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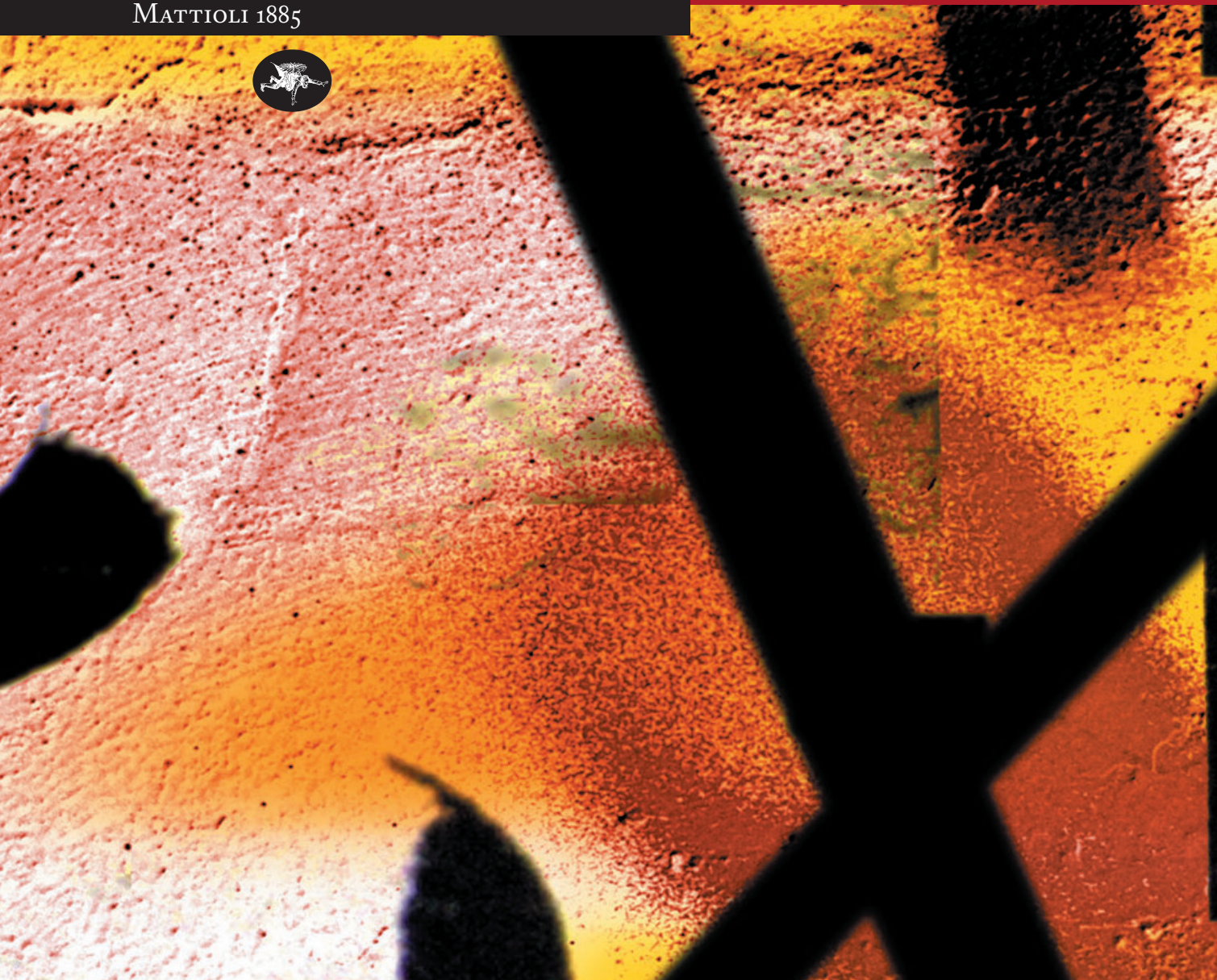
# MEDICINA HISTORICA

*Organo Ufficiale della Società Italiana di Storia della Medicina*

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MATTIOLI 1885



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# MEDICINA HISTORICA

ORGANO UFFICIALE DELLA SOCIETÀ ITALIANA DI STORIA DELLA MEDICINA

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## Editoriale

Il 52° congresso nazionale della nostra Società, organizzato alla perfezione e con successo dal professor Michele Riva dell'Università Bicocca, a Monza dal 12 al 14 giugno, è la miglior prova della nostra vitalità e della nostra operosità scientifica. I tre giorni hanno visto impegnati gli storici della medicina italiana. Sono stati quindi un momento di confronto tra di noi, pur tra le molteplici differenze, ma altresì un'occasione preziosa per avviarsi verso le nuove frontiere che la disciplina deve affrontare, con le varie componenti societarie: cultori, studiosi, liberi professionisti, ospedalieri, universitari. Molte cose sono cambiate e stanno ancora cambiando. Le straordinarie trasformazioni scientifiche agiscono sulla prassi clinica dei medici e dei chirurghi e si riflettono anche sul nostro compito di guardare il passato. Gli autorevoli trattati e i manuali lasciatici dai nostri maestri non hanno perso significato e restano sempre validi, ma il tempo che passa e ci presenta tante novità, invita a scrivere in chiave aggiornata la storia. A Monza abbiamo confermato la nostra identità di storici medici che non si confonde con le altre tante identità presenti nell'orizzonte vasto dell'impegno storiografico. Abbiamo un'articolazione di indirizzi di ricerca, sui diversi campi riconosciuti all'interno della declaratoria del settore scientifico disciplinare universitario (Med02), sì da poter servire efficacemente gli impegni della didattica dei molteplici corsi di laurea di area medica, ma pure quelli di tradizione umanistico-letteraria. Siamo storici della medicina, quindi le *Medical Humanities* hanno sempre fatto parte dell'humus fondante della nostra associazione. Ma sappiamo bene che il nostro ruolo verso i colleghi della medicina militante in ricerca e assistenza è molto più riconoscibile dentro i confini della *Metodologia clinica*, dove la conoscenza sempre aggiornata della storia è indispensabile per confrontarsi con lo sviluppo del procedere diagnostico e curativo, in stretta consonanza con le problematiche delle semeiotiche, della interpretazione del processo diagnostico e del mutare degli indirizzi terapeutici. La nostra società ha da sempre valorizzato l'area culturale delle *Medical Humanities*, casa di tante diverse competenze, ma brilliamo sempre per la nostra identità specifica e non vogliamo decampare dal nostro compito. La nostra Società, che ha attraversato tutto il secolo scorso ponendosi costantemente come autorevole punto di riferimento per gli studiosi di storia della medicina, oggi come in passato, è ancora un punto di forza utile ad affrontare le problematiche nuove del mondo universitario che deve aggiornarsi. Il Congresso di Monza, con i temi scientifici trattati e con la partecipazione così ampia di tutti i nostri soci e di tanti amici, ha dimostrato quanta energia ci anima sempre e ci fa crescere. E ci ha anche confermato il ruolo della Società Italiana di Storia della Medicina.



## Editorial

The 52nd National Congress of our Society, successfully organized to perfection by Professor Michele Riva of the Bicocca University, in Monza from the 12<sup>th</sup> to 14<sup>th</sup> June, is ultimate proof of our vitality and our scientific industriousness. During the three days many Italian medicine historians were involved. These 3 days were therefore a moment of confrontation between us, despite the many differences, but they were a precious opportunity to move towards the new frontiers that the discipline must face with the various members of the Society: researchers, researchers, professionals, hospitals, university. Many things have changed and are still changing.

The extraordinary scientific transformations act on the clinical practice of doctors and surgeons is also reflected in our task of looking at the past. The authoritative treatises and manuals left to us by our masters have not lost their meaning and are always valid, but the time that passes and presents us with so many novelties invites us to write to keep the story up-to-date. At Monza we have confirmed our identity as medical historians that can not be confused with the many other identities present in the vast horizon of historiographical commitment. We have an internal articulation of research guidelines, on the various fields recognized within the declaratory of the university disciplinary scientific sector (Med02), so as to be able to effectively serve the didactic commitments of the many degree courses in the medical area, but also those of traditional humanistic-literary. We are historians of medicine, so Medical Humanities have always been part of the humus founding of our association. But we know very well that our role towards colleagues in militant medicine in research and assistance is much more recognizable within the confines of Clinical Methodology, where the constantly updated knowledge of history is indispensable for dealing with the development of diagnostic and curative procedures, in close consonance with the problems of semiotics, of the interpretation of the diagnostic process and of the changing of therapeutic approaches. Our society has always enhanced the cultural area of Medical Humanities, home of many different skills, but we always shine for our specific identity and we don't want to decay from our task. Our Society, which has traversed the entire last century constantly placing itself as an authoritative point of reference for the researchers of the history of medicine, today as in the past, is still a useful strength to face the new problems of the university world that must be updated. The Congress of Monza, with the scientific topics covered and with the broad participation of all our members and many friends, has shown how much energy always animates us and makes us grow. And it also confirmed the role of the Italian Society of the History of Medicine.

# The teaching of anatomy throughout the centuries: from Herophilus to plastination and beyond

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**Abstract.** Cultural changes, scientific progress, and new trends in medical education have modified the role of dissection in the teaching of anatomy in today’s medical schools. Dissection is indispensable for a correct and complete knowledge of human anatomy, which can ensure safe as well as efficient clinical practice and the human dissection lab could possibly be the ideal place to cultivate humanistic qualities among future physicians. In this manuscript, we discuss the role of dissection itself, the value of which has been under debate for the last 30 years; furthermore, we attempt to focus on the way in which anatomy knowledge was delivered throughout the centuries, from the ancient times, through the Middle Ages to the present. Finally, we document the rise of plastination as a new trend in anatomy education both in medical and non-medical practice.

**Key words:** anatomy, dissection, medical education, wax modelling, body donation, plastination

## 1. Introduction

Dissection is indispensable for a correct and comprehensive knowledge of human anatomy which can ensure both safe and efficient clinical practice and the human dissection lab could possibly be the ideal place to cultivate humanistic qualities among future physicians in the 21<sup>st</sup> century (1, 2). Nevertheless, cultural changes, scientific progress, and new trends in medical education have modified the role of dissection in teaching anatomy in today’s medical schools. Towards the end of 20<sup>th</sup> century dissection was the core basis in medical education. Even today defining the exact anatomical site of a lesion is crucial for a physician to resolve a problem effectively and safely. Therefore, adequate anatomical knowledge is essential for surgeons and anyone performing an invasive procedure on a patient. Anatomical knowledge is also pivotal to com-

plete a medical examination, to make a diagnosis and also to properly communicate with colleagues. To date worldwide curricula reforms, which have resulted in a reduction both in the gross anatomy teaching hours and its context, lead to a serious re-examination of the way in which anatomy is taught (3, 4).

### *1.1 Human dissection from the Ancient times to the Middle Ages*

Human cadaveric dissection has been the primary way of teaching gross anatomy to medical students for centuries. Before any “scientific” autopsies and formal teaching in ancient times were established, an early attempt to explore the inner structure of the human body was made by pre-historic people. This often coincided with invasive interventions such as the cranial trepanations still visible on skulls from the Palaeolithic. Those

traces have sometimes been interpreted as surgical operations, following traumatic or pathological events as would be suggested by the evidence of new bone formation at the margins of the excised area, although purely religious or medico-magical rituals have also been proposed as a valuable explanation (5, 6).

According to Porter (7), the ancient Egyptians were the first people to recognize medicine as a craft; moreover, dissection was more a ritual needed to eviscerate the bodies in the final step of the embalming process, than a scientific procedure being required as a rite of passage to the kingdom of the dead (1, 8): the mummification practices, which required the removal of internal organs, most notably lungs, livers, intestines and stomach, destined to canopic jars (9, 10), failed to provide the ancient Egyptians with an exact anatomical knowledge. As a matter of fact, the embalming process only required a small incision (e.g. a left oblique inguinal one) to remove the viscera and the priests who carried out the process were not primarily interested in studying the extracted organs (5).

The introduction of systematic human cadaveric dissection represented a milestone in the history of medicine: in the 5<sup>th</sup> century BC, the development of Greek medicine culminated with Hippocrates (c. 460-c. 375), who founded a medical school in Kos (Dodecanese); Herophilus (c. 335-c.280 BC), a disciple of Praxagoras of Kos (born 340 BC), later became a well-respected anatomist of the so-called Alexandria School during the 3<sup>rd</sup> century BC (11-13) and together with his colleague Erasistratus of Ceos (fl. c. 250 BC), became the first Greek physicians to perform systematic dissections of human cadavers in the first half of 3<sup>rd</sup> century BC (11), elevating cadaveric dissection to a fundamental tool for learning anatomy. However, after the deaths of Herophilus and Erasistratus, human dissection first decayed in Alexandria and subsequently across the Hellenistic world (13).

After the glorious Alexandrian season, the fall of the Western Roman Empire and the beginning of the Middle Ages, limited advances were made in the study of human anatomy (14); physicians could therefore only follow the works of the eminent figures from past such as Aristotle or Galen, without seriously questioning their scientific validity (15). It was only in the early 14<sup>th</sup> century that human dissection was revitalized as a

tool for teaching anatomy at the University of Bologna (16,17).

Recently, the idea that the Middle Ages were a time of obscurantism and decadence has been revised: the middle-to-late Middle Ages indeed were marked by many scientific accomplishments. Moreover, the late 11<sup>th</sup> and 12<sup>th</sup> centuries saw the establishment of a number of universities across Europe, for example in Bologna (1088), Paris (1150), Oxford (1167), Montpellier (1181) and Padua (1222) (15, 18); from the 12<sup>th</sup> century onwards, the Church did not forbid human dissection in general even if certain restrictions remained: in 1163 a bull by Pope Alexander III (c. 1105-1181) stated the prohibition of clerics being involved in the studies of physical nature; in 1231, Frederick II (1194-1250), Emperor of the Holy Roman Empire, decreed that medical schools were allowed to dissect at least one human body each five years (19) for anatomical studies and attendance was made mandatory for everyone who practiced medicine or surgery (20-22). Only in 1292 did a bull by Pope Nicolas II permitted all doctors having graduated from Bologna to teach at any University in the world (23).

One step forward and one step back, when Pope Boniface VIII (c. 1235-1303) issued a Papal bull entitled "*De sepolturis*" declaring that anybody "cutting up bodies of the dead and boiling them in order to separate the bones" would be excommunicated (15), therefore the post-mortem manipulation of corpses and their reduction to bones might have been partly limited. The bull has often been misinterpreted: it was indeed intended to stop the dismemberment of the cadavers and prohibit the bones trading from soldiers killed during the Crusades. It was not meant to prevent human dissection and in the end the bull did not have any significant impact on the anatomical activities in Italy (24).

The first public dissection was made in 1315 by Mondino de' Liuzzi (1275-1326) the "Restorer of Anatomy" (17), who is considered the first to have followed in the footsteps of after Herophilus and Erasistratus.

The dissected cadaver belonged to an executed criminal, most likely a woman and was observed by medical students and the public with the purpose of showing the exact position of the anatomical elements described by Galen. According to the custom of the



time, Mondino did not perform the dissection himself: a professor, because of his distinguished status, he would sit on a large, elevated chair, above the dissection table, and would read aloud from Galen's works commenting on it to the audience, while a demonstrator attempted to isolate or point the body parts according to the professor's instructions (2, 15, 25).

When a cadaver was made available, time became a capital issue, since there were no means to preserve it. This is why the abdominal cavity, which contained organs that putrefied most easily, was dissected first, followed by thorax, head, and extremities. To prevent putrefaction dissections were scheduled in winter when the weather conditions were more suitable to preserve the organs at best (26-30).

Mondino's book *Anothomia* was completed around 1316 and, due to the clarity of his text, became the reference book in nearly all European medical schools for the next 3 centuries: the structure of the book followed the order of dissection, starting from the abdominal cavity and ending with the head; the specification of the basic elements of organ anatomy, the position in a topographic region of the body, relationship with the surrounding structures, shape, size, texture, parts, physiology, and pathology was made (31).

Moreover, the widely known author of the *Decameron*, Giovanni Boccaccio (1313-1375), in the sixth story of the Fourth Day of his famous novellas, tell us that certain doctors, by order of the *Podestà* (chief magistrate) presumably performed a rudimentary forensic examination on Gabriotto's body to certify the nature of his death and deliver their verdict of cardiac failure (32). Thus, it appears clear that in the Middle Ages autopsies could also be carried out for legal purposes.

### 1.2 The Renaissance: Anatomical theatres and wax modelling

The first permanent anatomical theatre designed for public anatomical dissections was built by Fabricius ab Aquapendente (1533-1619) at 1594 in the University of Padua. This was followed by the anatomical theatre at the University of Bologna built in 1595 and reconstructed in 1636.

During the Renaissance, anatomy was considered an artistic and spiritual exploration of life, suffering

and death. These theatres were everything—a place to understand human anatomy, a place to witness the celebration of life through the analysis of death, and a place to be captivated by science.

Anatomists began to dissect bodies in order to investigate their inner structure and produced texts illustrated with images based on their own "autoptic" dissections (1, 33, 34).

In the 16<sup>th</sup> century, Andreas Vesalius (1514-1564), a student from Brussels who frequently attended human dissections, decided to investigate the accuracy of the Galenic concepts and made records of his findings (35). In 1537 a day after obtaining his doctoral degree, he became professor of anatomy and surgery and six years later, at the age of 27 years, he finished his masterpiece, *De Humani corporis Fabrica* (36). His work proved a milestone in the history of human anatomy and Vesalius himself changed the face of anatomical studies and teaching with his observational studies of dissected human tissues.

*De Humani Corporis Fabrica* was the first illustrated scientific work to evoke astonishment and admiration from the scientific community: Vesalius's work translated the exquisite detail and three-dimensional form of the human body onto paper. His work and publications captivated, engaged and educated scholars and students setting the standard for subsequent generations of anatomical publications, research and training (37, 38).

The text and iconography of Vesalius' *Fabrica* had a tremendous influence on medical thinking since its publication in 1543. The reasons were manifold: the visualization of natural and realistic human anatomy rather than theologically-inspired anatomy, the magnificent Renaissance depiction of the human body in different poses and in various stages of the dissection process, the unprecedented use of anatomical terminology, the classification into seven organ systems, and the reaction against the millennia-old Galenic theories (30).

Moreover, during the Renaissance the increasing popularity of anatomy was not confined to physicians or medical students but also involved contemporary artists: Italian Renaissance artists started to perform their own dissections, tightly binding the science of anatomy and the artworks in a *crescendo* that reached

its peak in the work of Leonardo da Vinci (1452-1519) and Andreas Vesalius himself (40).

By the beginning of 15<sup>th</sup> century, the increasing interest in dissection and anatomy led to shortage of cadavers available. Therefore, medical students taking part in the dissections were charged with an attendance fee and were also required to be at the subsequent funeral of the corpse after dissection to encourage families to offer their loved dead for anatomical studies. Nevertheless, the problem of supply was not perceived as critical because dissection did not become the main teaching tool for learning anatomy during the 15<sup>th</sup> century (41). In those days the role of dissection was that of an extension of anatomical illustration and its goal was not to add to the existing body of knowledge concerning human anatomy but to help students and physicians remember the text in which the knowledge was contained (42).

Furthermore, the time devoted to dissection was hardly adequate to acquire a command of the discipline by the student and was mainly restricted to wintertime.

By the 17<sup>th</sup> century, the difficulty in acquiring enough cadavers to meet the growing demand of anatomy students resulted in the need to produce a non-perishable surrogate. The outstanding result was the highly accurate anatomical wax models that were sculpted through direct observation of dissected cadavers: they served as an invaluable substitute for first-hand dissection, as well as stylized, two-dimensional textbook images (43, 44).

In the beginnings, wax was mainly used for votive and *ex voto* images; the first attempts to use injection to preserve anatomical preparations of the human body from deterioration were carried out by the Italian physician Marcello Malpighi (1628-1694). Moreover, the endless *liaison* between wax and anatomy began towards the end of the 17<sup>th</sup> century when a collaboration between the Sicilian wax artist Gaetano Giulio Zumbo (1656-1701) and the French surgeon Guillaume Desnoues (ca. 1650-1735) resulted in the creation of the first realistic anatomical models made from coloured wax (34).

