Isabelle Souquet-Leroy, Hélène Réveillas and Dominique Castex

4 The Impact of Epidemics on Funerary Practices in Modern France (16th – 18th Centuries)

Throughout the course of the modern period, the populations of the kingdom of France were confronted with recurrent epidemics. Today, the reaction of these populations to events of excess mortality is better known through the study of texts, but also through field excavations and laboratory research of funerary complexes recording these crisis episodes. Considering twelve archaeological examples of cemeteries in France, this chapter analyses the different reactions of populations facing an epidemic and explores the potential of funerary practices between the 16th and 18th centuries.

4.1 Mortality during the Modern Period

The following section looks at the range of typical mortality regimes found in medieval and early modern France, contrasting so-called 'ordinary mortality' with the evidence from the Ancien Régime with frequent crises of extraordinary mortality rates suggestive of epidemic illness, as well as famine or war. These are discussed in detail in relation to five excavated sites with human remains.

4.1.1 Ordinary Mortality

> 'People died very young and they died old, but they did not die young'
> (Dupâquier, 1988: 237).

The populations of the Ancien Régime[1], referred to as pre-jennerian[2] (Bocquet & Masset, 1977), were subject to environmental factors (surroundings, climate...) and sanitary conditions (hygiene, illnesses...) which at times influenced mortality more than social ranking. Nearly one person out of two died before his/her 20th birthday, and half of those died before the end of their first year. This high rate of infant

1 The Ancien Régime, in France, is the chronological period from the beginning of the 16th century until the eve of the French Revolution in 1789. For three centuries, the French population is characterized by a high rural residence rate, with 80% of the overall population living in the countryside, and a mainly agricultural economy (Garnot, 1988).

2 Referring to populations from the periods before the creation of the smallpox vaccine by Jenner (1796), which radically changed the mortality profile after the administration of the first vaccinations.

mortality is partly due to the number of deaths before the end of the first week of life (Séguy & Signoli, 2008), or even after several hours (Lalou, 1990). In a society where birth rates were high, it was not rare for families to be affected by the death of a newborn. These deaths were as much due to biological factors as to social behaviour such as inexperienced mid-wives, or sending the baby to a wet nurse[3]. After maturity, individuals had a life expectancy of 40 years. In addition to the illnesses which affected all ages and both sexes of the population, female mortality was linked to childbirth, even though this percentage appears derisory (between 1% and 2%) like male mortality mainly caused by accidents (Dupâquier, 1988). The effect of social differentiation is perceptible for infants over a year old and in adults, for whom association with a privileged background was responsible for non-negligible mortality differences. Better nutrition and improved hygiene resulted in longer life expectancy. However, epidemics, famines[4] and wars could transform death into a mortality crisis.

4.1.2 Extraordinary Mortality

Mortality crises are characteristic of the Ancien Régime. They span the whole of the modern period, and recur on average every 10 to 15 years (Delumeau & Lequin, 1987; Hildersheimer, 1993). In addition to wars, famines and natural catastrophes, epidemics regularly triggered an increase in mortality. An epidemic is characterized by the rapid spread of an infectious illness to a large number of people, generally by direct contagion. In several months, or even in several weeks, the number of deaths could be multiplied by five, and could halve the population of a town or a village.
The plague is undoubtedly the main epidemic illness of the Ancien Régime, as shown by the various surgical treaties dating from the end of the 15th century onwards[5]. It is

3 Sending newborns to wet nurses played a considerable role in infant mortality yet was widespread among urban populations. Wet nurses were generally poor and accepted several children as well as their own. Consequently, dubious living conditions were a significant danger, and feeding methods (with animal milk) were very often fatal for babies (Badinter, 1980; Lalou, 1990; Rollet, 1978).

4 'People do not physically die of hunger' in towns in the 18th century (Le Roy Ladurie, 1980, p. 332). Rather, famine weakens organisms and illnesses develop within populations, killing a large number of people. It can thus be associated with an illness imputable to malnourishment (mortality by simple starvation), or to contagion inseparable from shortages, which not only contribute to the development of illnesses but also to their propagation (Jean Meuvret, 1946, p. 644). However E. Le Roy Ladurie differentiates between urban mortality in the 18th century mainly due to illnesses, and mortality during the preceding centuries during which 'pure and simple hunger … may have killed their medieval ancestors and those who died during the reign of Louis XIV' (Le Roy Ladurie, 1980, p. 341).

5 For example, we can cite an Italian treaty by Rolando Capelluti, the *'Tractatus de curatione pestierorum apostermatum'* (1481-1487), or the *'Traicté et remèdes contre la peste: utiles te salutaires à gens de tous estatz'* by Master Jehan Guido, Regent Doctor at the University of Paris, 1545. It is not possible to cite the countless works written on this subject, symptomatic of a constant preoccupation.

often called 'contagion' by the doctors of this period. But it is not the only one: some of the illnesses from the Middle Ages continued to decimate populations, such as smallpox, tuberculosis[6], typhoid fever or dysentery, whereas new illnesses appeared, such as typhus, sweating sickness or syphilis (Dupâquier, 1988, I, pp. 436-462 and II, pp. 243-252).

The intensity of these phenomena of "mass" death was exceptional and could attain several hundred deaths per day (the Marseille plague in 1722, typhus in 1712 at Douai: see Marchal, 2002; Nguyen-Hieu et al., 2010). This led to a modification of funerary practices, whereby instead of single burials of prepared corpses, which were either wrapped in a shroud[7] and enclosed in a coffin according to a liturgical codified ritual, several corpses were buried directly in a pit, at times without any preparation[8] and without any receptacle.

Historians specialized in the study of the dead, either in the Middle Ages or in the modern period, underline the traditional dissimulation ritual of the corpse: wrapping it in a shroud and/or concealing it in a coffin from the 9th century onwards (Alexandre-Bidon, 1993, p. 197; Ariès, 2014, p. 169; Vovelle, 1983, p. 333). In a society where death is hidden, the multiplication of deaths threatens the established ritual and requires the implementation of practices aiming to maintain some kind of stability.

The identification of a multiple burial is based on taphonomic observations which take account of the evolution of anatomical connections from the deposition to the discovery of the corpse. When several corpses are deposited simultaneously, they decompose at the same time and the joints of each skeleton are thus maintained (Duday, 2005). In the present state of knowledge, it is not possible to advance the hypothesis of a crisis episode without these multiple structures (Duday, 2007), except in specific cases where sites are well-referenced by manuscripts. Given the expanse

6 Tuberculosis and syphilis are, in the same way as leprosy, illnesses which did not affect populations on the same scale or with the same speed as the plague or cholera. They are contagious illnesses which spread slowly 'which proceed by successive epidemic and endemic phases with particular rhythms' (Ruffié & Sournia, 1984, p. 149). They played an important role in early populations due to their social and demographic impact (Hildesheimer, 1993). For this reason, we cite them alongside brutal epidemic illnesses.

