tradition; his ashes were scattered in the waters of the two rivers. In those days, the capital of the Kingdom of Italy had been moved from Florence to newly conquered Rome.¹³ A monument, built in 1874 by the Englishman Charles Francis Fuller (1830-1875),¹⁴ gives testimony to that unique event for which the Council of Ministers of the Kingdom of Italy had made an exception in giving their approval for the ashes to be scattered there. Even today, the far end of the Parco delle Cascine is called The Indian's park. Nearby, there is also a bridge named after him which was built in 1978.

Precursors and innovators

As always, some men have a future vision and inspire innovation. In the field of modern cremation, Abbot Scipione Piattoli (1749-1809) from Modena is worthy of being remembered. In 1774, he suggested adopting the ancient tradition of incineration for reasons of hygiene.¹⁵ He wrote a thesis on the subject and in spite of the debate it aroused, the text was translated into French¹⁶ and annotated by Félix Vicq d'Azyr (1746-1794).^{16,17} Piattoli is also remembered for his work at the court of Stanisław August Poniatowski, King of Poland (1732-1798) and participated in the drafting of the Polish Constitution of May 3, 1791. In revolutionary France, legislative proposals (21 Brumaire, a. V-11 November 1796 and 14 Floreal, a. VII -3 May 1799) granted citizens the freedom to be cremated. In the mid-nineteenth century, a lecture by Jacob Grimm (1785-1863) at the Berlin *Academie der Wissenschaften* (November 29, 1849)¹⁸ revived the debate on cremation in the Parisian press, and in Padua in 1857, Ferdinando Coletti (1818-1881) provided a description of the cremation of corpses similar to those to be found in the Parisian press.¹⁹ In London in the same year, a book by an anonymous author proposed that cremation should be adopted on the grounds of public health needs;²⁰ the volume is attributed to Charles Cobbe.

An apparent dilemma: save or destroy the corpses?

In an old Romantic and positivist Europe, the attitude towards the corpse now swings between two opposite extremes: the search for indefinite storage and research into methods of complete destruction. Neither goal was completely achieved but sometimes scientists managed to come incredibly close. There are references to cultural and historical ideals about conservation or about destruction of corpses that

hark back to ancient civilizations.^{21,22} The interest in ancient Egyptian civilization, the archaeological excavations, the deciphering of the hieroglyphics, and the arrival in the West of large quantities of artifacts, had all helped improve our understanding of the practice of mummification. Regardless of the link between conservation practices with medicine and surgery, the very availability of corpses preserved from ancient times confirmed a number of practices that had been proposed over the centuries. This is demonstrated by the preservation of the corpses of Popes. Among the most well-known scientists who devoted themselves to research on embalming or petrification were Jean Nicolas Gannal (1791-1852), Girolamo Segato (1792-1836), Paolo Gorini (1813-1881), Lodovico Brunetti (1813-1899), and Efisio Marini (1835-1900). In some cases, the procedure adopted was never made public (as in the case of Segato and Marini). There were artistic, literary, archaeological, iconographic, and cultural references to the ancient practice of partial (or total) destruction of the corpse.²³ The development of nineteenth century archaeological excavation also contributed much new knowledge on the subject, and helped to confirm the spread of cremation practice in antiquity. At the end of the nineteenth century, two choices appeared which offered alternatives to burial and which favored hygiene requirements. The prevailing tendency was to restrict the practice of conservation of corpses to eminent personalities for cultural or historical reasons in individual countries (or supranational communities), but preservation of corpse of persons with no special status are also reported. In the case of indefinite storage of bodies, their small number would not affect the problem of the location and size of cemeteries. This problem was particularly felt in Italy, partly because of the influence of the Vatican.

