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Durham University

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EN HISTOIRE

AND

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by

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Born on 7 February 1979 in Kaiserslautern (Germany)

THE MATERIALITY AND SPATIALITY OF GRAVES AND GRAVE MARKERS IN THE BORDER REGION BETWEEN LUXEMBOURG AND GERMANY

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TABLE OF CONTENTS

1. Introduction 3

1.1 Seminal Cemetery, Grave and Grave Marker Studies in Historical Archaeological Literature 7

1.2 Consumption 15

1.3 Monument Recording 23

1.4 Specific Research Context of Luxembourgish and German Cemeteries: Challenges in Comparison to Anglo-American Cemeteries 30

1.5 Research Lacuna and Research Questions 37

2. Funerary Practices and Grave Memorial Culture in Luxembourg and Germany 42

2.1 General Overview 42

2.1.1 Funerary Culture Milestones and Frameworks 42
2.1.2 The Funeral 45
2.1.3 Ownership and Legal Framework 46
2.1.4 The Burial 47
2.1.5 Grave Tenure and Use 48
2.1.6 Cremation 49
2.1.7 Monumentation and Commemoration 50
2.1.8 Tradition and Funerary Heritage 51

2.2 The Border Region between Luxembourg and Germany 53

2.3 Socio-Cultural, Economic and Demographic Developments in Selected Locations 62

2.3.1 Wormeldange 62
2.3.2 Wincheringen 74
2.3.3 Walferdange 83
2.3.4 Konz 93

2.4 Grave Monument Industry 105

2.5 The Role of Cemetery Regulations 127

3. Theoretical, Epistemological and Methodological Background of the General Research Project 145

3.1 Materiality in Historical Archaeology 145

3.2 Ontology of Materiality 148

3.3 Social Spatialisation 150

3.4 General Research Paradigm 152

3.5 Ethical Standards and Conduct 155

4. Pilot Project Walferdange Cemetery in Luxembourg 161

4.1 Data Collection 161

4.2 Data Analysis 167

4.3 Quantitative-spatial findings 169

4.4 Discussion of Pilot Project Findings 175

4.5 Critical Assessment of Pilot Project Approach 179

5. The Cemetery Surveyor Application 185

5.1 General Overview and Introduction 185

5.2 Methodological Issues and Criticism 190

6. Extended Data Sample, Collection and Analysis Approach 210

6.1 Spatial and Material Data Sample 211

6.2 Spatial and Material Data Collection 219

6.3 Spatial and Material Data Analysis 225

7. Findings from Material and Spatial Data 230

7.1 Descriptive Findings 230

7.1.1 Wormeldange 252
7.1.2 Wincheringen 253
7.1.3 Walferdange 254
7.1.4 Konz 255

7.2 Spatial Analysis Findings 260

7.2.1 Wormeldange 261
7.2.2 Wincheringen 262
7.2.3 Walferdange 264
7.2.4 Konz 266
7.2.5 Critical Assessment of Spatial Analysis Findings 267

7.3 Excursus: Inscription Data 271

8. Extended Theoretical Discussion 303

8.1 Continuative Literature Discussion 308

8.2 Consumer Behaviour, Choice and Fashion.....314

9. Conclusion 323

10. References..... 327

11. Annex 359

11.1 Screenshot of Microsoft Excel Data Sheet from Walferdange 359

11.2 Variables collected at Walferdange Cemetery 360

11.3 Walk-Through Input to Cyrille Médard de Chardon for the Development of the Cemetery Surveyor Application 361

11.4 Additional Typology.....363

11.5 Selected Variables Checked for Frequency.....366

11.6 Unedited SPSS Output Descriptive Stastical Analysis 367

11.6.1 Wormeldange 367
11.6.2 Wincheringen 378
11.6.3 Walferdange 391
11.6.4 Konz 402

11.7 Information Sheet for Study Participants 422

11.8 Research Consent Form 424

11.9 Cemetery Survey Application Specifications (Adapted) 426

11.10 Usage Manual (Adapted).....430

11.11 How to Install the Cemetery Surveyor Application.....442

LIST OF ILLUSTRATIONS AND TABLES

Figure 1: A historic view onto Wormeldange from Wincheringen, across the Mosel River (1). .. 64

Figure 2: View onto the church in Wormeldange. 65

Figure 3: Wormeldange church and cemetery viewed from the Mosel River. 66

Figure 4: Aerial photograph of Wormeldange. 66

Figure 5: A historic view onto Wormeldange from Wincheringen, across the Mosel River (2). .. 67

Figure 6: Burial with military honours at Wormeldange cemetery (1). 68

Figure 7: Burial with military honours at Wormeldange cemetery (2). 68

Figure 8: Wormeldange cemetery today (1). 69

Figure 9: Wormeldange cemetery today (2). 69

Figure 10: View of Wincheringen around 1993. 80

Figure 11: View of Wincheringen in 1933. 80

Figure 12: Aerial photograph of Wincheringen; unknown date. 81

Figure 13: Historic photograph of the Warsberghaus with tower and cemetery; unknown date (1). 82

Figure 14: Historic photograph of the Warsberghaus and cemetery; unknown date (2). 82

Figure 15: Warsberghaus and cemetery today. 83

Figure 16: Snapshot taken from Kirchenfabrik Walferdingen (1993: 42). 88

Figure 17: Population of Bereldingen, Walferdingen and Helmsingen. 89

Figure 18: Walferdange around 1850. 90

Figure 19: Aerial photograph of Walferdange with church and cemetery in the upper left. 91

Figure 20: View from Pilsert onto the old parish church in Konz and the cemetery around 1910. 101

Figure 21: View from the train station onto the old parish church in Konz around 1920. 101

Figure 22: View from the train station onto the old parish church in Konz around 1938/1939. 102

Figure 23: Aerial photograph of Konz and cemetery, 1937. 102

Figure 24: View downhill from parish church in Konz, with the former market garden in the centre. 103

Figure 25: View uphill towards the old parish church in Konz before its demolition in 1958. ... 103

Figure 26: View of the new church building in Konz, unknown date. 104
Figure 27: Aerial photograph of Konz St. Nikolaus church in 1969. 104
Figure 28: View downhill from Konz St. Nikolaus church onto the cemetery in 2016. 105
Figure 29: Examples of porcelain paraphernalia. 110
Figure 30: Example of a reform movement grave marker 1928..... 111
Figure 31: Example of a reform movement grave marker 1935..... 111
Figure 32: Example of a reform movement grave marker 1933..... 112
Figure 33: Conventional granite headstone design. 112
Figure 34: Grave marker draft from 1939..... 113
Figure 35: Headstone design around 1960 (1)..... 114
Figure 36: Headstone design around 1960 (2)..... 115
Figure 37: Headstone design around 1960 (3)..... 115
Figure 38: Grave marker design around 1988. 116
Figure 39: Contemporary grave marker design around 2015. 116
Figure 40: French mid-1930s grave monument example. 117
Figure 41: Grave monument example in German stonemason magazine 1950. 119
Figure 42: Grave monument example in German stonemason magazine 1955. 120
Figure 43: Grave monument example in German stonemason magazine 1960. 121
Figure 44: Grave monument example in German stonemason magazine 1965. 122
Figure 45: Grave monument example in German stonemason magazine 1970. 122
Figure 46: Grave monument example in German stonemason magazine 1975. 123
Figure 47: Grave monument example in German stonemason magazine 1980. 123
Figure 48: Grave monument example in German stonemason magazine 1985. 124
Figure 49: Grave monument example in German stonemason magazine 1990. 124
Figure 50: Grave monument example in German stonemason magazine 1995. 125
Figure 51: Grave monument example in German stonemason magazine 2000. 126
Figure 52: Grave monument example in German stonemason magazine 2005. 127
Figure 53: Graves in Wormeldange. 135

Figure 54: Catalogue example found in *Monuments Funeraires* by Rombaux-Roland. 137

Figure 55: Example from the gravestone catalogue *Grabsteine* by Rupp and Möller, 1928: 26.138

Figure 56. The location of Walferdange in Luxembourg. 163

Figure 57. Satellite image of Walferdange cemetery, ca. 2015. 163

Figure 58. Grave allocation plan: Walferdange cemetery. 164

Figure 59. An overview of Walferdange cemetery. 164

Figure 60. A screenshot of the Cemetery Surveyor Application (CSA). 166

Figure 61. An example of a detailed photograph of a grave at Walferdange (here grave W-B1). 166

Figure 62. Number of graves (vertical scale) according to oldest date of death indicated on the gravestone (horizontal scale) at Walferdange (n = 417) (note that 322 graves showed no dates). 167

Figure 63. Number of top five grave material types (vertical scale) and their chronological distribution (horizontal scale) at Walferdange over decades (excluding undated and/or empty plots n = 386). 169

Figure 64. Number of top five grave types (vertical scale) and their chronological distribution (horizontal scale) at Walferdange over decades (excluding undated and/or empty graves n = 341). 170

Figure 65. Number of top five holy water container types (vertical scale) and their chronological distribution (horizontal scale) at Walferdange over the decades (excluding undated, empty graves or lost holy water containers n = 285). 171

Figure 66. The concentrations of granite graves (n = 514) at Walferdange. 172

Figure 67. The concentrations of bluestone graves (n = 58) at Walferdange. 173

Figure 68. The concentrations of the *1a-stepped (raised)* grave type (n = 382) at Walferdange. 174

Figure 69. The concentrations of the *1e-stepped (2 plates)* grave type (n = 54) at Walferdange. 174

Figure 70. The concentrations of the *4a-knob-rectangular* holy water container type (n = 67) at Walferdange. 175

Figure 71. The chronological frequency of C1 graves made of granite, type *1a-stepped (raised)* and *5a-praying-hands* holy water container type at Walferdange (# vertical scale, dates horizontal scale). 176

Figure 72. The chronological frequency of C2 graves made of granite, type *1a-stepped (raised)* and with the *1e-Latin-cross gammion* holy water container type (# vertical scale, dates horizontal scale). 176

Figure 73. The concentrations of C1 graves made of granite, type *1a-stepped (raised)* and *5a-praying hands* containers at Walferdange. 177

Figure 74. The concentrations of C2 graves made of granite, type *1a-stepped (raised)* and *1e-Latin Cross-gammion* at Walferdange. 178

Figure 75. The first mock-up the researchers provided to Mr. Médard de Chardon. 186

Figure 76. CSA gravestone details. 187

Figure 77. CSA horizontal dimensions 187

Figure 78. CSA stoup details 188

Figure 79. CSA linguistic details. 188

Figure 80. Content of exportable csv file. 189

Figure 81. CSA data output sample 189

Figure 82: Green-Wood cemetery in Brooklyn (USA). 191

Figure 83: Southern Californian grave marker sample. 191

Figure 84: Grave monuments at Wincheringen cemetery in Germany. 193

Figure 85: CSA data entry mask on cemetery level. 205

Figure 86: CSA data entry mask on section level. 206

Figure 87: CSA data entry mask on individual grave plot level. 206

Figure 88: CSA data entry mask on gravestone level. 207

Figure 89: CSA data entry mask on grave level. 207

Figure 90: CSA data entry mask on paraphernalia level. 208

Figure 91: CSA data entry mask on linguistics level. 208

Figure 92. Research region. 211

Figure 93. Wormeldange and Walferdange in Luxembourg, as well as Wincheringen and Konz in Germany. 212

Figure 94. Konz cemetery (1). 213
Figure 95. Konz cemetery (2). 214
Figure 96. Konz cemetery (3). 214
Figure 97. Wormeldange cemetery (1). 215
Figure 98. Wormeldange cemetery (2). 215
Figure 99. Wormeldange cemetery (3). 216
Figure 100. Wormeldange cemetery (4). 216
Figure 101. Wincheringen cemetery (1). 217
Figure 102. Wincheringen cemetery (2). 217
Figure 103. Wincheringen cemetery (3). 218
Figure 104. Wincheringen cemetery (4). 218
Figure 105. Konz grave allocation plan with sections. 221
Figure 106. Walferdange grave allocation plan with sections. 221
Figure 107. Wincheringen grave allocation plan with sections. 222
Figure 108. Wormeldange grave allocation plan with sections. 222
Figure 109. PicotChart and PivotTable 227
Figure 110. Percentage of datable graves according to decade. 240
Figure 111. Percentage of datable grave marker types according to decade. 241
Figure 112. Percentage of datable grave marker material according to decade. 242
Figure 113. Percentage of datable grave marker colour according to decade 243
Figure 114. Percentage of datable grave types according to decade. 244
Figure 115. Percentage of datable grave material according to decade. 245
Figure 116. Percentage of datable grave colour according to decade. 246
Figure 117. Percentage of number of items according to decade. 247
Figure 118. Percentage of stonemason names according to decade. 248
Figure 119. Percentage of number of Christian symbols according to decade. 249
Figure 120. Percentage of cross types according to decade. 250
Figure 121. Percentage of stoup types according to decades. 251

Figure 122. Wormeldange combinations. 252
Figure 123. Wincheringen combinations. 253
Figure 124. Walferdange combinations. 254
Figure 125. Konz combinations. 255
Figure 126. Wormeldange detailed combinations. 256
Figure 127. Wincheringen detailed combinations. 257
Figure 128. Walferdange detailed combinations 258
Figure 129. Konz detailed combinations. 259
Figure 130. Nearest Neighbour Analysis according to ArcGIS. 260
Figure 131. Relevant selection for Wormeldange. 261
Figure 132. Relevant selection for Wincheringen 263
Figure 133. Relevant selection for Walferdange. 264
Figure 134. Relevant selection for Konz. 266
Figure 135: Normal curve and equivalents. 268
Figure 136: Percentage of graves/grave markers inscribed with the word *Famille* or *Familles.* 272
Figure 137: Percentage of graves/grave markers inscribed with a maiden name. 272
Figure 138: Percentage of graves/grave markers inscribed with other names. 273
Figure 139: Percentage of graves/grave markers showing a certain number of inscriptions. ... 273
Figure 140: Percentage of graves/grave markers showing a certain type of inscription. 274
Figure 141: Percentage of graves/grave markers inscribed with R.I.P. 275
Figure 142: Heatmap of maiden names at Wormeldange. 277
Figure 143: Heatmap of other names at Wormeldange. 277
Figure 144: Percentage of graves/grave markers inscribed with the word *Famille*/*Familie at Wincheringen.* 278
Figure 145: Percentage of graves/grave markers inscribed with a maiden name at Wincheringen. 278
Figure 146: Percentage of graves/grave markers inscribed with other names at Wincheringen. 279

Figure 147: Percentage of graves/grave markers showing a certain number of inscriptions at Wincheringen. 279

Figure 148: Percentage of graves/grave markers showing certain types of inscriptions at Wincheringen. 280

Figure 149: Percentage of graves/grave markers inscribed with R.I.P. at Wincheringen. 280

Figure 150: Heatmap of maiden names at Wincheringen. 283

Figure 151: Heatmap of other names at Wincheringen. 283

Figure 152: Percentage of graves/grave markers inscribed with family names at Konz. 284

Figure 153: Percentage of graves/grave markers inscribed with a maiden name at Konz. 284

Figure 154: Percentage of graves/grave markers inscribed with other names inscription at Konz. 285

Figure 155: Percentage of graves/grave markers showing a specific number of inscriptions at Konz. 286

Figure 156: Percentage of graves/grave markers showing a certain typology of inscriptions at Konz. 286

Figure 157: Percentage of graves/grave markers inscribed with R.I.P. at Konz. 287

Figure 158: Heatmap of maiden names at Konz. 291

Figure 159: Heatmap of other names at Konz. 292

Figure 160: Percentage of graves/grave markers inscribed with the word *famille at Walferdange.* 293

Figure 161: Percentage of graves/grave markers inscribed with the word *familles at Walferdange.* 293

Figure 162: Percentage of graves/grave markers inscribed with a specific number of maiden names at Walferdange. 294

Figure 163: Percentage of graves/grave markers inscribed with other names at Walferdange. 295

Figure 164: Percentage of graves/grave markers with a certain number of inscriptions at Walferdange. 296

Figure 165: Percentage of graves/grave markers with family-related inscriptions at Walferdange. 297

Figure 166: Percentage of graves/grave markers with profession-related inscriptions at Walferdange. 297

Figure 167: Percentage of graves/grave markers with other inscriptions at Walferdange. 298
Figure 168: Percentage of graves/grave markers inscribed with R.I.P. at Walferdange. 298
Figure 169: Heatmap of maiden names at Walferdange. 300
Figure 170: Heatmap of other names at Walferdange. 301
Figure 171: Consumer Behaviour according to Loudon and Della Bitta (1993). 316
Figure 172: Consumer Behaviour according to Blackwell, Miniard and Engel (2001). 316
Figure 173: The adoption and diffusion of new products, according to Foxall (2016: 75). 318
Figure 174: Proposed preliminary model of grave and grave marker genesis. 321

Table 1. Data regarding the relative share of cremations in Germany. 49
Table 2: Development of the population of Wormeldange between 1821 and 2020. 73
Table 3: Migration movements in Wormeldange between 1990 and 2019. 74
Table 4: Population of Walferdange between 1821 and 2020. 85
Table 5: Population movements in Walferdange between 1990 and 2019. 86
Table 6: MAXQDA Analysis of selected cemetery regulations in Luxembourg and Germany. ... 134
Table 7: Walferdange cemetery regulation overview. 139
Table 8: Konz cemetery regulation overview. 139
Table 9: Wormeldange cemetery regulation overview. 141
Table 10: Wincheringen cemetery regulation overview. 142
Table 11: Inscriptions at Wormeldange cemetery. 275
Table 12: Inscriptions at Wincheringen cemetery. 281
Table 13: Inscriptions at Konz cemetery. 287
Table 14: Inscriptions at Walferdange cemetery. 299

PHOTOGRAPHS

If not stated otherwise, the author provided all the photographs that are used in this thesis.

DECLARATION

Between 2015 and 2019, I conducted the research for this thesis as part of the project entitled "Material Culture and Spaces of Remembrance: A Study of Cemeteries in Luxembourg in the Context of the Greater Region", which was funded by the National Fund for Research (FNR). I researched numerous aspects of modern funeral culture from a historical and archaeological perspective in that specific region. Prof. Dr. Sonja Kmec and Dr. Thomas Kolnberger supervised the project.

I confirm that this thesis is my own work, is not copied from any other person's work (published or unpublished) and has not previously been submitted for assessment either at the University of Luxembourg, Durham University or elsewhere. I confirm that I have read and understand the various departments' and universities' regulations with regard to plagiarism and ethical conduct.

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DEDICATION AND ACKNOWLEDGEMENTS

First of all, a personal note of gratitude is due to Dr. Thomas Kolnberger and Associate Professor Dr. Sonja Kmec who allowed me to participate in this research project and to write a PhD thesis based on the collected data. Although the thesis may come across as a common academic process, it was not, as I already have had a previous academic career and hoped to fulfil my dream of working as a historical archaeologist by changing my career path altogether. Despite the potential risks of hiring a more mature candidate, Thomas and Sonja believed in the envisioned advantages and entrusted me with this important work. Without their tremendous patience and understanding, which was surely necessary for me to settle into a new academic discipline, this work – and a renewed career – would have been impossible, particularly since my wife and I started a family during these years, a decision that has proven to be life-altering. Thus, my wife, He Junwei, and surely our children, Carl and Hermine, would like to thank Thomas and Sonja, as they have always gone out of their way in order to help us. This has been a truly remarkable team.

Secondly, I would like to thank Associate Professor David Petts for accepting me into a double-degree program at Durham University. Owing to his patience, tenacity and endurance, I could conduct this joint PhD research project and hopefully it stands at the beginning of a continuous collaboration between the two universities. Most importantly, I also appreciate his understanding when family matters on my side prevented me from spending more time at Durham University than I initially hoped for.

It is almost impossible to mention and thank all the people, companies and institutions that were involved in collecting the data for this thesis – most importantly because I granted full anonymity to most of them. However, since this thesis would have been impossible without the permission to collect data on cemeteries and without the interview participants' trust and openness, I hereby thank all of them for their participation and support. If they read this thesis, I trust that they find themselves well-presented, – should they recognise their statements, – and that they find the results intriguing.

Not to be forgotten, are all the people who helped with formatting and proof-reading this thesis, notably Caroline Woermann and Kornelia Streb.

Last but not least, I would like to thank the three most important people in my life: my wife, He Junwei, and our children, Carl and Hermine. That I dared to change my career and that I was actually able to study and work at the University of Luxembourg, were solely my wife's doing, as she has consistently supported me, always believed in me and never complained when most of my spare time was invested again and again into writing this thesis. She is a truly remarkable person. Carl and Hermine have also had to compromise over the last few months, as Daddy

appeared to have been living in his office instead of playing with them. I promise to make up for this.

Horbach, July 2019

ABSTRACT

This PhD thesis is the partial result of the research project entitled "Material Culture and Spaces of Remembrance – A Study of Cemeteries in Luxembourg in the Context of the Greater Region", under the coordination and supervision of Dr. Thomas Kolnberger and Associate Professor Sonja Kmec at the University of Luxembourg, and funded by the *Fonds National de la Recherche* (FNR).

Building on prior, seminal research, this thesis aims to address the following questions concerning a specific, predefined region between Luxembourg and Germany, and selected cemeteries:

- Does the research approach demonstrated from Anglo-American literature also apply to the sample in the border region between Luxembourg and Germany?
- Does the analysis of materiality within its spatial context provide indications of a neighbouring effect, i.e. do material characteristics appear in spatial clusters?
- With regards to the materiality that can be observed at the selected cemeteries, what might explain the specific appearance of, especially, graves and grave markers; i.e. what factors, such as cemetery regulations or stonemasons, might have had an influence?

Based on a pilot project at Walferdange (Luxembourg) cemetery, as well as a specifically developed and designed data collection approach and tool, the author of this thesis collected the data from full populations of grave and grave marker material culture at three additional, selected cemeteries in Luxembourg and Germany, i.e. Wormeldange, Wincheringen and Konz, in order to allow an analysis of the present assemblage, reaching back into the late 19th century. The data gained thus were analysed using statistical and geo-spatial methods.