7 We differentiate the "shroud", a sheet sewn firmly around the corpse, from the simple cloth wrapped around the corpse rapidly during epidemics in order to handle the corpse. The lack of evidence, such as the presence of pins or "wide" positions of the deceased in multiple burials such as at Issoudun (cf. infra) could point to such practices. In this case, the treatment of the corpses may be related to an institution taking charge of the ill and minimizing handling the dead. Descriptions of corpses manipulated in sheets or blankets have been described during the plague in Marseille (Carrière, Coudurié & Rebuffat, 1968).

8 Certain deceased were buried immediately after their death, i.e., dressed or in the state they were in at the time of death. This was the case during epidemic peaks when disorganization reigned and funerary practices were no longer respected. The only requirement was to get rid of corpses as quickly as possible by burying them in large pits (see below).

and the density of urban cemeteries, it is not always possible to identify these specific episodes, even though we strongly suspect that individual burials could be ascribed to such events.

The study of the population composition by age and gender enables us to assess any possible selection. Infectious illnesses, which are lethal in the short term, often leave a specific demographic signature, i.e., they do not affect the same ages of the population. Some affect mostly children (measles, for example), whereas others generally kill adolescents and young adults (like the plague, which is not discriminatory). Overall, the profile of a population affected by an epidemic no longer resembles that of a natural population, and the study of the composition of an archaeological series by age and by gender can therefore lead to the identification of the type of epidemic (Castex, 2005). However, in the absence of historic sources, it is not easy to determine the cause of death in cases of epidemics. Death often intervenes very rapidly, before infectious agents have time to cause any characteristic bone lesions. However, it is now possible to identify certain pathogenic agents through molecular palaeobiochemical analyses (Biagini et al., 2012; Bianucci et al., 2009; Bizot et al., 2005; Haensch et al., 2010).

We propose the identification of an episode of mortality crisis from the examples presented below, based on three non-dissociable points: firstly, the presence of several contemporaneous multiple burials (simultaneity of the deposits, contemporaneity of the structures and recurrence of the phenomenon); secondly, the non-natural dispersal of population age groups, and thirdly, a possible similar cause of death. An isolated multiple grave is not sufficient to characterize a crisis phenomenon. It can, for example, be the result of an accident without any incidence on the composition of the population. In any case, it is more relevant to analyse a crisis of mortality from large population samples.

4.2 Documented Sites

The five sites presented here have all been subject to comprehensive studies, from the point of view of both funerary practices and biological data. Inter-site comparisons and a first overview were established with the available information for each site.

4.2.1 Fédons Cemetery at Lambesc (Gard)

During the course of the plague in 1590 in Provence, an infirmary was installed in the hamlet of Fédons, just outside the town of Lambesc, in the southeast of France, in order to wipe out the contagion in the region (Fig. 4.1). The archives of Provence, and reports written in 1590-1591, have permitted the location of places where patients were housed, and of the cemetery; and allowed us to make connections with the Fédons

cemetery excavations (Rigaud, 2005). Seventy-five individual and 26 multiple burials (one quadruple, four triple and 21 double) were brought to light, representing a total of 133 individuals. The tombs are spread over 18 rows from east to west and six from the north to the south.

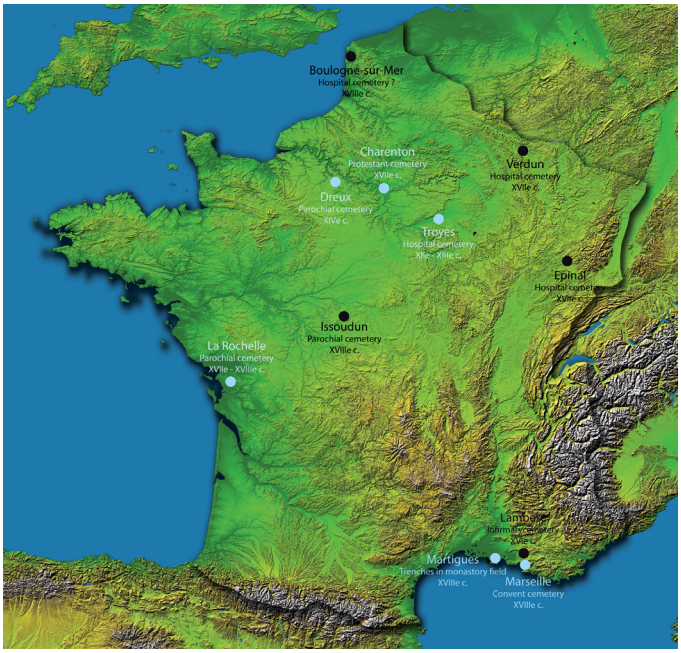

Figure 4.1: Map showing location of sites named in the text (in black, studied sites, in grey, sites of comparison).

The dimensions of the pits are variable, depending on the age of the deceased and the number of individuals buried there (Fig. 4.2). The analysis of the burials showed that the deceased were systematically buried in open ground, for both individual and multiple graves. The deceased are always lying on their backs, with their heads towards the east, regardless of whether they are adults or children. The upper limbs are bent with the hands in front of the upper body and the lower limbs are stretched out more or less close to each other. Only a few cases (four out of 133 individuals) attest to the use of a shroud. Several small objects were discovered (about 60 for 36 individuals), most of which are directly related to clothing, and others to decorative elements or small everyday objects (Moreau et al., 2005). Written sources and a predominance of teenagers and young adults support the hypothesis of an epidemic crisis, substantiated by molecular paleobiochemical analyses which identified the *Yersina pestis* bacillus.