His successor was Ercole Lelli (1702-1766), whose name is strongly tied to the anatomical chamber in the Academy of Sciences of the Institute of Bolo-

gna, sponsored by Prospero Lambertini, Pope Benedict XIV (1675-1758). According to Dacome (45), the anatomy room, was employed in the training of both artists and surgeons; conversely according to other findings (46), the anatomy room clearly evoked the moral tone of the public anatomical lessons held in the Bolognese anatomical theatre and was envisioned as a venue for artistic training rather than medical learning.

Although his entry into the anatomical wax modelling was somewhat of stormy, Lelli created a collection that was unparalleled because of its accuracy: using a technique of sculpting wax musculature upon natural bone, Lelli focused his work on osteology and myology (44): when in 1765 the Neapolitan anatomist Domenico Cotugno (1736-1822) visited him, Lelli introduced his guest to his art: the anatomical statues were built on natural bones, therefore one had to choose the bones of a young and slender body; the bones were then pierced, boiled twice and injected with hot water. After being exposed to the open air, they were finally coated with white wax and tied with metal and hooks (47); Giovanni Manzolini (1700-1755), who served for a period as Lelli's main assistant, would subsequently dye the material on a coloured wax that "imitated the truth" and started modelling on the skeleton.

As a young man, Lelli apprenticed in the workshop of Domenico Brugnoli in Via delle Cavature, where he was well-known as a arquebus maker (45); while he was working at the workshop, he met Giovan Gioseffo Dal Sole and later built a strong friendship with the Bolognese Giampietro Zanotti (1674-1765) who introduced him to the study of anatomy (48). As Zanotti observed, Lelli devoted himself to dissect and reconstruct the origin and the progress of muscles and in order to retain knowledge and remember what he saw dissecting, he made anatomical wax models of the dissected parts (45). By then Lelli started to devote himself to the first project of an anatomical museum launched by Lambertini; a number of anatomical statues were assembled in order to show "the origin and the progress, insertion and direction of the fibre of each muscle so as to acquire the knowledge of its use" (45, 49). Indeed, Lelli's was not the first collection to be acquired by the growing museum, since in 1720 the Institute of Sciences inherited a collection of dry anatomical

specimens by Antonio Maria Valsalva (1666-1723); the entire cabinet was donated to the Institute of Sciences by Valsalva's widow, Elena, shortly after his death.

Lelli worked with other artists/anatomists such as Giovanni Manzolini, Lelli's coworker in the period 1740-1745, and his wife Anna Morandi Manzolini (1714-1774), who was appointed an Anatomy teacher in 1760 (49). Leaving behind complaints, broken collaboration and disappointments occurring between Lelli and his friend, the Bolognese anatomical cabinet was finally completed in 1751.

Ercle Lelli's works represented the artistic gold standard of the Bolognese wax modelling school and his workshop spread and influenced the wax modelling in Italy and all over Europe. The art of anatomical wax modelling spread from Bologna to Florence, where the second great wax modelling workshop was created by Felice Fontana (1730-1805) at the Natural History Museum 'La Specola', probably towards the end of 1771 (50).

According to Ballestriero (43) the Italian anatomical waxes differ from models created in other countries across Europe: Italian waxes are imbued with a real sense of beauty; they are usually refined, pleasant, and everything that could provoke repulsion or disgust in the viewer is removed; specimens from northern countries instead are usually more realistic, almost brutal, preferring anatomical accuracy rather than artistic flair and are intended for use exclusively by the medical world.

### *1.3 Towards the 21<sup>st</sup> century: the modern era*

The role of dissection and the teaching of anatomy evolved during the second half of the 20<sup>th</sup> century: traditional anatomy education based on topographical structural anatomy taught in lectures and in gross dissection classes, has been recently replaced by a multiple range of study modules, including problem-based learning, plastic models and/or computer-assisted learning and curricula integration. Dissection and light microscopy are in fact not problem-free: storing human bodies is expensive and may display logistical problems due to the lack of space or and other issues such as preservation, staff costs and as well as furniture and equipment.

History repeats itself and in the modern era as well as between the 15<sup>th</sup> and the 17<sup>th</sup> centuries, one of the main problems in the teaching of anatomy is therefore the shortage of cadavers available as well as the increasing staff and equipment costs. Moreover, dissection and prosection have also issues concerning ethical convictions and legal restrictions. Once more these two factors led to alternative methods for teaching anatomy resulting in new preservation techniques and technological tools based on the imaging such as plastination and 3D-printing (51, 52). 3D-dissection/virtual dissection units and body donation programmes.

In the biomedical context, the dead human body is a crucial resource in teaching, research and training: many universities around the world have dissection labs and body donations programs even if the availability of donated human bodies for training and research purposes is not free of ethical, legal and even religious issues. Therefore, the acquisition of deceased human bodies as a scientific tool had to be managed carefully.

Nevertheless, although body donation for scientific purposes requires careful ethical consideration, it can also be argued that there is a more general "human objection" to dissection involving, for example, bodies whom the dissector could be familiar with either by personal, social, racial or even religious background (53).

Over the centuries, the sources of bodies changed from executed criminals, to "unclaimed bodies", to donated bodies and although the ethical issues concerning the use of unclaimed bodies still exist in some Universities worldwide (54), even regulated body donation programs might warn ethical and even legal uncertainties.

Usually the legal situation concerning body donation programs is regulated by different local laws based either on burial or transplantation laws. Finally, it should be mentioned that in contrast to research on living human beings, research on human cadavers is not yet regulated internationally.

Anatomists and body donation programs have to handle the dead body physically: in this context we can consider the human cadaver simply as research material, a condition that does not have any ethical implication; nevertheless, most people properly ascribe dignity to the donated body extending honours from the living persons to her/his mortal remains. Even today, just as during the



15<sup>th</sup> century, most modern body donation programs include a thanksgiving ceremony at the presence of the deceased's relatives special guests and students during the Memorial Services and thought Memorials gardens.

*“As students of human anatomy in the health sciences, we wish to acknowledge formally in this Act of Recognition, our gratitude for the gifts of human bodies and our respect for those people who have generously bequeathed their mortal remains so that we may study and understand.*

*We also recognise that there is something special about this material, that each of these bodies represents the tangible remains of a person with a living history of growth from childhood, of a rich and varied life story, of health and illness, of joy and sadness, of human relationships, of intellectual and spiritual achievement”* (55).

Moreover, as a result of the present era of E-learning”, computer animation and 3D-printing, some anatomists suggested to substitute gross dissection classes with the more modern techniques partially or completely (56). Others defend traditional practise; for both perspective, these experiences are irreplaceably important (57). A good balance might be the use of virtual dissection tables, such as for example the *Anatomege Table*. This virtual dissection table has both complete male and female anatomy; the images are consistent for colour and shape and can be sectioned and tissues can be sliced as well. According to Nambiar and Moro, this novel technology could be comparable to traditional dissection sessions in neuroanatomy and could be included in undergraduate curricula in medical schools as a further teaching tool to improve anatomy learning and retention among student (58).

Plastination, created by Gunther Von Hagens, was an innovation in the anatomy laboratory at Heidelberg University in Germany in 1978 (59, 60). It is currently used in both teaching and research and according to some findings it may be considered a furtherance of the wax modelling practice (44, 49). This preservation technique has changed the ability of people not from the anatomy field to see the human body, and there are exhibitions of plastinated bodies and body parts around the world (called Body- Worlds),

resulting in the concept of “anatomical art” (61). Not surprisingly, there are different opinions about exhibits like BodyWorlds (11, 62).

Over the past 20 years plastination has made its way into anatomy departments, principally as an additional teaching tool. The technique has begun to revolutionize the way in which the human body can be presented to students; the development of plastination has opened up new vistas for gross anatomy. In particular, it has led to a major expansion in the range of human anatomic specimens available for teaching and its potential value in research is increasingly being appreciated.

Thiel embalming fluid contains formaldehyde in a very low concentration, along with glycol, water and various salts, and hence is safer than a traditional embalming medium. Following the embalming process, the tissue is preserved without the need for refrigeration or special storage facilities suggesting that Thiel cadavers may be suitable for use in a broad range of medical skills and human factors training; furthermore, the issues traditionally associated with cadaveric dissection, such as disturbing odour, ethical constraints and cost, are definitely more affordable using Thiel cadavers. Moreover, the anatomical accuracy and fidelity of tissue properties were rated highly; according to a recent study by Yiasemidou and coworkers, organ and tissue realism are truly excellent with the exceptions of brain, eyes and blood vessels (63).

## 2. Discussion

Anatomy is essential to the health and medical professions: by learning anatomy, medical students learn about the structure of the human body, providing them with the basic tools needed for understanding pathology and clinical problems.

According to Estai and Bunt (64) plastination can be considered a specialized way of preserving prosecutions and nowadays many anatomists favour plastinated specimens over formalin fixed material, because they are odourless, allow convenient storage, and ease of handling. Moreover, plastinated specimens can be carried out using low cost equipment which is readily available in most anatomy departments (65). Previous studies

showed that plastinated specimens were deemed useful by students and accommodated their needs at various levels (66, 67). However, plastination is not free of disadvantages: it shows the most common variations, in time, plastinated sections lose their novel character and eventually students master the exposed variations by heart (68). Wax models were widely used before photography was introduced in the medical teaching and provide students with a three-dimensional vision of human structures otherwise barely comprehensible if solely learnt from books. Moreover, it could be used for understanding structures of normal and pathological anatomy and ceroplastic collection are currently used in some medical courses for undergraduate students.

Hence, we strongly suggest that anatomy be vertically vertically integrated into medical education so that dissection and prosection may raise to a prominent position; nevertheless, it is also undoubtedly true that it is necessary to examine the curriculum, the way of teaching, the quality of how it is delivered, and the infrastructure within which it takes place, for optimal and proficient tailoring of anatomy teaching and learning material. Of course, integration is also comprehensive of the new digital resources available. In the past two decades, the “digitalisation” of anatomy has profoundly influenced the field of anatomy education (69, 70). Students have now several digital programs (such as Anatomedia, Complete Anatomy, Biodigital Human and so on) that can reproduce 3D structures in a detail manner with the possibility of substantial manipulation of the specimen examined (rotation, virtual dissection, etc). We welcomed this helpful resource to the anatomy teaching armamentarium and we feel that these new tools are useful and complementary to the more traditional methods used in teaching anatomy. In this regard, recent publications have timely assessed the efficacy of the various methods used for teaching and learning anatomy. Three large and careful meta-analysis of the previous literature (71, 72) in the field reached a somewhat surprising conclusion that dissection was neither better neither worse in regard to short term anatomy recall ability. The useful and substantial impact of the digitalisation was also acknowledged (72) and subjects engaged in more innovative pedagogies such as student-centred learning and computer-aided instruction outperformed more classically trained stu-

dents (72). Of note, these data are valid only for short term retention (72, 73) and we do not know the validity of the methods used for long term retention. Furthermore, at this stage and with this data it is not possible to clearly assume if some special cohort of student (such as Medical students) are favoured by classical tools (dissection) vs modern tools. We strongly suggest that the best anatomy teaching practice is a careful adaptation of resources and methods in a realistic integrated scenario (dissection if possible, plastinated specimens, digitalisation, 3D models, Student centred and computer aided learning). Citing Bergman (74) “*there is no single method that can function as an answer for how anatomy should be taught. ....it is not about the method you are using, but about how you are using it.*”

### 3. Conclusions

We suggest that the study of ceroplastic and plastinated models should be reconsidered as an integral tool in expanding students’ understanding of human anatomy. In addition, plastinates are essential to complement the traditional dissection courses and contribute to a better preparation of postgraduates and clinicians. Lastly, careful integration with the new available pedagogies and with the new computer tools is warranted and helpful in setting the best practice of anatomy teaching.

### 4. Acknowledgments

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## Spanish flu ended a century ago: references in historiography and art

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**Abstract.** Spanish flu worldwide appeared for the first time between 1918 and 1919 and Italy has definitely been one of the most heavily affected country. It exactly ended a century ago causing the death of at least 50 million of people according to some authors. Our attention is particularly addressed to the world of art and historiography and to all those works in which a connection with this biological tragedy can be found; the production of books concerning this specific issue has considerably multiplied in the last two decades.

**Key words:** spanish flu, Richard Collier, Piero Chiara, Edvard Munch

The most terrible pandemic, popularly known as *Spanish flu*, has recently completed its first century. In 1918, while the war, which claimed a large number of lives, was almost over, another terrible tragedy happened in Europe. Spanish Flu worldwide made its first appearance between 1918 and 1919, causing the death of at least 50 million of people according to some authors, after having affected about a billion people. Italy was definitely one of the most heavily affected country, with a mortality rate that ranked second only after the Russian one; from statistical and authors' sources we estimate that more than four and a half million of people were affected in our country, between 375.00 and 600.00 victims (at that time the Italian population was just below 36 million people). According to data from the Central Statistics Office of Rome the deaths caused by the flu in Italy in 1918 were 274,041; however, these data do not consider all those deaths due to bronchopulmonary complications in patients affected by the flu. The economist Giorgio Mortara, by adding the data recorded by the military authorities, calculated that the total deaths in Italy caused by the Spanish flu were about 600,000 (1). In Europe the impact of the virus on people - which

were already completely torn by the Great War- was very terrible making Spanish flu seem even more terrific. Moreover the medical science at that time had no means to defeat it (2). For about a year the whole world was devastated by the flu which ended only in the spring-summer of 1919.

In 2018, the celebrations to commemorate this tragedy were numerous; several authors have recently rediscovered the Spanish flu as a research topic subsequently turned into books. Through this writing we do not want to retrace the epidemiology, etiology and symptomatology of Spanish flu, nor the implications it had for the civil and military population; our intent is actually to investigate how art and historiography dealt with Spanish flu, and thus becoming historical and archival sources on which researchers can base their studies.

We must immediately state that, even if Spanish flu was one of the most terrific pandemics in history, it found it difficult to find room within literature, historiography and art contexts. "*The Plague of the Spanish Lady October 1918 to January 1919*" (published in Italy by Mursia in 1980, under the title "*La malattia che atterrì il mondo*"), printed in 1974, was the first book in



**Figure 1.** R. Collier, *La malattia che atterri il mondo*, Mursia editore, Milano 1980.

which the effects of the disease were reported for the very first time.

The author, Richard Collier (1924-1996), an English writer and war correspondent, retraced in detail the different phases of Spanish flu and its effects, by interweaving historical events with soldiers and civilians' personal experiences, based on hundreds of testimonials from all over the world.

The work gives information about the pathology and tells tragic and moving tales of those who were infected or took care of the dying instead. We also find all those curious news concerning the aetiologies written by astrologers, who actually attributed the cause of the disease to the planet Jupiter or the star sign Leo. For scientists in Quebec, the flu was caused by the cold and rainy summer, for European ones instead, by the hot and dry summer. There were those who spread also

particular remedies: charlatans and healers proposed the sacred stones of the temple of Kyushu in Japan or a bottle of river water with the mud of Ipoh in Malaysia; in Sweden instead it was believed that white surgical gowns were able to absorb and defeat Evil. In the States, instead, it was suggested to put sulphur inside the shoes, tie cucumber slices to the ankles or keep potatoes in the pockets to prevent infection (3). Collier's book naturally followed the medicine of that time, which had no means to act against the terrific developing of this plague. The cover of the Italian 1980 edition was very particular since it showed a satirical figure published in the newspaper "Avanti", in Milan, and made by Giuseppe Scalarini: the "flu bacillus" was represented with the figure of Napoleon with folded arms, who seemed to be very satisfied being "The conqueror of Europe".

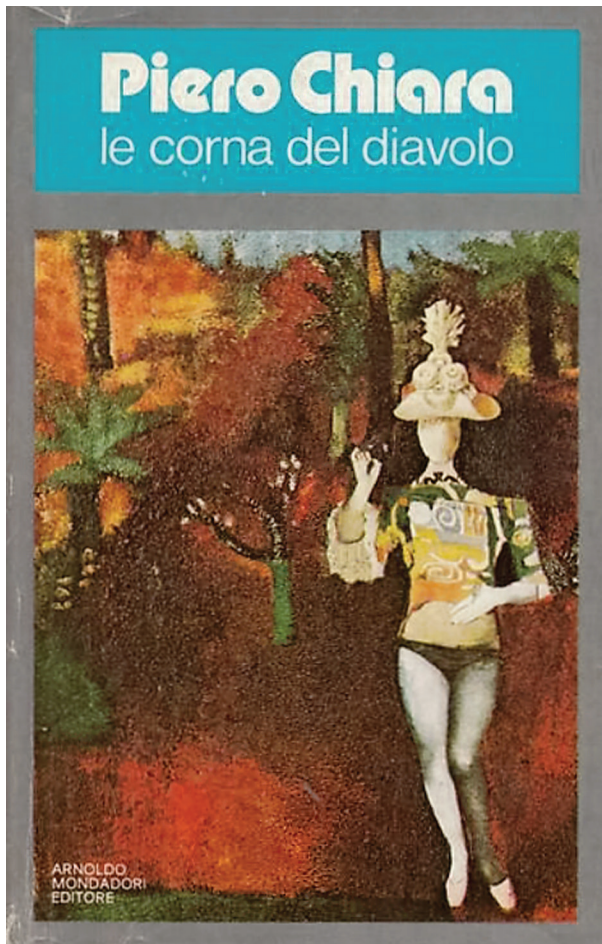
The term "bacillus" refers to a generic germ, since the medicine at that time had not yet discovered the Spanish flu causative organism, which was subsequently identified with the acronym A / H1N1.

The reference to Europe did not actually correspond to reality, since the first cases of the pandemic were reported, in the early 1918, in the States, subsequently in Europe and finally, during the summer months of the same year, in China, India, Japan and Australia. Also the subtitle of the 1980 book (*Storia della "Spagnola", il terribile flagello che uccise in pochi mesi 20.000.000 di persone*- The story of Spanish flu, the terrible plague that killed 20,000,000 people in a few months) is the result of science and statistics of that time; unfortunately the number of deaths for Spanish flu was actually over twenty million. Collier did a great job by collecting testimonies and through historical bibliographic research, but let us not forget that, unfortunately, his communication and research were fully linked to the knowledge of that time.

In Italy, Piero Chiara (1913-1986) gave a precious testimony about Spanish flu, through the brief tales "Le corna del diavolo" - The devil's horns- (1977), dedicating a short chapter to the disease, which told what happened when the virus came in the countries along the valleys and the shores of Lake Maggiore.

During those years Chiara was a five years old child and lived in Luino (Varese), the town where he was born (4). For the writer it was a very tragic expe-





**Figure 2.** P. Chiara, *Le corna del diavolo*, Arnaldo Mondadori editore, Cles (TN) 1977.

rience defined by him as “*the direct route*” due to its rapid evolution and how fatal his prognosis was. He also used to call it “*a real pestilence, such as that of earlier times*”. Fear of death, the popular belief and the lack of effective new medicines led the population to rely on unconventional therapeutic remedies, including amulets, medals, precious stones and potions.

The cult of saints was also usual and the belief that the use of wine and grappa against infection considerably increased the number of alcoholics. Many Chiara’s acquaintances therefore left their homes choosing to find refuge in the mountains and in the shepherds’ huts while trying to escape illness and death. In the late 19th century, Luino, like many other Italian towns and cities, became a holiday resort thanks to railway connections, where numerous hotels were built which

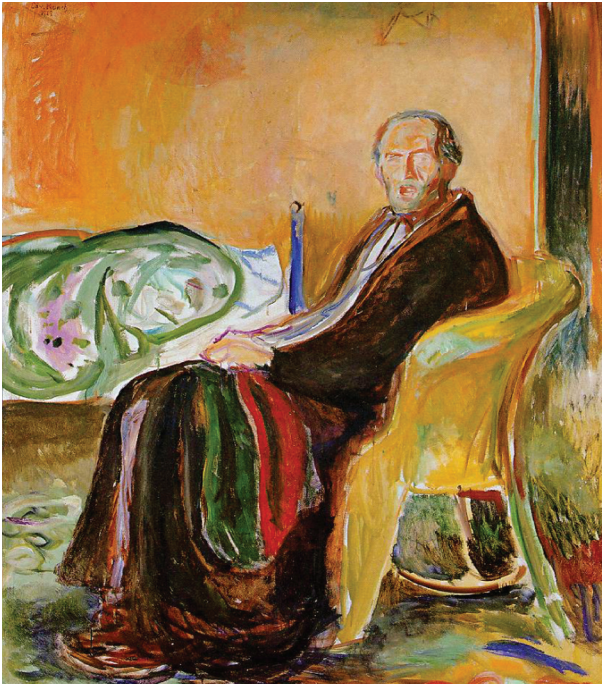
then, during the flu epidemic, became places of shelter for the soldiers who fell ill while engaging on the fields of battle.