The results of this data collection and analysis indicate the following: similar methods compared to, for example, work in the Anglo-American context, can generally be applied; since materiality of funeral culture shows a certain level of fluctuation and volatility over time in this specific research context, the researcher has to be careful in order to ensure appropriate dating; results in a chronologically limited data set in which also accurate spatiality cannot be ensured. Whileclusters of materiality can be identified visually, they do not in all instances produce stable results during statistical testing. Thus, a neighbouring effect cannot in all cases be supported and needs to be critically questioned in the face of different tactical confidence intervals.

Moreover, potential cultural differences and differences in cemetery management, manifested for example in cemetery regulations, are not enough to explain the actual materiality and spatiality that can be found on the researched cemeteries. The author uses additional literature from business studies and economics in order to highlight a different approach in historical archaeological research in understanding grave monument genesis, their explanatory power and

studying related phenomena in the future, hypothesizing about business related aspects in the interrelationship between stonemasons and their customers.

1. Introduction

The first chapter of this doctoral thesis addressing space and materiality at selected cemeteries in the Luxembourg-German border region, attempts to provide a broad overview of the most relevant and seminal background literature regarding related studies in historical archaeology, the field in which this thesis is conducted. It appears as if this is helpful in setting the stage and to illustrate what kind of research has been conducted thus far and with which methods in order to show what is new and different in the thesis at hand. Besides literature detailing related research in general, also issues of consumption, – i.e. consumer choice and consumer decision-making with regards to funeral culture –, the recording of materiality at cemeteries, as well as the specific context of funeral culture in Luxembourg and Germany will be addressed. These aspects will be summarised in a set of broad research questions, which this thesis will try to answer. In short, the author of this thesis tries to analyse whether the Anglo-American research approach in studying cemeteries, which dominates in historical archaeology, also applies to the cemeteries in the Luxembourg-German border region, whether there is an indication of a neighbouring effect of materiality – i.e. whether similar materiality appears to cluster – and what the observations mean for consumer choice decision-making, i.e. how the observed materiality might have been created.

Graves are, arguably, amongst the first man-made points of reference in civilization that mark a culture's past, present and future. The Greek word for grave (*μνήμα*) derives from the root *σῆμα* (*séma* for sign or signal). Robert P. Harrison (2003: 19) notes that "a place is where time, in its human modes, takes place. A place cannot come into being without human time's intervention in nature's eternally self-renewing cycles". Burial sites signify fellow humans' bygone lifetime and represent a material connection between the deceased and the living. Burial practices and locations have undergone major transformations and still vary considerably, even within Europe (Laqueur 2015; Kolnberger 2017a). Consequently, especially in the field of historical archaeology, the study of graves and/or grave markers holds an important place: The data are easily accessible, as the graves and/or grave markers often do not require excavation and often provide a date of death of the person buried and commemorated there. This allows for a good approximation of the point in time when the monument had been erected and, most importantly, the differences in the material and design used in their many forms trigger interpretations for the reasons why these materials and designs apparently change over time. As the author shows later on in this thesis, researchers usually ascribe such changes to socio-cultural and/or socio-economic transformations, as they treat this particular materiality as a proxy for their analysis. Moreover, cemetery research is a multidisciplinary and often transdisciplinary field that archaeologists, historians, art historians, geographers and sociologists investigate, although they mostly only address materiality indirectly. When scholars tackle the issue of materiality directly, a series of

questions and challenges emerge, which, amongst other things, will be the subject of this thesis. At least in today's modern cemeteries, grave monuments are usually set in a dedicated space – the cemetery – which itself comes in many forms. However, for the author of this thesis it is the grave monument's materiality that defines this special space, because only the actual burial places and the grave monuments indicating and locating these burials constitute a cemetery.

The study of cemeteries and their constituting elements, i.e. the graves and grave markers, is also the subject and focus of the research project funded by the *Fonds National de la Recherché* (FNR) entitled "Material Culture and Space of Remembrance – A Study of Cemeteries in Luxembourg in the Context of the Greater Region" at the University of Luxembourg, and under the supervision of Prof. Dr. Sonja Kmec and Dr. Thomas Kolnberger. This three-year project aimed at researching and analysing the materiality and spatiality of Luxembourg's and its immediate cross-border regional context's sepulchral culture from the early 19th century to the present and the future. Based on previous studies, this project assumed materiality's explanatory power with regard to socio-cultural transformations in particular. Contrary to previous research, this project also considered spatiality as a main explanatory variable, thus attempting to collect the full population of available data on selected cemeteries across borders. For this, the author had to develop a unique digital historic approach, which he explains in detail below.

The PhD thesis at hand is the direct outcome of this research project, although its focus is much narrower and of a methodological and theoretical nature. The main research questions have already been briefly introduced in the abstract and will be subject to a more detailed derivation and explication in the following introductory chapters. However, when stepping back and considering a more general perspective in the subject of funeral culture materiality and spatiality, an overarching question appears to be simple and straightforward, almost trivial, and yet, answering it turns out to be complex: Why does the materiality at a cemetery have a specific physical appearance? If one considers the grave and grave monument as the elementary constituting elements of the overall cemetery, one can specify the question even further: Why do graves and grave markers, as well as the related paraphernalia, have a specific physical appearance? These questions go much further than a question such as "Who designed it like that and why?" Many more input factors and decision processes are responsible for what one can witness at a cemetery, which the author will discuss throughout the thesis. Moreover, the role that space plays in this context needs to be considered. For example, does it matter which materiality already exists at a cemetery when new grave monuments are added, i.e. do the bereaved show emulation? Is this how conventions and trends arise? Answering these questions is important, as previous research into the materiality of funeral culture assumes the before-mentioned explanatory power – specifically for socio-cultural transformations over time. To the

conventional archaeologist, the material culture visible at cemeteries is the researcher's window to the past, depending on his or her research perspective and ideological imprinting. Different perspectives in this regard and a critical discussion of what previous research tries to learn from grave monuments will follow below. However, if, one way or another, researchers use this data in an attempt to understand the past, the key is understanding the material culture's genesis in order to critically assess its explanatory power. Most researchers do not try to understand the actual processes, which led to a specific physical appearance of materiality, in detail. They address this issue only implicitly and indirectly, underestimating its relevance when trying to deduce any kind of knowledge from cemetery materiality and its spatiality – if this aspect is addressed at all. They may possibly address the grand socio-cultural transformations that might or might not have influenced materiality but neglect the micro-economic decisions and interpersonal relations. Consequently, and beyond the more detailed actual research questions, the author of this thesis attempts to also keep in mind and contribute to answering the question of how graves' and grave markers' materiality and spatiality came into being, i.e. why the assemblage of artefacts at cemeteries have a specific physical appearance, and what this implies for such artefacts' and their spatial context's explanatory power in explaining past socio-economic and socio-cultural transformations.

In order to proceed with the above stated intentions, this thesis begins with a brief overview of the most seminal, relevant research in historical archaeology that specifically relates to the study of funeral and sepulchral culture and modern grave markers. While the aim is not to present an exhaustive literature review in the first chapter, which, considering the quantity of publications, is beyond the scope of this work, the intention is to clearly identify and outline the before-mentioned research lacuna. In this context it is also necessary to briefly introduce and discuss, – already in this introductory chapter, – the topics of consumption in general, as well as grave monument recording, as factors that are relevant for and influential in the overall research framework. Moreover, as it is foreseeable that Central European cemeteries might present important differences regarding their context and management, this will also be discussed briefly here. Next, in Chapter 2, the author presents a general overview of the funeral culture in Luxembourg and Germany to allow more context for the reader. Again, the aim here is not completeness but to help the unacquainted reader understand the two countries' funeral culture. In order to include more social and demographic context about the actual cemetery locations selected and focused on in this research, however, the author provides more information, to the extent that such was available, as well as a brief introduction of the differences between grave monument industries and cemetery regulations in the two counties. In Chapter 3, the author presents the research project's theoretical, epistemological and methodological background, specifically discussing not only this thesis's concept of materiality and spatiality but also the

treatment of ethical issues. After this rather theoretical and introductory part, the author presents the pilot study at Walferdange (Luxembourg) cemetery in Luxembourg in Chapter 4. This particular material had previously appeared in the *Journal of Material Culture* and is slightly adapted for this thesis. Integrating this material into this thesis permits not only an introduction of the overall research project at the University of Luxembourg but, most importantly, an introduction of the methodological approach, which, to a large extent, is also at the core of the work at hand. This part of the overall research project was necessary and important in order to develop the necessary understanding and research tools to continue with the project across the Luxembourgish borders into France, Germany and Belgium. The Cemetery Surveyor Application (CSA), which the author presents in Chapter 5, was derived from this particular pilot study at Walferdange cemetery and, as such, this data collection tool is an important result of the overall research project and forms an integral part of the data collection for the PhD thesis as well. The subsequently described data sampling, collection and analysis approach discussed in Chapter 6, – which aimed at extending the data sample beyond Walferdange cemetery and applying the finalized method, – already utilises this tool and presents the more evolved overall research process. The findings in Chapter 7, thus, provide the results similarly derived from the additional material and spatial data collected at Wormeldange (Luxembourg), Wincheringen (Germany) and Konz (Germany) cemetery and in comparison to the pilot study at Walferdange. As the author will show, research can visualise the conventional seriations of materiality transformation over time and contextualise the transformations' specific spatiality, permitting new interpretations of this particular and unique assemblage of materiality's genesis at each cemetery, especially with regard to emulation, while also permitting a cross-border comparison. To conclude, in Chapter 8 and Chapter 9, the author critically discusses the above-mentioned findings with the support of additional literature in order to highlight the identified issues' larger context and relevance.

The analysis of the data gained in this manner reveals a complex interplay of variables, factors and stakeholders regarding the actual assemblage and genesis of materiality and spatiality at the sampled cemeteries. Most importantly, the stonemason's role in this process should not be underestimated. At the same time, the stonemasons operate businesses. Consequently, they are part of a supply chain, especially via catalogues and industry software, and need to fulfil economic requirements and goals. Together with a standardised sales approach, as well as the supplier's and demand side's embeddedness in a socio-cultural and socio-economic environment, selecting a grave and/or grave marker is also subject to conventions, trends, fashion and product life cycles. Therefore, the results regarding the cemeteries' materiality and spatiality that slowly but constantly evolve over time, are deemed too complex to be limited to a consideration of single variables and factors. Most importantly though, considering the lack of understanding how

conventions, trends and fashion actually work, the explanatory power of the graves and the grave markers for social transformations of any kind in any time horizon must be critically reviewed.

This thesis places itself in the larger research context of historical archaeology and its interest in studying the material culture of death, burial and commemoration. By nature, though, the thesis is relatively theoretical and ontological, aiming at deriving a new methodology for the study of graves, grave markers and cemeteries, while simultaneously questioning the established consensus of the field's epistemology. Naturally, this comes with a number of limitations. Most importantly and considering the amount of data, the sample is limited, located in a specific socio-cultural setting and, therefore, the findings cannot be generalised. Moreover, issues regarding data collection, dating and typologies might apply. However, the author trusts that the following discussion can alleviate such concerns and inspire a new and critical perspective on the field.

1.1 Seminal Cemetery, Grave and Grave Marker Studies in Historical Archaeological Literature

The archaeology of cemeteries and grave markers has received and keeps receiving significant attention from researchers. Baugher and Veit (2014) published a book, which reviews the field enthusiastically from an American perspective. The authors discuss the ethics and science of belowground archaeology before also addressing 17th and 18th century gravestones and cemeteries. Unsurprisingly, as will be discussed below, they refer in detail to the works of Deetz and Dethlefsen in that respect. While they do an excellent job of presenting the relevant literature in the field, as well as the general perspectives and concerns regarding socio-cultural transformations and recent approaches, – which will also be discussed below, – their approach needs to be criticised in that they do not move beyond the above-mentioned aspects. While their work is a worthwhile introductory reading to the field in North America, it does not offer any new and/or critical insights. By focusing on ethnicity, race and class in research, and by overemphasizing ethical concerns about the excavation of modern cemeteries, they even miss an opportunity to move beyond an extensive literature review in order to avoid the pitfalls of ideology and mainstream research. In that sense, their work already forestalls the problematic with most of the recent research in the field, especially in historical archaeology, concerning materiality of burials and commemoration: They tend to rely on a relatively limited set of seminal literature, applying the same methodology and focus on socio-cultural transformations of modern societies, usually assuming one or another correlation between such transformations and what can be observed in terms of change in materiality. Baugher and Veit (2014) also avoid practical methodological advice, thus making their work difficult to integrate in novel studies.

A much better example of a seminal contribution, which is similar to a review work such as Baugher and Veit's (2014) and pre-dates it by a decade, is Mytum's (2004). Here the author also

provides a complete overview of the current state of the art but in much more detail with a more applicable use for further research. After a brief introduction, also including an introduction to theoretical approaches in the study of burial ground and grave monuments, Mytum introduces and describes in detail the internal and external grave monuments' relevant material and linguistic characteristics, such as material, type and symbology, amongst others. He continues to discuss what, from his point of view, are relevant socio-cultural issues to be contextualised, for example, identity, status, family, gender roles, institutions, religion, profession, etc. Last but not least, Mytum (2004) provides much more practical recommendations and guidance for actually conducting related research. In that sense his contribution can still be viewed as a standard but lacking an update via more recent contributions and research methodology, especially those that are now possible as a result of digital methods. Mytum (2002) can be understood and read as an example of the above summarised approach and standard. Applying this, Mytum attempts to research differences in terms of the form, material, motifs and language of north Pembrokeshire nonconformist and Anglican burial grounds. The observed differences are then discussed in a socio-cultural, historic and religious context, since an effort is made to compare the behaviour and beliefs of Anglicans and nonconformists in researched cemeteries and to find out how these behaviours and beliefs have been expressed in burial and commemoration. At the same times, differences between rural and urban burial grounds are identified.

From the above-mentioned recent examples it should be clear that the study of cemeteries, graves and grave markers is not novel. Depending on the field of study, researchers have different motivations to do so; they ask different questions and apply a multitude of methods. In order to allow for the necessary focus, in this subchapter only literature within the larger area of historical archaeology will be considered, since this is the epistemological frame of reference for this doctoral thesis. Moreover, mainly research that emphasizes the grave and/or grave marker is focused on. Obviously, this discussion of seminal literature does not claim completeness or unbiased objectivity. It is, after all, the subjective selection and preference of the author who intends to give an overview of the status quo of related research, keeping in mind the research question: Why do graves and grave markers look the way they do, what has been researched about that and what potential conclusions can be drawn.

In Europe, archaeological excavations of modern cemeteries are rare (e.g. Anthony, 2016; Kenzler, 2002); consequently, investigations into the sepulchral infrastructure, material décor and furnishing mostly comprise an assemblage of surface elements explained in relation to legislation, local and church authorities (Rugg, 2013; Bertrand and Carol, 2016), questions of social identity (Cipolla, 2008; Mallios and Caterino, 2007; Mytum, 2006; Reimers, 1999), ideology (Bernbeck and McGuire, 2011; Chadha, 2006; Gorman and DiBlasi, 1981) and emotion (Tarlow, 2012, 2000). Gravestones and accessories have, for instance, been examined in terms of consumer choice to

determine how the class or the ethnicity of grave owners affected their choice set (Clark, 1987). Buckham (2000) has also touched on ambivalent identity and behaviour of grave owners and designers as consumers with their own needs and desires confronted with a certain commercial offer and legal framework. In this respect, her focus is on the human agents and not the materiality itself as such.

Art historians, on the other hand, who are interested in the evolutions of style, as well as archaeologists who research the functionality of artefacts, have addressed the question of materiality, although rarely in terms of agency. The study of graves' and gravestones' material features often produces models of seriation that relate observed changes to societal transformations (Deetz, 1996; Mallios and Caterino, 2011; Streb, 2017). Furthermore, the historical evolution of modern cemeteries in general, and the rationality – in contrast to churchyards – of this clearly defined and designated place, have attracted much attention (Rugg, 2000; Sörries, 2009; Zentralinstitut für Sepulkralkultur Kassel and Sörries, 2002). Surprisingly, even related geographical research into "deathscapes" has largely ignored the "production of space" (Lefebvre, 1974) on the micro-level of the grave, since it is more preoccupied with questions of planning, design and the management of a burial space as a public or a semi-public space (Maddrell and Sidaways, 2010; Anderson et al., 2010). With regards to related research, the focus is on a cemetery in its entirety, not on individual graves, except in the case of mausoleums or remarkable tombs built for notable, famous and/or wealthy individuals. The current trend for highly individualised graves that are conspicuous in an ordinary cemetery has attracted the attention of sociologists Benkel and Meitzler (2013). However, the materiality of conformism and its subtle shifts in shape or modest utterances of dissent remain largely unexplored.

Tarlow (1999: 2) emphasizes the relevance of gravestones as both text and artefacts; thus, she also emphasizes the relevance of related studies for both history and archaeology, and specifically for historical archaeology. She continues to explain the relevance of such research within the broader context of authors like Lewis Binford and Ian Hodder. She also explains the particular development of processual and post-processual archaeology, as well as the related interpretation of what artefacts can tell the research about past social identity and ideologies. She works along Michael Parker Pearson's (1982) more advanced interpretation of grave markers, moving away from simply reflecting past social relationships towards a role of actively shaping it, that is "articulating, rather than reflecting social reality" (Tarlow, 1999: 22). She also works along Hodder's (1995: 232), – based on the research of Anthony Giddens, – notion of agency, that is knowledge, power and volition as a means for intentional and meaningful action. She finally makes a strong plea to add emotions as another important topic in related research.

Tarlow's (1999) above-mentioned research is a good example of related research in historical archaeology as a distinct field of study, commonly known to rely on the convenient and rich data source gravestones can provide about the modern world. Obviously, her work is based on further seminal literature that applies the detailed study of graves and/or grave markers. For example, Dethlefson and Deetz (1966: 520) seek "… to direct attention to a corpus of artefactual material in which a wide variety of archaeological methods may be tested, refined, and perhaps improved under highly controlled circumstances", that is colonial gravestones in New England (U.S.), to shed light on function changes of such artefacts that reflect society as a whole. Deetz and Dethlefsen (1967) applied the method of seriation when analysing how stylistic changes relate to changes and adaptations in religious practices. As Deetz (1996) explains, this method assumes that any cultural trait peaks in popularity at a certain point in time – and then it fades away. While their further research went beyond the simple method of seriation, they gleaned very important findings about the interrelationships between socio-cultural dynamics and religion over time. Much of this work became an integral part of Deetz's (1977) "In small things forgotten". Not only are gravestones convenient and non-intrusive accessible artefacts that are often easy to date and that provide much data (Tarlow, 1999, Bashford and Sibun, 2007); they can also tell us about socio-cultural changes in the past and even about society in the present. Ariès (1976) pointed out that burial practices enable many tangible and intangible insights about the deceased, the bereaved and the societies they are embedded in. Collier (2003: 728) suggests that the "… memorialization of individuals reflects society's attempts to deal with death. In an effort to create a kind of symbolic immortality, relatives attempt to create a memorial that displays, in a favourable way, who the deceased was […]. The choices family members make over inscriptions, which reveal an attitude toward death through the summation of a life, are both personally meaningful and socially normative". Deetz's (1977) research influenced a number of scholars who tested and largely confirmed his theories; furthermore, they could often also add new perspectives and additional data (e.g. Baugher and Winter, 1983, King, 1985, Veit, 1999).

Despite this, only few publications treated gravestones as data – until a decade ago. Veit, Baugher and Scharfenberger (2009), in their literature review of articles published in *Historical Archaeology* between 1967 and 2003, and also in *Northeast Historical Archaeology* between 1971 and 2004, show that very few publications focused on gravestones – a trend that was reflected in other journals in the discipline and that is only now changing slowly. Regarding this lacuna, Joseph (2009) suggested that although the influence of the seminal works by Dethlefsen and Deetz (e.g. 1966) had inspired historical archaeologists, the multidisciplinarity of cemeteries and mortuary art might have proved too big a challenge.

More recent scientific research deals with a number of issues concerning the socio-cultural information that can be gained from gravestones. Reimers (1999: 147) considers funerals and

graveyards in their entirety as "…communicative symbolic actions for construction of ethnic and cultural identity", also in the active construction of individual and social identities. Reimers cites Ariès (1976), van Gennep (1960) and Myerhoff (1984) to underline the roles of burial rituals in creating collective identity. Collier (2003: 727) supports this by claiming that the graveyard of any period can be perceived as replicas of past cultural patterns reflecting the historical record, especially when concerning people's changing social identity over time. In doing so, she also refers to the seminal works by Seale (1998) and Tuchman (1994). The bereaved try to remember the dead by allowing them the same social position in death as in life. According to Collier (2003), this also includes changing institutional perspectives on life and death regarding, for instance, individuality in a society in transition from modernity to postmodernity. Mytum (2004) analyses gravestones at and around Balrothery in northern County Dublin, focusing on dimensions, design and decoration, as well as the content of their inscriptions. From his findings, Mytum deducts that clear changes in these gravestones reflect the beginning of a new funerary tradition in Ireland and Britain. During the middle of the 18th century, the use of permanent grave markers spread from the middle class to all other social and economic groups, thereby indicating a new and different understanding of commemorating individuals after death. Mytum (2006) extends this sample with data from New England and also by a more distinct theoretical focus on the role of consumption. According to the author, the 18th century spread of individual, permanently marked burial places reflect global changes in social relationships and changing attitudes in a world of increasing material consumption. Without isolating any one major reason for this change, Mytum (2006) claims that increased economic opportunities, increasing material consumption, individuality and the need to permanently express social status form an overarching topic. Mytum (2009) increasingly argues from an ideological perspective and includes the role of identity when analysing 18th century Protestant and Catholic memorials in West Ulster, Ireland. He claims that graveyards witnessed religious and social tensions in 18th century Ireland; he furthermore claims that the symbols and texts on the gravestones shed light on these conflicts and socio-cultural dynamics, especially concerning identity anchored in religion. Chadha's (2006) work is an example of mainly ideologically focused research on grave markers. In his study of a colonial graveyard in Calcutta, he illustrates the ideological extent and impact in both the past and the present. Mallios and Caterino (2011), in their study of Californian graveyards from the 1800s and the 1900s, support the potential link between social and economic possibilities and grave marker choice. They provide an excellent overview of historic burial and commemoration practices over their chosen time period and acknowledge prior research concerning social identity, ideology and socio-economic impact factors. As a result, they apply seriation and match changes in grave-marker designs, as well as materials, over time with the socio-economic development of the area under scrutiny.