The destruction of corpses: evolution of techniques and equipments

The first practical apparatus to completely destroy corpses was made in Italy and Germany in the 1870s.²³ The first Italian crematorium opened on February 21, 1876 in Milan; the second was in Lodi in 1877. The crematorium in Gotha was opened on May 26, 1878. In 1872-1873, various methods of incineration of corpses were proposed in Italy. Paolo Gorini thought about dissolving them in a molten liquid.²⁴ Ludovico Brunetti considered the use of reverberatory furnaces²⁵ and Giovanni Polli (1812-1880) proposed the use of illuminating gas as fuel.²³ Brunetti presented his results at the Universal Exhibition in Vienna in 1873 and they aroused great interest among the French and British delegates. Within a short time, cremation companies had been established. One example is the Cremation Society of England which was founded in 1874, although the Woking Crematorium was only built five years later²⁶ and became operative in 1885. The experiences of Brunetti speeded up technical progress, but it was Polli's system which was the first to be adopted. On February 21, 1876, in Milan, the corpse of Alberto Keller (1800-1874) was cremated.²⁷ His corpse was incinerated by fire from 285 illuminating gas burners. The system proved not to be completely reliable because of its technical complexity. This resulted in significant maintenance costs and it proved to be a rather uneconomical process. A simpler, more efficient, economical and practical system was proposed by Gorini, who had by this time abandoned his experiments with molten liquid. His crematorium, which he called Lodigiano in honour of his hometown, Lodi, used bundles of wood²⁷⁻³⁰ and had no mechanical parts or fuel tanks. It could be mounted on a gun carriage or a wagon (including rail) and could then be transported for use after battles, epidemics, or natural disasters. In Dresden, Germany, Friedrich August Siemens (1826-1904) introduced his model of crematorium; the first legal cremation was held in Gotha in 1878.³¹

The model was based on the production of gas and the heating of a large mass of air; characteristics which attracted interest from industry.^{32,33} The technical problems to be met were: the need for a quick cremation, absolute and complete cremation, exclusive use of the facilities, no malodorous gases or vapours to be produced, no noise, production also of ash, esthetic respect and sensitivity, low cost, the possibility of performing cremations in sequence. In the last decades of the nineteenth century, the various crematorium models proposed solved some but not all of these problems. One of the most important problems was the perception of the cremation process as being the equivalent of industrial disposal of waste. In some models of crematorium (like the Siemens), the corpse was made to disappear down into the basement (where the heating facilities were) or the process of cremation was hidden from the view of those present. In the first crematorium in Milan (Polli-Clericetti), the crematory area was visible by all and this reflects the grounds on which the practice was presented in terms of a *new civil religion*.^{4,23}

The preservation of corpses: evolution of techniques and equipment

The names of Jean Nicolas Gannal,³⁴ Girolamo Segato,³⁵ Paolo Gorini, Lodovico Brunetti and Efisio Marini have already been mentioned. Gorini and Brunetti were both working at the same time on research into the preservation and destruction of corpses. Experiments on petrification were already being conducted in Europe. This technique consisted of soaking the body in or injecting it with metal salt solutions through the vascular system, or both at the same time. There could have been various objectives: the desire to preserve the corpses of famous people, the need for cadaveric preparations that could maintain some useful features for scientific use (consistency of soft tissue, joint flexibility), or the need to preserve the organoleptic properties of edible meat over time facilitating imports from overseas countries. Some preservation methods, such as those of Segato and Marini's, remained secret. Giuseppe Tranchina (1797-1837) used arsenic and cinnabar; Bartolomeo Zanon and Angelo Comi used corrosive sublimate. In France, Jean-Nicolas Gannal injected one of the carotid arteries with a solution of aluminium salts and put the method on the market. Paolo Gorini presented his anatomical preparations to the Meeting of the Italian Scientists in Milan in 1844 and to the Medical School of Pavia in 1846.³⁶ He proposed the use of this preparation method also for preserving meat and it was presented as improving meat imports from the Americas and Australia. Gorini produced four different types of anatomical preparation: mummified parts (such as those of ancient Egypt), petrified parts (such as those of Segato), parts that kept volume, shape and color, and translucent parts that maintained a degree of flexibility. Brunetti, however, proposed a tanning method, injecting tannic acid diluted in distilled water. This was similar to tanning treatments of the time, before the introduction of chrome tanning.^{37,38} The corpses of Alberto Keller and Anna Pozzi Locatelli were preserved by injection and wetting with alcohol, phenol, sodium acetate and arsenious acid.^{23,24} Gorini employed two different methods which have recently been clarified. The first, faster, but less effective method, involved the use of 10% sulphuric acid. The second, which could take months or even years to carry out, involved the use of saturated alcoholic solution of dichloride of mercury and muriate of calcium (10:1). Gorini used this method to preserve the body of Giuseppe Mazzini (1805-1872) with excellent results.³⁹ The success of the procedure was recently verified at the signing of the Treaty of Maastricht (1992) when the body of Mazzini was exhumed. Gorini had met Mazzini in London in 1851 when he presented his anatomical preparations to the English