Even the writer’s family, who lived near one of these hotels converted into hospitals, was infected and marked by some deaths. His beloved mother did not escape from the disease and healed after a long period, while his father, committed to looking after relatives and friends, did not have time to raise his little son Piero, who started going to the hotel-shelter near home, unaware of the risks he could face.

He could feed on what the soldiers gave him in exchange for odd jobs or on some loaf of bread or soup leftover found in the rooms where the sick were hospitalised. He was often assigned to post letters or make small purchases and buy lard, bacon, mountain cheeses, dried chestnuts and peanuts. Those were times of shortage both for the war and for the flu pandemic that was spreading and Piero Chiara’s story and experience can be considered as a slice of daily life, able to tell in detail the health and economic situation of those days. In April 1919, Spanish flu stopped and the survivors, marked by both the war and the disease, gradually repopulated the streets of the towns.

The art world rarely offers testimonies of Spanish flu. Only Edvard Munch (1863-1944), Norwegian painter, author of one of the most famous paintings in the world, “*The Scream*”- 1893, painted two self-portraits during the period in which he contracted the disease, at the end of 1918, and then he healed. In the first canvas, “*Self-portrait after the Spanish Flu-1919*”, Munch portrayed himself as a sick person in his room; the use of colour and technique fully express the different phases of the disease: the death approaching, the defeat of evil. The painter portrayed himself as a weak person, meeting the viewer’s gaze through a sort of witness of events, wrapped in a dark robe, with thinning hair and an olive complexion, while sitting on a chair by an unmade bed. The paint strokes are simple and the use of his own figure’s dark tones, in contrast with the light ones of the background, gives and expresses a feeling of restlessness and confusion in a fragile man. His face is almost indefinite and anguished and mouth, nose and eyes are just hinted. In the second oil painting of 1919-1920 Munch painted a close-up of himself, through a great use of colours he represented





**Figure 3.** Self-portrait after the Spanish Flu 1919, Edvard Munch, Munch Museum, Oslo.



**Figure 4.** Self-portrait after the Spanish Flu, Edvard Munch, 1919-1920, Galleria Nazionale, Oslo.

his sunken dark face, due to the lack of oxygenation probably because of bronchopulmonary complications, and a blank stare, tried by illness. His figure is defined by black and grey colours, in marked contrast with the red of the carpet that lies on the floor. These two self-portraits are part of the late phase of Munch's works, also known as *"the author of anxiety"*, which is well rep-



**Figure 5.** Arrivo della signora febbre spagnuola, watercolour by Friar Menotti, september 1918, Biblioteca Nazionale, Bari.

resented through these paintings; with these works the painter returned to take care of himself, his humanity and his pain of living.

As for Italian art, we know a watercolour by Friar Menotti, dated September 1918, *"Arrivo della signora febbre spagnuola"* – When Spanish flu arrived- today preserved at the National Library of Bari. It is an allegory that represents the personification of the flu pandemic; a Spanish woman dressed in mourning wear is depicted in the middle of the canvas, holding a basket full of skeletons in her right hand and a coffin in the left one. Above the lady, visibly sad and painted in dark colours, an little owl is flying; the background is portrayed in cold colours and depicts a cemetery surrounded by grey cypresses and a man intent on making wooden coffins, waiting for the numerous deaths which will soon arrive laying on that stretcher next to him.

This particular sort of collective oblivion, which involved the literary world but also the historiographical and the artistic one and the information and history manuals (including those of the History of Medicine), created an information vacuum maybe truly wanted by the population that suffered this immense tragedy.

The pain of losses, the shock of illness, the stress and fear that reached inside people's minds were not appropriate to write books or painting canvases. It was a pandemic consisting of many personal tragedies; probably the population only wanted this scourge to slip into oblivion, without the need to create "tangible memories", being able to forget and start living again, which was actually really complicated, considering that they were also just coming out of the terrifying war experience.

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## The interpretation of suicide in the work of Enrico Morselli

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**Abstract.** This short article is dedicated to Enrico Morselli, a leading figure in the panorama of Italian psychiatry between the late nineteenth and early twentieth centuries. In particular, the focus is on a study published by Morelli in 1879, entitled “Suicide: An Essay on Comparative Moral Statistics”.

**Key words:** Enrico Morselli, moral statistics, suicide, history of psychiatry, italian positivism

Enrico Morselli (1852-1929) (1) studied at the University of Modena, obtaining a paper on blood transfusions in 1874. After graduating, he attended as an assistant, first Carlo Livi at the asylum in Reggio Emilia and then Paolo Mantegazza at the University of Florence. In these years, he made contact with the best neuropsychiatrists of his generation, in particular Augusto Tamburini and Eugenio Tanzi, with whom he collaborated with for a long time. In 1877 he was called to the direction of the asylum in Macerata. In this institution, he was a pioneer in the use of labor as a tool for therapies and reintegration.

In 1880 he obtained a teaching qualification in psychiatry. He taught at the University of Turin, where he was also director of the asylum. On the death of Dario Maragliano (1889) he agreed to move to Genoa, where he remained for over three decades, as a full professor of Psychiatry, of Experimental Psychology and director of the clinic for nervous and mental illnesses, which along with Morselli it found a new arrangement and organization.

In the scientific field, his main works focused on neurophysiology (sympathetic system and epilepsy), as well as on neuropsychic pathologies and physical anthropology. He was also among the first to consider Freudian theories and actively participated in the debate on different forms of supposed animal magnetism and spiritism, always from a positivist and atheist point of view. His studies on suicide must also be mentioned,

with an analysis of the relationship between suicide and work, particularly in the armed forces.

He also contributed to the foundation of numerous periodicals. Together with Augusto Tamburini, Morselli founded the famous and still active “Rivista sperimentale di freniatria e medicina legale” (1875), offering fundamental contributions in the field of anthropology and criminology, in particular forensics, also intervening in famous processes such as the one against the bandit Musolino and that Murri in Bologna. In 1881 he founded the “Rivista di filosofia scientifica”, considered an essential point of reference for Italian positivism.

Morselli was one of the most illustrious and eclectic Italian psychiatrists of positivistic education and his interests ranged from philosophy to psychology, from neuropathology to forensic psychiatry, from psychiatric therapy to forensics (2). In particular, the focus is on a study published in 1879, entitled “Suicide: An Essay on Comparative Moral Statistics” (3) (Fig. 1).

Morselli embraced the philosophical culture of evolutionary positivism that had spread in Italy since the second half of the 1800s (4). Following the positivist and experimental orientation of the new Italian psychiatry and the reformist ambitions of psychiatrists such as Carlo Livi and Cesare Lombroso, Morselli proposed an anthropological psychiatry based on individual statistical-differential analysis and on the comparison between homogeneous groups. The compara-



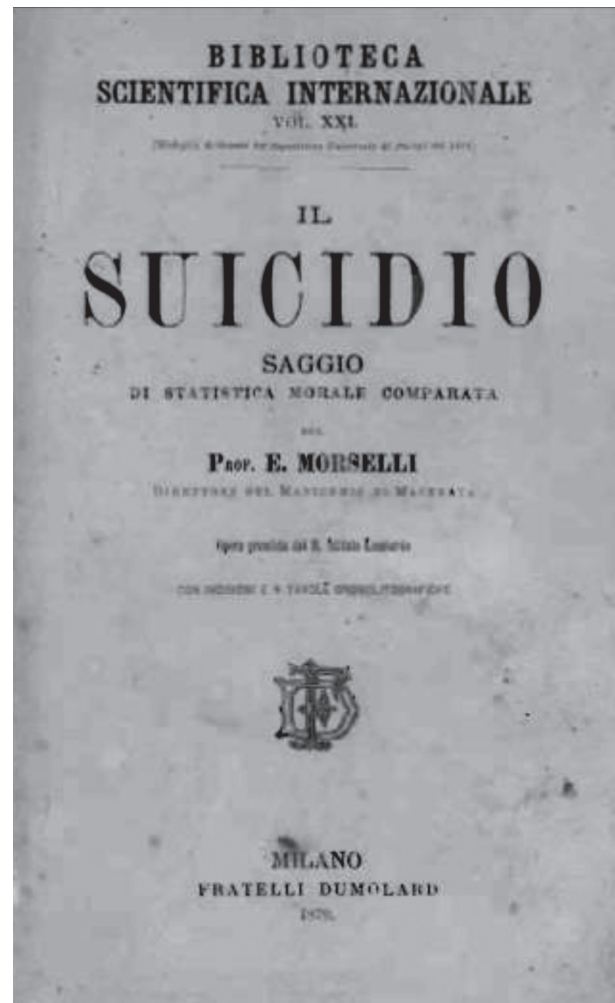
tive statistical method of biological, ethnological and social components (Moral Statistics) was applied by Morselli to analyze the phenomenon of suicide (5). He reported numerous statistical data, combining experimental observation of clinical aspects with psychological and cultural states. His study seemed to scientifically confirm the rise in suicides in almost all civilized countries of Europe and the New World.

The author has defined suicide “a voluntary act that moves from a logical process, of which certainly in many cases the premises remain unknown; it is the extrinsic manifestation of a phenomenon of conscience that escapes, because the statistics do not extend beyond the external characters of the event, but allows the possibility to go back from the objective notes to the psychic objectivity of the event itself” (3). “un atto volontario che muove da un processo logico, di cui certamente in molti casi restano ignote le premesse; esso è la manifestazione estrinseca di un fenomeno di coscienza che sfugge, perché la statistica non si estende oltre i caratteri esterni dell’avvenimento; ma consente la possibilità di risalire dalle note obiettive alla subbiettività psichica dell’evento stesso”.

Morselli believed that the use of statistical methods could explain the deeper reasons of this social phenomena. The moral statistics allowed the collection of the social and moral facts, presenting them under a common denominator in relation to a series of variables such as sex, age, marital status, religion, etc. So even suicide, like every other social phenomenon, was the consequence of events which occurred in previous periods and complies with laws and specifications influences deriving from society. Accepting the recent theories of Darwinian evolution and social evolution, Morselli identified suicide as a sign of weakness and a waiver in the struggle for survival (6): “Suicide appears as a legitimate and necessary effect of the struggle for existence and of human selection, which operate according to the law of the evolution of civilized peoples”, “Il suicidio appare come un effetto legittimo e necessario della lotta per l’esistenza e della selezione umana, le quali operano secondo la legge dell’evoluzione dei popoli civili”.

In the essay, Morelli proposed a meaningful comparison between the act of suicide and murder or the criminal act. The Italian scholar regarded both crimi-

nals and suicides as degenerate subjects. The main difference between the two behaviors was in the environment where the action takes place. In primitive civilizations the weakest element was identified and eliminated through murder while in modern society the same result is achieved with suicide: “the criminal man to satisfy his needs will kill the other man or he will rob him; the other, in whom education instilled the sentiment of duty, will cut the thread of existence with his own hands. The end result is the same: both are inept, they are deformed, and they will exit the fight in different ways, but identical in effect” (3). “l’uomo criminale, che non ha di che appagare i suoi bisogni, ucciderà l’altro uomo o lo deruberà; colui in-



**Figure 1.** Suicide: An Essay on Comparative Moral Statistics, Milano, Fratelli Dumolard; 1879.



vece in cui l'educazione instillò il sentimento del dovere, troncherà colle proprie mani il fil dell'esistenza. Il risultato finale è il medesimo: ambedue sono inetti, sono deformi, ed usciranno dal combattimento per una via diversa, ma identica nell'effetto". For Morselli's evolutionist argument, crime and suicide were two different manifestations of the same natural cause. "If there were no other reasoning to show that suicide among civilized people is a consequence of the struggle for life," he wrote, "the inverse proportion it has to crime would be enough to prove it." Morselli continued his thought by presenting the relationship between crime and suicide as "the double phenomenon that occurs in civilized countries". Suicide analysis has taken on a social dimension. In particular, from the numerous data collected by Morselli, higher suicide rates emerged in the populations of urban areas. He argued that the regularity of a progressive increase of the phenomenon over time proved beyond reasonable doubt suicide, "the most fatal and apparently arbitrary" of human actions, was in "an effect of that universal and complex influence to which we give the name civilization". With regard to moral rules and religious faith, Morselli noted their considerable importance in relation to a better understanding of suicide phenomenon. He in fact started from the assumption that the human mind is strongly influenced by religious faith identified in the loss of feeling religious as a fundamental cause of the increase in suicides recorded in the transition period between Idealism and Positivism.

Another determining factor was education. The data collected by the scholar showed, in fact, higher suicide rates among the "more educated" countries and among the most educated social classes.

Morselli's work was one of the first attempts to provide an organic and broad treatment of suicide, applying the numerical-statistical method to psychological phenomena. It was remarkably successful also attracting the attention of Emile Durkheim who, while criticizing the research of the Italian scholar, used part of his statistical analysis as an empirical basis for the editing of his work "Suicide: Study of Sociology", published in 1897.

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## True change or return to the past? The evolution of psychiatric care in Italy

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**Abstract.** The psychiatric care in Italy has undergone radical changes over time, passing from a custodialist form, that of the 1904 law, to a community psychiatric care suggested by the law 180. However, in recent years there has been a further change in which old formulas of custodialism and control of the mentally ill are re-proposed.

**Key words:** mental health system, community care, psychiatric reform, Italy, Reform law 180, Mental health

The first law on psychiatric care in Italy dates back to 1904 (Law no. 36 of 14 February 1904) which established psychiatric hospitals for the care of the mentally ill.

Individuals with mental disorders were considered unpredictable and dangerous due to the perceived association between mental illness and violent behaviour, which had its roots in fear and prejudice rather than scientific evidence. The spirit of the law, mainly focused on detention, was aimed at protecting society against the violent behaviours of the mentally ill and their disruption of social norms. The main task and responsibility entrusted to psychiatrists was to detain mental patients and control them. However, it is wise to refrain from judging the past from the perspective of the present, and we should add that the introduction of psychiatric hospitals meant that for the first time the mentally ill were offered a bed, a roof and hot meals, despite the distortions and abuses that over time have characterised this care model.

Fast forward to 1978, when Law no. 180 revolutionised the paradigm: this act recognised the dignity, autonomy and freedom of choice of the mentally ill, rejected the assumption that they were a threat to society and set in motion the process of closing psychiatric hospitals, which were to be replaced by community-based psychiatry (1). A key right recognised to individ-

uals with a psychiatric disorder was precisely the right to the free choice of care, which is part of a broader process of change, and the decline of the paternalistic therapeutic relationship. During those years, the rules on psychiatrists' professional liability, as established by the case law of the courts, were rather lax: as a corollary of the freedom, dignity and autonomy enjoyed by patients, psychiatrists were held to have a duty to provide care with diligence, prudence and expertise, but not a duty of control. However, implementation of the psychiatric reform was bogged down by several problems, resulting in mental health clinics which in many ways replicated the exclusion and marginalisation of the old psychiatric hospitals (2).

Later still, in recent years, a further shift occurred, prompted by three distinct factors. The first element is a shift in the position of the courts, heralded by some judgments of the Court of Cassation (VI Criminal Chamber, judgment no. 10795/07) which ruled that the psychiatrist can be held liable for the patient's behaviour, thus placing on psychiatrists not only a duty of protection and care for the patient but also a duty of control. The second element is the revival by some legal scholars of the concept of the mentally ill as a source of danger '... thereby imposing on the consultant the duty to neutralize the negative consequences of that danger on third parties' (3). The third element is the

process that led to the closure of the Forensic Psychiatric Hospitals, the opening of residences for the execution of security measures (REMS) and the entrusting of mentally disordered offenders to community psychiatry (Law no. 8/2014). This process has resulted in a sort of 'community-based mental asylum' combining different types of patients: psychiatric patients, mentally disordered offenders, and other offenders who are improperly placed in psychiatric facilities, altering their purpose and operation.

This is how, in the name of innovation, we have disturbingly come full circle, since psychiatrists are once again asked to provide not only treatment but also control, chipping away at the psychiatrist's ethical dimension and giving rise to a new problem: the diversion of resources from psychiatric patients to individuals who do not actually need psychiatric care. While this is happening, *the stars look down*.

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# Necropsy reports and anatomico-pathological observations from the archives of the Grand Ducal Medici family of Florence. Part II - The 17<sup>th</sup> and first half of the 18<sup>th</sup> century

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**Abstract.** During the Modern Age, dissection began to be practiced for medico-legal purposes, in order to investigate the causes of death. In particular, starting from the 15<sup>th</sup> century evidences of autopsies performed by doctors on their private patients emerge. These dissections were requested by those families who can afford the expenses, in order to search the possible presence of hereditary diseases and to predispose a prevention and cure. The extremely rich documentary archives of the Medici family, one of the most important family of the Italian Renaissance, report several description of necropsies carried out on the bodies of the members of the family. The analysis of these reports offers important direct information on the autopsy practices performed by court surgeons of the members of an aristocratic class in a period comprised between the 16<sup>th</sup> and the first half of the 18<sup>th</sup> century, and allows in some cases also to propose a retrospective diagnosis on the diseases that afflicted the Medici. Following a previous work that discussed the evidences dated back to the 16<sup>th</sup> century, this paper will be focused on the reports about autopsies carried out during the 17<sup>th</sup> and the first half of the 18<sup>th</sup> century. During this period, the reports became more accurate and detailed, reaching at the end of the period the characteristic of modern scientific autopsy notes. Therefore, in the majority of cases the lesions referred by the court physician provide sufficient element to propose a retrospective diagnosis based on the symptoms referred by the historical sources during the life of the patients and on the cadaveric examination.

**Key words:** 17<sup>th</sup> century, 18<sup>th</sup> century, Medici, autopsy, embalming, court surgeons

## Introduction

The Medici were one of the most powerful families of the Italian Renaissance: starting from the 14<sup>th</sup> century, they ruled Florence and Tuscany for many generations thanks to their careful management of banking ventures and skilful political actions. Lovers of art and science, the Medici were patrons of famous artists and scientists, such as Michelangelo, Leonardo, Galileo and others, contributing to make Florence the intellectual centre of the Western world.

The extremely rich archival documents of the Medici family, whose corpses were submitted to au-

topsy after death, refer in several cases details about the clinical history of the main personages and the report of the necropsy performed by the court surgeons.

The majority of information about the Medici family deriving from archival documents and written sources are collected in the fundamental work of the Florentine physician and historian Gaetano Pieraccini (1864-1957) written in 1924 and reprinted in 1986. These documents provide relevant information about the practice of autopsy carried out on the bodies of the Medici family for medico-legal purposes in a time range comprises between two centuries that is when the Medici sovereigns of Tuscany were nominated



Grand Dukes. In a previous work the autopsy reports performed during the 16<sup>th</sup> century were analyzed; the present work is focused on the autopsy reports of the members of the family who lived within the 17<sup>th</sup> century and the first half of 18<sup>th</sup> century, when the dynasty extinguished because of the death without heirs of Giangastone, the last Grand Duke. Those members of noble family for whom no autopsy reports are mentioned will be excluded from our dissertation.

The skeletal remains of some personages included in this work were submitted to an anthropological and paleopathological study. In these cases, the results of the analysis of the autopsy registers will be compared with the information provided by the accurate examination of the skeletons, which revealed evident signs of autopsy practices such as horizontal and oblique craniotomies, longitudinal and transversal cuts of the sternum, and sectioning of the sternal extremities of the ribs (1).