Although published earlier than many comparable articles, Cannon et al. (1989) stands in sharp contrast to all the above-mentioned publications because she challenges their underlying paradigm when it comes to a direct reciprocity regarding the level of expression of mourning and the level of emotional detachment concerning death and loss. The authors apply an ethnographic perspective when criticising the simplicity of the argument that more elaborate mortuary expressions simply indicate relative economic and social status. They show that the cyclic rise, peak and decline in elaborations are a common topic and follow similar patterns, such as fashion, luxuries and etiquette driven by competitive behaviour – in contrast to, for instance, Parker-Pearson's (1982) or Hamell's (1983) hypotheses. The similarity lies in the conclusion that different levels of mortuary elaboration or restraint are perceived as symbolic expressions of social aspirations (Cannon et al. 1989: 447). Although it appears that recent literature has hardly noticed this research, the stated concerns must be acknowledged. Changes in commemoration over time, as addressed by Mytum's works, have also been described by Tarlow (e.g. 1999). However, Tarlow's (2000, 2012) most recent study seeks to introduce emotion as a factor and dimension to be studied in historical archaeology, including the study of death and commemoration. Considering such a body of literature, it might be deduced that, firstly, gravestones are convenient and, secondly, that they provide a rich data source enabling historical archaeologists to research a broad and multidisciplinary set of questions relating to socio-cultural dynamics, such as social identity, ideologies and emotion.

Cannon et al. (1989: 438) discuss several cases in detail, hypothesising relationships between certain mortuary practices, such as certain traits of gravestones and socio-economic changes, individual and class status, including competition and status aspirations – even the role of fashion in how people express mourning. In this sense, any recordable dimensions of burial and commemoration could be linked to changing social identity over time. This is supported by Mytum (2004) who focuses on 18th century gravestones found in Dublin's Balrothery cemetery and who seeks to understand changes in commemorative practices and social identity of Irish and British samples. He considers the size, shape, decoration and textual content of his fairly small sample and compares them to data collected from the larger region. He starts out by acknowledging the boom in gravestones during the 18th century, which is clearly reflected by his sample; however, he also mentions that the sample is hardly representative of the original population because many gravestones have been destroyed or moved. He continues to describe the data collection process, which consisted in acknowledging limitations concerning what could be reliably gathered (e.g. size) and in numbering, photographing, rubbing and filling in standard recording forms (cp. Mytum, 2000). He processes this data in very simple tables, focusing with much detail on, for instance, symbols and text that could be found on the stone, which he generally attributed to new burial practices that aimed at a more permanent commemoration of a social class that lacked

the experience but clearly required such behaviour. While this article has a highly explorative character and provides more questions than answers, Mytum (2006) builds on this work and more explicitly attributes rising external commemoration in Britain, Ireland and New England during the 18th century to changing attitudes about social relationships, memory and the body in relation to increasing material consumption. Although it appears reasonable that increased wealth, the rise of the middle class, literacy and a greater emphasis on the individual and the small family unit that could be observed during this period might explain his observations, his suggested explanations are, however, hypotheses that are not supported by data in this particular article. Mytum (2009: 179) eventually attempts to link specific symbols with identities of class, ethnicity and religion. Reimers (1999) picks this up in her study of death and identity in which she explains how symbols and symbolic acts related to funerals and graveyards, including gravestones, actually reflect ethnic and cultural identity or how these monuments are used to create ethnic and cultural identity. While she does not explicitly state an exact methodology, the rich details in her work make a strong case that any detail can matter when it comes to social identity, whether it reflects society or whether it is a construct of envisioned identity. Based on similar assumptions, Mallios and Caterino (2007) collected extensive data about grave markers from San Diego County (US), such as location, orientation, size, materials, finishing, epitaphs, symbols, etc., in order to create a detailed pattern of gravestone styles and types over time. He presented them in battleship curves and tables, and matched them with historical changes in the beliefs and practices of the community under scrutiny. Such research appears to be rather hypothetical because a simple correlation of grave marker dimensions and social identity is assumed; however, it is never questioned or proven. Such examples can be found in the field of ideology as well, although a somewhat more complex correlation is assumed.

Since the call for a historical archaeology of capitalism (e.g. Leone, Potter and Shackle, 1987; Leone, 1995; Leone, 1996; Leone and Potter, 1999), researchers have had to acknowledge the political dimension of their work (Hamilakis, 2012). Lukàcs (1971) already claimed that it is the historian's task to unravel modern class-based ideologies, including issues of slavery, sexism, racism and other forms of exploitation. In this sense, Parker-Pearson (1982: 110) states that "the material expression and objectification of idealised relationships formulated about the dead by different individuals and groups within society" are a form of social manipulation rather than a snapshot of social reality. Rugg (2000) transfers this right to the field of death, burial and commemoration by emphasizing that cemeteries and burial grounds of any kind are always also public and political, actively shaping collective identity and ideology. This paradigm appears to be confirmed by the work of McGuire (2003) who correlated commemoration practices with changes in ideology (cp. Cipolla 2011: 151). Gorman and DiBlasi (1981) researched mortuary ideology in connection with religious, social and economic factors in South Carolina and Georgia (US) during

the 18th and 19th century from an ethno-historical perspective. Interestingly, they propose a direct link between gravestone iconography and ideology. Gorman and DiBlasi (1981: 80) first defined variables concerning the factors under scrutiny and statically correlated them with certain motifs, significantly confirming and advancing the seminal work of Deetz and Dethlefson (1967) via a processual archaeological perspective. More recent research, such as that by Mallios and Caterino (2011), seeks to combine past research efforts into a more complex understanding of how symbols work in relation to mortuary ideology. Mallios and Caterino (2011: 431) refer to the work of Veit (1999) when showing how, during the 17th and early 18th centuries, symbols like skulls on gravestones had been associated with fear and awe of death and its inevitability, while, later, cherubs symbolise the belief in an afterlife, and urns and willows reflect the mourning of the bereaved. This work is contrasted with but linked to the works of McGuire (2003) and Leone and Potter (1999), which refer to capitalism and ideologies that enable exploitation. Although Mallios and Caterino (2011) might not be directly appreciated in that research stream, their research on how grave markers changed over time when it comes to socio-economic factors can be viewed in a broader context. Based on data collected on gravestones (e.g. shape, size, material, etc.), they too create categories and patterns of stones that are then compared with the historical background of the region under scrutiny. Tables and battleship curves are the main means of their analysis. Chadha (2006), in contrast, focuses on the design and the epitaphs on gravestones in a colonial context; he seeks to make certain deductions about applied ideology based on choices of words and phrases.

As with social identity, certain details on and traits of gravestones are linked to dimensions of ideology for the purpose of analysing diachronic changes (cf. Barnett and Silverman, 1979; Burke, 2006). Maybe more so than with social identity, it appears difficult how exactly this can be achieved. For all related studies, it would be important to clarify in advance which symbols, designs and wording or choice of epitaph can be clearly correlated with certain hidden or intentional ideology. However, such a pre-condition is not fulfilled.

Last but not least, while social identity and ideology in research that considers grave markers as material culture and data are increasingly common, Tarlow (1997, 1999) makes a strong plea for considering emotion alongside identity and all studies of power relationships. Tarlow (2000) repeats her call for integrating emotion into archaeology. She presents biological and socially constructed approaches to emotion in general and seeks to link these to archaeological research by calling for emotion to be considered as biological and cultural phenomena (Tarlow, 2000: 728). These notions are contextually variable and are of most value as social emotional values as opposed to individual ones. In short, while Tarlow (2000) acknowledges the importance of emotion as an important aspect of human experience, she does not make explicit potential methodological approaches. Tarlow (2005: 165) picks up on these issues again; however, this time

she focuses on being aware of wording in epitaphs because they might indicate the emotions of the bereaved. In this article, she illustrates that gravestones can generally provide important data for demographic research and research into social identities, class, wealth status, power and ideology (Tarlow 2005: 164), with emotion as an aspect embedded in identity. She also strengthens her perception of the 19th century as an emotional one with a strong focus on personal relationships and personal loss. In order to illustrate this, Tarlow (2005: 167) highlights changing design features as well as euphemisms in epitaphs despite the generally mass-produced and formulaic layout. Hence, she claims that standardisation via industrialisation was extended by more emotional details on gravestones that could be used to personalise and express grief. While this is an interesting idea, the article fails to provide proof for this hypothesis. Tarlow (2012) adds an interesting distinction concerning emotion's role in archaeology: She distinguishes between the researchers' past emotions and emotional subjectivity as foci. Based on a post-processual understanding of the subject, she now dares, in contrast to her earlier work, to describe the possibilities of an archaeology of emotion concerning interpretations, contextual knowledge and social dynamics (Tarlow, 2012: 172). However, her review article is still theoretical and lacks explicit methodological guidelines. While it appears obvious to simply link, as in the case with identity and ideology, certain design features of gravestones to emotions, it appears that no research has explicitly sought to do this.

As illustrated by the selected seminal literature above, – which is not intended for completeness but rather aims to cite those sources that are still regularly noted in recent publications and acknowledged for their impact, – there is a multitude of research conducted on the cemetery, considering the grave and/or grave marker as artefacts worthwhile to be studied for a variety of purposes. However, there is rarely an explicit reference to the related materiality and its spatial context. These factors are usually treated as a given. Moreover, the related entanglement of materiality, space and humans as both agents and consumers of materiality and spatiality, as well as their role in reciprocally producing materiality and spatiality, appears to be largely ignored and only implicitly addressed. Researchers appear to make strong statements based on the materiality and spatiality they find at cemeteries; however, apparently they never ask the question: How were these artefacts and their spatial arrangement brought about in the first place, i.e. what are the detailed processes that led to these artefacts and their spatial arrangement?

1.2 Consumption

The general field of funeral culture is not limited to considerations related to, for example, religion, spirituality, grief and commemoration or, especially with regards to related material culture, to art history or grave marker typologies. Other topics, such as socio-economic

considerations, do appear although they are usually treated rather superficially. The role of economics in funeral culture and commemoration is more than merely correlating certain grave monument characteristics with income statistic or assumed social status. Burials and commemoration had always encompassed elements of business and industry too – this is by no means a recent development. This needs to be emphasized explicitly in order to allow alternative perspectives for further research. Tarlow (2000: 235), in her study of the 19th century garden cemetery, has already pointed out that "landscapes are emotional places as well as economic, social or symbolic spaces. […] a nuanced and contextual history of landscape needs to address consumption and use, not just design".

However, with little immediate concern for material funeral culture, Akyel (2013) published a study focusing on the undertaker industry in Germany and its transformation from traditional, non-innovative, static and communal organised care of funerals to profit-driven businesses, especially since the 1980s. In a complex interplay of changing societal ideas about death and piety, spending power, market supply, consumer behaviour, deregulation and historic caesuras, such as the fall of the Iron Curtain at the beginning of the 1990s and the abolishment of the governmental funeral benefit in 2004 in Germany (a formerly, – to a large extent, – communal and personal act, which was usually accompanied and structured by the representatives of the relevant religious community), the undertaker industry has increasingly become a business with rather profane intentions. At times, such intentions might be frowned upon and might cause harsh criticism, especially in cases where the intention for profit is in conflict with the piety that is still nonetheless present. Schomers (2007) is an example of such concerns having created the rather polemic and certainly unscientific platform via investigative journalism for criticising such developments within the funeral industry. While little can be learnt about this research from such approaches and since the generalisation of such claims is impossible, it is obvious that something like a funeral industry does exist and that business aspects are important. In that context, Hänel (2003) presents a very detailed study of the professionalisation of the undertaker industry, including the industry's historic development, self-perception and institutionalisation, as well as an overview of business processes, such as customer service and marketing. While Hänel produces an invaluable account of this particular occupation's internal processes, self-perception, and third-party perception within its social-cultural context and past transformations of societal ideas of death and commemoration, she unfortunately only scratches the surface of important business aspects, such as the interaction between customer and service provider. Nonetheless, it becomes clear that modern capitalist economic and business-related concepts have found their ways into every aspect of life, including industries conventionally considered to be emotionally sensitive and requiring piety. This potential conflict of business versus piety appears to have

created research interest to a certain extent; however, the focus is mainly on the undertaker industry (see the before-mentioned and exemplary literature).

An aspect often referred to in historical archaeology when it comes to this influence of modern capitalism on the materiality of the past, including funeral culture, is consumption and consumer choice. In Timothy James Scarlett's entry about consumption in the *Encyclopedia of Historical Archaeology* (Orser, 2002: 129ff.), the word "consumption" is defined as "…the destruction or using-up of utilities, through either physical destruction […] or exploiting a good or service. […] The patterns in what people purchase or how they spend their resources is reflective of, influenced by, or constitutes each individual's ethnicity, class, social, gender, age, sexuality, socioeconomic status, their location in geographic space and so forth" (Orser, 2002: 131).

The author then continues to distinguish between two different schools of thinking: consumption as reflection and consumption as construction. Orser explains the latter as understanding the consumer to be similar to a bricklayer who "… explicitly assembles his or her information about his or her identity utilising the symbols of artefacts and actions. Objects are analogues to words, which can be assembled into expressions that transmit information. Sets of symbols must then be 'read' by contemporaries in society (as well as archaeologists in the present)" (Orser, 2002: 131).

Consumption as reflection, in contrast, assumes that decisions and behaviours mirror individuals' identity as part of a specific, inherited reference system, and any changes of such behavioural patterns indicate transformations of such system (Orser, 2002: 129). Potential criticism aside, it is clear that the different understandings underlying both approaches draw a distinction between those favouring static social explanations in explaining archaeological assemblages versus those preferring interpretative approaches. Both approaches to the study of the past have their value, depending on the research question and setting.

If economics play an important part in explaining such behavioural patterns, one is referred to consumer choice analysis, addressing the decision-making processes and motivations of individuals when acquiring material culture in the form of consumption, especially during modern times. One can again differentiate between approaches focusing on social differentiation defined by artefact assemblages and others focusing on the interpretative and symbolic meanings of artefacts people consume (Orser, 2002: 126). When considering dimensions, such as income, prices, ethnicity or race, many consider Spencer-Wood's (1987) edited book focusing on and entitled *Consumer Choice in Historical Archaeology* a seminal contribution to the field. However, the book is limited by a focus on price indices and probate records in making deductions about socioeconomic status, which are treated as sufficiently explaining the scope of consumer decision-making in a static, almost neo-classical economic environment. Consequently, in the

light of much more recent research, this work is no longer necessarily helpful. Klein and LeeDecker's (1991) special issue in the journal *Historical Archaeology* did not really succeed in moving beyond those limitations. While the related publications consider customers' psychological and physiological needs (cp. Orser, 2002) together with socio-economic factors, the basic understanding of the individual or household is still driven by economic theory and modelling, usually ignoring non-rational behaviour and even assuming the potential to predict behaviour.

The assumed interrelation between household income and/or wealth and social status is, of course, problematic. These concepts are not necessarily the same (cp. Wurst & McGuire, 1999). The reality is often more complex and obscured by social transformations of the past. Moreover, such models often work under the assumption of large differences between social groups or classes when it comes to available resources and the relative scarcity of all available consumer products. While this was certainly true for most of mankind's history, industrialisation changes modes of production and the availability of consumer goods and their price alike (cp. Symonds & Casella, 2006: 143ff.). While this is, first of all, a chance for the historical archaeologist to observe this dramatic change of material culture (e.g. Newman et al., 2001; Palmer and Neaverson, 1998), its concurrence and complex interaction with isochronal shifts of of how people understand individuality and identity within Western societies require an understanding of consumption that goes beyond the simple idea of lower social classes emulating the elite classes' buying behaviour and, consequently, the elite classes' reactive and dependent behavioural patterns. This includes earlier research regarding Marxist perspectives in archaeology following an extreme Newtonian and economic stance on production and consumption, constructed and forced into concepts of power and ideology (cp. Bate, 1984; Pearson, 1984; McGuire, 2006: 123ff.).

Following Lynda Carroll's entry regarding consumer choice in the *Encyclopedia of Historical Archaeology* (Orser, 2002: 127f.), agency became an important issue to consider during the 1990s. Following Bourdieu's understanding of consumption as a process that communicates meaning, it is also a means to construct and express own identity as part of and in context with society as a whole. Cook et al. (1996) make a strong plea for considering human agency and decision-making in the study of consumption in historical archaeology, as this expresses the perception and definition of one's symbolic self and allows shifts of such understanding as well as the negotiation of social lives. Admittedly, this perception of consumption and related human decision-making as well as behavioural processes generally appear to permit a more coherent insight into why and what people of the past consumed and, consequently, what archaeological assemblage might survive. Introducing methodology that is less influenced by economic modelling and that refers to a more realistic notion of human beings as actors and agents appears useful. That these issues might be relevant can also be illustrated by studies, such as Latour's

(1996: 228), highlighting that “each actor's every action is interfered with by others, and since succeeding in one's aims is mediated by continual negotiation, one can talk of this in terms of complexity – that is to say in terms of the obligation to take into account a large number of variables at the same time”, including the role of an overarching structure. This is similar to the entanglement between human actors and materiality as described in Hodder (2012).

However, besides a variety of ideological concerns, related studies appear to focus on assumptions and models that are too simplistic when it comes to the forms of human agency and the potential negotiation of identity. In his consideration of historical artefacts, Orser (2004: 89ff.) refers to mass-produced goods as commodities that allow deductions to be made about trade, commerce, politics and society; however, with regards to research he mostly utilises probate inventories and household wealth that was assessed ex post after a person had passed away, only briefly referring to “ideas behind artefacts” (Orser, 2004: 111) when it comes to consumption as construction. This is very similar to, for example, the contributions of David Barker and Teresita Majewski or Julia King, all published in Hicks and Beaudry's (2006: 205ff. and 293ff.) edited book *Historical Archaeology* that illustrate how especially ceramics and household commodities of the modern times can be used to trace trade and consumption. However, they do not offer any explanations for the observed consumption patterns that go beyond the usual assumption of wealth and social status, albeit from a consumption-as-reflection perspective. King (2006: 299ff.) at least considers alternative theories stemming from the consumption-as-construction perspective, including ideology and class struggle; however, like Orser (1996: 189ff.), she also avoids more precise models of consumer behaviour.

The author of this thesis conducted a more specific literature research into consumer choice and/or behaviour research with a specific focus on historical archaeology; however, based on available data on a variety of material culture, this has also not revealed any studies that go beyond assumptions and potential inferences regarding certain social dimensions. Pendery (1992), for example, researched consumer behaviour in Charleston, Massachusetts (US), during the 17th and 18th century. Utilising probate inventories and archaeological evidence, he makes claims about the emulative consumption behaviour of locals in order to establish and communicate social rank. He assumes the locals' active manipulation of social rank via their experimentation with innovation and patina to express the family's ancient honour; furthermore, this active manipulation also mirrors shifts in political and economic power towards the expression of personal gentility. Buckham's (2000) is an impressive study of the material culture of Victorian commemoration at the York cemetery. Despite Buchham's claim that consumer behaviour is explicitly addressed and despite her disputing an extensive study and originally developed typology of local grave monuments, she fails to transcend conventional ideas of consumer behaviour in historical archaeology. Relying heavily on the works of Cannon (1989), she

focused on his assumptions of fashion and social emulation (Buckham, 2000: 81ff.). The basic idea that Buckham (2000) adopts from Cannon (1989) is that certain material cultural traits and characteristics – or rather fashion – spread via social emulation from higher social classes to lower ones and, once this has happened, it is again abandoned by higher classes in order to continuously distinguish themselves from the lower ranks of society. Buckham (2000) focuses on the interrelation between producers of Victorian grave monuments and the corresponding consumers, assuming a strong link between production and purchasing (Buckham, 2000: 90). While Buckham's research in terms of available material and archival records is impressive, she does not engage in depth with the actual purchasing process and actual behavioural dimensions. In her conclusion, she suggests this producer and consumer relationship for further research, especially with regards to the creation of grave memorials as artefacts, subject to fashion and industrial marketing. While highlighting and emphasizing these issues, she does not take the next step and, therefore, fails to introduce actual business-related insights on the consumer's decision-making process and also fails to introduce consumer behaviour into her research. Although she acknowledges the active voice of consumers in the production process (Buckham, 2000: 359), she does not engage with the details of this process, most likely due to the obvious temporal distance. Blanke (2007) considers, amongst other factors, not only issues related to a capitalist consumer economy and agency but also institutions. In an excellent analysis of rural history and the introduction of modern consumer goods during the 20th century, he succeeds in proposing the critical question regarding consumer agency: “If consumer agency did exist, then the logical question to follow is: to what end?” (Blanke, 2007: 197). The author of this thesis believes that this question needs to be extended: It is not only to what end but also how and in which interrelated process with the producers?