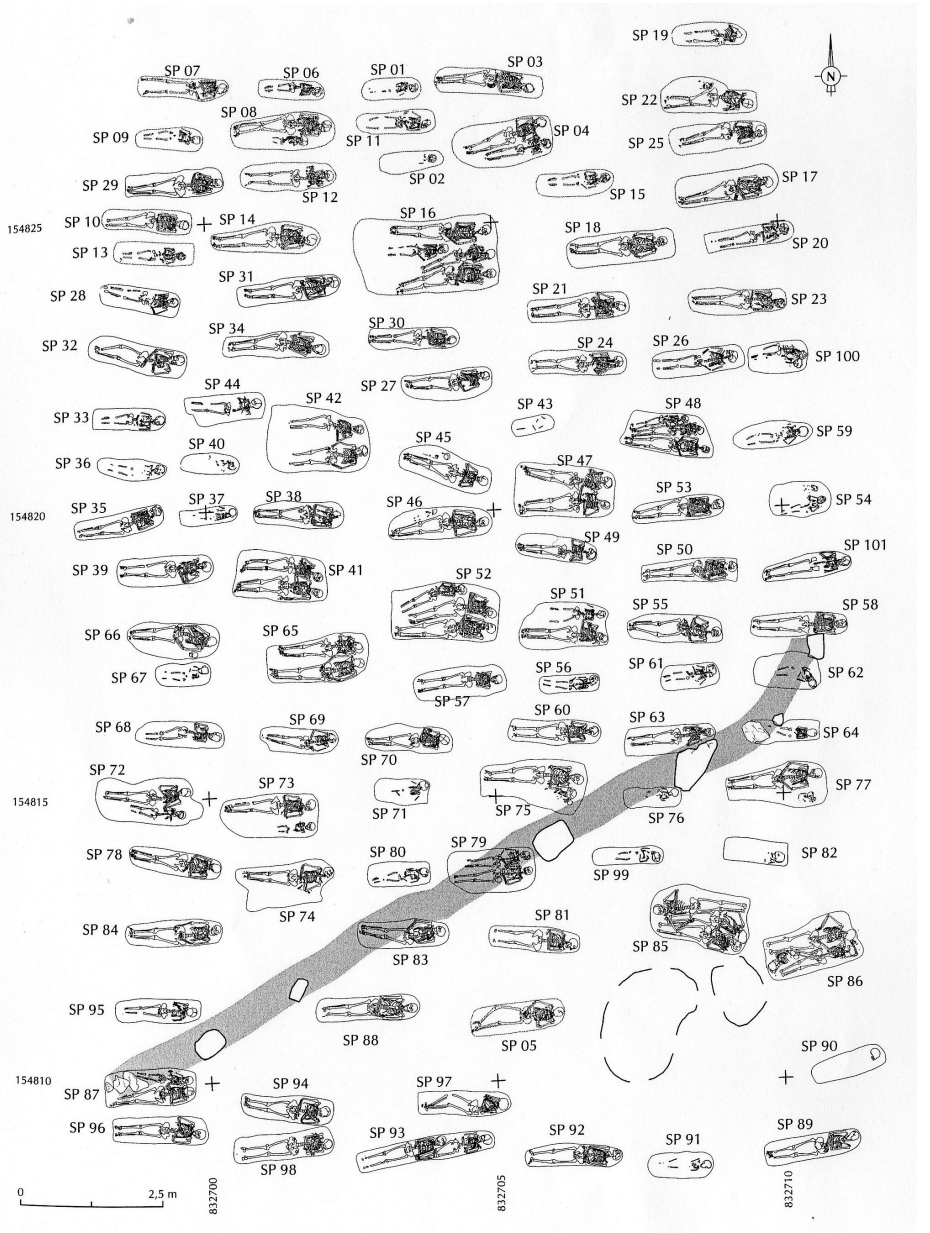

Figure 4.2: General plan of the cemetery of 'Les Fédons' (Lambesc). Map AFAN (in Bizot et al. 2005).

4.2.2 The Cemetery at Saint Catherine's Hospice at Verdun (Meuse)

The town of Verdun is located in the northeast of France, in Lorraine (Fig. 4.1). A rescue excavation conducted by the Association pour les Fouilles Archéologiques Nationales (AFAN) during the winter of 1998-1999 and the spring of 1999, directed by P. Kuchler, brought to light the remains of the Saint Catherine Hospice, the neighbouring parish church Saint-Sauveur and their respective cemeteries. The hospice cemetery was established during the course of the 17th century in the gardens situated beside Saint Catherine's Chapel. It was only used for a short time as new buildings were erected there in 1715 (Kuchler, 1999). Seventy-eight individuals were discovered in 15 individual and six multiple graves, including two double graves, one triple and one quadruple. The two other funerary structures (158 and 161) are much bigger, with 21 and 26 skeletons, including 18 immature individuals and 29 adults of both sexes (Réveillas, 2010). They are very close to each other and present the same rectangular plan. They are included in the funerary zone in the same way as the individual graves.

It is difficult to advance hypotheses as to the event behind the two double graves, the triple grave and the quadruple grave, given the small numbers of corpses. At most, we can observe the absence of traumatic lesions following a violent episode, such as a combat, a massacre or an accident. On the other hand, food poisoning or an infectious illness could be envisaged, although it is impossible to prove. If we focus on the two large graves, specific lesions resulting from inter-human violence can be observed on three individuals, but in all but one case, they are in the process of healing, and none of the 44 other individuals presents any signs of injury. Injuries thus remain limited and do not seem to be imputable to an act of war. Moreover, the mortality profile and the distribution of individuals by sex does not correspond to the usual war time mortality profile, i.e., made up of mainly male, rather young soldiers, such as the site of Vilnius (Lithuania) where large pits were discovered with individuals died during Napoleonic war. The demographic composition with sex and age data, reveal a characteristic military population (Signoli et al., 2004). On the other hand, an epidemic could explain this excessive mortality. Several illnesses developed as epidemics during the modern epoch in Lorraine (Cleu, 1914). The composition by age and sex of the sample, with an over-representation of individuals aged from 5 to 14 years, implies that mortality may be due to illnesses such as dysentery, typhoid fever, flu or sweating sickness, an illness which appeared in the 15th century but for which we have little data as to the mode of propagation and impact on populations (Réveillas, 2010).

All the skeletons buried in the two multiple tombs are in contact with each other and are globally in good anatomic connection. No dislocation of the joints was caused by the successive deposition of the corpses and the only movements observed are limited to the interior volume of the corpse, which can be attributed to gravity with the creation of secondary empty spaces during the decomposition of underlying individuals. The presence of a rigid receptacle, such as a coffin or paving can be

ruled out and the position of certain corpses points to the possibility that they were wrapped in a shroud or clothing. This hypothesis is backed up by the discovery of several pins in copper or iron alloys as well as the identification of a scrap of fabric. Most of the individuals were lying on their backs, with two exceptions; one was lying on its right side, in tomb 161, the other on its stomach, in grave 158. The latter is the last corpse to be deposited in the pit. The corpses were laid out following a west/east or even a southwest/northeast orientation, with the exception of the corpse lying on its stomach in grave 158, with its head facing northeast. The upper limbs of most of the bodies buried in these graves are in a raised position and/or crossed. None of them has both arms along the body, but they cannot all be observed due to the state of conservation.

Figure 4.3: Mass grave in Verdun. Photo AFAN.

The lower limbs display more varied positions, as out of 35 observable cases, at least six have one leg bent to the side (Fig. 4.3). There is no difference in the treatment of the corpses according to age or sex. However, it is interesting to note that the younger individuals are often deposited in the vacant spaces left by larger corpses. Small objects have been found with rosary beads, several religious medals and unidentified metallic elements (Kuchler, 1999). It was not possible to attribute these objects to any particular individual.