scientific community.⁴⁰ The preservation of Mazzini's body was also a symbol for a positivist, Masonic, republican Italian minority at that time.⁴¹

The hygienic reasons for cremation: not to pollute the water-bearing strata and to streamline the cemetery structure

Throughout Europe, the nineteenth century saw the rapid urban expansion of the more densely populated centres. This meant that the suburban cemeteries were quickly incorporated into the fabric of the city and this gave rise to a new awareness of the problem of the effects of interment on the environment. Which would be the best public health service in view of the specific regulations of the police mortuary? Did the cemeteries pollute groundwater and threaten the water supply?

The city of Milan, in northern Italy, is an example of the thoughts and actions of the hygienists of that time. In Milan, the rivers run from north-west to south-east and along their course the height of the city above sea level decreases from 147 meters to 102 meters. In the 1870s, there was no organized sewage system and no aqueduct capable of serving the whole city. As the main cemetery was located northwest of the city, concern was given to the possibility that the presence of burial sites could pollute the soil and damage the quality of the civic water supply. The Royal Lombard Institute of Science and Letters, an academic institution in Milan, proposed a study on the subject in 1873. The study lasted five years and the results were published by the hygienist Angelo Pavesi (1830-1896) and the engineer Ermenegildo Rotondi (1845-1915). They showed that there was a polluting effect which could be attributed to the presence of the cemetery.⁴² The adoption of a policy to cremate corpses would certainly have solved the problem of possible groundwater pollution, but it could also change the policies of construction and location of public cemeteries.⁴³ It would be possible to construct urns capable of holding large amounts of cremated remains to be stored in a relatively limited space, and these could be kept over a long period of time. The urban location would no longer be a problem or an obstacle.⁴⁴

An apparent schizophrenia: working to destroy and maintain the corpses

Paolo Gorini is not the typical figure of a scientist, if we consider him in the light of our modern ideas. However, he is typical of the Positivistic period (even if he partially lived during Romanticism) and is a bridge between a time when the contributions of the natural sciences still provided the basic scientific structure and a time when science became more *modern*.⁴⁵ Mathematician, son of a mathematician, Gorini developed an interest in science at an early age and became involved in the characteristics of combustion and the preservation of foodstuffs.²⁴ These naive experiments were interrupted by the death of his father (1825), but show us some of the interests that Gorini would not abandon throughout his life-time. Could they almost be defined in psychiatric terms? Two sides of the same coin? A dissociative trait? A response to phobias? He was also involved in experimental geology, investigating the formation of volcanoes and, indeed, a new role for geological testing: applying his theories to the *three kingdoms* of nature. Invited to London in 1851, Gorini set up his experiments into the artificial formation of volcanoes, and also presented his anatomical

preparations.⁴⁰ At the same time, Gorini was carrying out research that would lead him to develop effective methods of preservation and destruction of corpses.²⁴ The Italian hygienists would support him in his extensive studies, which were outside the realms of academia; he did not, however, have the support of geologists. Gorini returned to London to supervise the construction of the crematorium in Woking in 1879.²⁶ From 1869, Lodovico Brunetti was the first professor of pathological anatomy at Padua. He introduced a vision of Viennese modernity and saw the museum to be an educational tool to spread culture and knowledge.⁴⁶ At the same time, he worked on anatomical preparations and, one of the first to experiment with cremation procedures, he used a reverberatory furnace. These two figures are symbolic of how scientific interests, which may appear to be in contrast, come together in the service of public hygiene.^{24,47,48}