Scholz (2012) acknowledges the consumption topic's relevance in historical archaeology and also illustrates, specifically for research in Germany, that related research usually ignores methods and theories from consumer choice and behavioural research. Most importantly, she shows that issues of social status and consumption as well as socio-cultural transformations are, instead, only part of a whole assemble of potential research paths to be taken, considering material culture of modernity. However, when returning to the Anglo-American research realm, a focus on economic considerations becomes obvious again, illustrated, for example, by Reiffenstein and Selig's (2013) article about production chains of gravestones to be found on Prince Edward Island and the implication on the assemblage that can be found there. Basically, based on an analysis of the supply side of grave monuments via business records, advertising and catalogues, Reiffenstein and Selig argue that grave monument design is, at least in part, also the product of changing production methods and supply chains, hence emphasizing the production side's and agency's relevance. Dürr (2016) provides an excellent comparison of German and British grave and grave

monument research, concluding that despite different pathways, similar research questions and approaches had been developed over the course of the last decades. While British research appears to be more driven by theory and concerned with social status and at least for post-processual archaeology assume a link between the organisation of a funeral and societal organisation, German research focuses more on method and typologies. Without judging this assessment, it is striking that Dürr (2016) does not mention the need to add a more in-depth consideration of consumption aspects in both research realms. Moreover, the potentially more positivistic approach to archaeology, as mentioned above, is not necessarily only followed in Germany, as, for example, the work by Madrid i Fernández and Sinner (2019) shows in which an elaborated typology of Late Republican Black Gloss pottery from Hispania is related to these specific products and the decisions consumers had based on potters' production choices. Similarly but not as sophisticated, Schweickart (2014) discusses the colonial commodification of goods in 18th century Virginia to make assumptions about changing ideologies regarding consumption. That consumption is a multifaceted phenomenon is also shown by Taschereau and Rousseau (2019) and their consideration of credit and the government's role in extending the Montreal population's consumption during the early 20th century. Stobart (2015: 102) is an example of a scholar who adds to consumption by considering aspects like the individual lifecycle, gender and status as factors influencing consumption and again highlights the complexity of consumer decision-making. While Majewski and Schiffer (2009) have highlighted the use of an archaeology of consumerism by adding issues, such as advertising and reactionist movements against consumerism, it is especially Mullins (2011) who makes a strong plea to generally integrate archaeology into the study of consumption, especially by adding materiality. He states that a "rigorously interdisciplinary and ambitious archaeology of consumption provides the intellectual and methodological insight to document concrete consumer patterns, embed those in broader structural and cultural influences, and underscore the rich range of ways consumers negotiate dominant influences and socialize goods in distinctive ways" (Mullins, 2011: 142).

If this is true and if historical archaeology should follow the plea for more consumption-oriented research not only to solve its own research questions but also to contribute to the general field of consumption studies, it is even more striking that historical archaeology thus far fails to integrate existing research results from the broader field of consumption studies and remains at a superficial level of making broad statements of, for example, social identity and socio-cultural transformations based on observed changes of material cultures and related typologies, such as ceramics or grave monuments.

There are, of course, examples of historical research into more in-depth, consumer-oriented topics, such as fashion. Belfanti (2008), for example, approaches the question whether fashion was originally a European invention or whether fashion already existed in other cultures before

or at the same time. However, Belfanti also does not make an effort to understand the phenomena in more detail, based on research from other disciplines. This is a pity because the potentially interesting models and factors are numerous. For example, Bikhchandani (1992) proposes a model of fads, fashion and customs based on an elaborated model of information cascades. Applying stochastic games, Shoham and Tennenholtz (1997) theorise about the emergence of social conventions. McGuire (1976) discusses internal psychological factors influencing consumer choice and Bettman et al. (1998) propose an integrative framework of consumer choice processes.

Returning to research in historical archaeology, Mytum (2018: 75) notes three main explanatory factors or issues in explaining product change, based on literature mainly from Britain. Firstly, fashion is largely considered an unexplainable phenomenon as, for example, discussed by Litten (1991). Secondly, the rise of mass production during the Industrial Revolution has resulted in a powerful position of the producer when it comes to creating available choices (cp. Buckham, 2000). Thirdly, it is ultimately the consumer's choice that creates a market (cp. Tarlow, 1999). Mytum (2018) sets this out in his study to examine the power relationships, – in the context of death, burial, commemorations and consumption, – between the producers, retailers and customers with regards to coffins and grave monuments. He finds that there is a disparity in the rates of stylistic change as well as the variety of choices for both artefacts, i.e. coffins and grave monuments, explaining his findings with the different levels of grief and commemoration the customer experiences when placing an order. For the coffin, this usually takes place right after death, providing the undertaker as retailer necessarily with control over the process; in contrast, when it comes to the erection of a monument, time has passed and this shifts a bit of control and power back to the customer. Mytum (2018), in this context, discusses the power and dynamics of consumer choice and draws heavily on data that have already been collected from and/or published in Britain, i.e. changes of patterns observed over time. Unfortunately, his conclusions about the mentioned power dynamics and consumer choice are based on secondary literature about the grieving process and consumer decision-making (see Mytum, 2018: 90). Mytum did not make an effort to grapple in detail with the related consumption process. Thus, his work can only be considered hypothetical because his assumptions lack ultimate proof.

The intention is not to provide an extensive literature review of consumer behaviour and decision-making processes in general or of historical archaeology in specific in this chapter. Nor can the above-mentioned literature necessarily be applied to this research. However, it should have become clear that consumption is an important issue with regards to funerary culture research of the modernity. Moreover, it might be necessary to include perspectives from other disciplines in order to deepen our understanding of relevant processes.

1.3 Monument Recording

Data collection is a fundamental element of the study of grave monuments and mainly consists of the recording of the relevant monuments. In order to facilitate the subsequent analysis, it is often necessary to categorise the collected data and create typologies. What related literature has in common is that despite dealing with typologies of grave markers, the literature contains no detailed description of how typologies are created and how, during data collection, different categories can be distinguished from each other, i.e. how typologies are assigned. In her detailed introduction to the *Farber Gravestone Collection* supported by the American Antiquarian Society, Farber (2003) describes not only the corresponding photographic collection, its origins and its context but also the design, decorations and interpretations of motives and inscriptions. Without providing too much detail on the sources and derivation of this information, she focuses on the size, shape and material of this particular sample of grave monuments, surprisingly similar to Deetz' (1996) research, showing the gradual shift from death heads to cherubs and eventually willow trees as dominating motives. What Farber (2003) adds is three more variations based on tympanum motive and shoulder design, which can consequently be understood as her refined typology. Moreover, she refers to information pointing towards the stonemasons and further motives, such as those related to mortality, winged faces, urns and willows or portraits. A significant part of her research involves the inscriptions that can be found on the monuments. Importantly, she emphasizes that in terms of “shape, material, carving style, motif, inscription, and every other characteristic mentioned, there are innumerable variations” (Farber, 2003: 37), thus pointing out the importance to reduce the quantity of information for the sake of becoming able to analyse this information; at the same time it becomes obvious that any typology is the result of subjective preferences and depends on the recorded grave monuments' local context. The problematic with such typologies becomes clear when, for example, referring to Heinrich (2014): Critically reflecting on James Deetz' research, Heinrich makes a strong argument for interpreting Deetz’ cherub as a putto, thus challenging the idea of changing religious notions as a main reason for motif transformation on colonial grave markers, preferring fashion and consumer choice as main motivations.

Nonetheless, typologies and the use of purported standard procedures are common in related research. In their study of pre-industrial headstones across the North Sea plain, Nijssen and Nyssen (2011) refer, with regards to their methodology, to standards set by Baker, Farber and Giesecke (1980). Nijssen and Nyssen fail to illustrate how Baker, Farber and Giesecke's guidelines to record and photograph a cemetery and grave markers have influenced their own procedures, which amendments they had to make, if any, or what needed to be changed. This might be because Nijssen and Nyssen are actually more interested in the absence of certain grave marker

types in certain regions. Nijssen and Nyssen obviously refer to a limited and very general typology and choice of material in order to explain supply routes and subsequent spatial distribution.

Ames (1981: 652) points out that variety and height are important factors for typologies.

"If eighteenth century burial grounds are often characterized by rows of slender tablets and cemeteries of the early twentieth century by low blocks of granite, the nineteenth century cemetery stands as an energized transition, containing both the end of the tablet tradition and the start of the granite, as well as extensive evidence of experimentation with a wide range of alternative in between".

Ames (1981: 652) also notes the works of much earlier authors generally supporting the idea of transformation from sandstone monuments or any other local material to marble and subsequently granite, while he mentions typologies such as "gothic, obelisk, cross-vault obelisk, tablet, pulpit, scroll, block, raised-top inscription and lawn-type". Starting with Deetz' seminal work during the 1970s, Stone (2009: 146) refers to a large number of literature that has since applied a regional focus, such as:

"Dethlefson and Jensen (1977) in Florida; Crowell in Philadelphia (1981) and in Cape May, New Jersey (1983); […]; Sweeney (1985) in Western Massachusetts; Frederick Gorman and Michael DiBlasi (1976) in South Carolina; Little-Stokes (1984) in highland North Carolina; Sophia Hinshalwood (1981) in the Mid-Hudson Valley; Richard Veit (2000) in Middlesex County, New Jersey"

and so forth. As Stone (2009) highlights, these studies are, however, mostly descriptive in nature. Following the approach of James Deetz are

"Darrel Norris's (1988) analysis of Ontario, Canada, gravestones for ethnicity and status as well as other variables; Crowell and Mackie's (1990) study of burial patterns and social status in Tidewater, Virginia; Tadashi Nakagawa's (1994) meta analysis of a sampling of all of Louisiana's cemeteries for regional and ideological variables; Gregory Jeane's (1987) study of 'sacred artefacts' in upland south folk cemeteries; and Gary Foster and Richard Hummel's examination (1995) of one cemetery for sociological data" (Stone, 2009: 146).

Stone's (2009) rather superficial listing of such research exemplify the quantity of research that has already been done since the early 1980s, usually with a variety of foci and with the application of different variables. Stone (2009) himself appears to use this input as the basis for the development of his methodology; however, he mostly relies on the seminal contributions of authors, such as Deetz and Dethlefsen. Collecting data from 4,300 grave markers at 164 locations, Stone claims to have collected 44 variables by photographing the grave monuments, and open

coded these variables based on his personal codebook according to variables, such as ethnicity, ideology, cemetery hierarchy, epitaphs, siting, etc. (Stone, 2009: 148f.). It would have been very interesting to observe how Stone operationalised these variables, i.e. how exactly certain grave marker features translate into certain values for the mentioned variables and, moreover, why exactly he chose these variables and not others. It is unclear whether this was a process that occurred before actual data collection based, for example, on a thorough literature study or whether Stone made these deductions based on what could be observed at the researched cemeteries.

Similarly, McGuire (1988) works on a larger grave marker study of a specific North American region, with a specific focus on ideology. With regards to methodology, McGuire claims that he and his team "recorded a wide variety of data for each stone. [They] copied down all written information exactly as it is presented on the stones. [They] computer coded a number of other variables, including the material of the stone, size of the stone, an estimated erection date, the formal type of the stone, the type of plot the stone is in, and of course the cemetery" (McGuire, 1988: 443). In total, he mentions 50 recorded variables; however, more details are again lacking, even though he also criticises the lack of any rigorous standards of recording. It appears as if all visible and noteworthy features of the stone and its context were simply recorded, focusing on inscriptions with the purpose of making certain claims ex post about ideology. However, it is not clear how any of the typologies were derived, if at all, and how these typologies correlate precisely with a form of ideology. Consequently, McGuire's work has to be criticised as too driven by a teleological research approach.

Mallios and Caterino's (2007) work mark an important step forward from this lack of rigour in terms of methodology, as they explicitly and in a lot of detail mention their categorisation of cemetery types as well as their typology and methodology when recording the actual grave monument. They advance very strategically by organising data collection into three distinct categories: positon, physicality and literality.

"A data collection page for each data category was constructed. Page 1 included positional information - northing, easting, and elevation - that was collected with the use of hand-held GPS units. This information, entered into a GIS for map ping and analytical purposes, could be used to relocate gravestones in the future. To save space, Munsell color identification and granite identification information was added to this page. Page 2 involved aspects of a physical nature, including monument type, material, dimensions, condition, orientation, and decorative technique. An identification key was developed with examples of general monument types. The orientation of the gravestones and graves was determined using a hand-held compass, then rounded to the nearest cardinal or intracardinal point (north, northeast, east, etc.). True bearings were used. Page

3, the 'literality page,' covered the written aspects of the gravestones, the inscriptions, personal data, symbolic aspects, and decorative motifs. Notice was taken of the language of the epitaph, type of script, idiosyncrasies such as misspellings, and assorted oddities. Each gravestone was numbered sequentially within its particular cemetery. As data on each gravestone was recorded, the gravestone was digitally photographed along with reference scales" (Mallios and Caterino, 2007: 57).

Moreover, Mallios and Caterino provide a certain level of abstraction by presenting illustrations showing how types of grave markers were organised. It is obvious that despite the relevance of any details, it is necessary to aggregate the data to a degree that analysis is at all possible, and useful information can be gained. In this case it is especially the type of grave monuments and their different quantity during different periods of time, – similar to the research of Deetz and Dethelfsen, – that are used to deduct socio-cultural transformations within a certain community. Mallios and Caterino's subsequent study (2011) is based on the same project and data. In this study, their considerations extend beyond socio-cultural transformations into the realm of socio-economic factors as well. By considering not only type and size but also material, they correlate their data with local economic bust and boom cycles. Even though this is again not made explicit, it was necessary to aggregate the data onto a manageable level of abstraction, independent from the level of detail during data collection, which presumably corresponds to that of the previous study by Mallios and Caterino (2007). Unfortunately, more information about their approach and strategy of aggregation is not revealed. When it comes to previous studies, however, they refer to, amongst others, Brandes, o. J.; Cannon, 1989; Deetz, 1996; Francaviglia, 1971; Gorman & DiBlasi, 1981; McGuire, 1988; Mytum, 2004; Rainville, 1999; and Veit et al., 2009, – therefore, mainly works that are already discussed elsewhere in this thesis.

The inscriptions on grave monuments require a side note. Especially for research in historical archaeology, it is clear that there is a very special relationship between material culture, i.e. artefacts, and the kind of text that might be linked to such artefacts (cp. Moreland, 2001). Thomson (2009) provides a full and detailed study of grave marker lettering that goes well beyond the simple transcription of text. He suggests to also record style, case, inscription method, ligatures, letter proportions, weight, capitals, distinctive letter forms, serifs and the cut (Thomson, 2009: 127ff.). He aims for a subsequent statistical analysis of the data gained through these means, as he generally ascribes the same explanatory power to inscriptions and other before-mentioned material that characterises the grave site. Moreover, he considers such details of inscriptions on grave markers an often overlooked feature that has the power to provide important knowledge on a nation's past, and he claims to have collected data not only from the Anglo-American realm but also from Continental Europe (Thomson, 2009: 1ff.). While it is certainly true that most seminal studies in historical archaeology concerned with the study of

grave markers neglect many details concerning inscriptions, it must also be emphasized that especially in the case of the most recent grave monuments the extent of inscriptions has become extremely limited in terms of content – often only providing a family name and years of birth and death – and standardised through industrial production in terms of quality. Hence, the question that arises is what can be gained by such data with regards to, especially, 20th century grave markers. Last but not least, although Thomson (2009) claims an international context for his work, most of his samples are early modern, Anglo-American grave markers with a significantly different treatment of text than, for example, grave markers at a late-20th-century Luxemburgish or German site. While Thomson's input is appreciated, it is questionable how useful his suggested level of detail is with regards to the envisioned sample of this thesis.

What are, however, the standards for data collection? It appears there are almost as many self-styled standard guidelines for the recording of grave monuments as there are studies applying one or another form of similar procedures often going back to the seminal work of authors, such as Deetz and Dethlefsen. An overview of different guidelines can, thus, never be complete, but only exemplary, similar to the above-mentioned literature. The Council for Scottish Archaeology (2020) published a gravestone recording form, demanding information, such as the locational context, material and form and inscription. While such a form appears to be helpful, it is also extremely limited by its default choices, which are clearly determined by its focus on Scotland. While the structure makes sense, a one-on-one application outside of Scotland is not possible. Maybe not surprisingly, Johnson (2000) acknowledges the variety of approaches and lack of any fixed standard by offering general guidelines for recording and data entry, while emphasizing that each researcher might find a unique means of collecting such data. While this might be good advice, it ignores that in research progress can hardly be expected if there are no standards by which data also becomes comparable. An extreme example of such negligence and also ignorance of modern data collection techniques is Maloney's (2019), which provides only cursory information about related procedures. Trinkley's study (2020) is another US example of a pre-set survey form for individual grave markers. Since, in this particular case, other forms were used to record the context of the grave markers that were studied, Trinkley's sheet is very brief, focusing on a default typology, material, condition, size and inscription, in addition to other detail. The problematic is again the default typology linked to a certain location and a lack of explanation whereon such typology is based, which prevents any further application in another, non-US context. The same applies to the recording form offered by the Dyfed Archaeological Trust (2020), an example from Wales. A number of extremely detailed self-styled manuals for grave marker recording from the US as well as the *Guide to the Historical Cemetery Form* (2019) and the manual by King et al. (2004) not only provide a very interesting introduction to the field and a practical guide to the task but also, — even if not explicitly stated and merely by their regional focus, –

make it sufficiently clear that such guidelines were intended for data collection within the region and for the time frame they have been designed for. Obviously, the limitations with regards to generalisation is known to the authors. It is still remarkable that the related issue of a lack of comparability of studies never appears to be discussed.

Consequently, it is questionable whether any standard could ever be generalisable at all. The similarities are usually that a default typology is presented, i.e. material, size, condition and locations as well as inscriptions. Further details can be added, but are often not specified. Considering the differences that exist between different cemetery locations, especially across national borders or even continents, it is hardly surprising that the above literature usually appears to withdraw to the most basic research literature in developing a location-specific data collection methodology. This might be especially important to allow an appropriate typology. In contrast, such an approach requires a relatively high level of advance knowledge about the location that is the subject of the research. Moreover, a new typology makes comparisons difficult and requires an abstraction of data at the cost of the level of detail.

The sheer number of purported standard procedures mask one simple fact: There is no standard in grave monument recording, while existing forms of any kind are extremely similar and draw heavily on Anglo-American grave monument samples. Most studies avoid detailing their approaches for creating typologies and assigning such typologies to grave monument characteristica, which unfortunately might indicate a certain laissez-faire treatment of such data-collection-related issues. In order to provide a certain scientific standard and study comparability, a full transparency is required. In contrast, from the above-mentioned literature it is clear that a global generalisation and standardisation of approaches or typologies is not only impossible but equally unscientific. It is necessary to develop a local standard permitting the most objective and transparent data collection and analysis methodology.

What needs to be considered, nonetheless, is the significant trade-off between the level of detail and the applicability of data collection for scientific purposes. While it might be useful, especially in a novel research environment, to collect as many details of a grave site as possible and to subsequently develop an original typology, to do so requires a certain level of post-data-collection aggregation of data. This process would then require a number of decisions regarding categorisations as well as their quality and quantity, which always results in the loss of detailed data and full objectivity. Put differently, while it might make sense to apply a high level of detail during data collection, during analysis the level of complexity needs to be reduced. While this is useful and critical for research, such a process has the potential downside of predetermining certain outcomes. For example, a too high level of detail might obstruct the visibility of patterns, while a lack of detail might hardly produce novel information. Furthermore, typologies always

create boundaries and apparently clear and obvious categories, — and even a false sense of objectivity, — where these might actually not exist and where certain characteristics of artefacts are actually not easily put in certain categories. At the same time, putting unclear characteristics in summarising or miscellaneous categories might again omit relevant data. Consequently, there is a trade-off between making clear distinctions and allowing flexibility. Moreover, as the above-mentioned research into ideology, especially from a Marxist perspective, has shown, a strictly set and predefined analytical framework or research paradigm might counteract novel findings by limiting flexibility in the treatment of typologies. Boundaries of classifications are necessary to be able to work with the data; however, the boundaries contain a subjective element and require explanation. Similarly, details are important in order to recognise new information; however, too much details will obstruct the big picture. What needs to be avoided is any limitation by a particular analytical framework that might limit analysis a priori. The only means to avoid this, though, lies in a full transparent dealing with the data such that the research approach becomes replicable and the reader of this study can follow certain necessary decisions that were made. During the introduction of the data collection tool, these issues will be identified again and practically explicated.

Last but not least, Mytum (2000) deserves mentioning. Although his contribution appears to be dated considering the above-mentioned studies and standards, his seminal work still needs to be considered the most thorough and scientific introduction and practical guide to the field of grave monument recording and study. Mytum (2000) sets out to illustrate the use of grave marker studies for social historical-archaeological research before explaining in detail how such a project should be planned and carried out, including the provision of actual recording forms and a detailed coding system for a variety of typologies ranging from material characteristics to linguistics. In that sense, Mytum (2000) appears to offer nothing new. Moreover, he is transparent with regards to his limitations when stating that the presented coding form is the result of work mostly in England, Wales and Ireland (Mytum, 2000: 97). Consequently, despite the level of detail presented in his work, Mytum states clearly that other locations might require significant modifications to his standard, i.e. cemeteries in other countries might require a different typology based on original research (Mytum, 2000: 103f.).

In this sense, Mytum (2000) presents the strongest argument for the development of original typologies when studying cemeteries in places where little to none similar work has been done before. What is the same is the transparency that negotiates between the boundaries of categories and level of detail while predefined analytical frameworks that limit subsequent analysis need to be avoided.

1.4 Specific Research Context of Luxembourgish and German Cemeteries: Challenges in Comparison to Anglo-American Cemeteries

Research into funeral culture, including semi-scientific contributions, are generally manifold and illustrate the variety of topics, concerns, potential future developments as well as differences and similarities across countries and regions. A number of examples attempt a historic synopsis before actually focusing on what they consider modern and progressive funeral rites and customs (cp. Happe, 2012). While similar teleological approaches might make an interesting read, they deviate from otherwise interesting finds from data. Francis et al. (2005) chose a more interesting perspective by moving away from the focus on the deceased and their material culture towards the living visiting the cemetery and how they behave. In their contribution they study a number of cemeteries and how they are used, for example, during the course of mourning. Aspects they considered range from how people behave in this specific space, what they do and their "words, actions and reflections" (Francis et al., 2005: 4) to how they tend the graves, what such actions and activities mean to them and, – maybe a focus of this contribution, – how different cultures, especially immigrant societies, shape the cemetery as a space for the living, expressing their own, foreign beliefs and creating their own safe spaces (Francis et al., 2005: 179ff.). Common considerations of related literature apply here as well when the authors conclude that many "variables characteristic of survivors – age, material and health status, socio-economic class, religion and even housing patterns – affect the process whereby the identity of the deceased is partially transferred from the familiar domestic home to the new cemetery home" (Francis et al., 2005: 103). By including the changing perspectives on a cemetery from an individual level, extending the common descriptive of cemetery development from a macro-historic perspective, Francis et al. succeed not only in showing the meaning of a cemetery for the living at the beginning of the 21st century, they also draw a lively picture of the general role of cemeteries for the bereaved during the overall process of mourning and the cemeteries' changing role individually and societally, including what the future might bring in an ethnically fragmented society.