4.2.3 The Hospital Cemetery of the Hospitaliers of Saint John of Jerusalem at Epinal

Like Verdun, Epinal is a town in the northeast of France in the region of Lorraine (Fig. 4.1). In the spring of 2000, the excavation of Rue Saint-Michel, led by A. Masquilier, archaeologist with Institut National de Recherches Archéologiques Préventives (INRAP), led to the discovery of remains of an establishment of the Hospitaliers of Saint John of Jerusalem and in particular of the associated cemetery. Two occupation periods were identified, the first related to the Middle Ages and the second to the modern period (Masquilier, 2001). The latter contained four multiple graves, three of which were excavated. They yielded four, five and six individuals, and given the size of the tombs, an estimate of at least twenty buried individuals appears to be accurate. Altogether, 10 adults and five immature subjects were brought to light. The rather low number of individuals and the fact that we are dealing with truncated tombs means that we must remain cautious as to the composition of the population by age and sex. Moreover, none of the corpses present traumatic lesions imputable to an act of war (combat or massacre), which is why it is conceivable that this mortality crisis is due to an epidemic, which may or may not have been accompanied by a famine. As mentioned for Verdun, Lorraine experienced numerous epidemics during the modern period.

The corpses are in contact with each other and do not present signs of having being moved significantly from their general layout. The position of certain individuals implies that cloth shrouds may have been used, as does the presence of silver or copper alloy pins. All the corpses were buried on their backs with their arms folded and their legs stretched out. The graves do not display any particular organization in terms of age or sex. On the other hand, orientation is not the same in all cases; in each tomb the corpses have been deposited head to toe in order to optimize the available space. In this way, in grave 101 for example, the first two buried individuals were deposited with their heads towards the northwest, the third with the head southwest, the fourth northwest and the last two were deposited with their heads facing southwest and southeast (Fig. 4.4). Several small objects were found, such as a copper alloy coin, and bone beads, a cross and glass bead elements.

4.2.4 The Cemetery on the Island of Saint Louis in Boulogne-sur-Mer

Boulogne-sur-Mer is a town in the north of France (Fig. 4.1). In November 1994, during the rescue excavation directed by the town archaeologists E. Belot and V. Canut, remains from the modern period were discovered on the Ilot Saint-Louis. At the south-southwestern tip of the excavated sector, a funerary zone comprising seven multiple graves, with a total of 39 individuals was brought to light. Stratigraphic evidence dates these tombs, each of which contains between three and seven individuals, to the beginning of the 18th century (Fig. 4.5).

Figure 4.4: Mass grave in Epina. Photo INRAP.

Figure 4.5: Mass graves in Boulogne-sur-Mer. Photo Service Municipal d'Archéologie de Boulogne-sur-Mer.

These graves are located in the gardens of the general hospital of the town, at a considerable distance from the "official" hospital cemetery and no links have yet been established with the latter, due to the absence of an archival study. The simultaneity of the bone deposits associated with the contemporaneity of the different recurring structures lead us to interpret this site as the result of a brutal mortality crisis (Castex & Réveillas, 2007; Réveillas 2005). On the basis of archaeological and historical arguments, we have eliminated the hypothesis of a belligerent episode in favour of an epidemic. The distribution of sexes is balanced (10 men and 9 women) and the number of adults is almost identical to the number of youths and children (18). In the light of historical, medical and demographic sources, these facts rule out certain epidemics. Smallpox is the only promising avenue of research although other, poorly documented yet recurring illnesses during the period under consideration cannot be totally excluded.

The persistence of numerous anatomical connections points to the primary nature of the deposits. The systematic connection of the most labile joints demonstrates a process of the progressive filling in of the space freed during the decomposition of corpses and thus characterizes a filled-in space. All the individuals were buried on their backs, along a southwest/northeast axis, juxtaposed and/or superposed in the same way, with the head towards the southwest. The lower limbs are nearly always stretched out and the upper limbs are frequently folded. No particular organization emerged according to age or sex, and young individuals were indifferently placed above or below adults. The only constant factor is the simultaneous presence of adults and children under ten years old. Nonetheless, it appears to be a relatively ordered organization, as in the majority of cases, the youngest individuals seem to have been placed in vacant spaces left after the deposition of the first adults. Three graves contained small objects including coins, a ring and non-identified metal objects. In all the tombs, several skulls presented traces of oxidation which could be linked to iron remains with a non-identified function.

4.2.5 The Parish Cemetery at Issoudun (Indre)

An excavation of a vast 11th to 18th century parish cemetery at Issoudun (Fig. 4.1), carried out by the INRAP in 2002, revealed the presence of 14 multiple graves clustered together in the same sector (Fig. 4.6). They contain between 2 and 23 individuals and are spread out over two distinct chronological episodes. The first is represented by twelve pits oriented northeast/southwest and organized into five rows. They contain at least 168 individuals. The second episode is represented by two pits perpendicular to the former, i.e., along a north-northwest/south-southeast axis. They contain at least 33 individuals. Altogether, 201 individuals were buried in these pits. The organization of these structures reveals that the gravediggers tried to conserve some of the usual funerary rites with the organization of the pits in rows and excavations with similar dimensions to the surrounding individual pits.

Figure 4.6: Six mass graves in Issoudun. Photo INRAP.

The pits are rectangular and all display similar dimensions, regardless of the number of buried individuals or the burial phase. The corpses were placed on their backs, head to toe. The deposits are organized to make optimal use of the available space. The bodies are laid out according to size, and consequently, according to age. In parallel, the smallest individuals are distributed in the empty spaces between corpses. In the pits related to the first crisis episode, the largest individuals (adults and large teenagers) were deposited in two rows, head to toe at the base. Then, smaller corpses were deposited in the upper levels. Conversely, during the second crisis, the youngest individuals were placed at the base of the pit and then covered by older bodies.

The absence of traumatic lesions on the bones of the buried cadavers rules out the hypothesis of an act of war and again implies that two epidemic episodes occurred. From a demographic point of view, several age and gender facts indicate a non-natural recruitment. We observe a clear predominance of males with very marked anomalies compared to a natural population, such as the under-representation of children under one year old and the over-representation of children aged between 5 and 9, and especially between 10 and 14, as well as the clear over-representation of young adults.