The paradox of the first cremation: corpses first preserved, then destroyed

Alberto Keller, originally from Zurich, had lived in Milan from 1820 until his death (January 22, 1874), reaching a prominent position in the silk industry. In his will, Keller ordered his body to be burned, asking Polli to take charge of the necessary arrangements. Polli had, since 1872, been one of the first advocates of cremation.⁴⁹ In the absence of a law authorizing this, and without suitable facilities, two years passed before his wishes could be granted. Only on January 22, 1876, exactly two years after his death, was his body cremated at the Monumental Cemetery in Milan. The remarkable paradoxical story of Keller, or rather the story of his body being preserved and then destroyed or kept, waiting to be permanently destroyed, was brought to an end. What a few years before could only be considered a utopian wish had become fact. The family had supported the financial burden of the construction of the crematorium chapel and the Milan City Council had provided the area in the Monumental Cemetery free of charge.^{27,50} The second cremation, which took place March 24, 1876, was performed on the preserved corpse of Anna Pozzi Locatelli who had died five months and two days before.⁵¹ The corpses were preserved by injection and wetting with alcohol, phenol, sodium acetate and arsenious acid. The cremation altar was made by Polli, by the engineer Celeste Clericetti (1835-1887) and the architect Carlo Maciachini (1818-1899). Only one more corpse was cremated with the Polli-Clericetti system using illuminating gas, for experimental purposes, on April 17, 1877; the system was later abandoned because it proved to be too expensive.

Criticism of cremation: the catholic world and the forensics

In the second half of the nineteenth century, the newly formed Kingdom of Italy was in open conflict with the Catholic Church. It is easy to understand how some political and social currents related to Freemasonry could approve the spread of the idea of cremation as a *new civil religion*. Equally understandable is the valiant opposition to cremation of the Catholic hierarchy, especially in Italy. The Vatican decree of May 19, 1886, officially condemned the practice of cremation, associating it to Freemasonry and launching an excommunication against their members. There was very little, if any, religious opposition to cremation to be found in the rest of Europe and the world at large. There was little doubt about the hygienic advantages, even among its detractors, along with those few who were opposed to the use of incineration to deal with bodies on the battlefield. The dramatic

pages written by Henry Dunant (1828-1910) in his *A Souvenir de Solferino* are well-known and we know that conditions of the battlefield did not change throughout the nineteenth century. However, the strongest objections to the spread of cremation came, in fact, from the world of medicine. They might have been catholic doctors, such as Antonio Rota (1838-1897),⁵² who pointed out the inherent contradiction of those who, like Gorini and Brunetti, promoted the cremation and preservation of bodies. However, the doctors first of all considered the legal aspects, in relation to the ultimate destruction of potential criminal evidence; this was an objection which was difficult to answer.⁵³⁻⁵⁶ Greater and more rigorous regulation of the procedures prior to cremation were needed; it was only possible to try to prevent the cremation taking place. In fact, once the cremation had taken place, no further investigation could be carried out. So, one of the answers, although inherently weak, was related to the very small number of crime cases resolved by exhumation of the corpse.

The response to forensic objections: free autopsies

An effective response to the forensic objections to cremation was found in Milan, a city that had been among the first to institutionalize modern cremation.^{56,58} In 1881, Prospero Moisè Loria (1814-1892), a Jewish merchant from Mantua who had lived in Milan for many years, donated 20,000 Italian lire to the Milan City Council. The revenue (estimated at about 1000 Italian lire per year) was to be used to create a municipal service offering free autopsies. This would have allowed relatives to know the cause of death of one of their family. Moreover, performing the autopsy before the cremation of the body, it would have responded to forensic objections in avoiding the risk of destroying the bodies of deceased persons involved in criminal investigation. This was the main reason for offering free autopsies and this was also confirmed by the fact that any assets left over were allocated to the Society for the Cremation of Corpses, which ran the cremation service on behalf of the Municipality of Milan. The practice of free autopsies was an issue of epidemiology, environmental health, occupational medicine and medical genetics. In fact, autopsy could bring to the light possible causes of death through being guilty of crime, by accident, environmental or occupational hazards, or atavism. This promotion of public health fitted perfectly with the dictates and practices of public hygiene. Responsibility for the autopsy room was entrusted to Andrea Verga (1811-1895), a famous phrenologist and director of the Maggiore Hospital in Milan from 1852 to 1865. Dissection of cadavers was carefully performed at the request of another doctor, Achille Visconti (1836-1911), director of the pathological anatomy unit at the Maggiore Hospital, or by Ambrogio Beretta, a city council doctor. The institution worked for decades and, in fact, in 1890, one of the autopsies confirmed the first case of human pulmonary actinomycosis in Milan.