Anthony's (2016) research is another extensive example attempting to place the cemetery into modernity and, studying common phenomena, normality. Interestingly, here the author also includes aspects of materiality by "investigating the relationships between the material placed within them and their own physical presence. It is about how a cemetery functions and what drives the changing relationships with its community who had to deal with the consequences of death" (Anthony, 2016: 342). In doing so, Anthony takes a much more functional and practical approach, detailing the everyday issues, tasks and challenges of a modern cemetery in Denmark.

Mutual agency and the role of the undertaker are present in Anthony's (2016) work, although rarely noted with more emphasis. With a strong focus on British mortuary culture, Mytum (2018), first of all, highlights the role of fashion, industrial mass production and eventually customer choice in the shaping of materiality at a cemetery before illustrating the undertaker's mediating role, especially with regards to the coffin and the grave marker, when it comes to making these choices. Since this thesis focuses on material culture above the ground only, some contributions in Mytum and Burgess's (2018) edited book mainly focus on below-ground examples, such as those in Garrow's (2018) study of coffin hardware in Georgia, Sprague's (2018) plea for precisioning terminology or Springate and Maclean's (2018) consideration of the Anglo-American realm.

While interesting, for historical archaeology the aforementioned endeavours might be futile in many European countries, as a limited number of excavations of modern cemeteries takes place. A focus on the materiality above ground appears to be recommended. Nonetheless, the appreciation for materiality with regards to burial and commemoration needs to be acknowledged, as literature from other countries appear to be somewhat limited in their perspective. A very good overview of literature from other countries is presented in the edited work by Denk and Ziesemer (2005). Amongst other topics, they organise the contributions into transformations of burial and commemoration culture, the role of representation, iconographic studies and the shift towards privately organised burial grounds. Exemplary for the explicit German perspective is the omnipresent Reiner Sörries (2005) with an overview dating from 1800, Blisniewski (2005) with an obligatory study of Jewish burial culture and Fischer (2005) with a study of seriation, to name but a few of the most prominent authors in this field. What the aforementioned studies have in common is very similar to literature about the Anglo-American realm. They describe the shift from communal church yard burial to landscaped garden cemeteries with a strong emphasis on representation during roughly the last 250 years, as well as the interlinked transformed role of the church, the state and the individual with regards to burial and commemoration, and even the impact of mass production and capitalism on modern burial forms and especially the aspects of materiality with regards to these socio-cultural and socio-economic shifts. Especially in Germany with its focus in historic developments since 1800 and its fascination for Jewish and middle-class burial sites, this is usually concluded with a plea for increased individuality and versatility of burial forms, including the anticipation of the impact of immigrant societies' burial culture.

These kind of considerations might vary with regards to the exact chronology, the roles of agents of change and certain cultural details; however, they also apply similarly all over the Western cultural sphere. Examples of that can be found in the research by Worpole (2003) who draws a detailed and illustrated picture of the development of Western cemetery culture and funeral

practices from a landscape perspective, including the consideration of materiality, amongst others. Interestingly, Worpole highlights the issue of graves assigned for perpetuity, – usually in Britain or North America according to him –, versus places were graves are frequently reused after a relatively brief period of time (Worpole, 2003: 8). Although the reality is more complex, this issue is addressed in more detail below, as it is relevant to this study at hand. Worpole's summarises his conclusion regarding the aforementioned issue as follows (Worpole, 2003: 9):

"…northern Europeans are happy with cremation and any kind of earth burial, but find the re-use of graves unacceptable, and resist inhumation in vaults above ground; southern Europeans are more resistant to cremation but are happy with most kinds of burial, above or below ground, and are even relaxed about the re-use of graves, even after as little as ten years; Americans are generally unhappy about cremation, prefer burial […], but find the re-use of graves and the idea of 'natural burial' unacceptable…".

It is quite obvious that Worpole makes extreme generalisations in the above quote. Nonetheless, an important issue becomes apparent here. When speaking of northern versus southern Europe, for example, where does one draw the line? Does Germany belong to northern Europe? Would the entire Germany agree to such a statement? The reality is far more complex; local traditions and beliefs, especially in Europe, albeit all communalities, can be extremely versatile and fragmented. Consequently, this dissertation, while acknowledging differences across borders too, will also refrain from generalising studies. With all empathy for such an ambitious study, the far too wide scope on cemeteries in the West is problematic. Similarly, further edited volumes attempting to cover a wide spectrum of issues related to death, burial and commemoration, such as Williams and Giles's (2016), might offer an interesting introductory read only for the uninformed reader.

This criticism is not limited to Anglo-American literature. Similar issues apply to, for example, Fischer and Herzog (2005) or Stöcker (2005) who, almost mirror-like, present the same composition of themes and topics, with the same issues that are addressed in the before-mentioned literature. The cases and places might vary, but the purported findings are the same. While these observations are certainly interesting, it is questionable how much novelty is presented to research. Hence, it might be with little surprise if even the literature considered seminal from today's perspective hardly provides any novel insights. The edited volume by the *Arbeitsgemeinschaft Friedhof und Denkmal, Zentralinstitut und Museum für Sepulkralkultur Kassel* (2003) provides chapters authored by Reiner Sörries, covering the historic development of funeral culture since the Roman Empire, again containing chapters about modern cemeteries being moved outside the city walls (cp. Barbara Happe), the garden cemeteries (Barbara Leisner), cremation (Norbert Fischer), the German reform movement (Helmut Schoenfeld), Jewish

cemeteries (Reiner Sörries) and the obligatory contemporary trends and developments, such as individualisation (chapters by Norbert Fischer, and Barbara Leisner) and Moslem cemeteries in Germany (Reiner Fischer). Not only can the list of authors be considered rather homogenous, also the topics appear repetitive. One might argue, at least for Germany, that research is stewing in its own juices. Worth mentioning, however, is the contribution of Barbara Happe (2003), shedding light on the development of funeral culture in Germany during the separation after World War Two – an issue picked up again in Toth's (2016) consideration of death and burial in communist Eastern Germany and Hungary. Happe's and Toth's contributions form part of the edited volume by Buchner and Götz (2016), comprising a number of presentations held during a topic-related workshop called *Transmortale* in Germany. Here, more recent studies are published. At first glance, these studies are more specific and concerned with niches in the overall field; however, issues, such as historic developments, studies of specific sites or progressive trends in burial dominate at present. More interesting are considerations of digital spaces of death and commemoration (chapter by Eva Mieder), death as a matter of business considerations (Antje Kahl) and death in popular culture (Johannes Wende). However, death, burial and commemoration again appear to be considered mainly via a historic, cultural and de-materialising momentum, ignoring the material reality of the recent modernity's cemeteries. Shifting the focus to future developments, Venne's (2010) dissertation on the problematic of the cemetery space's usage in times of altered demographics and customer requirements is the most extensive study in that field in Germany and combines historic insights and specifically collected data with a market-oriented, space-utilisation concept aimed at the future. It is here that the main differences in current issues regarding death, burial and commemoration might become most apparent compared to other regions of the world, as similar developments in Western societies have led to different problems. As is evident from Venne's (2010) thesis, it is, however, not the grand historic and cultural differences that set us apart, but details in local requirements and traditions that might lead to a different management of death, burial and commemoration.

Which leads the author of this thesis to another question: Are the cemeteries in Central Europe, especially in Germany and Luxembourg, so much different from the Anglo-American-focused research in historical archaeology? As is evident in the chapter addressing monument-recording standards and procedures, a significant part of studies rooted in the Anglo-American realm focus on cemeteries that are no longer active, i.e. there are no new or recent interments and, thus, can be considered static with regards to their monument assemblage, apart from grave markers that are removed for whatever reason or become too deteriorated to provide useful data. This is an important difference from Central Europe where the study at hand is situated. Especially, considering the envisioned research area for this thesis, it is noteworthy that most of the available cemeteries providing a large enough sample size suitable for research are still active and in use.

This means, for both Germany and Luxembourg, that individual grave sites can be abandoned and/or dismantled, reused via occupation by a new body or even simply renovated and kept within the same ownership, as is the case with family graves. At the same time, the cemeteries sample might depict a variety of grave monuments from different periods, although in varying quantity. Generally, modern, more recent grave monuments dominate, while the oldest samples are low in numbers by comparison. The main reason for this is that grave plots are generally leased for a certain period only and not considered permanent.

The reuse of gravesites, which brings about new occupants, owners and new grave monuments, is per se not a problem. It is common to set up a grave monument within a relatively short period of time after the burial, usually within a year or two, and it can be assumed that such a grave monument accurately represents the style that is common around the time mentioned on the actual monument. How long a grave site is maintained depends on the standards set by the cemetery regulation, which also stipulates whether additional bodies can be interred after the first one, for example, in family graves, usually extending the period of usage accordingly, or whether the grave owners make any effort after the standard use period has lapsed to extend the lease if so permitted in the cemetery regulation.

The disappearance of grave monuments after the lease period is only a challenge with regards to the available time horizon for research on a cemetery. If grave monuments are removed soon and regularly after the lease period has expired, this affects the discussion on older grave monuments and what data might become available. If, however, a lease by a specific family is for a longer or even an unlimited period of time and such a grave monument becomes renovated, for whatever reason, the data gained about the style and outlook of such a grave monument in correlation with the engraved dates have to be treated with great caution, if possible. A grave monument that is erected at another time period than the engraved dates indicate does not represent contemporary technology and style because it cannot be accurately dated by inscription alone. More archival data would be needed in order to find out more about the dates of erecting and how common such renovations are in Luxembourg and Germany. However, interview data gained within the RIP research project revealed that this kind of data is not available, as it is not archived by the cemetery management (e.g. Interview Cemetery Administration Perl, 2016; Interview Cemetery Administration Saarburg, 2016). It would need to be estimated how often such complete renovations take place. Upon inquiring at the cemetery administration of Walferdange in Luxembourg and in Saarburg in Germany, it became clear that full renovations of grave monuments appears to be very rare. Walferdange claimed that this happened exactly once since 2015, while Saarburg knows of no such case (Interview Cemetery Administration Walferdange and Cemetery Administration Saarburg, 2020).

Wormeldange's cemetery administration was able to produce a number of photographs of the local cemetery taken between 2003 and 2009; these photographs enabled a comparison with the photographs that are part of the original data collection for this thesis (Wormeldange Archival Pictures, 2018). Judging from the comparison of 184 counted grave sites in 2018, 19 showed noteworthy alterations, such as another fixed plaque or coverage with a slab stone. To be more precise, for 12 of those grave sites, the only change was that a grave, which was previously completely or partly open, was now covered. Only four graves were actually drastically remodelled since 2003. This fits the interview data gained by the cemetery administration at Walferdange very well, indicating about one remodelling at the overall cemetery during the last five years, even though the number of grave sites in Walferdange is much higher than in Wormeldange. It is not possible to judge whether such a rate is representative for Luxembourgish cemeteries – or if this also happened at German cemeteries at all within the sample of this thesis – or whether such a number has been consistent over the last decades. Assuming all other factors are stable, this would translate into 0.26 renovations per year at Luxembourgish cemeteries the size of Wormeldange, or roughly 26 renovated grave monuments over a course of a 100 years. Acknowledging, however, that grave monuments can also be abandoned even after remodelling at a point in time, the actual number of existing cases, i.e. grave monuments for which the actual erecting dates do not match their inscribed dates, would be lower. While the renovation of grave monuments appears to be a factor, at least in Luxembourg, how these renovations actually affect the data collection and data analysis is unclear.

This is in sharp contrast to general previous research in the Anglo-American realm and in many other countries, which usually can assume that grave monuments depict the accurate dates of erecting, mostly because the reuse of grave sites and/or the renovation of grave monuments appear to be a lot less common – if it happens at all. In many cases, non-active cemeteries are used or the time frame from which grave monuments are sampled is voluntarily limited (e.g. Bashford and Sibun, 2007; Gorman and DiBlasi, 1981; Mytum, 2004; Rugg et al., 2014; Tarlow, 1999). In other cases, even at active cemeteries, issues, such as renovation and/or reuse, are not mentioned, presumably because this is uncommon (e.g. Teather, 1999; Tzortzopoulou-Gregory, 2010). In the light of US examples, such as Mallios and Caterino (2007 or 2011), Baugher and Veit's (2014: 12) statement regarding 19th century burial customs makes sense: “In Europe individuals could purchase burial plots for a specific period of time, but in America the burial plot was regarded like any other type of American individually owned land – it had no time restriction”. While this might still be the case in many places in North America, the practice of unlimited leases or leases in perpetuity appears to have been largely abandoned in England and Wales as the work by Rugg and Parsons (2018) shows and as the issue of reuse is problematised in Rugg and Holland (2017).

In Luxembourg, the situation appears to be very similar to what is described in the research by Rugg and Parsons (2018). According to Streb (2019), it appears as if, based on 19th and 20th century cemetery regulations, leases in perpetuity were common in Luxembourg during the 19th and most of the 20th century, while significantly less so in Germany around the same time. For example, while the 1924 cemetery regulation of Remich in Luxembourg mentions the availability of self-styled concessions in perpetuity (ANLux Int-003, 1924), the 1918 cemetery regulation of Ayl in Germany (Kreisarchiv Trier-Saarburg L124,1, 1918) mentions a maximum lease time of 50 years, which can be extended after the first period has lapsed but only if permitted by the local authorities. The difference might appear subtle, but it might have a significant impact: While in one country a permanent lease, – a quasi-ownership, – is permitted and people deal with the grave plot accordingly, in the other country it is stated clearly that the lease is always for a limited lease period. Consequently, in Luxembourg one might presumably find much older graves and monuments, including samples that have been renovated at a specific time for whatever reason, while in Germany this might be less common, – if one can find such graves at all, – as grave sites tend to be abandoned and reused, which is something the owners take into consideration, thus making renovation also much less likely. Consequently, it needs to be considered that, in Luxembourg, certain grave monuments might survive longer and the extended use of the same grave site, – for example, as a family grave, – makes renovation more likely, while in Germany this is not the case because the available time horizon at a cemetery might be much more limited. This is somewhat in contrast and counterintuitive to what researchers from North America might expect. The possible consequences for data collection and analysis need to be determined. Generally, available time horizons might be limited and dating of certain grave monuments might be inaccurate based on engraved dates of death alone.

In closing, issues with dating of grave monuments are common even when renovations are uncommon. As Mytum (2002: 198) puts it:

"The dating of memorials is not always as straightforward as it first seems, and where possible the phases of inscription on a stone should be investigated and the primary inscription used to provide a date […]. The primary inscription may itself be years and even decades apart from any year of death noted on the stone, and examples have been identified in other studies which post-date and pre-date the death date concerned. The simplest, though, not the most accurate method of memorial dating uses the death year of the first person listed on the memorial. This provides an approximate date, though if a list of commemorations in calendrical order were all placed on the stone at once this may give too early a date. Less commonly, memorials were chosen and erected prior to the death of the individual commemorated on the memorial, and mark the plot ready for use. The first-person method has been used to date the monuments in this study, and these have been accumulated into decades for the purposes of the tables and graphs. Whilst there

will undoubtedly be a few misdated memorials through this method, they should not affect the overall patterns revealed with such a large sample".

Last but not least, the challenge of dealing with active cemeteries actually extends beyond the problem of dating. In his study of a modern, active cemetery, Anthony (2016: 342) provides an exemplary case overview by focusing on the relationship between materiality and people at a cemetery:

"What this research has done is to stress how cemeteries actually work, not just through the daily work of the staff and use or visiting of graves but how all the things within the cemetery fit together and affect each other. There is an active discourse which changes as the cemetery develops. They are places of active practices, where everyday acts are learnt and transmitted unconsciously which reproduce but also alter ideas of how to behave. This works with the concepts of habitus and doxa, of practices involved in the handling of dead bodies and material culture such as gravestones that have an evolving role in dealing with emotions and grief. All of this occurs within socially structured frameworks and individual agency".

How a cemetery and the material culture contained in it affect its viewers and how materiality and people interact in the context of death and commemoration, are issues already picked up by Tarlow (2000) during her review of the origins and developments of the 19th century garden cemeteries. Consequently, related issues will again be addressed below.

1.5 Research Lacuna and Research Questions

The epistemological question of what knowledge can be gained by referring to gravestones as data is apparently still controversial and contested. Michael Parker Pearson (1982: 99), to refer to this prominent author in the field again, approached this issue from an ideological perspective, referring to the potential of manipulation and construction of social strategies. He continued to refer to agency by proponents of hygiene, science and medicine as a key issue when considering materiality of death, burial and commemoration. While referring to related issues throughout his relevant book chapter and while explicitly referring to the potential of reconstructing social organisation based on such materiality, he failed to provide more proof of his argumentation. On what authority does he ground his arguments and how do such artefacts come about, considering such complex agency? Multiple agency based on a capitalist-influenced economic and political system (Parker Pearson, 1982: 101) would need to be further discussed; the levels and extent of the replacement of "… traditional agencies of social control, notably religion, by the new agencies of rationalism, science and medicine …" need to be detailed, not simply vaguely hypothesised (Parker Pearson, 1982: 110). Nonetheless, Parker Pearson (1982: 112) concludes the chapter by proposing an ethnoarchaeological agenda, making a strong plea for researching agency in the

materiality of burial and commemoration, especially in the context of social transformations. Despite decades that have passed and other authors, such as McGuire (2003), who continued the research into related issues of ideology, hardly any research into actual agency has been conducted. As deduced by earlier literature, it is unclear how the entangled materiality and spatiality, in context with human agency and consumption, create the artefacts one can observe at a specific cemetery location. However, in order to understand what graves and grave markers can actually tell historical archaeologists about the past, one needs to understand how they came about. Only then can one deduce more accurate findings.

Susan Buckham's PhD thesis, dated 2000, appears to address at least certain aspects of related issues of agency when researching commemoration and consumer choice in York cemetery, especially when it comes to 19th century stones. She explicitly refers to social status, identity and personal sentiment; not unlike Tarlow's (1999, 2012) research, she integrates Cannon et al. (1989) when it comes to fashion and social emulation. She also applies a consumer choice model for her analysis. Although a very decent historical analysis that applies archival records, typologies and even GIS data, her study appears to fall short of its own potential when treating consumer choice theory rather superficially and almost without its business aspects. Most importantly, she limits herself by only considering data from the past in order to illuminate the question "… whether stylistic similarity and variation had the potential to communicate social meanings" (Buckham, 2000: 357). She considers the consumer-producer relationship within a set of social constraints, but it is not clear to which extent this enables unravelling complex and hidden agency, especially concerning individual choice. The reader finds multiple approaches and explanations for the observed phenomena; however, the actual process of gravestone genesis as an artefact, as well as the graveyard as an overall assemblage of gravestones, remains somewhat in the dark. This is because she does not question the archival records that were available to her; furthermore, she treats alternative theories and access to data superficially instead of critically challenging her own findings by questioning why agents acted the way they did. Buckham asks the right questions but does not provide satisfactory answers.

This impression is effectively emphasized by Rugg (2013) who is familiar with Buckham's (2000, 2007) research. She makes a strong plea for not treating the modern cemetery landscape as simply a proxy of past societal configurations. As proof, she discusses the York diocese's decisions during the 1950s and the consequent impact of grave marker choice. As a result of such tensions between individual preference and choice, on the one hand, and municipal ideals and power to enforce such, on the other hand, the cemetery is an artificially constructed compromise of different interest, not social reality. After discussing earlier literature and the promoted understanding of the validity of a graveyard as a historic record, she emphasizes a more complex understanding of the resulting assemblage by referring to the agency and area of potential

conflict between individuals and families as well as stonemasons and Diocesan authorities that do not always share the same interests and ideals; however, within this conflict, artefacts and their assemblage are inevitably shaped, thereby resulting in a much more complex story that they can provide about the past (Rugg, 2013: 224f.). At the same time, she highlights the potential to individually express, within the limitations, such extended agency provided to families (Rugg, 2013: 230). This can be interpreted as a plea to critically question actual agency in that regard in order to shed light on what the historical-archaeological record is effectively able to tell us about past social configurations and transformations.

The literature discussed above draws heavily on the body of literature available within the broader scope of historical archaeology. This is intentional because for this study it is the epistemological framework. For archaeologists in general, the basic challenge is to bridge the gulf between the past and the present; that is, to try and approach an understanding of what the past was like, based on the material evidence that is available today, be it sherds, bones or any other kind of artefact (Johnson, 2010: 13f.). Needless to say, it is impossible to really know what the past was like. However, by applying the right methodology, it might be possible to go beyond simply collecting artefacts and at least improve our knowledge of which process led to their creation (Johnson, 2010: 13f.), thus providing indications of what the archaeological data could actually tell us about past societies. One needs to avoid the trap of believing that material culture itself will immediately and intuitively tell us about past societal configurations and transformations, regardless how complex the hypotheses are that have been presupposed.