### **Filippo (9 April 1598 - 3 April 1602)**

Filippo was the sixth son of Ferdinando I and Cristina of Lorena. Very little is known about this child. The documents attest that on the same day of the death, April 3<sup>rd</sup>, the surgeons Pier Rossi, Fonseca and Turini autopsied the little corpse. They opened the thoracic and abdominal cavities and examined the internal organs. They reported that “We have been at Belvedere and we have opened don Filippo and [...] we found in the concavity of the thorax and in the lungs a quantity of rotten substance, large and thin. That was an astonishment, as it consisted in half a fask of material, and furthermore among the intestine, in the abdominal cavity, abundance of this substance, thinner, came out [...]. The intestines were then all swollen, and full of wind; the other parts then, as the liver, the spleen, the kidneys and other parts were fine” (2).

The anatomic-pathological picture appears quite clear: Filippo presents the signs of an acute suppurative bronchopneumonia, with pleuritic effusion, and suppurative peritonitis, thus suggesting a generalized acute septicemia.

### **Don Pietro (1554-1604)**

Don Pietro, last son of Cosimo I and Eleonora, was ambassador for Florence in Spain. From the age of 24, he presented symptoms of a gastrointestinal disease. Court doctors described gastric bloating, fever, dark green vomit and several diarrhoeic episodes probably due to infectious enteritis treated with bloodletting and infusion of chamomile, rhubarb and barley. In the last 8 years of life, Don Pietro had severe relapsing fever, dark vomit and gastric pain, until he passed away at the age of 50. Chronicler Gomes de la Portilla wrote: “On Sunday 25 of April 1604 a surgeon performed the autopsy of the corpse; I was present too with the physicians Sepulveda, Real, the governor Silva and other noblemen. Opening the abdomen we heard a big noise of air and it seemed that a full bladder had broken out; we found the lungs grey in color, the heart healthy, the liver a little inflamed, the membrane very inflamed, the stomach with a quantity of melancholic humour and very little blood; all the rest was in quite good condition” (2).

The most mentioned symptom of Don Pietro, in addition to fever and abdominal pain, was the incoercible vomit of blood and dark material; the causes can be various but the most frequent are gastric tumor, esophageal varices caused by chyrrosis and peptic ulcer. Stomach cancer is excluded because the symptoms generally arise in advanced stage after which the death comes in few months, whereas the nobleman had a long time disease. Esophageal varices are most often a consequence of cirrhotic portal hypertension, and are present in almost half of patients at the time of diagnosis of cirrhosis whose estimated prevalence around the world is 100 (range 25 to 400) per 100,000 (3). Cirrhosis cause a marked anatomical alteration of the liver, but the autopsy of Don Pietro revealed only a little inflammation of the parenchyma, so this pathology can be ruled out.

The fact that the son of Cosimo suffered for gastric pain mainly in springtime and autumn suggest the diagnosis of peptic ulcer. This recurrent disease, whose etiology is multifactorial [*H. pylori* infection, stress, genetic factors (4)], typically appears with seasonal periodicity. A review of the literature concludes that peptic ulcer disease is lower during the summer than

the other seasons of the year (5). The last acute stomach ache attack with fever and severe abdominal pain suggest the diagnosis of acute secondary peritonitis due to the perforation of the ulcer. The “very inflamed membrane” cited in the autopsy report would be the phlogistic peritoneum, while the “big noise of air” during the “opening of the abdomen” could indicate the wheezing spill of the free intra-abdominal gas which is a typical sign of a gastrointestinal tract perforation (6).

Instead, based on the anamnesis and clinical data, we believe that Don Pietro died because of an acute peritonitis due to a perforated gastric ulcer.

### **Ferdinando I (1549-1609)**

Ferdinando I, son of Cosimo and Eleonora, was 3<sup>rd</sup> Grand Duke of Tuscany. His death was caused by heart failure accompanied by dropsy and intestinal occlusion at 60 years of age. He was submitted to autopsy and Roberto Lio, ambassador of the Republic of Venice in Florence, refers: “once opened the corpse, from the heart onward, which was beautiful, all the other parts were found damaged, as the liver was white, full of water and demonstrated a beginning of dropsy. The spleen was black and all the intestines damaged, he had no stone, but the disease was the windiness, that caused the aforesaid convulsion” (2). In the diary written by the chamber assistant Cesare Tinghi we read: “Once opened the corpse of His Majesty by Simone Cresci surgeon of His Majesty and with intervention of other physicians and found that the lungs were damaged and the liver, in the body [i.e. the abdomen] and in the intestines a large quantity of water was present; except for the heart, that was very beautiful, all was infected” (2).

The anatomo-pathological interpretation of this report suggests that Ferdinando was affected by abdominal occlusion with hepatic and intestinal edema and congestion of the spleen. Effects of occlusion could be hypothesized for the intestinal lesions and the intense meteorism; we think that they were not caused by cadaveric decay because it was February and the cold temperature should have prevented early putrefaction. Chronic intestinal obstruction was the hypothesis of the Court doctors too, since they speci-

fied that no stones (i.e. faecaloma) were found in the abdomen. The lungs were damaged and an abdominal edema is described; the expression that all was infected except for the heart could also indicate peritonitis.

The paleopathological examination of the skeletal remains of Ferdinando demonstrated the presence of the craniotomy, whereas no autopsy cuts on sternum and ribs were observed (1).

### **Francesco (1594-1614)**

Don Francesco, 4<sup>th</sup> son of Ferdinando I and Cristina, died at 20 years of age of an acute intestinal disease, probably abdominal typhus. The death was dated May 17 at 17.45 and the corpse was submitted to autopsy on May 18, at 9.00 a.m. The report refers that “once opened the abdomen, the “hairnet” [mesentery] appeared worn and the intestine was pale and in some places red, mainly in the colon [...]. At the section the substance of the liver was yellow, the veins white without drops of blood inside. The colour of the spleen was livid, mainly the hollow part and similarly inside. The pancreas was dry, hard. In the stomach, a little liquor similar to broth was found. The intestine was full of liquor and wind similar to that found in the stomach. The duodenum in some parts was ulcerated. The jejunum showed also a little ulceration. The colon downward was completely ulcerated, and with attached glandulae. The rectum was completely ulcerated, red. In the gallbladder [there were] bilious humor and ulcerations. The lungs of the right part were attached to the chest and the substance was white in some part and livid in some other, mixed. The little heart very exhausted, with a little fat. The bladder was ulcerated at the bottom, close to the rectum in two parts, which were livid. Once the cranium was cut, the beautiful natural brain appeared, without damage to the membranes and the substance, if not a little more white” (2).

As for the anatomo-pathological considerations, the picture of ulcerations of small and large intestine supports the diagnosis of abdominal typhus, an infection caused by Gram-negative bacteria, the *Salmonella* species. Most infections are orofecal, i.e. caused by ingestion of food contaminated by animal or human feces. Ulcerative colitis (UC) is a chronic inflamma-

tory condition of the gastrointestinal tract whose association with the *Salmonella enterica* serotypes (*Typhi* and *Paratyphi A* both) has been demonstrated (7). Possible or expected findings during autopsy are perforation with peritonitis, inflammation and ulceration of Peyer's plaque, intestinal hemorrhage and lymphadenitis. Differential diagnosis of the various clinical and macroscopic features of infectious gastroenteritis may be extremely difficult. Anyway, salmonella infections were a very widespread cause of death in antiquity and are still an important health problem nowadays. In Italy, for example, during the period 1982–1992 the percentages of *Salmonella enteritidis* isolations have increased from 2.4 to 57.1% from human beings and from 0.5 to 22.8% from food (8). In paleopathology, several studies, with the help of ancient DNA, have highlighted how many epidemics of the past, whose responsible was believed to be the plague, were due to a large contagion from *Salmonella* species (9, 10).

#### **Don Giovanni (1567-1621)**

The autopsy of Don Giovanni, illegitimate son of Cosimo, was performed two days after his death and do not reveal any specific alteration; in fact “the viscera of His Eminence were found very beautiful” (2).

#### **Cosimo II (1590-1621)**

Cosimo II, son of Ferdinando I and Cristina from Lorraine and 4<sup>th</sup> Grand Duke of Tuscany, had a poor health since he was a child. His condition was described as ‘*habitus tiscus*’ (2) by the fact that tuberculosis weakened his body. He died at the age of 30 after eleven years of reign. “On the March 6<sup>th</sup> the necropsy of the Granduke Cosimo II was performed. Once opened the body of His Majesty and puled out all the viscera and well considered all, they found the liver beautiful and without spot, the loins and the bladder beautiful and the heart good and hard, but the spleen little and little crumbled and the apices of the lungs a little ulcered and crumbled; in the abdomen the mesentery was little and the mesenteric veins narrow” (2).

This report proved indeed a pulmonary bilateral ulcerative lesion with retraction of the sclerotic pa-

renchyma certainly of tubercular origin. Curiously, no other signs of tuberculosis were detected during the autopsy.

#### **Maria Maddalena of Austria (1589-1631)**

Maria Maddalena of Austria, daughter of Carlo II and Maria Anna of Bavaria, was wife of Cosimo II; she suddenly died during a state trip in the direction of Vienna to meet his brother, Emperor Ferdinand II, after visiting the other brother Leopold in Innsbruck. The Court doctor, Ronconi, wrote in Latin the description of the evisceration of the body of the Archduchess. The organs were generally in very good conditions, except for the hearth and the lungs that were damaged. The hearth “was big, surrounded by a putrescent blood, and the fleshy substance [i.e. the myocardium], that is solid by nature, appeared flaccid” whereas the lungs “had copious humor from the apices” (2). This pathological picture has no character of specificity, so we can hypothesize a pulmonary infectious disease with cardiac involvement as a cause of death.

#### **Maria (1575-1642)**

Maria, 6<sup>th</sup> daughter of Francesco and Giovanna from Austria, was Queen of France and Navarra as second wife of Henry IV of France. On her death, alone and in exile in Cologne, there are few certain documents so that the causes of his demise remain obscure. However, it is well documented the fact that the sovereign suffered in the last years of life from ‘dropsy’ due to oliguria. The oedema of the legs was so severe that a phlyctena with superficial necrosis of the skin appeared. The necropsy report, written in French, affirmed that “the external exam of the corpse showed that the cancrene was generalized and from the right leg it had gained all the back. Large strips of epidermis come off and the rest of the skin was of a very bad color and intense yellow. The heart was about twice its volume; the abdominal cavity was full of a malodorous and purulent liquid. The intestines and the liver were in putrefaction; the same for the kidneys, which were atrophied, especially the right one; the pancreas

and the mesentery equally in destruction. The ventricle [was] dilated and showed, inside, an excoriation similar to a sore" (2).

Excluding the organs with initial putrefactive phenomena (pancreas, intestines and liver), it is crucial to note the sclerosis of the kidneys and the marked cardiomegaly that must necessarily be related to the dropsy described by the Court doctors. In fact, we can hypothesize a pathology characterized by chronic kidney disease (CKD) (underlined by the poor diuresis reported by the chronicles) with intense oedema of the lower limbs and marked chronic heart failure (with the so-called 'bovine' heart) that may have led Maria to death. Actually over half of all heart failure patients may have moderate to severe chronic kidney disease (11). Over 80% heart failure patients are  $\geq 65$  years and most of these patients suffer from one or more comorbidities like the obesity, and we know that they were both present in the Queen.

Unfortunately, in 1793, revolutionaries profaned the tomb of Maria in the church of Saint Denis and dispersed her remains.

### Leopoldo (1617-1675)

Cardinal Leopoldo, last son of Cosimo II and Maria Maddalena of Austria, showed one of longest autopsy report of the Medici family. The body was opened the day after the death and "the thorax was both externally and internally with a natural color without any humor. The substance of the lungs in the dorsal part of the extremities of the lobes, right and left, was inflamed for an extension of four fingers [...] the remaining part was natural. The pericardium was not wet and the hearth was brown, with a proportionate size and a flaccid consistency rather than compact, with the ventricles empty; in the right part a bloody polyp, soft and a span long was found. [...] The stomach had a normal size and shape, but the external color was not normal since it clearly appeared very inflamed, with the veins very swollen and full of dark blood. In the inner part, the inflammation was even more evident not only in all of the veins but also in the whole part [...]. The intestines, externally and internally, had normal color and no other substance was found except

the one that should be present normally. The extremity of the rectum had a livid color for a height of two fingers, where we found three small wrinkles with a size of a lens and fistulous for a length of a finger, from which came out a rotten material with a good color and in a quantity of a spoon. The peritoneum, the mesentery, the liver, the spleen, the pancreas and the urinary bladder were all in an excellent state of preservation. The liver however was larger than the normal size [...]. The two kidneys were quite small, with natural color, soft consistency and with some cysts full of water on the outer surface [...]. Opened the cranium, from the inner cavity a portion of bloody serum overflowed and the *dura madre* appeared in a reddish color [...], the *pia madre* appeared inflamed and almost black with enlarged black veins even though the brain was not mutated in color and condition [...]"

No severe conditions were noticed sufficient to find the cause of death even if the necropsy report appeared very detailed and 'modern' in the way the organs are analyzed and dissected. Except for a chronic rectal fistula with abscess, other descriptions could be related to thanatological phenomena (e.g. the inflamed aspect of the lungs and the red color of the meninges). It is possible therefore that the Cardinal died for an acute disease that did not entail evident changes of the inner organs.

### Vittoria della Rovere (1622-1694)

Vittoria della Rovere, daughter of the last Duke of Urbino, Federico Ubaldo Della Rovere, married Ferdinando II in 1634. We have extensive documentation on the state of health of the noblewoman since its birth, who as a child never suffered from serious illnesses, with the exception of sporadic and minor ailments (colds, fever, and toothache). However, during the pregnancy at the age of 17, he contracted the smallpox that caused the loss of his son, born premature. Over of the years Maria Vittoria adopted a sedentary lifestyle not disposed to physical activity, which led her to suffer from the consequences of mild obesity, such as oedema of the lower limbs and subsequently heart failure. After her death, occurred at the age of 72, the autopsy and subsequent embalming were complicated



by the imposing mass of the woman who spent in bed most of the last year of her life. The diary of Tinghi refers: "Twelve hours after the death of the Grand Dukess her corpse was opened and it appeared of very big size to the surrounding people, as each thigh had the circumference of one arm and two third. The color of the skin in all the hypogastric region [was] very polished almost similar to that of the gangrene, and in the posterior part of the right knee a sore with loss of the skin was found started, as well as in the buttocks, being the sore large like a half plate. They therefore opened the corpse... and taken out the intestines, and a large quantity of fat, they embalmed the body... From the inspection of the corpse it was observed that the origin of the death... it seemed that had depended from the not total suppression, but largely for the urine for the time of two months done in this princess, not by fault of the urinary canals, which were found pure and innocent, but for defect of separation". This description suggest that there was an altered function of the kidneys. In the "Information of the death and funerals of the Grand Dukess Vittoria della Rovere (2)" the necropsy is so summarized: "In the corpse water was found everywhere".

The circumferences of the thighs (97 cm) and the numerous bedsores are also cited, especially at the sacral area and behind the knees. The autopsy report shows in particular the large quantity of liquids of which the organs were soaked. This confirms that the cause of death should be sought in generalized edema due to congestive heart failure.

### **Ferdinando (1663-1713)**

Prince Ferdinando, first son of Cosimo III and Margherita Luisa of Orléans, died before his father and never became Grand Duke. In 1689, he married Violante Beatrice, daughter of an imperial elector Ferdinand of Bavaria and Adelaide of Savoy. However, from the last trip to Venice in 1696, on the occasion of the Carnival, Ferdinand returned suffering from syphilis that inexorably led him first to mental illness and then to death in 1713. The neurological involvement also manifested in form of paralysis, convulsions and unconsciousness in the last 4 years of his life. He was

treated with mercury pills, but was intoxicated by his physician, the English Dr. Maundy, with exaggerated doses, which certainly aggravated the neuropathies. The corpse was analyzed by the barber-surgeon Grassi in presence of various professors, "who recognized that the viscera were healthy without defect, except for a lung, which was dry, for the lack of blood, of humid and of sera". In another report it is referred that the corpse "was found missing at all of humid and blood, and with all the viscera very beautiful, and every other part of the brain intact and healthy" (2).

All agreed on the physiological aspect of all organs, but with excessive state of dehydration and poor presence of blood. The report is excessively concise and, although they knew the cerebral syphilis, the analysis of the brain is hasty since any alteration was reported. In that time, the problems caused by syphilis to the nervous system were not recognized; only the lesion to the lung, which can be interpreted as a pulmonary sclerosis of syphilitic nature, was observed.

### **Margherita Luisa of Orléans (1645-1721)**

Margherita Luisa of Orléans, daughter of the Duke Gaston of Orléans and Margherita of Lorraine, had a turbulent marriage with Cosimo III until she get the separation and the authorization to return to France, her homeland, where she died at the age of 76. Among the information about her health that are reported in detail by the doctors of the Court, there is a very interesting episode occurred on the evening of July 16, 1712. The Grand Duchess suddenly lost the motility of her left arm and leg, twisted her mouth on one side and was seized by aphasia. In the following days Margherita partially recovered her mobility and returned to talk, but a new apoplectic episode occurred in December 1713 caused the definitive decay of the noblewoman's clinical conditions. These symptoms are clearly compatible with an ischemic stroke localized in the right hemisphere of the brain. It is difficult to identify the etiology of this disease since many may be the causes, including atherosclerosis, diabetes, cardiac diseases and high blood pressure.

The last year of her life is studded with episodes of severe gastrointestinal disorders associated with fe-

ver alternated with cough and phlegm. The doctors also question the mental lucidity of the woman as she started to laugh for no reason, was no longer able to look after herself and stutter incomprehensible words. Finally, after the doctor found her dead on September 17, the autopsy and embalming was arranged in Paris. The necropsy report was drafted in French and is an interesting document for the history of medicine since it demonstrates the high quality and the great modernity of French physicians of that era. Here the translation: “this 18, at 10h we undersigned assembled in the Hotel of S.A.R Royal square... have proceeded to open the body of Her Royal Highness dead the day before about 10h in the morning, after 6 months of languor and 9 years of paralysis. Having started with the head we had found the brain of a natural color and consistence, the dura and the pia much more dense and bloaten of blood than these membranes normally are, being in some part dry and unequal for the obstruction of their glandes, which naturally imperceptible, after the superior sinus of the falx, granular and rough under the fingers like the sand grains. All the ventricles of the brain were strongly dilated for a great abundance of turbid serum of which they are full, to which the lethargy of 24h, which has preceded the death, can be attributed. The chest had anything unnatural, if not the heart which was very fat and of flaccid consistency and soft which rip under the fingers, particularly the left ventricle. In the lower abdomen, we found the intestines which navigated in a purulent material without being altered neither the stomach. The gallbladder filled with a stone of the dimensions of the gallbladder itself, and above the coating of the liver in the concave part, an abscess that has to be considered the cause of fevers, irregular thrills, disgust, want to vomit, vomits themselves and other accidents which supervened to the paralysis after 5 or 6 months. The stone of the gallbladder could cause this abscess for its size and solidity compressing the neighboring vessels. We also remarked that of the two ovaries, the right one was perfectly bright of the shape and hardness of a chestnut. The left one much bigger than the natural state of an oblong shape and of a consistency so hard that the chisel could not penetrate it, all the vesicles, which are called eggs were small bone lamellae applied one over the other” (2).

This report reveals a great deal of precision and a methodological approach not dissimilar to that of modern pathologists. All the anatomical alterations (like the meningeal thickening, the hypertrophy of the Pacchionian granulation etc.) are minutely described, and the clinic-epicritic reconstruction is very detailed. For example, doctors recognized a purulent peritonitis secondary to liver abscess, correlating the symptomatology described by Margherita in the last years of his life. The study of the brain demonstrates the dilatation of the ventricles, which is in accordance with the severe cognitive decay of the sovereign. It is very interesting to note the meticulous description of the female genital organs that represents a *unicum* among the reports of the Medici family. Both ovaries appeared calcific and almost impossible to cut; also, within the ovary minute ‘eggs’ that are referable to the involution of the ovarian follicle are described. Calcifications may be associated with neoplastic disease, either benign (teratoma, mucinous cystadenoma, thecoma) or malignant (serous carcinoma), or with endometriosis (12). In non-neoplastic elderly ovaries, bilateral calcifications are also associated with *corpora albicantia*, which are the regressed form of a *corpus luteum* (i.e. an endocrine structure that develops from an ovarian follicle). Most *corpora albicantia* are resorpted in premenopausal women, but they may persist in the ovaries of postmenopausal women (13). In the absence of a symptomatology and macroscopic alterations referable to a malignant neoplastic disease, we believe that the appearance of the ovaries of Margherita is due to regression phenomena related to its advanced age or possibly to a benign neoplasm such as a fibroma or thecoma.