The proponents of a new civil religion: hygienists in the front row

The hygienists were the main role players in the spread of cremation. The *Society for the Cremation of Corpses* was established in Milan in 1876. This was the first independent organization to manage a crematorium. Of its 130 members, 19 were hygienists who would later go on to found the Italian Society of Hygiene. This still exists today and is known as the Italian Society of Hygiene, Preventive Medicine and Public Health. Many of the members had taken part in the struggle for

Italian national unity and were affiliated to Freemasonry. This underlines the close ties between men of ideas and the principles of cremation and hygiene. The two themes were the subject of constant and energetic discussion at both national and international medical conferences. The life of the Italian Society is very interesting and it provided the main point of reference for carrying out cremations.

The idea of cremation had been born in a small, scientific, hygienist environment, and had been proposed and tested through academic channels. The idea had developed, however, due to the engagement of individual researchers in the early 1870s. Supported by Masonic circles, it was part of the positivist vein of thought which at that time was very strong, and began to spread through the Cremation Society from 1876 onwards.⁵⁸ However it was still, at least in Italy and unlike, for example, in Germany, an elitist choice. When the leading members of the Society (Gaetano Pini (1846-1887)^{60,61} and Malachia De Cristoforis (1832-1915)⁶¹⁻⁶⁴ helped to found the Italian Society of Hygiene in 1879, propaganda activities in favor of cremation were quickly developed at a high level. Even in terms of publishing, to continue with a *self-bulletin* didn't make sense; the *Journal of the Italian Society of Hygiene* offered a better and more influential stimulus to the cremation ideal. Hygienists could not be indifferent to new progressive ideas. And so it was. In the early years of the *Journal*, along with detailed reviews of news concerning the development and spread of cremation^{65,66} in Italy and abroad, wide-ranging essays,^{29,67} including independent monographs, appeared.^{28,50} The close link between the Society of Hygienists and the promoters of the cremation ideal did not weaken in the following years. The work of the International Commission of the Society of Cremation always found an echo in the publications of the hygienists. At the Royal Italian Society of Hygiene, Pini and De Cristoforis produced important monographs that provide a bibliographic basis for historical analysis.⁶⁸⁻⁷⁰ It must be remembered, however, that some high-level Italian hygienists, as well as Paolo Mantegazza (1831-1910), were opposed to cremation.

The state of art of cremation in the world at the end of the 19th century

In 1890, Malachia De Cristoforis wrote a geographically based bibliographic review,⁷⁰ which was exhaustive for the time. It included both papers in support of and against cremation. Even with some errors and repetitions, he published a census of cremations: 150 Italian, 261 German, 127 French, 147 British, 45 Americans (North, Central and South), 67 Netherlands, 17 Swedes, Norwegians and Danes, 18 Swiss, 16 Belgian, 8 Spanish and Portuguese, 18 Austro-Hungarian and 2 in Asian countries. The members of the International Commission in office before the death of Pini (De Cristoforis was the president and Pini the secretary) came from the following countries: Italy (2), France (4), Belgium (2), Germany (3), Russia (2), the United Kingdom (2), Switzerland (4), Greece (3), Spain (3), the Ottoman Empire (1), Austria (1), Hungary (1), the Netherlands (3), Romania (2), Portugal (2), the United States of America (3), Denmark (2), Sweden (2), Canada (1), Bulgaria (1), Mexico (1), and Chile (2). At the end of the nineteenth century, a first overview of the global spread of cremation could already be drawn.⁶⁸ Chronologically, the German states could be considered the birthplace of the studies,¹⁸ but the first organizations only began collaborating with the Italian societies in 1880, when the International Congress of Hygiene of Turin, held a special session in Milan dedicated to cremation. However, the growing practice of cremation, the number of associations, and the spread of specific periodical publications were remarkable.^{71,72} If Austria-Hungary had approached the idea of cremation through Brunetti's lectures at the Exhibition of