Of course, the above summarised, seminal literature should not be accused of such mistakes. However, despite all the discussions about whether material culture of death, burial and commemoration is actually a mirror of past societies or rather an idealisation, the surprising part is what it might tell us about identities and/or ideologies. To date, only a few studies made an effort to be more critical with regards to the question about how this particular material evidence of past societies has developed; that is, which social environmental factors, processes, agents, etc., have been responsible for shaping the assemblage of gravestones samples we find today. As the above discussed literature has shown, all studies assume one way or another to a higher or a lesser degree that gravestones provide important knowledge about past societal configurations, ideologies and even emotional states of individuals or society as a whole. Until today, the basic assumption of studies such as that of Deetz (1977) holds that the rise, peak and decline of certain gravestone characteristics – be it material choice, design and/or symbology – over a certain timespan, provides us with knowledge about social transformations, correlated to past social configurations. Recent articles still apply the basic methodology of seriation via one or another form of battleship diagrams (cf. Mallios and Caterino, 2011). It is surprising that over the last four decades hardly any methodological progress pertaining to this particular issue appears to have

been made, despite notable exemptions, such as Hodder (1995), Tarlow (1999), Buckham (2000), Rugg (2013) and Mytum (2018). These authors highlight the relevance of agency in the configuration of gravestone artefacts – sometimes more, sometimes less explicitly. The present study seeks to add to these exemplary investigations into past social reality with new research on the assemblage of artefacts one finds at cemeteries today. The general intention is to contribute to our understanding about how, using a given sample, an archaeological context and material assemblage is being generated and which factors might contribute to that. Certain studies hypothesise about specific issues of broader agency that, at first glance, are unrelated to gravestones but which have had a huge impact on the choice and design of gravestone material. These include, for example, technological advancements in stone cutting during the industrialisation, especially for granite, that made its use as a gravestone simply cheaper than before (cp. Mallios and Caterino, 2011: 446). The proponents of this new technology, thus, became agents of change in the material choice and design possibilities of gravestones, having a significant impact on what today is believed the typical late 19th century, central Europe grave marker – the black, polished granite monument, for example, the obelisk with its sharp edges, cold and somewhat standardised with an industrialised look and impression. However, what does such standardisation tell us about a past individual if we do not ask more questions about the process and further agency that might have led to choosing this particular stone?

Another example is the extensive research conducted by Fischer (1996: 75ff.) and Schoenfeld (2009: 163ff.) about the late 19th, early 20th century *Friedhofsreform* in Germany in which a group of influential individuals lobbied hard for their idea of a beautiful gravestone versus the black, polished granite stones. They simultaneously propagated their ideas about craftsmanship, the individual's role in society and society as a whole. If such agency has indeed influenced today's sample of gravestones available from this period, any oversimplified judgement of what such an archaeological assemblage really means is incomplete without fully understanding such agency, as well as the individual's margin of freedom and choice. Nonetheless, such studies fail to provide conclusive answers, especially regarding the question of what this means for our possible understanding of past societies, processes and dynamics.

As outlined before, while this study cannot methodologically solve the conundrum of actually observing past and foregone processes of artefact genesis in order to shed light on the immediate explanatory power of such artefacts, this thesis responds to the above described research gap by attempting to find an answer to the questions of whether the above discussed methods might be applied in this specific research context, whether there is a spatial neighbouring effect that might permit a number of deductions about how materiality and spatiality comes to be and which factors besides the above discussed ones might be responsible for the observed assemblage of materiality in their spatial context.

Yet again, no historian and no archaeologist can observe the actual past processes themselves anymore. They are lost in time, as one only knows the end-product; the processes themselves rarely left traces that can be assigned to specific monuments, especially when considering common people's memorials. The fluctuation and volatility of materiality in the specific research context of Luxembourg and Germany, together with the right methodology, could at least permit the deduction of proper hypotheses that might illuminate the creation of the numerous 19th and 20th century graves and grave markers still present at today's cemeteries and by their sheer numbers defining the overall assemblage. Such an understanding is key to any study considering gravestones as artefacts.

In order to do so and based on the discussed literature above, this thesis aims to address the following questions for a specific, predefined region between Luxembourg and Germany, and for selected cemeteries:

- Is the research approach demonstrated from Anglo-America literature also applicable for the sample in the border region between Luxembourg and Germany?
- Does the analysis of materiality within its spatial context provide indications of a neighbouring effect, i.e. do material characteristics appear in spatial clusters?
- With regards to the materiality that can be observed at the selected cemeteries: What might explain the specific appearance of especially graves and grave markers, i.e. what factors, such as cemetery regulations or stonemasons, might have had an influence?

The above stated research questions are purposefully broad and not limited. They underline the explorative nature of this research. In order to provide more context, though, – also for providing necessary information for the uninformed reader and a basis for subsequent analysis, – the following chapter provides more details and background about the specific socio-cultural, economic and regulatory context, as well as the funeral culture in specific, in the region under scrutiny.

2. Funerary Practices and Grave Memorial Culture in Luxembourg and Germany

This chapter provides important background information not only on the funeral culture in Luxembourg and Germany in general but also on the four selected research locations, especially their socio-cultural and economic development during the last 200 years, – as far as this information was available. This is done with the purpose of setting the scene with regards to the social context and important social transformations these regions have experienced especially since 1800. The author moves from a more general overview of funeral culture in the two countries today to a more historic overview with a specific regional focus and concludes with available information about the stonemason industry and the potential role of cemetery regulations. Again, the aim is to provide context. However, it has to be noted that information on such a regional level is extremely limited, cursory and not always available. Especially with regards to the functioning of the stonemason industry in the past or the actual social transformations in each cemetery location, there appears to be a significant research gap, which is also explainable by the lack of available sources.

2.1 General Overview

2.1.1 Funerary Culture Milestones and Frameworks

As in most European countries, the burial culture history in Luxembourg and Germany harks back to the very first moment humans inhabited this region. Even the briefest historic overview of this region's burial culture milestones would have to start with the pre-historic evidence of these practices. Since such sites are one of the most important sources of information about pre-historic cultures of the region, the literature on the pre-historic cultures is extensive (e.g. Haffner, 1989). However, in order to understand the modern funerary culture in Luxembourg and Germany as well as the milestones that led to it, it will suffice to focus on key developments during the 19th and 20th centuries.

During the 19th century, Napoleonic legislation on burials and cemeteries, passed on 12 June 1804 and known as the *Décret du 23 prairial XII sur les sepultures* (Zeiler, 2016), became an important and lasting influence on Luxembourg's and Germany's funerary culture. In addition to this legislation, the second influence within this region was a cultural one. While Luxembourg has a history that is strongly influenced by its relatively larger neighbours (Pauly, 2011), and from whom a culturally mixed influence is thus derived, – for Germany especially the *Wilhelmenian* values and ideals were important. The rising *Bildungsbürgertum* (educated middle-class) and economic elites of the second half of the 19th century in both countries needed to display their social status, wealth and superior taste through their aesthetic appreciation of neo-classicism and the neo-

gothic (Margue, 2006; Streb, 2017). The *fine de siècle* atmosphere before 1900 saw the rise of a multifaceted *Reformbewegungen* (reform movements) In Germany, which had a significant influence on the funerary culture as a key aspect of social education and improvement. This influence is tangible to this very day (Sörries, 2009b). For Luxembourg, such reform movements appear to have had less relevance.

While Luxembourg appears to have remained under and influence more dominated by the French when it comes to funeral culture during the 19th and 20 the century, for Germany the reform movement was critical (Streb, forthcoming). Certain milestones, individuals and organisations were very important in this context (Fischer, 1996): In 1905, the *Wiesbadener Ausstellung zur Hebung der Friedhof- und Grabmalkunst* (the Wiesbaden exhibition for the promotion of cemetery and grave art) opened its doors and soon became a travelling exhibition in Germany. The organisers aggressively rejected what they considered abominations of the 19th century funerary culture and propagated a return to local materials, craftsmanship and general humbleness in all matters related to death, burial and commemoration. Many relevant publications picked up on the exhibition and celebrated its ideals. The opening of the *Münchner Waldfriedhof* (the Munich woodland cemetery) in 1907 was a related key event, embodying these ideals for the first time. The director of the Munich urban building department, Hans Grässel, was responsible for a cemetery directive that enforced a relatively homogenous cemetery and grave marker layout. Grässel was also a member of the art pedagogic society, *Dürer-Bund*, and collaborated with the *Deutscher Werkbund* (German Work Federation), which was founded in 1907. Other propagators of related ideals and ideology, a few of whom are known names even today, are Fritz Schumacher, Ferdinand Avenarius, Paul Schultze-Naumburg and Leberecht Migge.

The First World War brought about a caesura in the early *Friedhofsreform* (cemetery reform). The carnage of the modern battlefields and the cemeteries with thousands of uniform military graves induced an extensive shift towards the ideals of extreme homogeneity, bureaucracy and social control — even after death. In 1921, this shift was institutionalised with the introduction of the *Reichsausschuss für Friedhof und Denkmal* (Reich committee for cemeteries and memorials), which Waldo Wenzel led by publishing strict guidelines for funerary practices in 1922. Stephan Hirzel's *Grab und Friedhof der Gegenwart* (Current graves and cemeteries), published in 1927, was responsible for spreading these practices widely. The ideals of social homogeneity, control and individualism in *Volk und Heimat* (the people and country) complemented the National Socialists' thoughts in this regard. In 1937, the National Socialists published standardised guidelines for the funerary culture throughout the country, incorporating many of the *Friedhofsreform* ideals. After the Second World War, these guidelines were continued in West and East Germany until the early 1960s, shaping Germany's funerary culture to the present. Again, for Luxembourg this impact is not visible, neither in its relevant legislation nor in the

material culture at cemeteries (Streb, 2019). During the 1980s and 1990s, globalised trade routes as well as new CAD-based technology had a significant impact on the material culture of Luxembourgish and German cemeteries, as had the subtle individualisation, mobilisation and resulting fragmentation of society, which gave momentum to the currently observable dissatisfaction with funerary traditions and demands regarding individualised offers.

Although Luxembourg and Germany are both states that are considered to be secular (Worldatlas, 2019; Schieder, 2015), the church in Luxembourg and Germany is still linked in many respects to the government, for example, via a church tax in Germany or via the Napoleonic Concordat of 1801 in Luxembourg. The church tries to exercise influence in many domains of everyday life. However, the church currently has much less influence in terms of the funerary culture as one might expect. This does not mean that the church is no longer involved in funeral rituals or that such past influence is not still expressed in traditional behaviour, etc. However, when it comes to the overall funerary culture, its materialisation and observable current trends, one needs to consider multiple influences of which the church is only one influence and no longer the decisive one. Societal changes as described beforehand are important but institutions, such as law or local cemetery administration, set the overall framework. While in Luxembourg the laws regulating the cemetery are usually guided and maintained by the relevant municipality, in Germany matters are more complex due to the country's larger federalist structure. Unless it is a dedicated ecclesial cemetery, each state in Germany has its own general cemetery and/or funeral laws that must be observed by the authorities when deciding on, for example, any rules and regulations regarding the cemetery. This rather heterogeneous legal situation needs to be taken into account, although all the basic laws are very similar (Deinert, Jegust, Lichtner and Bisping, 2014). For example, by law all states, except Bremen, require burial in a cemetery; this includes urns. Simply due to size, similar regulations, for example, the cremation laws of 1972, are much more centralised in Luxembourg.

In 2015, approximately 925,000 people died in Germany (Statistisches Bundesamt, 2016), of whom 45.5% were given conventional burials, 54.5% were cremated, 2.5% were buried at sea, while the burial of 5% was not specifically mentioned (*Bundesverband Deutscher Bestatter e.V.*, 2017). According to the website countrymeters.de (2019), 4,415 people died in Luxembourg in 2018. Remarkable here is the large number of cremated remains that are buried. In 2016, already more than 63% of all burials in Luxembourg were the interment of cremated remains (Kolnberger, 2017b).

Muslims form the largest religious minority group in Germany (Bund.de, 2019), as they do in Luxembourg (countrymeter.de, 2019). Similar to the Jews, they have very specific burial requirements, such as graves that must not be disturbed. In Germany, such arrangements can be

made if the relevant cemetery regulations allow this. As these demands slowly become more frequent, for example, as a result of the fast-growing Muslim communities, cemetery administrations make an effort to respond to these demands without any difficulty. Nonetheless, such graves are still scarce because many Muslims prefer to be buried in their home county.

Unclaimed bodies usually become the responsibility of the municipality in which these people died. They are usually dealt with in the most economical way possible, which usually means cremating the bodies and scattering the ashes. Funeral directing is generally in the hands of funeral directors of usually private family-owned businesses with a long history and a strong local orientation.

In 2004, the German government abolished the *Sterbegeld* (death benefits), which had provided the bereaved with up to €525 in health insurance money for a proper burial (e.g. Rohde, 2017). A similar government subsidy in the amount of €1,058.72 still existed in Luxembourg in 2018 (Guichet.lu, 2019). Information on the actual average cost of a funeral varies significantly in both countries. A number of people claim that it amounts to approximately €3,000, while others claim that it can amount to €8,000. The popular webpage, *Besattungen.de*, mentions prices ranging from €3,340 to €8,950 (Wenzel, 2017). Very similar numbers apply to Luxembourg (Pizzaferri, 2018) However, if internet funeral providers are used and all unwanted cost drivers are omitted, the costs can be lower. It is also possible to pay for a funeral in advance by means of instalments or a one-time payment.

As in many Western European countries, cremation has become increasingly popular in Luxembourg and Germany over the last ten years (Kolnberger, 2017b). This is associated with a general attempt to reduce funeral costs and to minimise issues, such as tending a grave. Hence, simple, closed graves, much smaller urn graves or even anonymous funerals are increasing in popularity. Most recently, *Friedwälder*, where an urn is placed underneath a tree in a forest, have become popular, and even commemoration on dedicated virtual cemeteries have increased in popularity.

2.1.2 The Funeral

That which is regarded as standard practices in a country needs to be considered extremely carefully, since even the smallest nation might have significant regional differences in their cultural expressions and execution. In Luxembourg and Germany, responsibilities in the case of a death are automatically transferred to the closest relative, if available. If this is not possible, the government takes charge as economically as possible. Currently, most natural deaths occur in hospitals or retirement homes. The residing authorities will then contact the local funeral director. The same happens if somebody dies at home. The first contact is usually with the funeral

director in the vicinity. Depending on whether the deceased made any specific preparations or arrangement, the funeral director will offer to take charge, which includes organising the funeral, handling bureaucratic issues and even dealing with a stonemason. Key issues are the form of the burial (in the ground, cremation, etc.), the amount of money available, issuing a death certificate, scheduling the funeral and, if required, organising a gravestone.

The funeral director will want to fetch the body as soon as possible, often within a few hours, and organise the funeral within three days. The details of the actual burial depend strongly on the deceased's or the family's religious denomination, if any, and will have significant regional characteristics. Generally, the body is transferred to the morgue or directly to the crematorium where a certified physician will perform a last examination and issue a death certificate. Thereafter, the funeral director and/or crematorium personnel prepare the body for a final viewing by the bereaved and for a funeral ceremony if required. After the coffin has been closed, the body is buried in a cemetery or it is cremated and the ashes handed over to the funeral director. In Germany, burial in a cemetery is obligatory; hence, even the bereaved may not handle the ashes. Cemeteries usually refer to a traditional graveyard or churchyard but recently even rededicated church buildings and forests dedicated to urns have been used.

The relatives' role varies. Generally, if a funeral director takes charge, only the closest relatives need to sign the required documents. Theoretically, no relatives are required to be involved. On the other hand, the bereaved usually have very little knowledge of how much freedom they actually have when it comes to organising the funeral. They are, of course, expected to attend the funeral, to carry the coffin (in a few regions) and to throw earth on the coffin once it has been lowered into the grave. The church is only involved if the deceased was a church member and has not explicitly rejected a Christian burial.

2.1.3 Ownership and Legal Framework

For Germany, as is the case with the general laws and regulations regarding death and burial in general, the provision and management of burial grounds and crematoriums are also subject to the regulations of the state in which they are located (Deinert et al., 2014); hence, these regulations differ when it comes to the detail. As mentioned before, this is more centralised in Luxembourg. Most importantly, besides church cemeteries in Germany, the municipality is fully responsible for the management of a burial ground; more specifically, it is usually the government building authorities, which the government officials represent, who have to deal with related issues. *Friedwälder* and/or crematoriums, which are always private enterprises, differ in this respect. While there is no cemetery or cremation management profession as such, commercial issues only apply in the case of certain crematoriums and private cemeteries.

Cemeteries are conventionally perceived as part of the overall urban planning and municipal building authorities manage them. Furthermore, cemeteries have to break even every year; hence, their utilisation, costs and prices are of strategic importance. The contrary applies to many privately-run crematoriums for which the regional demand is a strategic variable as is their cross-regional competition.

Since the 19th century, a geologist and a medical practitioner have to thoroughly inspect any location considered as a burial ground for potential health hazards. Most of the concerns refer to the potential pollution of the groundwater. Owing to their potential air-pollution hazard, all crematoriums must meet extremely high standards, which are similar to those that regulate the emissions of garbage incineration plants and that are in keeping with the *27th Bundes-Immissionsschutzverordnung* (Federal Immission Control Ordinance) *(Bundesministerium der Justiz und für Verbraucherschutz*, 2013) in Germany and the relevant cremation laws in Luxembourg from 1972.

2.1.4 The Burial

The state, – more precisely, the municipality, – the church in Germany or private companies as with *Friedwälder*, usually owns burial sites. Nonetheless, consecration of the burial space is common. The conventional burial ground is still the most common space for burying a body or ashes, but the sizes of cemeteries vary significantly. They range from old, often decommissioned and partly dismantled churchyards with hardly any visible graves left to Germany's biggest cemetery in *Hamburg Ohlsdorf*, which is also a well-known example of a garden or park cemetery design (Fischer, 1996: 49) spanning an area of 389 hectares and encompassing 235,000 graves. While the oldest cemeteries in Germany, such as *St. Matthias* in Trier, have literally been in use since Roman times, rural churchyards and graveyards might have been in use for 1,000 years or more, while *Hamburg Ohlsdorf* was opened in 1877. Many urban cemeteries date back to the last quarter of the 19th century when the population increased significantly as can often be seen in Luxembourg. Such examples are usually designed as a churchyard or garden cemetery, comprising at least a church or a chapel and a morgue, although the design elements can overlap. The larger the cemetery, the more refined the infrastructure, which might include administration buildings, war memorials, dedicated areas for Jews, Muslims, etc. However, the average Luxembourgish or German cemetery only contains a few hundred graves at best, often only has a small morgue, water taps, compost heaps for grave tending and an often centrally located memorial for the victims of both the World Wars. Trees, bushes and paths are laid out and are common. The municipalities have to ensure that their cemeteries, which are part of the building authorities' yearly budget, break even financially. Any additional costs generated beyond the

calculated budget during a year have to be added to the grave owners' fees. Unless the cemetery is of historic relevance, no further subsidies are provided.

At present, the most common burial sites in Luxembourg and Germany are the garden cemeteries, which were designed in and used since the late 19th century. The grave is below ground, in the earth. In Luxembourg such graves are sometimes built as a vault. This also applies to cremated remains, which often have dedicated burial areas and might include columbaries. Common alternatives are a rural churchyard, if still in use, *Friedwälder*, burials at sea, as well as all other dedicated spaces reserved for urns only, such as rededicated church buildings and mausoleums. Since Germany's legislation requires mortal remains to be placed in a cemetery in one form or another, it is either the funeral directors' or the municipalities' responsibility to prepare the grave. Green burials are known and advertised but, beyond concerns about eco-friendly urns, especially in the case of *Friedwälder*, this market appears to be negligible.

As in any other Western industrialised country, individualisation is a key issue in Luxembourg and Germany and this includes funerals. A standard burial ceremony is, therefore, difficult to define. Generally, on the day of the funeral, a coffin or urn is placed in a cemetery's morgue at a fixed time. The bereaved arrive at the dedicated time to pay their respects, often with flowers and garlands. If the bereaved are church members and no contrary wishes have been conveyed, there will be a brief tribute, which secular speakers currently often convey. The bereaved and the master of ceremony – either secular or ecclesial – then walk behind the coffin or urn to the grave to witness the final blessings, if any, and the actual burial. Today, there is a variety of individualisation in respect of this schematic procedure.

2.1.5 Grave Tenure and Use

Graves in Germany are usually for inhumation directly into the earth with no bricked or concrete vaults. In Luxembourg, such vaults are much more common. Individual cemetery regulations specify the grave depth and the number of possible interments, ranging from single burials to multiple ones, which are theoretically unlimited in the case of, for example, a family grave that has been used for a long time. Although one body has a minimum and maximum interment period, each interment in a grave plot that provided for multiple burials extends the overall interment period in that grave. Consequently, certain older family graves can hold a dozen inhumations at the same time, especially if urns are also permitted (Wilhelm, 2008).

Side-by-side burials and burials on top of each other are both possible, depending on the grave type and the relevant cemetery's regulations. A family grave for two people, that is coffins placed next to each other, is, however, most common. Such graves are usually bought by means of a once-off payment in advance for a period of 20-30 years and for a specified number of interments.

In Luxembourg, it is still possible to buy a grave plot for a much longer period. As indicated above and depending on regulations, a new interment resets the time of usage to ensure that each interment receives its agreed minimum period of rest. Only when a grave has had no new interments and the maximum usage period has run out without being renewed, is the grave prepared for a new burial. The existing remains are exhumed and usually re-buried under the grave's actual ground level but without a marker or a ritual.

The costs of inhumations, excluding any other burial arrangements as mentioned above, are specified in the cemetery regulations and vary greatly between the regions of these two countries. It is estimated that a grave for a period of 20 years costs between €1,500 and €4,000 in Germany (Wenzel, 2017). However, the costs are similar in Luxembourg.

It is the responsibility of the grave owner, which is usually the family, to tend and maintain the grave; this task can, however, also be outsourced to professional gardeners. The grave usually has a clearly marked circumference and a headstone, although this is not necessarily the case with graves covered completely by a – usually granite – ledge, which sometimes makes an additional headstone unnecessary. In Germany, a grave with a headstone, decorated with plants and, potentially, with a sanctuary lamp – usually for Catholics – as well as paraphernalia, such as crosses or figurines, is still most common. This also applies to urn graves, even though they are usually only a quarter of a normal family grave's size. Graves in Luxembourg often show less planted vegetation but complete coverage with granite or other stone material.