### Cosimo III (1642-1723)

Cosimo III, son of Ferdinando II and Vittoria della Rovere, is a key figure in the history of the Medici family because his reign is the longest in the history of Tuscany, and his political and economic choices resulted in a worsening of the decline of the kingdom, which in fact ceased with the death of his son, Giangastone. At the age of 81 the Grand Duke died because of a gradual decay of the general conditions lasted 53 days (14). The necropsy was carried

out by Giuseppe del Papa, lecturer of medicine in Pisa, who refers: "All the corpse seen and observed externally did not demonstrate any particular defect, but instead a solemn universal emaciation of the limbs and especially of the thighs and legs, and of the arms, which appeared as bones of skeleton dressed with a dry skin; the rib cage was fleshless for the extreme thinness of its integuments, but the cage did not little appearance for its natural breadth, and also the lower abdomen, although dressed by very thin teguments, did its appearance of sufficient elevation to contain a liver of no little size, as the not little mesentery. Only exteriorly a long strip of skin very livid in the right part of the thorax and in the flank could be observed, where the H[is] R[oyal] H[ighness] rested always with the weight of all the body, that it is possible that in the last moments of his life had produced this external and superficial skin bruise. Once opened the lower abdomen the very large size of the liver was immediately visible and of good consistency and of excellent color with its gallbladder without any trace, as also the spleen both in size and in substance, was not blameworthy. Not so can be said the ventricle, which was observed very vitiated, not only for its dark and denigrated color, and in particular in the left part around the superior orifice, but also as the ventricle had its tunics thin and consumed, so that for any little force applied to them they broke, so there was no wonder in knowing that HRH from several and several years had very scarce appetite and from any little quantity of food received always boredom and trouble, and never he could had food with some activity and especially those acid, bitter, salty, aromatic, and until the hot and cold of the food caused him immediate harassment. The intestines were filled in all their long tract of gas with very big excrement inside the last and big intestines, and all together had their tunics very thin and fleshless without any blame. The major defects were observed in the urinary canals and instruments, and firstly the left kidney was in the pelvis dilated and swollen for the abundant urine which contained, and more dilated was all its annexed ureter to be still swollen and filled with urine for all its length until its last approach to the bowel, where inside the ureter itself a stone stably fixed and imbed of the dimensions of a little date pit, which prevented the course and descent of the urine. The right kidney

had its natural consistency, as well as its annexed ureter was free and open and therefore all the urine descended; but it is true that in both the abovementioned kidneys several little stones and more than a little sand were found. The urinary bladder appeared between all other viscera the most broken down and vicious, for the fact that all its internal surface was plagued by a livid and dark sore deriving from a mortification or gangrene, and this dark color was communicated for all the substance of the tunics of the bladder and was diffuse also at the urethra itself for half of its length. Outside the bladder it is worthy of being observed that both the glandulate bodies called prostate were big of a very unnatural size. Inside the thorax no defect was observed which deserves to be described, for the fact that a certain dark and obscure color which was seen in some place of the lungs is in effect usual in all corpses produced by the stagnation of the blood occurring in the last of the life, and in particular in the corpses of old men who suffered the affliction of a long infirmity, and lastly a long agony. The heart then in the advanced age was observed of bog size and robust fibers and without any astonishment neither internal nor external. Finally inside the skull anything worth to be mentioned was observed, whereas all the substance of the brain together its membranes appeared of natural color without extravagant oppression of sera, and also the skull bones appeared good for their size and robusticity more than usual and natural" (2).

The autopsy is extraordinarily detailed and precise, from the careful external examination of the body to the evisceration and the analysis of the different organs. No district is overlooked and every detail is investigated, such as the gallbladder content, the appearance of the mesentery and the mediastinum. The genitourinary district is investigated and described with greater precision. Correctly, the doctors dwell on its pathological aspects because the renal and urinary diseases were responsible for the death of Cosimo. The left ureter appeared completely obstructed by a stone, while the right kidney contained numerous small stones and gravel. The bladder and ureter had an internal ulcerated surface with black color and flaccid consistency, and contained dark liquid. Finally, the pronounced hypertrophy of the prostate lobes with the consequent obstruction of the urine outflow was reported. With

this description, we can easily formulate an *epicrisis* to clarify the cause of death of the Grand Duke. The subject was of an advanced age and suffered from benign prostatic hyperplasia, a very common condition in adults and elderly (15). This led to a urinary stasis with renal suffering and especially with a severe bladder infection, probably bacterial (hemorrhagic cystitis) that irreparably compromise the health of the monarch.

### **Giangastone (1671-1737), the last Medici**

Son of Cosimo III and Margherita Luisa of Orléans, Giangastone was the last Grand Duke of the Medici dynasty, ruling from 1723 to 1737. In the last years, he became obese and very weak, consumed by a dissolute and lecherous lifestyle.

“On the morning of 10 [June], it was judged necessary to open the body of the Royal corpse, which was done at 3 p.m. by five surgeons who were his chamber assistants, with the presence of Dr. Niccolò Gualtieri, physician of His Royal Majesty [...] and the following things were observed: all the integuments and all the viscera contained in the thorax and in the lower abdomen were generally seen occupied by a perfect fatness, which does not astound, especially those who know with how little food the Grand Duke has been nourished, in particular in the last five weeks of his life. Once opened the skull, the brain, and the cerebellum were seen without lesions, with abundant humidity, and all of excellent color and of excellent substance. The lung, particularly in the right lobe, had in the surface, and much more in its substance, a color not only different from the natural with some portion of extravasated lymph, and a part of bad color so that it was similar to rotten, but this change must be considered occurred in the last days of the disease, and in the long and painful agony suffered by His Royal Highness; therefore, his breathing has always been very natural and equally natural has been the decubitus, and similarly the pulse was observed without that alteration which generally accompanies the long diseases of the lungs. The heart was of considerable size, but had a languid and limp fibers, and in its two ventricles, as it is observed most of the time in the cadavers, two long and thin polyps, but resistant to cut, were observed. The liver in

all the substance was of not bad constitution, except the gallbladder that was empty, and without a drop of bile. In the ventricle the tunics were seen infinitely thinned, weakened and limp, so that as soon as it was possible to see it, nevertheless the great diligence of the surgeons, the simple contact with their hands very easily lacerated it. At its bottom a little portion of fat, smelly and dark substance floated. The pancreas, the spleen, the mesentery and all the intestines were in their natural state, and of a fibrous and galliard consistency, but the intestines were empty, as the arteries and the veins still contained little quantities of blood, and much lower than the quantity of its temperament. In the opening of the kidneys, which were very large and robust, some little calculi were observed which were about to move to the pelvis, and other [calculi] held in the ureters, and a few were fallen in the bladder, and in total they were 18 in number of different dimensions and colors. However, in the right ureter four fingers far from the entrance of the bladder one was found, which properly was attributed the definition of stone, as it reached the weight of 5 deniers, and 11 grains. This one, being of very strong substance, smooth and formed by very thin layers, with great violence kept the ureter outstretched, and as it caused a very great pain to the Royal Sick, and a great violent effort in the act of urinate, thus it is highly believable that, united to the miserable weakness and inability of the ventricle could have been one of the fatal causes, for which we had lost our very clement Sovereign. Once finished the section, the Royal Body was diligently joined and embalmed with different precious aromas.”

The observations of the court physicians allow supposing that Giangastone was obese and that he was affected by terminal bronchopneumonia of the right lung; as for the heart, a cardiomegaly with whitening due to congestive heart failure and two intraventricular myxomas could be suspected. In the stomach an atrophic gastritis seems to be described, whereas, the strangury was caused evidently by the well described renal, ureteral and bladder calculosis with cystitis. The death occurred probably for heart failure.

At the paleopathological examination, the skull showed the sign of a craniotomy. His corpse appeared wrapped in a large quantity of clothes, which prevented recovery and observation of the postcranial skeleton (1).



## Discussion

The period under consideration is that in which Théophile Bonet of Geneva (1620–89) reported the observations made in 3,000 autopsies in his *Sepulchretum* first published in 1679. Nevertheless, the practical origins of the modern autopsy lie in the following century with anatomist Giovanni Battista Morgagni (1682–1771), professor at the University of Padua. He produced the first major work on the subject, *De sedibus et causis morborum per anatomen indagates*, in 1761, where he describes nearly 700 autopsies correlating the symptoms presented by the patients during life with the lesions observed in the cadavers. With Morgagni the humoral pathology, which had dominated the medicine for century was finally abandoned in favour of a modern pathology of organ.

As for the Medici, at the beginning of the 17<sup>th</sup> century the descriptions are still oriented to the quantifications of liquids, or humors, according to the theories of Hippocrates and Galen. This is valid also outside the boundaries of Italy, judging from the investigation of the corpse of Don Pietro, which took place in Spain and whose necropsy description, written in Spanish, demonstrates the same cultural background of Italy.

Later in the 17<sup>th</sup> century, the trend toward brief autopsy descriptions observed in the previous century was abandoned in favour of more accurate human dissection. Reports describe in detail the processes of the examination and the appearances of the organs observed during the autopsies.

We must dwell on what is handed down to us on the study of the corpse of Maria (death in 1642) and Margherita Luisa of Orleans (1645–1721) because, despite having been executed in two distinctly different epochs, both were performed in France. In both cases, the high value of the French medicine of that time is shown because the autopsy is performed with modern criteria. All the organs are analysed and dissected with precision and method, the colours of the organs and their characteristics are described and all the alterations are put in connection in order to formulate a complete epicrisis in which the sequence of the initial, intermediate and final death causes are listed.

In Italy, the full maturity in the necropsy study takes place at the end of the 17<sup>th</sup> century and is well

demonstrated by the descriptions of the body of Cardinal Leopoldo and Ferdinando II. Indeed the approach to the corpse is modern so that the doctors linger on the external inspection of the corpse with the complete evaluation of the skin and of any external pathological phenomena. All the alterations are then put in relation to each other and with the symptomatology that the subject manifested in life. The interest towards ‘the humors’ seems to be set aside for a more modern and ‘scientific’ approach.

In 1723, the autopsy on Cosimo III is extraordinarily detailed and precise, from the careful external examination of the body to the evisceration. Giuseppe Del Papa, Master of Anatomy at the University of Pisa, performed the procedure that was one of the most important university town in Italy. The city had a long tradition of anatomic studies since also the autopsy on Don Francesco (death about a hundred years before Cosimo III in 1614) was led by the Master of Anatomy of Pisa with the help of seven assistant doctors. With the study of the body of Cosimo III also the evisceration technique changes, as it is performed, like nowadays, starting from the thorax and then analysing the abdomen and the pelvic organs. It almost seems to read a modern report, in fact it is first described the corpse externally and then the dissection is performed.

Finally, Niccolò Gualtieri, Royal Court Doctor, carried out the autopsy of the last Medici, Giangastone, who died in 1737, with other five surgeons and several assistants. The report seems almost to anticipate the novelties that will be introduced by Morgagni a few years later; in fact, the approach is fully scientific and every single organ is cut, described and related to the medical records of the Sovereign. For example, the brain is not treated as a single entity, but is divided into its individual parts, such as the cerebellum. In conclusion, despite being in the first half of the 18<sup>th</sup> century, we find in this report the same terms and techniques that will come substantially unchanged until the post Second World War period when, with the advent of new discoveries and new imaging techniques, there is the birth of modern medicine.

The analysis of the documents relating to the autopsy investigations proves to be of great interest and importance. These archives are in fact a very valuable source of information about the state of health of past

populations and reveal which diseases were present and how they were treated. It is possible to understand how the influence of new theories and new scholars is reflected in the practice of autopsies learned in the great university centres of the time.

Moreover, comparing the detailed nosographic descriptions of the court doctors with the skeletal material of the great Medici family is fundamental to better understand the evolution of the pathological anatomy and of the legal medicine and provides an indispensable contribution to the history of medicine.

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# Mummified remains in the field of forensics. The comparison of a 19<sup>th</sup> century case report with current cases

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**Abstract.** From the medical report published in the “Rivista Italiana di Scienze Naturali” in 1890 about a forensic examination conducted on two mummified fetuses, we discuss the interdisciplinary approach in forensic field. Already in this nineteenth-century case, we note how the multidisciplinary approach was able to answer certain questions. During the forensic investigation of a mummified body, a correct analysis allows to determine the era of death and causes of the mummification process, the manner in which the person died, whether it is related to homicide, suicide or a case of corpse concealment. The dialogue between the different disciplines (forensic pathology, anthropology, radiology, histology, entomology, archeology, psychiatry, etc.) is fundamental today as it was in the past in order to solve cases in the criminological field. We hope that the collaboration between the different sciences can grow again in the future.

**Key words:** natural mummification, mummification in forensic field, multidisciplinary approach, entomology, 19<sup>th</sup> century forensic investigations

## Introduction

Forensic pathology, particularly in investigations related to mummified human remains, raises many problems and can not be separated from an interdisciplinary approach. It is often believed that interdisciplinary studies are a novelty. Instead, as demonstrated by the literature, both in the past and today, the multidisciplinary investigative approach that normally includes the forensic, biological, chemical, anthropological, archaeological, psychiatric sciences, etc., is fundamental to solve criminal cases (1).

From a medical-clinical point of view, mummies, and more generally, human remains, allow us to understand the origin and evolution of diseases (2-5).

With the term mummification, we usually mean a body that has been preserved both naturally and artificially. The English word “mummy” derives from

the Persian word “mum” which describes the brown-black discoloration due to the resinous substance used to embalm the body (6). As an artificial *post mortem* process, we know that the Egyptians were the firsts to adopt the ritual of mummification to preserve the body and the physical features with the aim to identify the person’s soul (7-8).

However, we want to exclude artificial mummification from our discourse because the tanatometamorphosis processes depends on rituality and beliefs not only for the natural conditions but also for the elapsed time from deceased to mummification.

The mummification process results from the dehydration of soft tissues. Massive dehydration and drying of soft tissues leads to mummification. During the mummification process, water is eliminated from tissue, avoiding bacterial putrefaction. Mummified tissues are rigid and dry.

To conclude the natural mummification process it normally takes between 6 and 12 months, but the time period of the process, in conditions of extreme temperature, can be drastically reduced (9).

When we talk about mummified bodies, we generally think of the past, the discovery of mummified remains in forensic contexts are rare and when this happens, it is necessary to determine the manner and cause of death.

Many examples of this type of natural conservation of the past have been discovered and have allowed us to understand what natural conditions have led to the conservation of tissues for many centuries (10).

Among natural mummies, we know of dehydrated mummies caused by the hot and dry temperatures (11-14).

Other particularly preserved bodies are the bog bodies, human remains, recovered in swamp lands in Denmark that dated back to the Iron Age (15).

The low temperatures, anaerobic environment and acidity of the water permitted this extraordinary conservation of the tissues even though the preservation of the skeleton is generally poor due to the mineral component of the bone being altered by the acidity of the bog (16).

In forensic cases, when a mummified body is found, it is necessary to make all possible assessments, of the way in which the person died, whether it is related to killing, suicide or a case of corpse concealment (17).

It is necessary to underline, as reported by the Laboratory of Legal Medicine and Anthropology of the University of the Côte d'Azur, that there is a deep discrepancy between the forensics of the mummified bodies discovered each year and the number of cases published in the forensic literature bringing to light a gap in the knowledge of this topic (18). In particular, the focus of the research conducted by the Laboratory of Côte d'Azur was to try to assess the minimum period needed to obtain mummification with the aim to date mummies using forensics. In this investigation, in which twenty mummified cases were examined, the researchers recorded that the minimum *Post Mortem Interval* (PMI) was three weeks (in an apartment) and the maximum was several weeks to five months. In forensic medicine literature, for mummification the

shortest PMI for "extensive mummification" indoor was 4-6 months, while complete mummification required a minimum PMI of 18 months indoor (19).

The team of the Forensic Medicine of Chandigarh reported a particular case of a mummified corpse who had belonged to a man who died under the care of a mystic. The corpse was discovered in 1987, two years after his death. The autopsy examination together with the investigative information on the case made it possible to understand that the man had been deprived of water and food and the mummification was inevitable because of the heat of the month of June in the region of Chandigarh (20).

A case, reported by the Italian researchers of Rome, described the mummified body of an older man found walled inside an alcove in a sealed silicon bedroom, in a semi-supine position with his back on the floor and his legs against the wall. The son of the subject stated that after his father's death, he hid the body so to continue to claim his annual pension. In this case, the mummification had manifested itself in a special condition due to the absence of air (21).

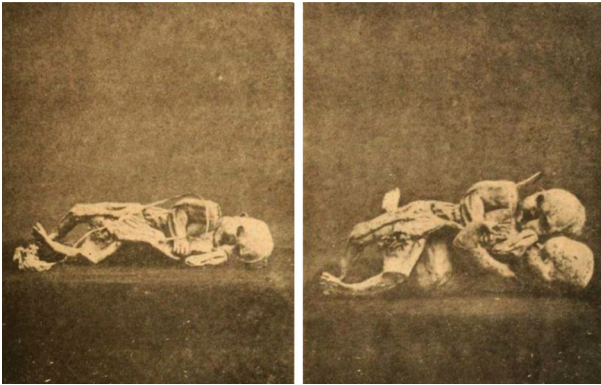
It is evident that many cases, as mentioned earlier, have escaped both forensic literature of the past and modern day. It is expected that in the future an intensification in scientific sensitivity towards cases of mummification in the forensic field will guarantee greater interdisciplinary to obtain investigative information from the mummified body (22).

## Case Report

Here, we report and discuss the legal and naturalistic medical considerations that had been published in the "Rivista Italiana di Scienze Naturali" by Doctor Corrado Lopez in 1890 about forensic examinations performed by Dr. Tebaldo Marini (23-24).

On October 23<sup>rd</sup> 1886, two mummified human fetuses were accidentally discovered in the attic of a house in Borgo S. Stefano near Volterra, one of the main city-states of the ancient Tuscan (Etruria) region in Italy (Fig. 1). The two fetuses - one a male, the other a female - were in a horizontal resting position and wrapped in dirty fabric on a very large piece of stone set against one of the walls. A scabbard had been re-





**Figure 1.** Photo of the two fetuses at the time of discovery. From Lopez C. Un caso di mummificazione spontanea. *Rivista Italiana di Scienze Naturali*. 1890;10(1): p. 7.

moved from a chair and laid on an inclined plane upon the fabric covering the fetuses.

The court instructed that the forensic examination be performed by Dr. Marini to ascertain whether the mummified newborn corpses had died of natural causes or infanticide (25).

The question had not been defined in an absolute way, the first hypothesis (the life of the newborns) had been considered the most probable, at least for the female foetus. The particular vertical position of the leg and of the arm of the female body made it probable, according to Dr. Marini, the contraction persisted in the cadaver.

When examining the fetuses, it was evident that parts of the body were out of place due to crushing forces. Also, in both fetuses and in both feet, there is a large interval between the fourth and fifth toe. The repetition of this divergence in both arts was attributed to an anomaly, rather than to a random fact.

Dr. Lopez then made his remarks on the mummification, which seemed to him to be due to a natural process. He reported that the bundle containing the two infant bodies was in this condition as it was continuously exposed to draughts as it had remained in the space between the vaulted floor and the vertical wall which, as it had been built 25 years earlier, had no plaster and consisted of porous yellow bricks.

The macroscopic and microscopic evaluations of the tiny bodies were made primarily to verify the spontaneous mummification, for this reason a critical

examination of the theories of natural mummification was also considered.