4.3 Overview of Funerary Practices

The number of skeletons in the graves associated with a mortality crisis is rather variable at the different sites. At Epinal, due to the intersection of tombs by posterior structures, it is not possible to determine the number of corpses buried there, although there appear to be at least 20 bodies. At Boulogne-sur-Mer, there are 39 skeletons, 47 at Verdun, 75 at Fédons and 201 at Issoudun. In spite of these disparate figures, similarities emerge with regard to the treatment of the dead. Everywhere, they were directly laid in the open ground without a container. The presence of pins and scraps of cloth at Fédons, Epinal, Issoudun and Verdun and the position of certain skeletons at these four sites implies that the corpses were wrapped in a shroud, but due to the restricted number of such remains, it is not possible to extrapolate to all the burials. The majority of the bodies were laid on their backs, the arms were often folded and the legs stretched out. Orientation is more variable and often seems to be related to a will to enhance the use of space in the pit. In the narrow (1m wide at most) multiple graves at Issoudun and Epinal, the corpses are often placed head to toe and alternate according to the different levels. This is not the case in Boulogne, where the width of the pits is limited but the intermediary levels of skeletons are often made up of children. At Verdun, in the wider structures (1.3m and 1.8m), the heads of the individuals are all generally facing west, apart from one body. It is interesting to note that the heads of the subjects buried at Fédons are generally facing east, which is out of keeping with Christian customs, whereas this space is described as a graveyard in written sources. It does not seem as though topographic constraints governed this choice. Small objects, such as coins or religious elements (pilgrimage medals, rosary beads) in bone or in metal are present everywhere in variable proportions. The ritual of depositing objects in the tomb had generally disappeared since the Early Middle Ages and resurfaced during the modern period. In the cemetery of the parish of Saint-Sauveur at Verdun, dated to the end of the 16th century and later, personal objects were brought to light (jewellery, rosary beads and so forth: Kuchler, 1999). These elements are similar to those found in the multiple graves in the nearby cemetery at Saint Catherine's hospice, but also in other tombs dated to the modern period, in Alsace for example (Collectif, 2010).

In Verdun and Epinal, the multiple tombs are situated beside individual graves in a sector which is not reserved for them. They are surrounded, and even intersected by individual graves, aligned with observable construction elements and located towards the edge of the funerary zone. At Issoudun, the multiple graves are clustered together and arranged in rows and have replaced individual graves in a sector reserved for periods of high mortality. The funerary zone brought to light in Boulogne-sur-Mer contains only multiple graves, and in the absence of further information it is difficult to refer to it as a cemetery. The site of Fédons is unusual as it is a cemetery created during the resurgence of the plague. It seems to have been organized according to a precise order of progression. The pits present a generally homogeneous format; some

of them appear to be undersized or oversized in relation to the buried individual, which seem to be related to a grave digging programme. Moreover, the relatively constant depth of the graves attests to a scrupulously respected burial code.

The number of bodies buried in each pit is an essential element for bringing to light a crisis episode. Although the presence of several multiple graves is required in order to advance the hypothesis of an epidemic, the variability of the number of bodies in each burial is difficult to explain and considerable inter- and intra-site differences exist. These burials could represent the number of deaths per day, as suggested for the Issoudun burials, where the number of bodies per pit is very similar to the number of deaths per day recorded in the parish registers for the first two weeks of September 1709. On the other hand, the organization of the graves in Fédons cemetery with a majority of individual burials indicates a simpler and more "ordinary" management of the dead. Apart from the six multiple burials, nothing points towards an epidemic nature of this funerary site. The location of this site in a rural environment probably explains this type of organization, with fewer sick people and thus fewer deaths to attend to and more space in a graveyard created especially for this epidemic. In Verdun, Epinal or Boulogne-sur-Mer, the variable number of bodies in each pit reveals an organization that we cannot elucidate since it is dependent on diverse factors (the burden of the weight, the availability of gravediggers, the epidemic impact, geographic context and the institution responsible for the sick, for example).

The multiplication of the discovery of multiple graves associated with epidemic mortality crises enhances our knowledge of the management of cadavers during these troubled times. It is still difficult to conduct an overview of the subject due to the absence of a certain amount of data such as the exact nature of the crisis in certain cases and the impact of variations in epidemic peak, but today it seems that we can identify the recurrence of a certain number of practices during the burial of epidemic victims. Up until the beginning of the 18th century, a rigorous organization of deposits is observed, particularly for the layout of immature individuals as opposed to adults. The orientation of young children appears to be more variable and is at times dependent on the number of individuals in the tomb. The deposition of corpses to fill in spaces seems to be constant, which differentiates these graves from those of 'classic' mortality periods. The graves are implanted in a pre-existing cemetery and always respect the prevailing organization. They are inserted into a schema of rows in Issoudun, even though they are concentrated in the same sector. At Boulogne, the layout is somewhat different as the pits are not in the hospital cemetery, but outside where there was more space available.

These similarities between sites during the modern period, can in fact be detected from the Middle Ages onwards (Kacki & Castex, 2012). Certain sites display the same rigour as regards the funerary treatment of epidemic victims. In Troyes, for example, seven multiple graves have been discovered presenting marked similarities with those from Verdun, as far as the shape and size of the pits are concerned (Réveillas, 2010, Réveillas & Castex, 2010). The radiocarbon dates showed a considerable gap

between two of these graves, implying that two phases existed for this site; the first from the 11th until the first half of the 12th century, and the second from the end of the 12th century to the first half of the 13th century. The age and sex composition and the absence of traces of violence imply that these two events were linked to mortality crises resulting from epidemics, which may or may not have been associated with a famine. The pathogen responsible for this excess mortality event has not yet been identified with certitude, but the chronology, age and sex distributions and the current epidemiological data tend to favour certain causes such as typhoid fever or dysentery, or even influenza. The orientation of the corpses in the tombs at Troyes is variable in the different levels, but all of them, with the exception of one child lying on its right side, were deposited on their backs. The deceased were carefully placed in the pit and variations in orientation can be imputed, once again, to the optimization of space.

This is also the case for the site of Dreux (Castex, 1994) where 23 graves comprising 14 individual and nine multiple graves (making up a total of 72 individuals) were discovered. The multiple graves contain two and 22 bodies (adults and children together). According to radiocarbon dates, this part of the cemetery dates from the second half of the 14th century. Again, corpses were buried directly in the ground, with no evidence of shrouds or coffins. Inside the pits, adults were deposited first, then younger individuals were placed in the vacant spaces or on adults.

A last medieval example reveals similarities with the Fédons Cemetery. During the course of excavations of the Hospitaliers cemetery of Saint John of Jerusalem at La Rochelle (Nibodeau, 2011), an alignment of five multiple graves containing between two and four individuals was identified in levels dating to the end of the Middle Ages. The management of the deceased is very similar to that observed at Fédons. It is possible that the individual graves from the epidemic event were not identified as such in this urban cemetery. As at Fédons, the corpses were deposited side by side, following the same alignment as earlier burials.