2.1.6 Cremation

In 1878, Julius Bertuch and Carl Heinrich Stier built the first crematorium in Germany in the main Gotha cemetery. Stier's was also the first body to be cremated there on 10 December 1878 (Deutsche Stiftung Denkmalschutz, 2020). Data from the consumer initiative, *Aeternitas e.V.* (Table 1), show that since the 1960s, cremation, – which was also allowed for Catholics after the Second Vatican Council in 1965, – has constantly increased and is currently the most common choice. The numbers in the former East Germany are even higher, while many Catholic-dominated regions still show a contrary distribution (Aeternitas e.V., 2017).

Table 1. Data regarding the relative share of cremations in Germany.

(Adapted from (Aeternitas e.V., 2017))

Year	Cremation	Burial
1960*	10 %	90 %
1970*	14 %	86 %
1980*	18 %	82 %
1992	28 %	72 %

Year	Cremation	Burial
1999	40 %	60 %
2011	55 %	45 %
2014	60 %	40 %

* only Western Germany

According to the same source, there are around 160 crematoriums in Germany, half of which are managed by private owners. As mentioned before, cremation is even more common in Luxembourg. Nonetheless, the first Luxembourgish crematory was not opened until 1995, as it was possible to use the neighbouring countries' crematories. Kolnberger (2017b) provides a more detailed overview about the history of cremation in Luxembourg.

While there is a difference between state-owned crematoriums and private ones when it comes to customer orientation and distinguishing between old and modern ones, all crematoriums usually have a front stage and a back stage area. This area – usually a space for viewing the coffin or for a brief ceremony if requested – is where the bereaved are hosted and where the high-tech incineration plant is situated. While the public area might remind the visitors of a chapel or provides a modern and soothing atmosphere, the back stage area is solely focused on the technical issues of preparing the body, incinerating it and facilitating the ashes.

At a standard ceremony, the bereaved arrive at the crematorium at a fixed time and have the opportunity to say their farewells or participate in a ceremony, exactly like the procedures in a morgue at a cemetery. The bereaved can then follow the coffin all the way to the oven and even witness the incineration, if so wished. However, this option is rarely taken, since most visitors leave before the incineration. The costs of the actual cremation ranges from €200 to €500 (Bestattungsplanung.de, 2017b). Additional costs arise in Germany because of the legal requirement that a coffin must be used, even for cremation, which then requires a simple urn.

2.1.7 Monumentation and Commemoration

As soon as the body has been cremated, the ashes are automatically collected and manually cleaned of any objects, such as jewellery, medical implants, metal parts of the coffin, etc.; a rough sieve and a magnet are used for this part of the process. Finally, the ash is grinded into a fine dust and put into a standardised, basic urn. In Germany, these remains are not allowed to be handed over to the bereaved; the funeral director or municipal representative handles them until interment in a grave, which is also obligatory. The ashes may be placed in dedicated columbaries, in urn graves, scattered or placed in normal earth graves depending on the cemetery regulations. Dedicated urn graves are usually smaller than earth graves, – roughly one quarter of the size, – while an earth grave in Germany usually ranges from 1x2 m for single interment to 2x2 meters

for family graves. Older family graves, as they are more common in Luxembourg, can have much larger dimensions. Restrictions are always subject to the cemetery regulations. While cemetery burials in Germany are often open on the surface or planted with vegetation and flowers, whereas in Luxembourg the covering with a ledge is preferred today, headstones come in many different shapes but are usually made of black, grey or reddish granite and are normally not allowed to be more than 1.20 meters in height. Older examples in Luxembourg and Germany obviously can vary tremendously in terms of size and material from today's norm.

Small and medium-sized enterprises, very often family-owned with a strong regional focus and usually located close to a cemetery, still dominate the stonemason industry in Germany. In Luxembourg, on the contrary, there is a much greater concentration of companies that offer their services cross-regionally; however, they do not usually cross national borders. Although there are handcrafted headstones and buyers for them, the stonemasons are usually intermediaries who sell industrial, mass-produced monuments. The costs of such headstones range from a few hundred Euros for a simple, small slab to €10,000 and more for an individualised grave monument. A typical headstone would not cost more than between €1,000 to €2,000; an urn grave is usually the cheapest due to its small size and the established standards (Bestattungsplanung.de, 2017a).

In certain cases, often due to a death in a traffic accident, bereaved families put up wooden crosses or similar monuments at the roadside, thereby commemorating the place of death. Dedicated shrines in homes are rare. If the deceased is commemorated in a domestic space, this is usually in the form of photos being displayed, often with candles.

When a grave is abandoned and/or reused, the former grave owners can reclaim the gravestone. In other cases, it becomes the property of the municipality, which will usually order a stonemason to dismantle it. In turn, the stonemason will eventually fragment the monument if it is not potentially valuable enough to be refurbished.

Visits to graves are still common, although far less regular due to modern society's mobility. During a normal grave visit, the bereaved place flowers or little souvenirs on the grave and spend a bit of time there in silence. This is often an opportunity for basic grave tending. Conversations with other grave owners are commonplace.

2.1.8 Tradition and Funerary Heritage

In Luxembourg and Germany, like in many other European countries, dedicated days for commemorating the dead are *Allerheiligen* (All Saints Day, Nov. 1), *Volkstrauertag* (Memorial Day for victims of armed conflicts, two Sundays before the first day of Advent) in Germany and *Totensonntag* (All Souls Day). In Germany, these are regularly observed holidays and subject to

specific laws, such as a ban on public celebrations and dancing to ensure a dignified atmosphere and respect for those in mourning. All Saints Day might be of the greatest importance in Luxembourg. On that day, the bereaved congregate at the cemetery to receive a priest's blessing for the deceased. This is usually preceded by extensively tending and maintaining the grave. *Volkstrauertag* was introduced in Germany after the First Word War to commemorate the fallen soldiers. After World War Two, this tradition was extended to all victims of war and terror.

In addition to these national and ecclesial holidays, it is tradition, especially in the Catholic Church, to conduct a *Sechswochenamt*, a *Seelenamt* and a *Jahresamt*. The *Sechswochenamt,* conducted six weeks after the inhumation of the deceased, concludes the first stage of mourning by means of a mass. The bereaved often want to have the gravestone erected by that time because then the mourners again congregate at the grave. One year after the death, another mass is conducted to conclude the traditional year of mourning or the *Jahresamt*. The *Seelenamt* is very similar but is held annually if the bereaved request this and offer a financial donation to commemorate the deceased. As in many other western industrialised countries, following such church traditions are in a decline and depend strongly on the social environment of the deceased and the bereaved.

In Germany, all architecture that are deemed worthwhile to maintain and conserve falls under the *Denkmalschutzgesetz* (Monument Protection Act) (Stegmann, 2005). Owing to the country's federal structure, all details of this law are subject to state regulation. Criteria are defined that automatically protect any object that fulfils the criteria. Then again, the authorities can simply decide to protect an object if its status is unclear. This law also applies to cemeteries as ensembles of single grave monuments. However, in practice, the application of the law is far less straightforward because even older cemeteries might be or have been in constant use, which makes it very difficult to mediate between cemetery regulations, the ever-changing cemetery ensemble, the interests of heritage legislation, as well as the bereaveds' needs. That which is for certain people a grave monument worthwhile maintaining is for others an old-fashioned gravestone that should be replaced with a modern one or that could be removed altogether. Since the heritage authorities are usually underfunded, the decision to maintain single gravestones usually lies with the cemetery authorities, whicj is the municipal board of works. Unfortunately, they have very little knowledge of heritage legislation. Consequently, while measures to protect funerary heritage exist, in practice their execution is limited to either the grave monuments of notable people or interesting, exuberant ones. Similar conditions apply in Luxemburg with the *Service des sites et monuments nationaux*.

Due to the significant change in Luxembourg's and Germany's funerary culture over the last decades (Fischer, 1996), the number of conventional earth graves decreases and are being replaced with the anonymous scattering of ashes, smaller urn graves and non-cemetery

alternatives. Especially in Germany, rural churchyards and cemeteries are increasingly being decommissioned and the graves on the surface dismantled. What happens to this space afterwards depends on its location, ownership, the available funding and other urban planning that are in place. If there is no alternative strategic planning, both church and public owners usually try to reduce costs by simplifying the space's maintenance, – especially by dismantling grave monuments – and often consider rededicating the space as a public park.

2.2 The Border Region between Luxembourg and Germany

In order to provide a deeper understanding of the region under scrutiny, in the following chapters an effort will be made to provide a more focused overview of the funeral culture within this specific region, the stonemason industry and the differences between cemetery regulations. The previous chapter has only provided a general overview of the respective subject in Luxembourg and Germany, as it presents itself today. Summarising these paragraphs again, and forestalling the following chapters, one can say that although both countries generally show shared characteristics regarding a Western European funeral culture based on a Roman and Frankian heritage and Christian Catholic influence, – especially with regards to the immediate Luxembourgish German border region, – the differences are subtle but present. It is worth a side note that the concept of a border region is subject to critical discussion, i.e. its definitions, meanings and the construction of borders, space and related identities. An example of such research can be found in Wille et al. (2015). Here, a border region is understood as a complex phenomenon, impacting on identities in manifold respects and even on the construct of materiality and space itself. As stated in the introductory part of this edited work,

"it is only constructivist and contingency-oriented approaches that provide adequate access to spatial and identity constructions in border regions which we argue conform only in a very limited way to 'nation-state orders' or to 'binary orders' of the here/there. Rather, in the case of border regions, one has to assume space- and identity-related 'logics of disorder' that manifest themselves in 'transversal' patterns of articulation, which themselves can be qualified as border regions or interstices, leading to practices that aim at the (re)institution of 'orders'" (Wille and Reckinger, 2015: 9).

While the constructivist perspective might be critically discussed and while the complexity of perspectives may be appreciated, it needs to be stressed that it is not the intention of this thesis to add to the related discussions. The complexities of border regions and the impact on shared and/or distinct identities is an issue that will be addressed later in this particular chapter when a common history and local culture will be derived for the region under scrutiny. However, adding to the discussion of social identity and social constructivism is beyond the scope of the thesis at hand.

Literature for Germany is manifold. For the early 20th century, Fischer (2002), for example, illustrates the impact of the cemetery reform movement in Germany in the context of its societal origins. This movement, which must also be considered within the context of the wider reform movement in general (cp. Streb, 2019), aimed at a broad reconsideration of the funeral culture beginning with the ideal design of a cemetery and proceeding to the design of grave markers. From an emphasis on nature and a local, regional design of materiality (Gröning and Schneider, 2002), this movement soon began to integrate the professional funeral industries, such as industrial stonemasons' specific requirements, and was heavily influenced by the millions of dead during The First World War, leading to elements of mass production and standardisation. The influence of an author like Hirzel (1927) was omnipresent and significantly affected cemetery and grave marker design from the 1930s onwards until at the least the 1960s and perhaps even until today. Details of these contributions have been cited in other chapters of this thesis. These details will be reviewed again with regards to cemetery regulation development (cp. Leisner, 2002) and therefore it is not necessary to repeat them here again.

It is, however, noteworthy that this above-mentioned development is strongly related to the general societal and cultural climate in Germany around 1900. During this period, the impact of industrialisation and mass movements were criticised in a general fine-de-siècle atmosphere as were, amongst others, the last quarter of the 19th century's architecture and design in Germany characterised, for example, by industrially manufactured, mass-produced grave monuments, showing historicist and neo-gothic design elements and using imported material such as black granite (Schuchard, 2002).

As stated, for Luxembourg and Germany the early origins of funeral cultures go back to Roman funeral culture as is evident from many artefacts, for example, at the cemetery St. Matthias in Trier or at the cemetery in nearby Igel (Sörries, 2003b). While we know a lot about this period's grave monument design and the locations where grave monuments could be found, the actual cemetery organisation is a subject that requires further research. The development of the medieval cemetery, – or rather churchyard, – is subject to Sörries's (2003a) contribution on that particular subject. Sörries shows that after the Late Antiquity, cemeteries moved from the periphery of settlements towards their centre, that one can recognise a collective design of places for funerals as opposed to individual solutions and that the church soon began to enforce their monopoly over all aspects of death, funeral and commemoration. Not only the churchyard but also the church itself was a place to put the deceased to rest. The churchyard itself was traditionally surrounded with a narrow wall. The grave sites were usually not clearly demarked or organised, the space itself separating the living from the dead (Sörries, 2003a: 29f.). Sörries (2003a: 37f.) also describes that the graves appear to have been marked by a form of grave marker and a grave mound as excavations around Trier have shown. The grave was respected as

a property of the deceased; however, little if anything is known about any actual grave and grave marker design or of tending the grave. Between the 10th and 12th century the understanding of a grave as being eternal was abandoned: The second burial in an ossuary was now custom, mainly due to the population growth and limited space at cemeteries, as a grave now had to be used more than once. It appears as if graves had a joint orientation within the churchyard and the use of a coffin was not common (Sörries, 2003a: 38f.). Leprosy and pestilence marked the first necessity to create additional funeral sites, – also further away from the living (Sörries, 2003c). However, it was the impact of population growth, the Reformation as well as new hygienic considerations and standards that finally moved new funeral sites permanently towards the periphery of settlements again (Happe, 2003a, 2003b).

Another important aspect of modern Western European funeral culture is certainly the introduction of cremation. In pre-Christian times, cremation used to be common. In Germany, however, it experienced a revival since the inauguration of Germany's first crematory in 1878 (Fischer, 2003b). The request for a modern, clean and progressive method of handling the deceased's body resulted not only in a new cremation technology but also new forms of handling the ashes. The ashes could now be scattered or buried in urns in a variety of manners. As previously mentioned, the reform movements also resulted in a general rationalisation of funeral culture (cp. Schoenfeld, 2003). This rationalisation also reached the undertaker industry, especially during the 20th century, which is detailed in Hänel (2003). As highlighted in other parts of this thesis, there generally was a significant professionalisation of the funeral culture in Western Europe in the 20th century; the funeral culture moved away from the communal practice of related tasks to professional businesses offering related services and handling the processes. Fischer (2003a) describes the most recent changes in funeral culture involving not only the individualisation and standardisation but also the digitalisation of commemoration. These recent changes are related to radical socio-cultural transformations, which can also be witnessed in rural areas, although such transformations take much longer to become visible there.

In sum and already with the border region between Luxembourg and Germany in mind, one can assume that also in this region's suburban and rural areas in the 19th and early 20th century, the society's funeral culture was rooted in the Christian domination of it, resulting in earth funerals in a cemetery or churchyard according to Catholic customs and rituals and largely carried out by the immediate community. This changed during the first half of the 20th century: A further professionalisation of the funeral industry involving not only undertakers but also stonemasons occurred, while the reform movement's immediate impact is strongest in the standardisation of cemetery regulations, at least in Germany, – a topic that will be discussed in further detail below.

While the discussion of funeral culture again appears to be most extensive in Germany and has a certain level of abstraction, what can be said in more detail about the region under scrutiny in this thesis? It is a difficult task to aim at providing an overview of the funeral culture in a space that is difficult to define and demark. In this thesis, the space is the border region between Luxembourg and Germany. What is clear, is that for Luxembourg as a whole influences from France, Belgium and Germany might also be at play, while for the immediate border region within Germany any distinct Luxembourgish influence might be hard to identify simply because Germany is larger in terms of its population and economic influence. However, such considerations are hypotheses and not the subject of this chapter. What is safe to assume is that even though the two countries are divided by a natural and national border, there might be similarities and differences with regards to the general funeral culture.

Kyll (1972) provides an excellent, seminal overview of the funeral customs of the last 1,000 years in the Trier region and Luxembourg. By this regional focus alone, he underlines the historic coherence of this particular region. He structures his contribution into chapters addressing death and the grave, the cemetery and the obsequies. Since he covers such an extensive time horizon, this chapter will focus only on the relevant passages, especially considering the most recent history and the materiality of the funeral culture.

With regards to death and the grave in general, Kyll (1972: 15ff.) describes the process of dying, preparing the body and the actual funeral in detail. He points out that the dying person would receive the last rites at home. The body would be placed on the floor, – on straw, – as the location where a person dies would be considered polluted and dangerous. The straw could easily be burned, contrary to bed sheets, etc. After that, the body would be washed, the deceased's hair would be cut and the deceased person would be dressed in the best cloths. This custom as Kyll (1972: 23f.) points out, was the norm in the urban areas until the end of the 19th century and in the rural areas until the mid-20th century when undertakers also extended their business into these areas and collaborated with local carpenters. The black suit for deceased men and the black dress for deceased women were slowly substituted by a burial gown, which is today even made of paper. Beginning with the 16th century, it became common to place a rosary in the folded hands of the dead, a custom that seems to prevail until at least the 1970s (Kyll, 1972: 29). Other grave goods are not known and might not be common. The custom of the death watch was prohibited since 1607; however, constant complaints against this prohibition followed by re-enforcements show that this law was not accepted, especially in rural areas (Kyll, 1972: 42ff.). Particularly since the 19th century, local priests tried to work against this custom, mainly claiming health issues. The custom remains until the time of the Westwall construction when many foreigners enter the area bringing new customs with them – and the death watch at home becomes uncomfortable, considering limited space and different families living under one roof.

Around the 1950s, the death watch slowly becomes less and less common, even in rural areas, as morgues at cemeteries provide a better infrastructure: The body is usually transported there immediately after the person had died and more people die in hospitals than at home (Kyll, 1972: 48f.). The body was then transported to the cemetery in a coffin, which was usually made of wood; slight variations of shape existed (Kyll, 1972: 58ff.). In its simplest form, the coffin was a hollowed-out tree stump; in much earlier days, coffins were even stone sarcophagi. In modern times, carpenters would make a rectangular or trapeze-shaped wooden box filled with straw or chipped wood. Often, flowers or herbs would be found on and inside the coffin. Frequently, the neighbour would provide a harnessed team of horses to transport the body and coffin to the actual funeral site (Kyll, 1972: 70ff.). Relatives and neighbours would accompany the transport. A proper, dedicated hearse only became common since the 1930s; the hearse was usually kept in the fire engine house. Since the 1960s, this custom has also changed, as professional undertakers handle many of the before-mentioned tasks. Since the 18th century, it was a law, – for example, in the city of Luxembourg, – to bury the body after 36 hours, a regulation that was often not obeyed in rural areas where it was custom to bury the dead on the same day, if possible (Kyll, 1972: 77f.). Often, the actual obsequies would be held on the third day.

Regarding the actual location of a grave, Kyll (1972: 80ff.) refers to the churchyard in medieval times, which is demarked by a fence of sorts, either a wall or a hedge. This appears to have been necessary, as local population utilised the churchyard for various activities, such as meetings, singing and dancing (Kyll, 1972: 95ff.); however, the churchyard also needed to be protected from defilements as well as livestock and wild animals causing damage. In the year 1589, the church even introduced a number of fines in case livestock would be found in the cemetery, the actual amount depending on the kind of animal (Kyll, 1972: 83). A self-styled *Beinbrecher*, a grille inserted into the ground at the entrance of the cemetery, would stop animals from passing. Generally, however, during the medieval times, the church and churchyard were mostly an integral part of public life but with a specific protective function as a safe space, not only for a local priest but also for the population, livestock, supplies and other things that needed to be protected. It was only during later times that profane usage of the church and churchyard could be prohibited (Kyll, 1972: 93). Nonetheless, the custom of making public announcements after church services existed until the 1970s, at least in the Trier region (Kyll, 1972: 94). Of specific interest is the Trierer Easter festivity known since the 13th century also in Luxembourg and conducted there in 1963 on the occasion of the 1,000 year celebration of Luxembourg City, which included a procession around the church and passion plays. During the 1960s, this custom was abandoned owing to changes in the context of the Second Vatican Council.

As stated, initially the site of a grave was considered to belong to the dead for good. According to Kyll (1972: 101ff.), however, this changed during the 7th century. Remains of a previous funeral

would be moved into a corner of the grave, with the body sometimes oriented in the opposite direction. Otherwise, there appears to have been little deference in that regard. With the advent of the 10th century, burials within the church itself were officially permitted, with the clergy being buried close to the choir and the aristocracy in the nave. The majority of the population would not be eligible and/or able to afford such a burial (Kyll, 1972: 104f.). Hygienic issues appear not to have been a major issue. Burials within churches were permitted until the year 1777 when the Archbishop of Trier, inspired by the Enlightenment ideals, prohibited funerals within church buildings in this region, an effort that required several enforcements until it was actually obeyed. In 1784, Vianden and Diekirch established a cemetery outside the city limits and Napoleon's cemetery decree of 1804 finally enforced the creation of cemeteries outside cities. However, following Kyll (1972: 106), it took until the second half of the 20th century for cemeteries outside cities to become standard in rural areas in the Luxembourg-German border region, as the local population continued using churchyards.

Marking the grave is also a custom that goes back to the beginning of funerals. During Frankian times, it might have been custom to mark a grave with a stone engraved with a cross. The dominant wooden poles that might have been the norm in the Trier region are difficult to prove, as they have not survived for long and evidence is scarce (Kyll, 1972: 111). Since the 10th century, stone material for grave marking was mainly used by the elite of the society, as was a lead tag that was placed in the grave next to the body, permitting ex-post identification. It might have been during the 12th and 13th century that the wooden pole was extended into a wooden cross. However, again, this development is difficult to trace; its origins are unclear (Kyll, 1972: 112f.). As funerals were usually conducted within 24 hours of death, wood was obviously a more realistic choice than stone. Since the 14th century, regions that provided good stone material also used stone crosses as grave markers. Stone samples, – also iron ones, – with no inscriptions were present until the 18th century (Kyll, 1972: 113). However, the wooden cross was most common. Furthermore, the grave would be marked with a grave mound.