In particular, Lopez criticized the hypothesis formulated by the doctors Zecchini and Pari, who had stated that the mummification of the two fetuses had been produced by the sole action of a fungus (suspected to be the *Hypha bombicina Pers*) already discovered by themselves in other natural mummies of Venzano (Tuscany). They stated that the parasite, when penetrating the skin, would make organic tissue more noticeable so they denied, as a rule, any influence of physico-chemical agents on mummification. In the two Volterra' mummies, which for three years remained in a dank room, no trace of *Hypha*, even microscopic, was found. Therefore, Lopez reported the conclusions of Marini that the mummification of fetuses had been caused by the incessant ventilation, the hygroscopicity of the stone, the rags in which the fetuses had been wrapped in, the drainage of cadaveric liquids in the gutter below the two bodies and finally the intensity of the cold environment.

## Discussions

Today we are aware that when a mummified body is found in the forensic field, a multidisciplinary approach is needed together with a rigorous methodology, all to complete a correct diagnosis (26-27).

From a collaboration of the different research fields: forensic pathology, anthropology, radiology, histology, entomology, archeology, psychiatry, etc. it is possible to determine an accurate diagnosis.

Concerning the multidisciplinary approach toward the Italian natural mummies, the cases from the Church of the Dead in Urbania, central Italy (Marche), and from Roccapelago (central Italy) are representative. In the first case, the natural mummification is probably attributed to the mold of *Hypha bombicina Pers*. The mummies are displayed behind the altar and are placed in an upright position enclosed inside glass cabinets. These mummies belong to individuals who, probably starting from 1567, the year in which the Company of Death or Brotherhood of Good Death was established, were buried next to the church of San Francesco, in territory used as a cemetery. In the early 1800s, following the edict of Saint Cloud by Napo-

leon Bonaparte, the cemeteries were relocated outside the city walls for sanitary reasons, the bodies were exhumed from behind the Cola chapel (28).

The second case represents a natural mummification process probably due the extreme pH environment produced by the limestone-rich soil combined with “wicking” provided by the cloth burial wrappings (29). Even the mummies of Roccapelago underwent a process of natural mummification, favored by the particular dry and ventilated microclimate present in the environment below the church, that was used as a cemetery crypt and also where the bodies were buried (30). The presence of cracks in the outer wall of the crypt had in turn led to the recirculation of air, which contributed to keeping the environment dry and airy. The favorable conditions of the crypt that has hosted the bodies for centuries have therefore allowed the rapid evaporation of the organic liquids from the corpses, draining them in a short time and protecting them from putrefaction. The histological study showed that it is a natural mummification obtained thanks to a large and ventilated environment.

In the case presented here, Marini was convinced that the abandonment or infanticide, took place on a winters day. As clarified by Aufderheide the particular microclimatic conditions of the environments such as a perfect balance of different elements including cold and non-rigid cold, are mainly responsible for the rapid loss of fluids and soft tissue desiccation (11).

One aspect that makes this 19<sup>th</sup> analysis peculiar is the entomological examination conducted by Professor Visart to clarify the era of death or abandonment of the two fetuses. Visart did not find any trace of *Diptera*, therefore, as flies are the first to lay their eggs on corpses to initiate the course of cadaveric putrefaction, it is understandable to admit that particular conditions (such as tissue mummification) made it impossible for them to do so. Lopez also highlighted that the *Diptera* adults are present all year except in winter, so this reinforced the hypothesis of Marini, that the abandonment took place in winter, possibly in January as food in those places were difficult to source due to the harsh conditions.

The entomological investigations of that time revealed even more evidence as the presence of worms had been less than nine years.

Today, forensic entomology is very important in criminological context. By studying the insect population and developing larval states, forensic scientists can estimate the post-mortem interval (31). From the earliest stages, insects are attracted to the decomposing body and lay eggs in it. Using necrophagous fly larvae found over or near the corpse the forensic entomologist try to determine the date of death.

In this type of investigation, the correct identification of the species represents an important method of investigation in the practice of forensic entomology (32-33).

*Diptera* in particular belong to the main groups of insects of forensic entomology together with coleopterans.

During the rotting phase (2-7 days) a large number of *Diptera* are attracted to the corpse (34).

In the past, the key to identifying the species was simply the morphological examination of the insect. In recent decades, molecular methods are increasingly used for species identification (35). Another type of identification can be based on wing measurements. This method proved to be reliable in the case of some groups of *necrophagous diptera* coming from various geographical regions (36).

In addition, the DNA analysis in forensic science plays a very important role. Here, it is necessary to highlight the fact that experiments have been carried out on the study performed on mummified tissues with the aim of increasing the knowledge on post mortem degradation of DNA. The research, directed by the researchers of the Institute of Anatomy at the University of Zurich in accordance with medical ethics standards (37), was conducted on an amputated lower limb of an adult female 24 h post mortem (day 0) who had died of natural causes and was dried in with the natron as a procedure for Egyptian mummification. Skin and skeletal muscle were tested at multiple time points for a period of 322 days and subjected to genetic analysis. The outcome of the study reveals an excellent level of DNA preservation in mummified tissues with salt (38).

The autopsy, together with the entomological analysis and the parasitology science, helps to investigate the era of death and causes of the mummification process.

In the case of mummified fetuses presented by Doctor Lopez in 1890, the mummification process developed under specific environmental conditions and the multidisciplinary approach allowed to provide the answers.

From the story of this case, it is clear that the historical memory of an interdisciplinary approach in a forensic analysis represents a chance to reflect on the results achieved through the collaboration between the various disciplines. We hope that in the future this dialogue between different knowledge may grow again.

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## Talking bones, intermingled individuals from a medieval secondary burial from the church of Saints Pietro and Paolo in Brentonico (Trento, Italy)

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**Abstract.** In the past decades the increased awareness of the importance of secondary burial, intermingled contexts or not well-preserved skeletal assemblage has led to the development of methodologies useful for the paleopathological analysis of these types of findings. This letter briefly presents the analysis performed on 22 individuals from the secondary medieval multiple grave of the church of Saint Pietro and Paolo in Brentonico. Bones talking to us despite the difficult of a paleopathological analysis performed on intermingled bones. Here, a brief resume of the research and a quick overview of the pathology of this medieval human group is presented.

**Key words:** Trentino, anthropology, paleopathology, secondary burial, differential diagnosis

The church of Saints Pietro and Paolo is situated in Brentonico (698 m a.s.l.), a village of the homonymous plateau on the southern part of the Province of Trento (Trentino-Alto Adige, Italy).

The church is one of the oldest religious buildings of the Vallagarina, which may have been erected between the 8<sup>th</sup> and 9<sup>th</sup> centuries. It has been archaeologically investigated since 2003. During this continuing investigation, a multiple mass grave was discovered under the 13<sup>th</sup> century Romanesque bell tower. The *terminus ante quem* for the burial is the construction of this tower above the tombstones of the grave.

The structure was identified as a secondary deposition of the most evident bones of a minimum number of 22 individuals: 4 subadults and 18 adults, 5 females, 10 males and 3 subjects of which the skeletal sex was not determined. The study, the assessment of biological and paleopathological profile is usually more complicated in multiple deposition composed by intermingled bones.

Indeed, as defined by Fox & Marklein (1), an intrinsic characteristic of secondary burial is the de-

individualization of the remains, with resultant decreases of diagnostic accuracy. A bone with pathological evidence in many cases cannot be certainly related to a specific condition, especially in case of a-specific evidence. However, a bone or a fragment that cannot be associated to a single individual is still a source of information about the biological and pathological history of the local population (1).

The increased awareness of the importance of secondary burial or not well-preserved skeletal assemblage has led in recent years to the development of methodologies useful for the analysis of these types of findings (2). In cases where bones of the same individual cannot be identified, paleopathological analysis should be carried out with caution and in a generalised way, in order to avoid speculation (2).

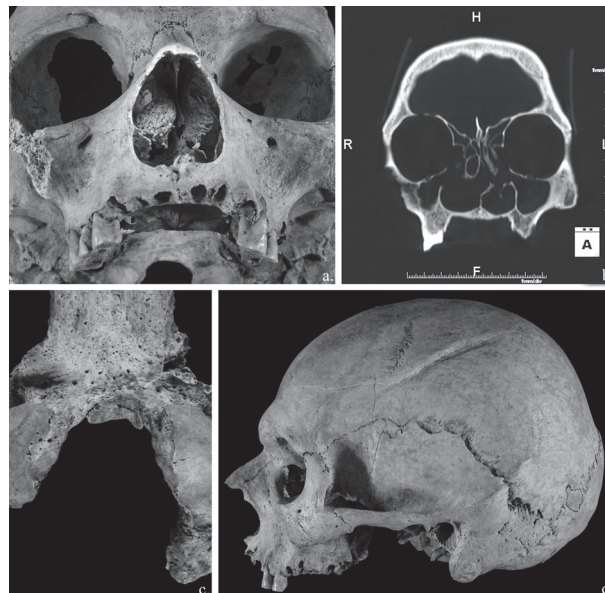
Nevertheless, speculation can be prevented with a good differential diagnosis conducted with the aid of diagnostic investigations. The importance of applying a broad differential diagnosis has often been highlighted in literature (2, 3); this may help by circumventing



**Figure 1.** a) A severe case of *cribra cranii*; b) Periostitis of the tibial shaft; c) Arthrosic degeneration humeral head; d) Osteochondritic phenomena on the semi-lunar surface of the acetabulum in a juvenile subject.

the problem of data incompleteness, without losing it completely.

The pathological picture, which emerged from the study of the Brentonico's sample, mostly underlines traces of deficiency syndromes with different levels of expression, on the totality of individuals of burial, adults and subadults. The constant presence of *cribra cranii* (Fig. 1a), with a generally severe level of expression, and *cribra orbitalia*, combined with periostitis (Fig. 1b), diffused on the femurs and tibias, can be interpreted as a signal of food shortage, iron-free diet or avitaminosis. In the same way the arthrosic evidences are homogeneous; the presence of degeneration is attested but it is not possible, due to the nature of the sample, to understand the triggering cause. The joints of the shoulder, knee and pelvis turn out to be the most compromised (Fig 1c); in the case of the pelvis, the strong arthritic degeneration is often accompanied by osteochondritic phenomena, also found in the sub-adult sample (Fig. 1d).



**Figure 2.** a) Concha Bullosa of the left middle turbinate; b) Coronal CT image, evidences of the Concha Bullosa; c) Third condyle on the front arch of the foramen magnum; d) Penetrating trauma on left parietal bone.

Among the diseases and anomalies found in the adult sample, some deserve more attention for their particularity. We have observed the presence of a case of Concha Bullosa (Fig. 2a; Fig. 2b), rarely found in archaeological documentation due to the difficult conservation of the nasal district (4), a case of “third condyle” (Fig. 2c), an accessory facet, placed on the front arch connecting the two occipital condyles, cause of limitations in the rotational movement of the head and a possible case of osteochondroma, a form of benign cartilage tissue ossification tumour led to tibia and synostosis fibula to the proximal joint. Moreover, in the sample there are several cases of traumas and fractures attributable mainly to accidental causes with exception of two skulls with evidence of penetrating trauma (Fig. 2d).

Despite the exiguity, incompleteness and selection of bones in the sample, the data achieved, which is not considered representative of the whole population of the time or place, is however relevant for a first classification of the living conditions and pathological picture of the communities of Trentino, a region still little investigated in the paleopathological study (4, 5, 6).

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## The walled nuns of the crypt of Santissima Annunziata in Valenza (Piedmont, Italy)

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**Abstract.** The Church of SS. Annunziata in Valenza was built in 1699, together with an underground crypt that preserves the cells in which, according to a particular type of burial practice, the nuns of the nearby cloistered convent were deposited. The hypogeum space was brought to light in the twentieth century, paving the way to the study of the ritual underlying this practice and to the anthropological study of the remains that the opening of the cells have brought to light.

**Key words:** bioarchaeology, paleopathology, anthropology, burial ritual, convent

The Church of SS. Annunziata is located in Valenza (Piedmont, north-western Italy). Inside the building, it is possible to enter the underground crypt through a trap door in the floor. It is likely that the construction of the hypogeum took place during the building of the church, in 1699. Crossing the crypt, three rooms, about 4 x 3 m wide, characterized by parietal cells, are progressively encountered (Fig. 1). Here, the ancient nuns of the nearby cloistered convent received a particular type of burial. The deceased were deposited on a step inside a cell, in sitting position. Then, a stick placed at the level of the bust supported the corpses and a vase was located at the foot of the seat to collect the decomposition fluids. According to this ancient ritual, after a nun was buried inside a cell, the body was walled up. In a sign of humility and in accordance with the rules of the Order, the graves carried no name, only the initials preceded by the letter “S”, which stands for “Sister”, engraved in the plaster. Next to this inscription, there is the date of death, which in Christian eschatology represents the true birth. There are thirty-two tombs in total and, according to the writings in the plaster, they all belong to 18th century.

After the church of the monastery was closed in 1802, the crypt was filled with earth and then discov-



**Figure 1.** View of the second room of the crypt: the openings on the cell walls show the inner step on which are visible the remains. In the upper portion of the walls, some inscriptions can be clearly read on the remaining plaster.

ered and brought to light in 1973 by members of the brotherhood of S. Rocco.

In Italy, about 80 sites such as the Valenza crypt have been registered, dating between the seventeenth and eighteenth centuries (1). These structures, defined as “*putridaria*”, were a type of architecture aimed at subdividing the treatment of the deceased into two



distinct phases: the scarification of the corpse was followed by its final location, and can be traced back to double burial practices (2).

The crypt of Valenza recalls the sepulchral typology of the *putridaria*, although we can not speak of a real double burial, since the bodies were walled up and did not undergo a second ritual translation. It is likely that these burials represented a transition phase succeeded to the open cells of the other Italian *putridaria*, a sort of compromise between archaic burial practices and the new Enlightenment mentality.

The exceptional nature of the site is the fact that allowed us to recompose the stratigraphy of the gestures, identify the will and awareness behind these “atypical” burials.

In some past researches, the archival and ethnographic sources and the religious and medical literary works of the period were examined, with the aim of proposing an interpretation of the use of these structures and the rituals they represented (3). It is of interest to integrate documentary research with the analysis of the remains (4).

The anthropological study will firstly be aimed at verifying that the burials undeniably belonged to female individuals, to confirm if the crypt was exclusively dedicated to the deposition of the nuns of the convent. Bioarchaeological studies focused on monastic populations can highlight the life conditions of the nuns, and by analysing the similarities and differences between the religious and the secular communities, questions concerning the everyday life of the Sisters compared to that of the lay women can be answered (5). In particular, the questions are directed to their rules and the kind of working activities performed. The demographic data can then be compared to those of a secular population of the same period, this comparison then presents an overview on the mortality rate of a religious context and the differences it presents with the not-devoted people. The study of a female sample usually dialogues with the high mortality rate of maternal and fertile period (6), but in this case the nuns did not have children, or they were supposed not to

have. Then, it is assumed that the length of life can somewhat approach to a higher age-at-death.

Moreover, the application of paleopathological investigations can provide an overview of the diseases they suffered from and the stressors they were exposed to, in order to analyse in depth the relationship between their life expectancy, the morbidity, their nutrition and health status.

In summary, an exclusively female sample offers the possibility to enter into social and gender studies, investigating into the life of a community not subjected to the same difficulties to which other women were dependent and therefore obtaining data on the response of the female skeleton to a life different from that imposed by the society of the time.

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## Narrative Bioethics and Film. Some Historical Remarks

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**Abstract.** The history of medicine, in synergy with other medical humanities, documents the relationships between technological progress, philosophy of care, and artistic vanguards. An important theoretical aspect is the contribution which narrative, in particular via the medium of film, provides not only to the clinical relationship (intended as a therapeutic alliance), but also to the ethical debate. An important instance of these relationships is seen in the evolution of the thinking of three important North American authors: Booth, Schrader, and Wiseman. Study of their works suggests, on the one hand, new lines of research in the fields of history, philosophy, and theology and, on the other hand, a consideration of new forms of clinical bioethics, drawn from aesthetic contributions. In fact, both clinical bioethics (which deals with actions) and film criticism (which deals with texts) seek to rationally justify an evaluation of either a moral or an artistic kind.

**Key words:** bioethics, film, history, medicine, narrative

### How Stories Can Salvage Both Medicine and Ethics

Medicine saved the life of ethics (1). It forced ethics to deal with concrete problems, real dilemmas, personal conflicts, and value-related uncertainties within society. Analysis of the language used and of the construction of theoretical systems thus found fertile application and renewed energy in the domain of day-to-day life, where the beginning and end of existence, the allocation of resources, and the adequacy of clinical care are at stake. Bioethics cannot help but be “empirical” (one hears the term *empirical bioethics*), being forced to consider both the *context* in which certain rules must be applied, as well as the *subjects* for whom certain vetoes are binding (2).

Recently it seems that narrative must, in turn, save the life of medicine. In fact, *evidence-based-medicine* no longer seems to be enough (3,4). Clinical medicine is not a science, nor a sum of sciences, nor a technique that applies sciences, but rather a vital practice, a profession that transforms, in scientifically consistent and technically trained forms, the basic gesture of taking care of someone who is suffering, establishing a *cove-*

*nant* with him or her. The parties in this agreement are so closely involved, both cognitively and emotionally, that they must imagine the future together (in other words: they must “narrate” it together), before being able to make a *shared decision* (5).

The rehabilitation of the “story” in medicine coincided with a third rescue: narrative prompted the growth of ethics as a discipline! This time literature was assisted by the medical world and by critical, engaging, and highly emotional situations experienced in research and treatment facilities. As many *clinical cases* (described in the context of patients’ personal biographies) as *fictional stories* (novels about illness, theatrical pieces about imaginary doctors and patients, television series that take place in emergency rooms) have invited thinkers to recognize a truth that has been obvious since the beginnings of the very first western moral philosophy, in the words and gestures of Socrates.

Which truth? The truth that narrative, ethics, and medicine are fundamentally intertwined. To explain this simple answer, at least two levels of integration must be identified. The first level: if one does not reconstruct the *historical context* in which an action

took place (for example, the decision to not resuscitate a patient that is hospitalized in intensive care – the “*Do not resuscitate order*”), then he cannot understand the *meaning* of this action (the time in which it took place, the situation as a whole, the intentions of the individuals involved, the existential, familial, and social assumptions and consequences), nor can he subject the gesture to a moral evaluation.

Moreover the second level: ethical theories rely upon *stories-of-origin*, on foundational narratives, on images of the “good life”, from which the concepts, rules, and principles on which these theories are based acquire meaning and establish roots. Clinical cases are a test bench for the consistent, flexible, and universal nature of ethical theories precisely because the latter bear no resemblance to geometrical theorems (which are deducted *a priori* through abstract syllogism), but rather rely on underlying myths which precede intellectual construct and provide the moral perspective essential to interpreting basic human situations, like the therapeutic relationship (6,7).

To respect the complexity of these amalgams, we resisted the naive simplifications which are present in hastily compiled manuals (8). Creating a narrative is not easy. And it is not easy to read or listen to, understand or interpret stories. It is not true that the right words “spontaneously” come to our lips, or that it is enough to be a good listener with a good vocabulary in order to transmit a story effectively. *Training* is necessary. A woeful improvisation in *narratology* leads, for example, to overestimating the *conscious intention* of the narrative voice (whether doctor or patient). What are important are not the statements of the actual author (i.e. the author living in the real world), but those of the text we have at our disposal. In truth, the *text* precedes the division of tasks between the author (one should say author, narrative voices, characters) and the reader. The text forces the author to keep in mind a certain type of reader (one among many possible readers), and the same text forces the reader to seek out an author that is capable of narrating that for which he or she (reader, listener, *narratee*) feels the need (9). As an expert once said: “The problem of the actor is that of both being owned by a piece and of owning it, and his or her freedom hovers between these two contradicting realities (10).”

The historical-narrative dimension of the healing enterprise can be mistakenly examined according to other reductive approaches. We have limited ourselves to several examples. Certain kinds of narrative medicine recklessly adhere to the motto: “tell me everything and I will understand you and you will understand you”. In truth, *that which is omitted* or withheld (lapsus, slip of the tongue, compulsion to repeat), according to Freudian psychology is often more important than that which is “sincerely” shared, written, or narrated. The admonition to tell the truth, the whole truth, and nothing but the truth (a memorable phrase in many American legal dramas) is a false warning and a paradoxical command. We have only a finite amount of time and are therefore forced to omit things. Furthermore, there is no such thing as a “spontaneous” narrative glance: what we see is always what we want to see or what we can see, due to substantial moral preconceptions (and sometimes insidious biases).