Conversely, three sites in the southeast of France, associated with the last plague epidemic in 1720 and 1721, show a very different treatment of the deceased, radically opposed to the schema described above (Signoli, 2006). The deposits do not present a rigorously organized aspect but instead portray an image of 'dumped bodies'. At the sites of Capucins in Ferrières, Délos in Martigues and the convent of Observance in Marseille, the dead were not buried in pits with the same dimensions as graves but rather in trenches dug outside funerary zones. In Martigues, the sites have respectively yielded five trenches containing 210 skeletons and three trenches enclosing the remains of 39 bodies. In Marseille, 216 skeletons were discovered in a vast pit. In these burials, the positions of the deceased (on the back with open arms and legs apart; in fetal position; on the stomach; arms up above the head) and the orientation of the bodies do not point to the organization of the deposits (Tzortzis & Rigeade, 2008; 2009; Tzortzis & Signoli, 2009). Scraps of cloth and leather were found, probably indicating that some of the corpses were dressed, and lime was used in the pits at Délos. All the gestures brought to light show that the corpses were deposited quickly and hastily,

in structures which probably remained open for several days. They were not handled in such a way as to optimize the use of space, as the vast dimensions of the trenches did not require any particular organization. The mortuary practices observed at these Provencal sites are totally different from the others, including Fédons, which shows the ravages of the plague a century earlier. It is interesting to note that reactions to the plague not only attest to the dangerous nature of the illness, with an image of panic at the sites of Marseille and Martigues, but also to measures of prevention, such as the geographical remoteness of burial sites (as at Fédons).

4.4 The Transmission of Illnesses

Before the first quarter of the 13th century, the observed funerary rites and practices do not display any evidence of urgency or panic. It seems as though populations did not consider that there was any sanitary risk during the course of the events causing death despite their frequency. Analysis of the types of depositions confirms that the processes were effective, well thought out and included close proximity during the handling of bodies for burial. Apparently, the population did not seem to fear possible contagion, or overcame such fear during the funeral. They may have recognized the cause of death and known that there was no risk of contagion or propagation, or have been unaware of the cause of death or any risks involved. They adapted their gestures to the immediate circumstances.

We know very little of the reactions of populations to epidemic illnesses such as diphtheria, typhoid, dysentery, measles or even smallpox, and it is difficult to discern just how much early populations knew of these illnesses. Thus, it is possible that the symptoms of certain illnesses remained unidentified and populations were not aware of the lethal nature of diseases, resulting in non-urgent action (multiple burials being the simplest reaction to multiple deaths). In the same way, an illness which only affected certain age classes (the youngest for example) probably did not result in the vigilance of the whole population. The sites where the cause of death is unknown, such as Issoudun or Boulogne-sur-Mer, could belong to this category of event. In all probability, other well-identified illnesses, such as syphilis or leprosy, which caused a horrible, but slow death, did not give rise to a reaction of panic.

The case of plague is different as it is sudden, rapid, uncontrollable and unexplained, yet identified by the populations it decimated. Due to the endemic state of the plague since the end of the Middle Ages, populations knew the symptoms of the illness[9] and the extreme danger it presented: it resulted in the death of up to 80% of

9 Many descriptions have been left by contemporaries, including the localization of the boils, the swollen tongue, ardent thirst, intense fever, shivers, irregular pulse, violent delirium, troubles of the nervous system, headaches, a fixed stare...

cases for the bubonic form and 100% for pulmonary cases (Biraben, 1975-1976; Signoli et al., 2002).

From this period onwards, preventive measures were introduced to wipe out infestations, to mixed effect. Quarantine has always been a response to the fear and shame of epidemics in the absence of more effective medical solutions[10]. Initially, people avoided contact with those affected by skin diseases such as leprosy, as 'the alleged contagion was perceived as both a physical and moral contamination' (Fabre, 1996). This model also served for the prophylaxis of the plague. Those struck by the plague were often isolated in places which had been used in the past to quarantine lepers (leper houses or maladreries), and burial grounds were often similar for both illnesses (Hillairet, 1958, p. 284).

The transmission of the illness soon became a major preoccupation for populations at the end of Middle Ages and the beginning of modern period (Vigarello, 1993). According to medical experts from the epoch, the spread of the illness was above all related to 'bad air'. Until the 18th century, the dominant theory was that the sick contaminated ambient air through rotting, and contact was not considered to be the cause of transmission. The corruption of the air causing these illnesses was due to malignant heavenly influences, to miasmas emanating from lakes or from decomposing corpses contaminating the air. This was the aerial doctrine. The plague added the notion that the illness could be transmitted by skin pores, a new fear expressed by Jacopo Soldi (Vigarello, 1993).

The idea of contagious illness (Paillard, 1998) was highlighted by G. Fracastor[11] during the 16th century in relation to the plague (and syphilis) and was very slow to spread. It was only really accepted during the 19th century, at which time it was so widely recognized by the public that the term 'contagion' became another name for the plague (Bély, 1996). Moreover, populations regularly affected by the illness observed 'with common sense' (Delumeau, 1978, p. 137) that proximity between individuals represented a danger and set up voluntary isolation to avoid contact between those who were ill and those who were not, even though this was contrary to the convictions of scholars, who refused to believe in contagion (Carrière et al., 1968; Fabre, 1996).

10 In parallel, collective piety and processions were responses to belief in divine justice for sinners. These beliefs were responsible for the creation of places of worship after epidemic crises (see infra).

11 In *Les 3 Livres sur la contagion, les maladies contagieuses et leur traitement*, Paris, 1893 (1st Latin edition, 1550). He differentiates three models of contagion very early on: contagion by direct physical contact (touching), indirect contagion through contact with objects or merchandise, and distant air-borne contagion, which reiterates the aerial thesis. Shortly before him, several doctors in the north of Italy developed a theory on contagion but this did not generate much interest in spite of their extensive knowledge of the European illnesses of the period (Fabre, 1996). This notion replaced the Hippocratic theory which emphasized environmental influences. The contamination by those stricken by epidemics was thus perceived as air-borne contamination rather than direct person-to-person contamination.

The new notions related to the porosity of the body and contagion by 'small invisible living creatures' generated new preventive reactions to illnesses. Each person might resort to individual protection such as escape or exclusion that towns tried to overrule by establishing preventive systems.

From the early Middle Ages, and especially from the 16th century onwards, thanks to the ideas of Fracastor and the notions and affirmations of Boekel, it became obvious that urgent prevention was required, especially for towns where the dominant activity was commerce. For example, on the diffusion of the plague at Hamburg due to a boat from the Orient see Biraben 1975-1976. These changing ideas led to the progressive setting up of a sanitary barrier by the health offices. This institution was to become permanent in the port cities directly in contact with contaminated regions, like Marseille and the Mediterranean coast (Hildesheimer, 1980) and temporary in less-exposed port towns on the Ponant coast (Barry & Even, 2007) or in inland towns and villages.