Vienna in 1872, in Switzerland the ideas of the cremation movement had also been widely circulated. In Geneva, even some of the founder members of the Red Cross together promoted the growing adoption of cremation methods.⁷³ In the UK, Dr Henry Thompson (1820-1904)⁷⁴ also promoted the idea of cremation,⁷⁵ and it spread rapidly, thanks to the debate which followed the publication of his articles in the *Contemporary Review*. In 1874, articles appeared on the proposals of cremation in *The Lancet*, *Iron*, *Medical Times and Gazette*, *Guy's Hospital Gazette*, *Medical Record*, *British Medical Journal*, and *Sanitary Record*.⁶⁸ However, as already mentioned, the first legal cremation was only carried out in 1885 in Woking. The work of Thompson and the British cremation movement⁷⁶ had repercussions throughout the continent. For example, Thompson's work was translated in Denmark.⁷⁷ The *British Medical Journal* distinguished itself in providing regular statistics and detailed information on the cremation movement in the United Kingdom,⁷⁸⁻⁸⁰ the articles by Thomas Spencer Wells (1818-1897) are of particular interest.^{81,82} In the period before the First World War, articles appeared in the *British Medical Journal* giving detailed information on the spread of cremation in the world.⁸³⁻⁸⁷

Even in France, after the interest shown over the previous fifty years, the revival of cremation was reported by Prosper de Pietra Santa (1820-1898) through an article which appeared in the *Annales d'Hygiene* in 1984.⁸⁸ De Pietra Santa was one of the founders of the French Society of Hygiene. Together with Max de Nansouty (1854-1913), De Pietra Santa published an account of the spread of cremation in the world in the early 1880s,⁸⁹ and ten years later the effects of this could be seen in the progress made.⁹⁰ The Belgian contribution to the spread of cremation was the creation of mobile crematoria.^{91,92} In the Netherlands, Sweden and Norway, the cremation movement was structured in the 1880s and Denmark proved to be particularly sensitive to the message. The situation was more problematic in the countries of the Iberian Peninsula, in Russia and the Balkans.⁶⁸ If the modern cremation had spread mainly from European countries, we must not forget the situation in the Americas.⁹³ We can well understand how, since 1874 when the new ideas came from overseas, the development of cremation practices in North America was rapid and solid.⁹⁴ There were close ties with hygienists in the European movements and the old continent.⁹⁵ However, the situation in South America provides some interesting data. In 1884, and after the cholera epidemic of 1886, the Republic of Argentina established compulsory cremation in case of death due to infectious diseases; this was not only in the event of epidemics or disasters.⁹⁶ The Asian continent was a reality in which cremation took on completely different characteristics. Towards the end of the century, in Africa, cremation was only reported in Egypt.⁷⁰ The cremation movement gained respect in other fields relating to hygiene, with the production of texts which analyzed the phenomenon and its prospects on a global scale.^{68,70,89,94,96}

Cremation today in relation to hygiene: analysis of scientific literature

Putting aside the forensic and ethical problems related to the cremation and cremation-related certification, attention in recent years has been given to any harmful emissions from crematoria equipment poured into the environment.⁹⁶⁻¹⁰⁰ This reflects a different sensitivity to environmental conservation and a greater presence of environmental health issues in medicine.

Another theme is the assessment of damage caused by the inadvertent condition of the corpse, such as the presence of pacemakers.¹⁰¹⁻¹⁰⁵ However, the theme of the best location of the crematoria in relation to

urban centers has not been overlooked.¹⁰⁶ We must not forget that the problems of cemetery crowding were partially mitigated by the increase in cremations. The philosophical ideal of the choice of cremation is no longer one of breaking with traditional principles, since the Catholic Church has, in fact, recognized the spread of cremation practice in ever larger parts of the population.¹⁰⁷

Some topics, however, such as the need for preventive autopsies, do not cease to be a subject of analysis, and seem to pass virtually unchanged from one generation to the next.¹⁰⁸

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