We also nurture strong suspicions on the presumed “*therapeutic quality of the writing*” or of the narrative practice, whether heterobiographical or autobiographical, and on the corresponding assumptions of *biblio-therapy*, *music-therapy*, or *film-therapy* (11,12,13). To be clear: reading, listening to, or telling stories is pleasurable, comforting, soothing, and at times uplifting and healing, in a broad sense. But the word “therapy” is very exacting and must be defended against the trend of over-medicalization. In other words, no storytelling practice can be certain of alleviating, reducing, or removing mental discomfort and psychological stress. Narrative cannot serve as a “soma pill”, as described in Huxley’s new world: all of the advantages of Christianity and alcohol put together, none of the disadvantages (14). Storytelling and art in general spark a demanding *search for meaning*, but where this will take us, what decisions it will lead to, and whether it will provide comfort or create anxiety is unpredictable. The truth, according to Jaspers, is not something that we possess (so that we may distribute it in pill form), but is our way. As modern ethics have taught us, art, including literature, is “intractable” and seeks the truth for truth’s sake, and for no other reason, not even that of providing someone with greater comfort (15).

### Clinical Ethics as Art Criticism

The mere inclusion of stories within our daily experience as professionals or as patients will reveal itself to be a simple exchange of new humanistic *evidence* (of a narrative kind) with another (of a scientific biomedical kind), if the decisive mediation of *ethics* does not intervene. Clinical ethics is the place in which what is explained intertwines with what can be understood; the place where our basic personal orientation, “who I want to be”, combines with “what I have to do” based on “how much it is technically possible to modify, treat, soothe, and rehabilitate.”

The trouble is that the *discipline of ethics is not always ready* to process narrative, symbolic, and emotional expressions due to ancient habits that are rationalistic (“affection clouds reason”), individualistic (for which human beings, isolated and foreign or perhaps even rivals with one another, are impersonal containers of pleasure/pain or satisfaction/preference), or dogmatic (for which the cases/stories are only raw material that serves as a field of application for general rules and precepts, established from the start in a no-man’s-land where an “angelic” disembodied intellect, lacking passions, would operate).

In other terms, what is required is a *narrative re-establishment* of ethics, which recognizes and enhances the aesthetic aspects of moral judgment. We must once again ask ourselves what “*to apply*” means in ethical terms (16). In our opinion “to apply” means to find, or to re-find, the narrative thanks to which we learned to think and in which we comprehend ourselves, others, and God. Once adequate attention has been paid to this narrative, it is necessary to implement a *criticism* similar to that used in the *artistic-literary* domain. Applied ethics, therefore, examines and verifies the compatibility between different kinds of narratives (stories about the “good life”, on the one hand, and smaller stories about our own biographical experiences on the other), and at the same time devises new and cohesive concepts to either justify that action which is capable of solving a moral dilemma or to display the meanings that make that action attractive, persuasive, believable, or even exemplary (17); concepts similar to those used by an art critic to document the quality of a painting, its historical originality, its pictorial success, and the

novelty and consistency of factors and elements that make a work of art beautiful.

For these reasons we availed ourselves of the lessons of Wayne Clayton Booth (1921-2005): literary critic, professor of “English Language and Literature” at the University of Chicago, an internationally recognized teacher of narrative criticism, and leader of the movement known as “Ethical Criticism” (18). “*Literary ethical criticism*” is a concept that converges with our vision of narrative medical ethics.

In the medical humanities it often happens that literature and clinical practice suggest original points of contact and *dialogue* between different sciences and cultural practices which appear heterogeneous among them. In fact, Booth acknowledges the need to investigate the moral dimensions of an artistic work (while avoiding any kind of ideological censorship), to recognize how ethical perceptions and aesthetic judgments are intertwined, to consider the value-based turmoil due to a reader’s entrance into the imaginary world created by the author, and lastly, to examine the consequences of this exploration or immersion with regard to the good of the reader/observer, or rather with respect to that which the reader/observer considers to be his or her own precious moral identity (19,20).

What are Booth’s useful intuitions? The first is that it is necessary to *believe in order to understand* the meaning of a narrative text. It is therefore necessary to have confidence in the hypothesis that those characters in print (or those painted on a canvas, or captured in moving images, to provide examples from other art forms) carry a humanly relatable and meaningful message for those who are nourished by them. The author offers us a pact and we accept it, agreeing or even surrendering to the allure (or to the disgust) which arises in the text. Our consent in this *alliance* obviously remains critical. We can think about it and challenge this narrative pact or even break it. But a preliminary act of trust is necessary. In fact, this is the only way that we can come to discover the individual qualities of a written work (or that of a painting or movie), the uniqueness of its internal rules, or the originality of its revelations. Something similar happens in ethics, as Paul Ricoeur taught us, *comparing the text to the action* (21). If we want to evaluate an action, we must give credit to the hypothesis that this is not a mechanical gesture or



a product of deterministic processes, but rather that it is fully intentional on the part of the person who performs it and that it has intrinsic meaning, a meaning that deserves to be placed within its unique context in order to be properly comprehended.

The narrator (Booth's second intuition) speaks of himself and of his world and invites the reader in. So, can we believe him? What will we gain from the decision to share his company? What *transformations* will this evoke in the spirit, thoughts, and emotions of the audience? No narrative and no interpretation of the story can exclude an *exchange of values*, a comparison and/or a conflict between the visions of the world according to the writer/director and according to the reader/spectator (in the case of film).

This is what happens in the *ethical pluralism* of our societies as well. Discussing a moral dilemma means entering an arena of dialogue in which our moral position always has something to teach and, reciprocally, to learn with regard to different or even opposing ethical traditions. Only a dogmatic or skeptic thinker (one that is entirely relativist) can turn their nose up at the importance of reciprocal listening.

This kind of comparison is not exclusively logical-intellectual, but also sentimental and imaginative, for *we are the stories in which we believe* and therefore the analysis of specific moral problems, for example regarding the concept of justice, is strictly tied to the vision of the good, just, and brotherly society in which we wish to live (22). The task of the ethicist is not that of balancing material data or events (pleasure, pain, joy, frustration), but rather of perceiving and discerning the values of a gesture or an omission, values that manifest themselves within a historical context, a biographical event, an ideal of health, or a vision of the good life; values that are interwoven with narrative components. In short, we could say that ethics (as a rational justification of moral evaluations) is a criticism of the *story which we are*. It will be the job of medical history to remind ethics that a moral judgment has inherent narrative nuances.

### Film: Narrative Content and Style

As we were saying, the *truth* which a *text* explores is never simple. In the case of film (the narrative form

to which we dedicated most attention in our recent study as clinical ethicists and professors in a school of medicine), three kinds of allusions can be identified (23).

A film explores a *theme*, an argument, for example an illness, like cancer of the larynx which strikes a surgeon who is then unable to communicate in the movie *The Doctor*, starring William Hurt (USA, 1992) and directed by Randa Haines. Any plot can be legitimately read from a psychological, social, or political standpoint, but nevertheless each story focuses on specific events that are directly represented in the sequence of scenes and immediately perceived by the observer (24). A medical historian, as he watches a film about a specific clinical case, will certainly ask himself: According to the way in which this pathology is portrayed, to what historic-cultural period does the illness pertain? Is this event realistic with respect to that time period and to that era of medical progress?

The medium of film also explores the kind of *gaze* that conceived, filmed, and edited a particular movie. This is the second meaning of any visual text. We are referring to the gaze of the director, his mental attitude, exploratory style, and creative expression. He is the author, or more precisely, he is the author-implicit-in-the-text, he who frames the events and either shows them to us or conceals them from us, choosing the pace of the editing, a certain kind of music, the cinematography, the scenery. Before any of this, it was he who experienced the hopes and fears of the characters. In the example of the film *The Doctor*, the feelings of the sick surgeon have infected, through an empathetic imagination, the sentiments and thoughts of the director, who then conveyed her distress about the cancer diagnosis to us, the spectators (25).

Finally, film also explores the very experience of *making movies* and *going to the movies*, an experience that has "pathological" characteristics (to remain with the theme of "illness"), given that the cast creates a "parallel" and fictitious world and given that we, as spectators, stay quiet for two hours, motionless in our seats, in the dark, among strangers, giving value to made up stories in a *willing suspension of disbelief*, as Coleridge wrote. In other words, film is, in its own way, an illness. Therefore, we can interpret the surgeon-protagonist's muteness (having undergone an operation

on his larynx) as the silence (muteness or blindness) of the movie camera, like the darkness of the screen, like those communicative gaps, those unexplained mysteries which a film prepares, represents, and offers to its audience at the same time that it offers a fuller, more virtuous, and more eloquent revelation.

Film is an art, and as such it refers, even in its fragmented texts, to an *unconditional truth*, to visions that no one has ever seen before, to a “beauty” that seeks to impose itself upon anyone who contemplates it. This tension is what unites a quality film with an exemplary moral gesture, through which each of us attempts to express an unconditional value, committing ourselves without reserve to a good cause, for an absolute good. Ethical decisions are motivated by a person’s desire to lead a good, happy, worthy and respectable life. *Aesthetics and ethics* cross paths and exchange images. As the philosopher Gadamer wrote, citing Plato: the concept of good and the concept of beautiful are closely connected, so much so that, in an attempt to find good in and of itself, the good takes refuge within the beautiful, which is more likely to be grasped. In other words, in the search for good, beauty reveals itself (26).

From this perspective, we can now implement a historical analysis, studying the transformation of a book’s thesis (with 46 years between the first and second editions), starting with the main assertion of the author, Paul Schrader, which is that a privileged *cinematographic style* exists for *representing the absolute*. The author is referring to the religious absolute, the divine, the Wholly Other (27). But in this paper we ethically interpret his bold theory and also refer it to the notion of good. How is it possible to translate into images that *good* which imposes itself on our will like an unconditional obligation, rule, imperative, or value? As film critic André Bazin (1918-1958) said: like death, so too sanctity, sex, and, more generally, love and kindness, which are evident in a noble life, *are to be lived* and not visually flaunted (28). These topics seem to escape ostentation in images. Special effects are of no help either; on the contrary they reduce these “sacred” experiences to mundane content and transform exemplary human experiences (like those of doctors and researchers who risk their lives for the good of the sick, in many motion pictures) into superhero comics.

To learn about life from film, to acquire the ability to discern a right, just and noble gesture from movies, spectators need *new eyes*, something which film - like a miraculous organ transplant - can provide, showing them the most real aspects of day-to-day existence for the first time and in original ways, even if less-than-dramatic. Only in this way will narrative be able to salvage ethics. But to explain this trick, we must begin with some *historical remarks* on Schrader’s evolution of thought.

### An Aesthetic Trend in the History of Cinema

Paul Schrader is an American screenwriter and director, whose writing credits include *Taxi Driver*, *Raging Bull*, *Bringing out the Dead*, and *The Last Temptation of Christ* (all movies directed by Martin Scorsese) and whose directing credits include (among others films) *American Gigolo*, *Mishima*, *Affliction*, and *First Reformed*. Schrader’s thesis was first formulated in his doctoral dissertation and published into a book in 1972. It was then re-explored and articulated in the new Introduction to the book *Transcendental Style in Film* (2018). Schrader thus had the opportunity to explore the fifty-year history of contemporary film and to draw a map of the poetical styles of the most important directors. In our opinion, this excursus does not relate simply to film criticism, but also - more in general - to the evolution of aesthetics and ethics, providing a significant historical contribution to the studies conducted in the field of *medical humanities*. Let’s begin, first of all, by summarizing the content of Schrader’s premise.

According to Schrader, transcendental style in film has always existed, basing itself on the hierarchic rigidity of Byzantine icons and the abstract lines of Zen gardens and rituals. This style was used particularly by Japanese director Ozu, French director Bresson, and, partially, by Danish expressionist director Dreyer. Fragmented stylistic elements are also found in films by other directors: Antonioni, Rossellini, and Pasolini, to name a few Italian examples. *The absolute is not perceived directly, but through a three-stage process*: everyday life, division, stasis. Film does not reproduce reality, but manifests its hidden truth. Transcendental

film does *not*, therefore, have specific mystical *content* to offer spectators, but forces them to participate in an artistic-creative process and, in so doing, to approach a sacred epiphany. It is, therefore, the *form* (not the narrated events, nor the informational message) that reveals the absolute. What counts is the way in which the sequences are constructed, edited, and offered up for reinterpretation by the spectator (intended as co-director). How and in what moments is this stylistic tactic articulated?

First stage: *day-to-day images* are presented in the simplest, most repetitive, stylized, and inexpressive way possible, like a documentary with no embellishments. The cinematography focuses on humble details: a door that squeaks, empty gazes, delicate facial profiles photographed head on. The asceticism of flat, “two-dimensional” vision weakens the seductive strength of the artificial, spectacular, “three-dimensional” action. It is like returning to Byzantine painting. The mundane, ordinary, and tedious aspects of everyday life are revealed. The camera is slow or stationary. The plot is monotonous. The pure silence or ambient noise have no need for an artificially added audio track. The audience reaction is that of curiosity and uncertainty, of boredom and inquiry, as it is unable to feel invested in the event as it normally would be. The spectator asks himself: What am I supposed to watch? What can’t I see? Is everything equal? Why is what I’m seeing so different from the perceptions that I’m used to?

Second stage: all of a sudden the true motives of the characters are revealed, motives that day-to-day life was concealing in its detachment, but which the spectator perceived inwardly, as in the first anxious contractions of labor. In the reality of everyday, an extraordinary event takes shape, an event that casts suspicion on everything “normal” that was patiently described to us previously. In this way a *disparity*, a division, a disunity between human beings and their environment takes place. The schism culminates in a *decisive action* that fractures the story. For example, a protagonist suddenly expresses his anxiety, his social maladjustment, with a gesture that breaks out of the cliché of the surrounding cultural environment and that uproariously frees the emotions that were previously held back, because this gesture reveals the hidden desire which he had always felt. The spectator senses

intense emotional distress, as before a sudden acceleration; he or she feels both astonished and tormented, as when observing a scene that evokes fear and pity, like in an ancient Greek tragedy. The same spectator comes up against an explosive spiritual message that no longer allows for neutral observation. It must be either accepted or denied.

Third stage: *stasis*. A symbol, a scene, a frame are brought into our field of vision, which hold together the two broken aspects of reality (separated from one another in the second stage) and transcend them, without resolving their contradiction. The pacification does not offer naive comfort, but rather represents the crystallization of an eternal conflict, the appearance of the *intimate unity of all things*. A successful film gives an aesthetic shape to reality (the reality that was previously shattered) and inspires respect and an almost religious devotion on the part of the audience towards the art of film; an art that has given up on entertaining or amusing an audience, using the allure of a beautiful image as an end unto itself or employing the psychological tricks of suspense and surprise.

Schrader finds several examples of *stasis* in Bresson’s films. “In *Diary of a Country Priest* it is the shadow of the cross, in *A Man Escaped* it is the long shot of the darkened street with Fontaine and Jost receding in the distance, in *Pickpocket* it is Michel’s imprisoned face, and in *The Trial of Joan of Arc* it is the charred stump of the stake” (29).

Rewording the author’s conclusions, transcendental style is a way of understanding the truth about the world, the human soul, the ultimate destination of our lives, the principle of hope, which some call God. It is a path toward that symbolic, hybrid, syncretic image that coagulates and reveals values, in which the lines of *art, ethics, and religion* meet and interpenetrate one another.

### Rethinking a Style, Fifty Years Later

The *history of medicine* has the important task of connecting technical-scientific and cultural transformations with medical philosophies and ethical theories (including those governing the kind of applied, clinical bioethics that examine the dilemmas of healthcare). In

our case, the evolution of a director-essayist's thinking, and the discussion around it, indicate and document important social changes that have taken place.

The edition of Paul Schrader's text, which appeared in 2018, deserves a brief summary. As he explains in the Introduction, the transcendental style has blossomed into what Schrader calls *slow cinema*, thanks to the contribution made by French philosopher, Gilles Deleuze (1925-1995), and Russian film director, Andrei Tarkovsky (1932-1986). The transcendental style preserves, in certain rare films, its unique characteristics (the phases of day-to-day life, disparity, decisive action, stasis), but in slow cinema this has evolved.

Deleuze made a distinction between (a) movement-image and (b) time-image (30,31). In (a) what counts is the action of a projected image, the movement of which, perceived on screen, continues in our minds. In (b) the creative desire associates images over time. But in this case, the *action is irrelevant*. Consciously telling stories is less important than communicating memories, fantasies, and dreams to the viewers' subconscious. If nothing happens, our minds are wired to complete an on-screen image. We, as spectators, create patterns from chaos. We complete the action (29). Therefore, (a) creates suspense; (b) nurtures introspection via duration.

Analogously, Tarkovsky valued style over content. The power of film is not to manipulate reality through the montage, but to *enable spectators* to choose what they want to see. The image of things is the image of their duration. Tarkovsky's films study time by means of long, meditative shots, which make the audience-mind work in order to assess, and even create the different meanings of a sequence. Dead time, long takes, still-life images, slow camera, and minimal narrative make *time become the story*. What counts is time, or rather the factor that ties events, people, and things together. Time is indeterminate, it is *das Um-greifende*, as philosopher Karl Jaspers (1883-1969) would have said. It is what envelops all real or fictional entities, embraces concrete events and manifests itself within them (32).

Generally speaking, the *techniques* of slow cinema include: static frames, languorous dolly movements, wide angles, minimal coverage, off-set edits (the film is cut either too early or too late, giving the sensation of

a post action lag), images are preferred over dialogue, visual flatness, repeated compositions, and unnecessary doubled or redundant information. These devices keep the viewer at a strange *distance*. We have the impression that something important cannot be seen directly and that it lies beyond the frame, in infinity. Moreover, the spectators are pushed away from easy empathy, participatory action, and emotional involvement. They have to contemplate or reject the visual text. Slow cinema assails you through *the strength of boredom*, sucking you in with idle time and cooled situations, in which you are expected to reflect on the meaning of a few, dissonant, and immobile details by yourself. In this way, you are democratically invited to construct your own film, with all the comfort of a prolonged, wandering visual exploration and a subsequent mental rearrangement. Meanwhile, the anxiety of waiting grows. Will there be a revelation? Will something essential happen (or is it perhaps already happening), despite the fact that the visual experience is empty, alienating, delayed, and irritating?

Historically, Schrader adds, film has moved *away from narrative* and has headed in one of three directions: (a) the *Surveillance Camera* (simply put, turn the camera on and let it record: no actors, no story, no set; reality made art by the all-seeing eye of the closed-circuit camera); (b) the *Art Gallery* (which uses pure, abstract photographic images, produced by light and color; in which time is manipulated to make a collage of impressions, to follow an obsessive stylistic path, or to interact with drawings based on computer algorithms); (c) the *Mandala* (this is a film of inaction which leads to quiet contemplation or a film of extended duration which makes one observe to the point of trance). "Warhol pioneered this sub-genre with academic exercises like the eight-hour observation of the Empire State Building, *Empire* (1964)" (29).

In tandem with Schrader's research, other recent film studies have paid fresh attention to the *flesh of film*, thus putting into focus not only the concepts which a film presents, but also the technical choices through which a vision of the world takes shape. Film techniques (sound, editing, lighting, close-ups, shot length) serve not only the form, but the content as well. This content deserves, in particular, a postmodern theoretical analysis (in terms of philosophy and, espe-



cially, theology) which would be able to demonstrate the director's message regarding anti-authoritarianism, anti-individualism, and anti-nihilism and would be, generally speaking, in favor of communitarian views. Cinematic institutions, art criticism, and cultural debate compel individuals (who are watching a movie) to find meaning through others. "Reading the flesh can reveal the word, but only through inter-subjective conversation with those who dwell among us" (33).

### Ethics, Film and Historical Changes

Alongside film, many things have happened in the *field of ethics* over the past fifty years as well, which are the first five decades of the discipline known as "bioethics". We will now indicate some shifts in perspective, shifts which we obviously find important from our point of view as clinical bioethicists.