The isolation of suspected cases and of those who were ill in infirmaries outside towns when the threat drew near became the recommended mode of prevention for small municipalities and provinces (Delumeau & Lequin, 1987, pp. 351-356; Lebrun, 1983, pp. 157-158). The Fédons infirmary and the adjoining cemetery located at more than three km from the town of Lambec are evidence of this type of measure. However, this system could be undermined when a population was caught off guard by a fast-spreading epidemic[12]. It could legitimately be panic-stricken when faced with thousands of dead bodies piling up in the streets every day. In cases such as this, the violence of the epidemic resulted in the total disorganization of the municipal structure. In Marseille and in the region, the 1720 plague shattered the preventive network and led to a series of uncontrolled individual reactions. This impression of general panic is conveyed by the measures taken (Fig. 4. 7). Popular accounts of reactions during the plague in Provence indicate that people were aware of contagion theories and had assimilated them much more quickly than doctors (Biraben, 1975-1976; Carrière et al., 1968; Fabre, 1996).

12 The non-application of laws with regard to boats from countries 'at risk' and the negligence of the authorities led to the rapid propagation of the illness from poor and overcrowded neighbourhoods. The population was only warned and preventive measures set up when it was already too late (Carrière, Coudurié & Rebuffat, 1968).

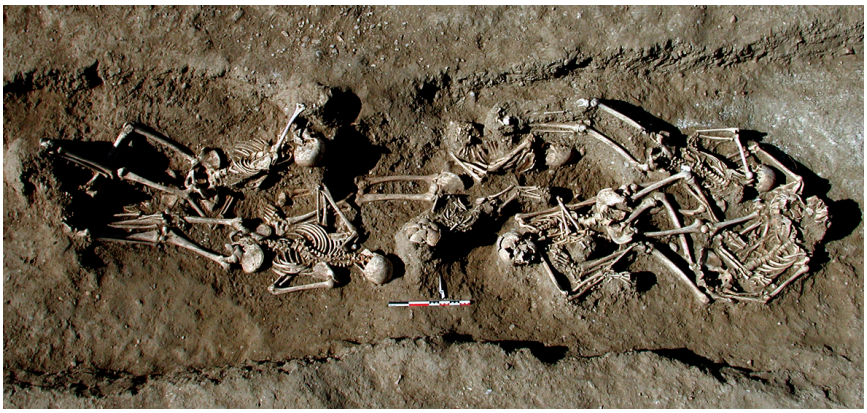

Figure 4.7: Bubonic plague victims in a mass grave from 1720-1721 in Martigues (Provence). Photo J. Chausserie-Laprée.

4.5 The Urban and Rural Environments: How was Mortality Dealt with During Epidemics?

It is important to note that the majority of the sites studied here are in settlements and part of the urban sphere. The only site in a rural environment is Fédons, which has a more conventional management of cemeteries containing a majority of individual graves and several 'small' multiple graves. In towns, the corpses were generally grouped together in pits, whether they were buried within or outside cemeteries.

Based on this first observation, it is possible to differentiate three types of funerary zones set up by towns and operating during epidemics. The first are parish cemeteries, initially used for burials but soon deserted due to the formal ban on burying infected bodies[13]. Before this directive, 'mass graves' were opened in the communal cemetery in order to deal with all the deaths. However, populations remained attached to the traditional individual grave and sometimes preferred to be buried elsewhere. In parallel, hospital cemeteries also contained pits for victims of epidemics. The use of open spaces outside holy ground attested to an additional step in the intensity of the epidemic. Lastly, municipal authorities, from the early Middle Ages onwards and especially from the 16th century, often created cemeteries outside towns during epidemics which operated at times in association with an infirmary or lazaretto. This third type illustrates the real 'epidemic cemetery' set up for the event and closed as soon as the illness passed. The site of Fédons belongs to this category.

13 The 'General rule for the rights of the parish church of S. Séverin, in Paris, and officers, quests and functions of the officers, 19 April 1637', cited in Couyba, 1905, p. 185.

It is thus tempting to associate individual graves and 'small' multiple graves with rural areas, and graves containing more corpses with towns. But the schema is not that simple. One reason is because our archaeological knowledge of the management of the dead in rural environments during epidemics remains scant. Preventive archaeological operations are generally limited to towns, leaving a gap in the rural record. However, it is possible to refute this apparently obvious link on the basis of an urban archaeological example. Since the 16th century, Protestants were not allowed to bury their dead in parish churches and cemeteries. In 2005, the excavation of a cemetery related to the only 17th century Parisian temple at Charenton took place (Dufour, 2012). This cemetery contained the remains of people from Paris as a whole, and brought to light a very dense concentration of burials (Dufour, 2012). It included the discovery of several individual tombs of plague victims. Due to the inscription engraved on the lead coffin of a Protestant student, Lord Thomas Craven, mentioning the date and cause of death by the plague, this became one of the key questions very early on in the excavation. A molecular biochemical analysis conducted on the teeth of six individuals, taken at random in the cemetery, yielded positive results for the bacillum *Yersinia pestis* for four of them (Hadjouis et al., 2006-2007). The deceased were systematically buried individually, in coffins and wrapped in a shroud, attesting to the constancy in funerary practices during periods of plague. The identification of an epidemic by the Protestant community did not change or influence funerary rituals in any way, though it is of course possible that multiple burials existed in the non-excavated zones. Therefore, the management of the ill and the burial of corpses were not simply linked to the geographical environment stricken by the epidemic, but also to the type of organisation, municipal or communal, set up for the ill and the corpses. The site of Fédons is a good example, since even though it is in a rural environment, the installation of the graveyard was the result of a directive issued by the local municipal authorities of the neighbouring town, which opted for moving the ill out of town in order to curb the spread of the illness.

Until the end of the 17th century, towns reacted individually to epidemics in the absence of decisions issued by central authorities: the first national measures were taken during the plague in Marseille during the 18th century. Both lay and religious local urban authorities neglected rural communities in order to maintain and protect commercial activity. They focused instead on preventive measures in their city through information campaigns. Access was closed to anyone suspicious or judged liable to spread the illness. The inhabitants remained behind the enclosed walls which ensured their safety but also led to overcrowding, lack of hygiene and thus to the spread of the illness (Chartier & Neveux in Le Roy Ladurie, 1980, pp. 38-39). The urban character of the epidemic thus led to the multiplication of the number of those affected and to the creation of institutions for removing the ill from the community. These establishments were installed in the nearby countryside. The epidemic phenomenon is thus impressive in urban environments due to higher population densities. However, the urban population only made up a small minority of the

overall kingdom as the population of the Ancien Régime was predominantly rural. In the countryside, this phenomenon appeared to be less marked, due to settlement dispersal and the isolation of populations accentuated by the epidemic (Delumeau, 1978, pp. 98-142; Lebrun, 1983, p. 159).