The outcry over special cases of border ethics aside, moral vigilance has also focused on *day-to-day ethics* (34). The critical gaze and social judgment do not focus only on the results of noteworthy interventions due to highly technological progress and extreme medical specializations, on spectacular news, or on the clamorous conflicts between opposing visions of the world, but are applied to the experience of illness and treatment and how these occur and are experienced in society's common spaces: the city, the home, the clinic, the nursing home, the therapeutic community. What come to light are, therefore: the communicative challenges among patients, family members, and doctors; the ways in which discomfort is commonly expressed and, unfortunately, often misunderstood; and the *medicalization of life* (which in turn causes specific damage known as "cultural iatrogenesis") (35). Medicine cannot humanize if it does not make a pact with a more just society. The same clinical ethics (and related ethical committees) risk becoming another specialization, a bureaucratic and conformist excuse that is used to preserve the previous communicative impasse and to confirm a misguided operative-institutional brutality.

A good example of the help which film, medical historiography, and ethics can provide one another is found in the *film-documentaries* of Frederick Wiseman, an American director born in Boston in 1930,

who chronicled day-to-day events without editorial comments. His stylistic characteristics (an observational film style that used slow or still shots with little outside interference other than editing and careful recording of the ambient noises) and his anthropological point of view have produced several interesting works. *Near Death* [USA, 1989; photography by John Davey; among the consultants who worked on the documentary there were several well-known ethicists] is a black and white full-length film (lasting approximately six hours) that was filmed in June 1989 at Beth Memorial Israel Hospital in Boston with a grant from the National Endowment for the Humanities and thanks to the willingness and cooperation of patients, family members, and hospital staff.

The day-to-day events of the intensive care unit were filmed, in which most of the patients recovered (as specified in the closing credits), but some patients in the terminal stages of their illnesses simply received palliative care. Everything is shown for what it is, without trying to provide audiences with a captivating plot, a dramatic script, an exciting adventure. There are doctor's visits, shots, patients undressing, nurses chatting in the hallways, and meetings among staff during breaks or in the reporting rooms. There are conversations between doctors and patients' family members. There are extremely long waits, silent moments, routine gestures, live conversations that seem like they were filmed in slow motion (*ralenti*). In a previous full-length film, *Hospital* [USA, 1970, duration: 84 minutes, filmed at the Metropolitan Hospital of New York], spaces and moments outside of the wards were filmed, like the long periods spent in waiting rooms.

The movie camera, both patient and curious, rests its *contemplative gaze* in silence; on the one hand it is impotent (life continues to swirl around it), and on the other hand it asks the spectator certain key ethical questions: What happens when death approaches or threatens to approach? What illnesses are worth treating? What communicative defects prevent a true therapeutic alliance? What does the patient truly need, for this is the primary thing (whether secular or religious) on which the entire routine should be focused? What has changed historically with regard to hospitals since the start of the 20<sup>th</sup> century? What has medicine become?

Wiseman gives the movie camera (which acts as an invisible angel) the fearless mandate of recording, documenting, and making people think. We as spectators can thus *imagine ourselves to be in those places of suffering*. We are like involved “voyeurs”, situated, however, a few steps back. Our eyes are given a close-up view of these “near to death” experiences, but from a safe distance, hidden behind a veil, located in another place. It is for this reason that those who watch a film see “themselves” in those on screen, like in a mirror. However they are free of material tasks, of reparative duties, and can allow their attention to wander and fluctuate freely, fully immersed in this lengthy contemplation. The audience can dedicate itself to the study of meaning outside of the strict clinical context, full of doctors, nurses, family members, rabbis, and other religious advisors, as well as consultants of every kind.

Wiseman’s message seems to be that, ultimately, we (director, cast, audience, real characters) are at a stalemate and that in *end-of-life visual bioethics* we are all working to prepare for a humane and compassionate separation (allowing one to die, turning off the life support machines, releasing a patient that has gotten better, advising family members). We are working to create an end that is consistent with our values and style and that of the patients being filmed. In the *standing meetings* or in the staff’s grand rounds, it is not only the experiences of the patients that emerge, but also the emotional resonance (sense of guilt, aggressiveness, sadness) of those providing care. The language of the clinical history is intertwined with the memories, fantasies, and biographical symbols of each subject and his or her most sacred values. There is, obviously, something artificial in all of this. The presence of a movie camera inevitably encourages certain false postures, histrionic behavior, melodramatic poses, and showy gestures, but it also contributes to raising the communicative standard of the staff. Then comes the end of the film, with the bodies being prepared for the funerals and short blurbs that tell us what happened to the patients, thanking all those who made the film possible.

Previously, Wiseman had already made the film *Titicut Follies* [USA, 1967, his first documentary, duration: 89 minutes] which chronicled day-to-day life in the Bridgewater State Hospital, a criminal asylum in

which the patients performed in little shows (*follies*), but suffered all of the contradictions of a *total institution*: they were interrogated, undressed, and monitored. “Total institution” is the term used by sociologist Erving Goffman (1922-1982) in his book *Asylums*, 1961 (36), to qualify the social conditions of mental patients and other inmates, the stigma that surrounds them, the ritual behavior of their social interactions, and the distorted methods of communication used (37). Conditions of imprisonment have improved since 1966, according to the Supreme Court of Massachusetts in reference to the documentary *Titicut Follies*, but what we see is not encouraging. The tics of the interrogators, their deviations from reality, the rhythm of their questioning, the cigarette smoke that they breathe are all unsettling. Everyone, both the patients and the operators, must survive this confinement and madness.

As we can see, the directorial quality of these documentaries elicits an empathetic *ethical evaluation* and cleanses the gaze of moralists from inopportune abstractions, bringing moral theories back to the *elementary experiences*, in which everyone perceives vulnerability, closeness, fear, aggressiveness, and a desire to be free from harm. We could say that, like through a *surveillance camera*, modern ethics feels a renewed need to “reset” the theories or, better yet, to rethink the critical language that we use to describe critical situations. Phenomenological philosophers would say that we need to, in the words of Edmund Husserl (1859-1938), “return to the things themselves” (“Wir wollen auf die «Sachen selbst» zurückgehen”), setting aside the prejudices that cloud our vision. We must move from the naive consideration of an object, to the essence of that object in the *experience of the person holding it* (38).

Moral reflection must therefore let go of presumed neutrality (neutrality of values, motions, sentiments) in the description of events, and instead recognize which are the implicit values that guide apparently natural *observation*, in order to initiate a comparison and a dialogue with other visions of good. In this transformational process, the constant allies of ethics are literature, clinical history, and film. In fact, what we referred to as “implicit values” often resemble *visions*, stories, and images of the world, epochal paradigms which, as we were saying, color our intellectual argu-

ments, sometimes without us even being aware that they are doing so. The lessons of Booth, Schrader, and Wiseman are useful because they force the gaze (of the clinical bioethicist who interprets the dilemma at the patient's bed-side as well) to acquire a new sobriety, to inform an ascetic outlook, and to eliminate grossly rhetorical evaluative components.

There is a page in Schrader's book which we could easily paraphrase into current ethical terms (29). He is talking about transcendental style when examined from the perspective of film criticism. We would like to apply his statements to the kind of "art criticism" that we believe is represented by ethical analysis of clinical cases. The moral agent who experiences, in the "everyday" (*le quotidien*), confused emotional discomfort and a strong *conflict in values* sprinkled throughout his or her personal history (especially in times of sickness and medical treatments), experiences emotional torment, which culminates in the so-called decisive event. This event (typical of the stage which Schrader calls "disparity") is not necessarily real. It can be the image of a gesture or the anticipation of something that has not yet happened. It can be a daydream or, as director Stanley Kubrick (1928-1999) would say, a dream with one's "eyes wide shut". *Eyes Wide Shut* is Kubrick's well-known 1999 film which talks about (while we are on the topic of stories about doctors) eyes that are both wide open and closed at the same time. The desire for stability (for "stasis", the third phase) fuels the search for a new balance that does not forget or lose track of the historical contrasts, but weaves them together and surpasses them in a new form or *Gestalt*. If the solution is found, then it works on both the objective plane (building a new structure of values in which to believe) and on the subjective plane (acquiring a new personal attitude towards moral principles).

The release of the dilemma is of *both ethical and aesthetic importance*. The moral agent can, in fact, confirm, correct, or even reject his or her previous moral vision (ethical aspect), and, at the same time, establish or dismantle and transform the previous perceptive style (aesthetic aspect), the manner of behavior, and the judgmental criteria of beautiful/ugly, worthy/unworthy, successful/mediocre: judgments that have been made before about concrete, specific situations. The emotional turbulence has not, therefore, been largely

removed, nor has it been pacified or received psychological reassurance, but rather has sparked an ethical and aesthetic investigation. The individual experiencing the crisis begins to sense the moral absolute (the supreme value, the categorical imperative, the latest principle of practical judgment) in a new light, represented by new symbols, inside new models of virtue and new paradigms of behavior.

In attempting to correlate the various forms of spirituality in art, Schrader (quoting French philosopher Jacques Maritain, 1882-1973) claims to prefer an entirely unartistic, yet *ethical*, metaphor; one which does not rely on aesthetic techniques, but instead refers to types of "good works" and considers two kinds of *means* (29). There are *abundant* temporal means, which demand a certain measure of tangible success and which are concerned with practicality, physical goods, and sensory feelings. And then there are *sparse* means, less visible yet more effective, which focus on the development of wisdom and on the elevation of the soul. The protagonist of a Bresson film, for example, is a person in realistic human form, whose physical needs are like our own (he or she benefits from abundant everyday means), but whose conduct is a model of sparseness.

We, as ethicists (adhering to a personalistic narrative definition of ethics), would rewrite this thesis by affirming that the moral evaluation of a deed takes into account primarily the *meaning* of the action and the *virtues* of the moral agents, rather than the visible effects, the mundane weight, and the measurable consequences of a decision. A fair gesture might be identified by the qualities of *claritas*, *integritas*, and *debita proportio* (in aesthetic words), qualities that Medieval scholastic philosophy ascribed to a beautiful object. In Schrader's case, "abundant means" are equivalent to *basic* or fundamental goods (in the Christian sense, to take an example from religious ethics). "Sparse means" meet *supreme* goods or values. As transcendental style in film sets the viewers in motion, pushing them from wealth to asceticism, so does ethical training urge a person to go deeper and deeper into his own quest for a moral truth, a truth that might entirely transform and shape his life. Slow cinema tries to provide (still in Schrader's words) a silent experience, to broaden the perspectives of the inner and outer world, to open a tranquil region untouched by the unreliable vagaries of individual

emotions. Emotions, sentiments, and feeling are still worthy, but they do not at first belong to the psychological domain. Rather, they take root in an ethical and aesthetic experience.

### **Bioethical Conclusions: How Philosophy and Theology Make Use of Stories and Images**

Many scholars have recently dedicated an enormous amount of effort to understanding the *theoretical qualities of film*, demonstrating not only that philosophical assumptions exist and that gnoseological, ethical, and metaphysical concepts are applied, but also indicating the reasons why a speculative truth requires a story in order to be understood and justified (39,40,141,42,43). We have commented elsewhere on this substantial concentration of interests, which reevaluates the role of medical humanities (and, among these, the history of medicine) in the modern debate on the relationship between ethics and narrative (44) and which makes an assertion such as the following possible: "A modern Plato would compare his cave to an underground movie theater, where the audience watches the play of shadows cast by the shapes passing before a light at their backs" (45).

In other words, nowadays film is a relevant *source of myths* which establishes a world of values (offered to the new "believers" of this experimental religion), organizes secular rituals that include a participatory performance (46), touches the audience at the sentimental level (47), and stimulates a re-figuration and new self-awareness of one's physical and emotional identity (48). Therefore watching a motion picture may resemble an enlightening immersion into a sea of truths and a liberating upheaval of an entire personal vision, a sort of emergence from a dark cave. Film makes philosophers more fully contemplate their traditional and timeless issues (49).

In this brief essay of ours we have cited two important critics, Booth and Schrader, according to whom *ethics and aesthetics* pertain to one another. We would like to reiterate that which for us is the fundamental reason for this relationship. Thinking in *images* (images connected to one another within a story) and in *concepts* (concepts which every narrative is full

of, concepts which are connected to one another via a rational argument) are two aspects of the same search for philosophical meaning (50). Such has been the case since the dawn of Greek thought. Ethics can, or rather must, criticize the myth (without presuming to dismiss it once and for all as unphilosophical) and the myth, story, literary or cinematographic plot provides food for thought on the theoretical level (if one does not want a narrative symbol to degenerate into dogma).

What criticism of a text accomplishes is equal to what applied ethics produces: the *rational justification of an evaluation* (aesthetic or moral). In particular, what Schrader teaches us ethicists is that the absolute imperative, the idea of good in general, and the unconditional norm are not objects of abstract intuition a priori, nor are they the result of the balancing of isolated empirical facts. On the other hand, good, as such, appears *in the drama of life*, when the crisis of day-to-day activities is interrupted by an event that causes disunity and which urgently requires decisive action. This trauma allows a new symbol to emerge slowly (the stasis stage), which transcends previous contradictions and inspires renewed trust as it refers to a more convincing icon of justice, brotherhood, health, and care.

Even *contemporary theology* has recognized that the religious moral norm (as a rule of the second part of the Decalogue) is valid without exception if it is symbolically understood as the expression of an individual attitude of care for other people (following the example of Christ, the actual parable of divine love) (51). One religious commandment refers to the *history of liberation*, in which this injunction or veto was offered to the people of Israel as instructions for following a path to salvation; instructions that are nourished by the memory of gifts received and that are open to the promise of making all things new, branding the law into the heart of the believer.

In this regard, Schrader's considerations on *transcendental style* become relevant once again. It is about changing the shape of one's life, rather than externally repeating codified rituals. Behaving well implies obeying a figure of beauty and honoring a worthy lifestyle, without being able to retrospectively verify, at each step, the benefits earned, and without the guarantee of achieving that which one hoped for in front of everyone else.



Moral theology has not merely examined the relationship between ethics and film (52,53), nor has it been limited to the study of the relationship between film and religion (54,55,56), but rather has reclaimed the need for an overall narrative approach and for a *dramatic anthropology* in order to be able to talk religiously about freedom (57). In fact, freedom is not a natural state, present at birth before one creates their personal history. The more mature freedom “to want” is established and nurtured by the daily revelations of life, and it grows further in the making of a promise, in the importance given to a hope, in the wonder one feels before events of liberation, and in the grateful memory of care received without merit.

According to Schrader, slow cinema documents the ethical desire for absolute goodness, which passes through and transcends individual histories and that inoculates against the commonplace seduction of an exciting or thrilling story line (“away from narrative”, is the motto of the new currents in film) in order to foster more profound and mature contemplation; a contemplation of *time* itself, rather than surrendering to the hypnotic power of clamorous, stirring moving images. The perception of the lived-time (*temps vécu* in French phenomenology) (58) of our biographical plot requires that we become the mature movie-directors of our life, that we create patterns from dark disorder and build creative and persuasive courses of actions, following the image of a good, just, and happy human existence.

But that’s not all. *Imagination* itself acquires a crucial role in theology (59), not due to a postmodern trend or a didactic exemplification, but due to the central role that the experience of faith and theoretical thought assign to the concrete history of Jesus, the man, raised in Galilee and considered the perfect *icon of the invisible*. If we examine, above all, the Apocalypse and the parables as special paradigms of the biblical story, we discover that revelation touches and stimulates the imagination, nourishing its many functions (contemplation, representation, exploration, interpretation, discernment, teaching).

Faith is, in fact, a type of *believed narrative*. It is a global vision of the world that allows the believer to interpret existence, know things, and meet people (60). From this perspective, films have even been interpreted as forms of prayer (sometimes entirely unaware of

this fact), analogous to the biblical psalms, as expressions of lament, praise, joy, confession, anger, reconciliation, and obedience: “allowing us to enter the theater as we would a sanctuary in which a prayer is about to be offered” (61).

“The matrix of film is connected for the most part to two categories which are fundamental in theology as well: ‘the image’ and ‘the word’ (62)”. The old Jewish rule against fabricating *arbitrary representations* of “anything in the sky above or on the earth below or in the waters beneath the earth (*Exodus* 20.4)”, imposes a rational and ascetic faith, preventing idolatrous devotion (63). But theological discourse cannot exist without image and symbol, not only because “from the greatness and beauty of created things their original author, by analogy, is seen” (*Book of Wisdom* 13.5), but because in the face of Jesus of Nazareth one sees the “image of the invisible God, the firstborn of all creation; for by him all things were created, in heaven and on earth, visible and invisible” (*Colossians* 1.15–16) (64). The creativity of the narrative language (which explores the notions of icon, εἰκών, *eikón*) helps religion to contrast the triviality of the dominating media representations, or rather those that are tyrannical, consumerist, and opportunistic. This struggle forces us to “re-see” the world, as much on the cognitive plane as on the emotional one (65).

In conclusion, philosophy and theology explore stories and images, working with and for them. In this sense *stories can salvage both medicine and ethics* (secular and religious). The history of medicine informs us of how much the dialogue between biomedical practice, the narrative of clinical cases, ethics consultation, and philosophical counseling will be further elaborated in the coming years. In the *history of scientific progress*, the art of narrated images (film in particular) plays a role that is much greater than that to which it is commonly assigned. As the great painter and scholar Paul Klee (1879–1940) wrote, “Art does not reproduce the visible; rather, it makes visible.” “Art unknowingly toys with the *ultimate* things” (66) in the sense that art examines daily facts and events from the perspective of their final eschatological significance.

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## B O O K R E V I E W S

**Pianeta diversità. Per una memoria del manicomio di Siena, Francesca Vannozzi, Franco Angeli, Milano 2018, ISBN 978-88-917-8031-7, pp. 248**

On 6<sup>th</sup> December 1818 it was opened – inside the old monastery of San Niccolò – the Psychiatric Hospital of Siena. It has hosted for about 200 years histories of dementia and exclusion which have been retraced by Francesca Vannozzi in her new book *Pianeta diversità. Per una memoria del manicomio di Siena*.

She has followed a purely scientific approach based on the analysis of the archive documentation through which Francesca Vannozzi has investigated the history of mental disease and psychiatric hospitals. She has highlighted how the history of these hospitals is far more complicated because they have always housed not only mad people but a wide varied universe of people. People refused and marginalised by the society because of their being different, troublesome or just behaving “differently” from the “normal” behaviours outlined by the same society.

The book is a collection of essays published over the course of thirty years by the same author and regarding the history of mental disease and the treating of psychiatric patients, along with unpublished works on this topic. The occasion was the recurrence of the 200 years from the opening of the Psychiatric Hospital in Siena.

She has started by an historical definition of psychiatric treatment in Eighteenth Century Tuscany, so that Francesca Vannozzi’s analysis has been specifically lingered on the Sieneze reality. Some of her works have been focused on the figure of Carlo Livi, the San Niccolò Psychiatric Hospital Director from 1858 to 1873

and on his modern vision of madness. Indeed, thanks to Livi, in the Sieneze Psychiatric Hospital madness started to be considered as a disease and the patients as people to be treated. By means of the «cura morale» (moral treatment’), he intended to give back to those women and men who had been shut up in the Psychiatric Hospital that dignity of human being denied by the society. He considered Occupational Therapy as a ‘useful means’ to defeat mental alienation.

The book is characterised by several essays which testify a path towards a science of the mind, hailing from the segregation to achieve the possibility of a psychiatric treatment, the mental hygiene. Moreover, the book studies in depth the detachment of the Academic Psychiatric Department from the Psychiatric Hospital and the progressive losing of its function.

Francesca Vannozzi’s work aims at offering an «homogeneous and full reconstruction of the history of the important Sieneze Psychiatric Hospital» and at giving «the readers, the students, the scholars all the tools to well understand such a situation, what it has represented, how it was managed, who has ‘lived’ and worked in it and how it has changed with the passing of time». She also explains how it headed towards its closure, established by the Law 180/1978 which really occurred only on 30<sup>th</sup> September 1999. She does so by considering some enhancement perspectives of this place which, by being considered an ‘empty urban place’, could become a symbolic place of knowledge and inclusion.

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