Historic sources such as parish registers contain essential information relating to deaths during epidemics and compensate for the absence of archaeological data in rural environments. In Aquitaine, the doctor Louis Couyba (1845-1909), a native of Sainte-Livrade (Lot), undertook a study of the history of his native region, concentrating on the registers from several communes in order to portray the countryside in the Agen area during the different waves of the plague during the 17th century (Couyba, 1905). His study shows that the management of deaths in the countryside depended on the coordination and the organization of rural folk. Although the first burials took place in the parish cemetery, it seems that the isolation of rural dwellers encouraged families to organize burials as quickly as possible very near the place of death, due to the risk of contagion and the corruption of the corpse. The burial took place either near a barn or in a garden. When space became tight, fields were also rented out. This was similar to measures taken in towns when new *extra-muros* burial grounds were opened.

The effects of an epidemic can be unpredictable if it strikes one village but spares the neighbouring village (Biraben, 1975-1976, pp. 226-229; Lebrun, 1980, pp. 209,), or only affects several people. This random spread confers an endemic rather than an epidemic aspect on the illness. Our vision of the reactions of the population and the organization of death can therefore be altered (Hildesheimer, 1993, p. 16). Thus, it appears that in rural environments, some of the reactions of the population may elude us totally. However, they remain similar to urban practices in that burials normally take place in the communal cemetery, but are then moved to open spaces in order to deal with an increasing number of deaths. When the rate of mortality is excessive during epidemic peaks, communication and organization cannot be maintained and burial management becomes fragmented as the family, the key unit in the structure of rural society, is rapidly destroyed, thereby throwing the economy and rural life into disarray. Country folk thus become increasingly isolated from each other during the course of such deaths (Le Roy Ladurie, 1975).

4.6 The Memory of Crisis Episodes

When an epidemic passed, what became of burial grounds set up in urgent circumstances? Among the five studied sites, two of them (Les Fédons and Issoudun) have historical or archaeological evidence indicating that the event and/or the burial grounds were soon forgotten. The infirmary of Fédons was closed very shortly after the period of contagion, and the area assigned to burials was re-used as agricultural land (Reynaud, 2005). At Issoudun, the installation of two series of multiple burials in

a relatively short lapse of time and in the same sector indicates that the first epidemic episode no longer preoccupied the living as a new crisis phenomenon occurred (Souquet-Leroy, in Blanchard et al., 2011). This new reaction to omnipresent death demonstrates that it required collective, rather than individual responses. Different factors are responsible for this forgetting. During periods of epidemics the main priority was to evacuate corpses, and not to conduct the last sacraments for the peace of the souls of the deceased, even if the place of burial, which was chosen in random fashion, might reveal some attempts at religious rituals, such as burials installed near a cross (Blanchard & Georges, 2007). Corpses were 'excluded' from cemeteries due to fear of contamination but were not deprived of burials (Vivas, 2012). However, death by epidemic is no longer necessarily considered a personal experience since it is multiple and visible to all (Delumeau, 1978, p. 115). Mortuary rites devoted to the individual person no longer exist.

The increase in the number of deaths as well as the multiplicity of burial grounds was not conducive to a process of recollection. In the cemetery, the creation of space for future graves was a constant preoccupation. And in towns or in the countryside, once the epidemic passed, life returned to normal and due to social and economic necessities, burial grounds were used for everyday activities including the commercial and agricultural. Burial grounds were covered over and forgotten. But early populations dealt with the inexplicable nature of an epidemic by bringing a religious element to it, either during or after the crisis (Walter, 2008). Processions and displays of collective piety were organized to dispel divine anger: the epidemic was considered to be the expression of a divine punishment in response to sins (Delumeau, 1978; Porter, 1992)[14]. These rituals helped people to get through periods of crisis (Walter, 2008). Other processes were set up to preserve the memory of these events, but not systematically of burial places nor of those deceased. The erection of a monument near the burial grounds after the event, as well as the presence of a cross, became the guardian of the memory of these catastrophic episodes but not of the individuals affected by the epidemic (Colardelle, 1998). For example, the disinfector of 1653, Martin Grou, built a chapel devoted to St-Roch near Renaud Lodge, and the first stone was erected on April 9, 1669, in commemoration of the plagues of 1652 to 1654. Many masses were celebrated there (Couyba, 1905). In the same way as death, memory was not a private or family affair but a collective matter organized by the living population. It was the event, rather than the place or the people, which was commemorated. This was an essential step as it enabled people to fight against the image of the plague and return to an ordinary life (Clavandier, 2004). However, due to

14 'the plague, leprosy, syphilis and cholera, all these illnesses, because they were new, or sudden or simply because of their epidemic nature, whether they are inexplicable or incurable, or even particularly disabling, are interpreted as stigmatizing vice or sin, whether individual or collective' (Porter, 1992, p. 185)

the regularity of epidemic crises during the Ancien Régime , they became part of daily life for these populations, despite their impact. In that respect, they are very different from other natural catastrophes, which were much rarer.

4.7 Conclusion

Over the past ten years, discoveries of graves linked to an epidemic crisis have increased considerably, due to preventive archaeological operations in France. These structures are thus more easily identifiable. Epidemic crises brought about the abolition of personalized death as it was no longer possible to cater for the ill, the dying and the dead in hospitals and institutions (Delumeau, 1978, p. 153). These episodes represented a brutal rupture with daily customs as this collective death was anonymous and desacralized. Among the many epidemic diseases known during the Ancien Régime, the plague plays a major role for several reasons, namely because of the brutality of the illness, the number of deaths and the social disorganization it caused. Syphilis brought enhanced understanding of the spread of illnesses, as it was passed from person to person.

This first overview of mortality during the modern period enables us to grasp the importance of inter-disciplinary research combining archaeology, anthropology, history and medicine in our understanding of episodes of epidemics and their impact on populations. It appears that all analyses require distinct objectives as soon as fieldwork begins in order to provide answers to specific issues and to ensure rigorous data acquisition. This means that sites must be accurately dated, using radiocarbon and other dating methods, in order to correlate archaeological data with archival sources. The detection of the nature of the epidemic (by pathogenic DNA) is also an essential source of information. The identification of the illness may be responsible for the disruption of funerary practices in one case and not in another. Medical knowledge evolved during the course of the modern period and contagion was no longer a totally abstract concept. It will be necessary to continue and complete this research by conducting a summary of the funerary practices of modern populations. This will be conducted by one of us (ISL) in order to place this phenomenon in a social and political context. One of the advantages of studying the modern period is the possibility of comparing various documentary sources with different data such as the archaeological and demographic. Archaeological data such as those described above are of capital importance in this domain. Finally, as epidemics were not exclusively a French scourge, it would also be interesting to compare the reactions of French populations to those from neighbouring countries with different political régimes from the absolute monarchy which reigned in France.

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