Since the 13th century, ossuaries were used in the Trier region for the second burial of the remains that were removed from reused grave plots (Kyll, 1972: 114ff.). The femur and skull were usually transferred to this dedicated building, as these remains were now particularly valued. Most ossuaries in this region appear to have been built at the end of the 15th century. Most disappeared during the 19th century. In a few villages, however, ossuaries were still visible until the 1960s. A major issue were the funerals of unbaptised children during the Middle Ages. However, this was solved at the latest during the 18th century with the baptism of even stillborn children. Consequently, this issue does not extend into more recent times.

Regarding obsequies and commemorative days, Kyll (1972: 127ff.) notes a well-documented procedure in the Catholic liturgical context. This procedure is structured into burial, commemoration on the third, the seventh and thirtieth day and commemoration one year after death. This concerns the belief that the soul stays in the body until the third day, decomposition assumes after day seven, the body loses its distinctive features after one month and after one year it was assumed that only the bones remain (Kyll, 1972: 129). There was no actual commemorative festivities on the day of the actual burial, as the preparation for the burial itself on the day of death consumed all the energy of the bereaved (Kyll, 1972: 131). They would meet at the deceased person's house after the church service and pick up and accompany the body to the cemetery. While there were subtle differences in how the third and seventh day would be organised, the thirtieth day commemoration would be most relevant (Kyll, 1972: 144ff.). It marked the end of the strict mourning period. The funeral feast on the day of the burial was a custom that was maintained until the 19th century. Lunch was followed by coffee and even a dinner. In between, the fresh grave of the deceased would be visited again.

Kyll (1972) is a seminal work about the funeral culture of the Luxembourg-German border region, based on Regino of Prüm's visitation record from the 10th century. It is an interesting study of further sources as well but unfortunately not offering more information beyond its date of publication. The most recent developments are not discussed, as there is generally very limited consideration for the funeral culture of the modern times. However, what is remarkable is the clear demarcation of the border region as a joint and coherent cultural space, sharing certain characteristics. This strength is also a weakness, as it is not clearly differentiated whether there are any differences between Luxembourg and Germany.

More information about this region's funeral culture can be found in the edited book by Kmec et al. (2019), which considers selected phenomena of funeral culture in Luxembourg and bordering countries. Bis-Worch (2019) presents interesting insights into past Luxembourgish funeral culture, based on archaeological evidence and largely confirming Kyll's (1972) historic overview. She describes that funerals in churches clearly provides evidence for social stratification, based on whether a person was buried close to the altar or outside the church building. Regarding grave markers, she also supports the idea that the common wooden cross and grave mound was present for a long time, although this is difficult to prove because material evidence is scarce. Smaller stone crosses are evident for Luxembourg from the beginning of the 16th century (Bis-Worch, 2019: 14), as now they are also inscribed with dates. The grave itself was usually an earth grave and until the 9th century it was also stone lined. Stone sarcophagi could be reused, wooden coffins and shrouds as well, although it is difficult to establish their dates. Funeral clothes and everyday clothes are uncommon for Luxembourg and only show up in the 17th and 18th century. A shroud appears to have been more common. During the Baroque period, small personal grave

goods also become popular again (Bis-Worch, 2019: 17). Rosaries, amulets or symbols of a pilgrimage are common. Tableware is possible grave goods, as superstition required that the tableware last used by the person before dying must leave the household. Space for graves appear to have been a common problem in the past. The problem of keeping the churchyard and cemetery clean and preventing profane activities from occurring there was a constant issue as the contribution by Heinz (2019) shows.

Quintus (2019) explains the genesis of cross shaped grave markers from the 16th to the 19th century, showing not only interrelations with available materiality and stylistic context but also the variety over time and depending on location. After 1830, the names of the craftsmen are shown on the monuments, allowing inferences about not only technological capabilities but also the transport of non-local material. As Quintus (2019: 33) suggests, with the appearance of bluestone as a popular material, the stonemasonries become more concentrated and larger around 1900. One could argue that this occurred as an result of industrialisation and globalisation.

An interesting topic mentioned in numerous chapters of Kmec et al. (2019: 153 ff.) is the issue of photography featuring the deceased or the portrayal of death in film in Luxembourg. However, photography featuring the deceased, although this might also have been present on the German side of the border region, is not mentioned in other sources on the Luxembourg-German border region available to the author. Hence, no more details can be offered besides that with the appearance of photography, this new medium was also used for the printed notification of death that became commonplace amongst higher classes in the Netherlands during the 17th century; it also became more widespread in Europe, including Luxembourg and Germany, around the 1840s (Toussaint, 2019).

A noteworthy aspect of Catholic funeral culture in this border region is All Saints commemoration on 2 November. This date is still observed and important for the population. According to Heinz (2019b), this custom originated in the 11th century, as people required a date on which the afterlife could be commemorated and the destiny of the deceased, i.e. their possible existence in purgatory, could be positively influenced. In later times, the custom included a church service, a procession to the cemetery and the blessing of the graves. Interestingly, while grave tending was for a long time of less interest to the bereaved, an extreme effort was made on All Saints' Day, such that during the 18th century new rules were enforced, preventing too pompous customs (Heinz, 2019b: 219).

Another important but more recent development regarding the funeral culture is the increased use of cremation, especially during the second half of the 20th century. Kolnberger (2017b) provides a good introduction into this specific subject. As he points out, today about 60% of all funerals in Luxembourg are cremations, with Germany catching up fast but already well beyond

the 50% mark for cremation. Cremation used to be a statement against the established order and the church's influence. At present, however, being cremated and choosing a final burial that is not necessarily in the earth has become normal and almost a new standard together with all the impact this has on the further materiality of funeral culture as well.

Braconnier (2018) provides a broad overview of the funeral culture in Luxembourg from a historic perspective. He proposes that funeral culture, – also in Luxembourg, – is subject to developmental cycles and trends. In short, funeral culture is a phenomenon that constantly transforms in context with socio-cultural transformations. Braconnier begins his master's thesis with an overview of the legal developments that have influenced cemetery regulations and funeral procedures alike, such as the *Décret du 23 prairial an XII sur les sépultures* of 1804, demanding cemeteries to be located outside city centres, and also the *Gesetz vom 1. August 1972 über die Regelungen bei Bestattungen*, which amended the law of 1804 and, as a main feature, integrated cremation as a proper funeral option into the legislation (Braconnier, 2018: 11ff.). Braconnier (2018: 28ff.) highlights the role of Catholic liturgy and ceremonial conduct not only for the Luxembourgish funeral culture but also for the overall, cross-border region, as nearby Trier, the seat of a Bishop, exercised a strong influence. These issues highlight what has been said before, especially by Kyll (Kyll, 1972). Braconnier (Braconnier, 2018: 35ff.) also describes the changes of the funeral ceremonies against the backdrop of the Second Vatican Council: church bells striking three times for anyone deceased regardless of social status or payments, the church service no longer being conducted in Latin but in German, French and Luxembourgish, which is a curiosity in Luxembourg today. With reference to the most recent editions of funeral culture liturgy, Braconnier (2018: 39f.) remarks that it appears as if the location of the ceremony and the annual commemoration has become more flexible, as detailed information about these aspects is no longer mentioned and has therefore disappeared – potentially a response to the more recent, individualised demands by the bereaved when it comes to commemoration. In this regard, Braconnier (2018: 49f.) also mentions an increasing number of civil funerals as opposed to clerical burials since the 19th century. It appears as if the influence of the, especially, Catholic Church on funeral culture has continuously decreased during the last decades. Braconnier (2018: 54ff) mentions a number of customs and procedures that used to be common in Luxembourgish funeral culture, such as the laying out of the body at home, the death watch, the communal transport to the cemetery after a church service, the funeral feast and the commemoration ceremonies on several successive days within a year after the death, — even the covering of windows and paintings. Most of these customs have been reduced to a minimum or have even disappeared. As individualisation increases and the role of the church in funeral culture continues to decrease, funeral culture is a varied phenomenon today. Death notices in newspapers have also increased

in popularity during the 19th century (Braconnier, 2018: 63) and are still common as is the observance of All Saints' Day.

In general, Braconnier's (2018) thesis confirms the before-mentioned literature, also cites it and mainly draws a picture of funeral culture's constant changes over time, especially during the 20th and 21st century. These constant changes are highlighted by a reduced role of conventions and the church, and a high demand for individualisation guided by a professional industry responding to and creating trends and fashion.

2.3 Socio-Cultural, Economic and Demographic Developments in Selected Locations

2.3.1 Wormeldange

Surprisingly little can be found about Wormeldange's history in published material. It appears as if an actual and official chronicle of the village does not exist and as if researchers have paid little attention to the village's specific historic development. This chapter is the attempt to retrieve as much information as possible from the material that could be found and that was received from a local historian and council member.

Wormeldange is a small village on the Mosel River, directly across from Wincheringen in Germany. Unsurprisingly, therefore, the histories of both communities, Wormeldange and Wincheringen, are closely linked to each other. According to Thomas Abel's webpage (Abel, 2020b), – a website that is focused on the greater region, – the municipality of Wormeldange is part of the canton Grevenmacher and presently includes the villages Ahn, Dreiborn, Ehnen, Kapenacker, Lehbusch, Machtum, Wormeldange and Wormeldange-Haut. The Cité Leibesch, which is also part of Wormeldange, is located between Ehnen and Wormerberreg. Wine is a key economic and cultural factor today as it was in the past. With 360 ha of farmland used for wine production, Wormeldange is the largest vine area in Luxembourg with well-known sites such as the Wormeldinger Koeppchen (Abel, 2020b). Moreover, the area has been – for centuries – part of the diocese Trier, which is now in Germany. As shown in the introduction to the locations under scrutiny for this thesis, this joint political, clerical and cultural past forms the overall research area regardless of today’s national border, which is here clearly marked by the Mosel River. The important bridge crossing the river between Wormeldange and Wincheringen underlines not only strong ties but also economic interests and dependencies between Luxembourg and Germany. Characteristic of many settlements in this region, the relevance of wine also points to a Roman past and heritage. Regarding the actual history, Abel (2020a) writes that the village of Wormeldange's history begins with Hof Lenningen. The owner of this court was the Trier cathedral chapter to which the villages of Beyren, Ehnen, Gostingen, Greiweldingen, Kanach,

Lenningen and several bailiwicks in Wormeldange also belonged. Wormeldange had 66 households and before the Thirty Years' War only 25 in 1656. At this time, the heads of the household were (surname followed by first name): Bach Michel; Bach Theis; Durre Peter; Fickerts Susanna, a widow; Fickius Sonndagh; Friderichs Adam; Goestingen Matheis; Kirst Hans; Korff Ditz; Lermes Theis; Linden Welter; Müllers Michel; Paulus Jacob; Peiffer Theis; Pinel Matheis; Pünnelle Peter; Schmidts Susanna, a widow; Schmidts Theis; Steymetz Peter; Stil Peter; Strouppe Matheis; Thieles Claus, a shepherd; Welters Theis; Winckel Susanna, a widow; and Zumer.

No actual professions are mentioned, except for the miller, Michel, who actually owned his mill, – a very rare occurrence at that time, – and the shepherd, permitting the conclusion that the population lived by subsistence farming. This might also include viticulture; however, it is unclear what economic impact this particular kind of farming actually might have had (Abel, 2020a). According to Abel (2020a), there is mentioning of 22 people who owned 34 acres of vineyards in Wormeldange. Another 18 households together owned about 56 acres of land. Only 19 acres were actually used – or were maybe usable – for other farming (Abel, 2020a). The community forest, far from the village, consisted only of bushes, which might be an important difference to Wincheringen across the Mosel River. Wormeldange's administration and jurisdiction were in the hands of a *Schultheiss* or sheriff and eleven lay assessors (Abel, 2020a). The Wellenstein family based in Ehnen provided the *Schultheiss* for many years. The family itself had its origins in Bech-Kleinmacher. Engelbert Wellenstein probably buildt the Wellenstein House in Ehnen. He was also a high court judge at the Grevenmacher district court. His son, Johann Wilhelm Wellenstein, who was born in 1661 and died in 1736 in Ehnen, was the sheriff of the Trier cathedral chapter for the courts of Lenningen and Wawern.

Figure 1: A historic view onto Wormeldange from Wincheringen, across the Mosel River (1).

(Ortsgemeinde Wincheringen, 1993: 258)

While Abel's (2020a) historic brief appears interesting, he does not give any indication of his sources. Consequently, the above information has to be considered with care. Nonetheless, the demographic development, strong political ties to Trier as well as the role of viticulture and subsistence farming appear reasonable and resonate with the overall region's history. Generally, this indicated a rural, agricultural and relatively poor society with the Catholic Church playing a strong role. The spatial proximity to Wincheringen is, in this instance, a decisive factor with regards to why this location had been sampled. Although divided by a major river and today by a national border, both villages share historic and cultural context and background. Researching funeral materiality in this context could reveal interesting finds. The spatial proximity becomes obvious when considering Figure 1, a photograph of unknown date but surely dating from the early first half of the 20th century, taken from the Wincheringen side of the Mosel River, overlooking Wormeldange. More or less in the centre of the photograph is the church of Wormeldange and in the forefront the cemetery is visible, although details are not recognisable.

What can be said, however, and what will be obvious when referring to other pictures of Wormeldange cemetery or even the map is that the cemetery's dimensions and location around and east of the church building towards the Mosel River has been left largely unchanged until today.

Further photographic evidence, which the Wormeldange municipality supplied, supported this first impression. Figure 2 is a much more recent photo – although, again, of unknown source and date – in which the cemetery's concentration on the eastern side of the church is obvious. Graves behind the choir to the north and on the western side are not visible.

Figure 2: View onto the church in Wormeldange.

(Unknown date. Source: Municipality Wormeldange)

This perspective, however, gives a very good impression of the cemetery's materiality. Obviously, by far most of the graves are covered by a slab. A larger number of high crosses of a variety that is not clearly distinguishable is visible.

Figure 3 to Figure 5 are of much older date, but again, it is not possible to identify the exact time and original source. The municipality Wormeldange also supplied the high crosses and they originate most likely from the first half of the 20th century.

Figure 3: Wormeldange church and cemetery viewed from the Mosel River.

(Unknown date. Source: Municipality Wormeldange)

Figure 4: Aerial photograph of Wormeldange.

(Unknown date. Source: Municipality Wormeldange)

Figure 3 appears to have been taken before World War Two, though. It shows the perspective as seen from the Mosel River upwards to the church, permitting judgement of the slope's steepness. A number of grave monuments are visible, as they are high enough to be seen across the cemetery wall. Similarly, Figure 4 could be pre-World War Two as well, now also permitting a view

of the grave monuments behind the choir. No details can be noted; however, it is a very good overview of the overall village.

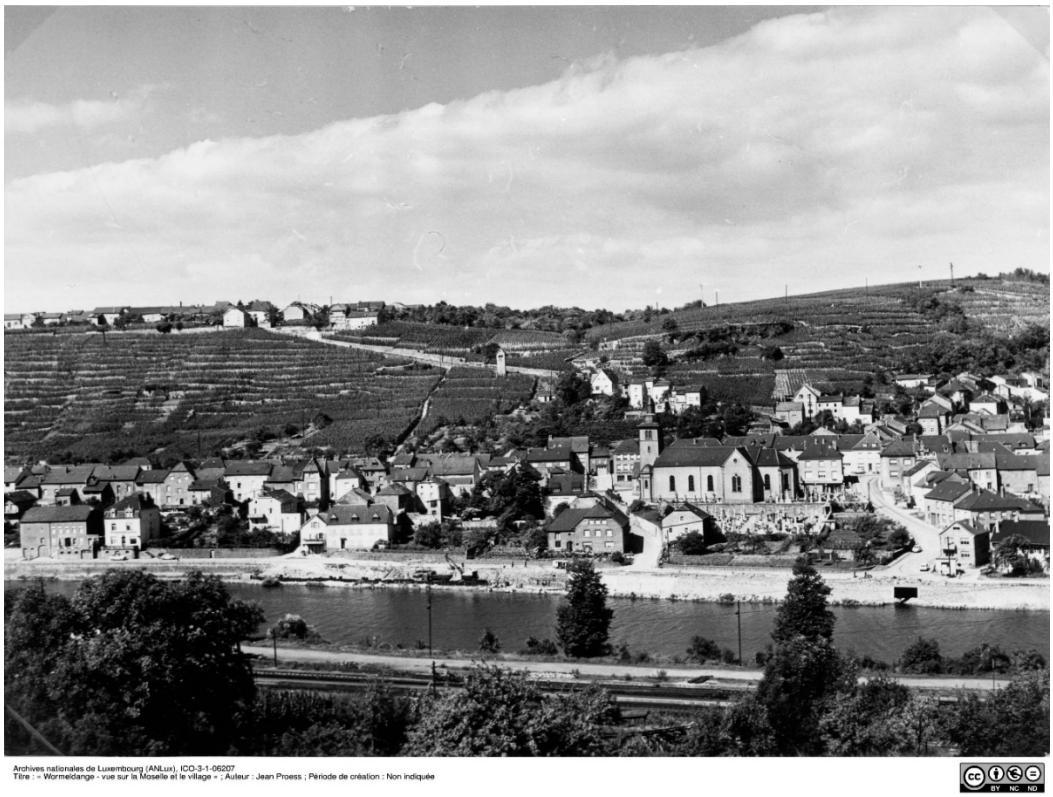


Figure 5: A historic view onto Wormeldange from Wincheringen, across the Mosel River (2).

(Archives Nationales de Luxembourg (ANLux) ICO-3-1-06207)

Figure 5 is a photograph that appears to have been taken after the Second World War, judging by a few automobiles present. Again, the cemetery is nicely visible and the high crosses can be noted. This photograph is apparently provided by the national archives in Luxembourg.

The municipality Wormeldange supplied two more photographs, – Figure 6 and Figure 7, – obviously depicting a funeral in the cemetery. The author of this thesis identifies the location to be in the cemetery's far south-eastern corner. What exactly or whose funeral these two pictures show is unclear. However, the presence of the US flag, the presence of people in what looks like World War Two period uniforms and the presence of armed men shooting a salute permit the conclusion that here either US military personnel are interred in the cemetery in the aftermath of fighting in this region or other combatants or non-combatants, – potentially Luxembourgish, – are buried with military honour. What is interesting is the close-ups of grave monuments, permitting more details of the actual materiality.

Figure 6: Burial with military honours at Wormeldange cemetery (1).

(Unknown date. Source: Municipality Wormeldange)

Figure 7: Burial with military honours at Wormeldange cemetery (2).

(Unknown date. Source: Municipality Wormeldange)

Figure 8: Wormeldange cemetery today (1).

Figure 9: Wormeldange cemetery today (2).

What is visible is a much less organised cemetery – in terms of footpaths, etc. – than it is today: mainly high crosses and a larger number of non-slab-covered graves. For the purpose of comparison, Figure 8 and Figure 9 show approximately the same perspectives as they are today. Notice the one grave marker still present today. Otherwise, the perspective has changed quite a bit with regards to materiality and infrastructure.

Besides an interesting and relatively rare perspective within the actual cemetery, these pictures are interesting, as they show a historic scene, indicating a certain relevance of the location during

World War Two. Similar to the neighbouring Wincheringen, Wormeldange witnessed destruction and fighting during the last weeks of the war but, yet again, no detailed sources about Wormeldange during World War Two could be found. An article in the newspaper *Luxemburger Wort* (2014), dedicated to before and after pictures of the war's aftermath in Luxembourg, shows the destroyed bridge between Wincheringen and Wormeldange. The article also indicates, in a brief text, that the Germans evacuated 400 inhabitants, taking the inhabitants months until they could return to their homes.

Notable in most of the above pictures is also the church building's presence, dominating the site. Unfortunately, as with the overall village, it is extremely difficult to retrieve any reliable information about the church building's history permitting also more information about the settlement in the past as a whole. There is a Wikipedia entry in Luxemburgish language but it is poorly referenced, if at all, and the authorship is unclear. The entry appears to draw heavily on a 1968 publication by the former local priest, Nic Seywert, entitled “1718-1968 - 250 Jahre Pfarrei Wormeldingen” (Seywert, 1968) and also two very brief articles about the parish of Wormeldange, which the Herz-Jesu priests of Clairefontaine published in *Heimat + Mission* in 1981 (n.A., 1981a, 1981b).

Summarising the above-mentioned regularly published sources, the parish's history can be detailed as follows: The name Wormeldange appears to have a Franconian origin, with the first settlements dating back to at least Roman times (n.A., 1981a). In a charter of the year 909 Wormeldange was called Burmaringa. Around 1030, Adalbert, Count of Metz, gifts the parish to the new monastery in Busendorf (Bouzonville) and for the first time viticulture in mentioned (n.A., 1981a).

The Catholic Church at Wormeldange is dedicated to John the Baptist and apparently has an interesting and extended history. Already from the years 1147 and 1161 there are papal documents hinting at a church in Wormeldange. A bull of Pope Alexander III (1159-1181) from the year 1179 appears to explicitly mention a church or chapel building there. Besides Bouzonville Abbey, however, Eichternacher Abbey also had property and land rights in the area. For that particular period, however, there is very limited information and it is not clear what kind of church the town belonged to. In question are Lenneng or the church of Temmels to which other villages in the vicinity may have belonged (n.A., 1981a).

Until the French Revolution, Wormeldange belonged to the Archdiocese of Trier, which also regularly conducted a church visit. The local church, however, had the abbot of the convent of Bouzonville's patronage. This abbot decided who could become the local priest, amongst other things. The first more detailed information about the church is obtained from the visitation report of 1570 (n.A., 1981a, 1981b; Seywert, 1968). In this report, Wormeldange is referred to as a free

chaplain with 150 communicants. The pastor was Martinus Willich who was represented by Dominicus Fontlingen. The church had three altars, three keels and a monstrance. The abbot of Bouzonville was entitled to one-half of the tenth, while the priest received the other half. In the report of 1641, one finds that the church was dedicated to St. John the Baptist and St. Anna. For the tenth to be stored, an additional storage, – later called the *Schmietzhaus*, – was built in 1619 and destroyed in 1944 during the war (n.A., 1981a, 1981b; Seywert, 1968). The next visit was in 1657, which found the church building in good condition. When it came to the next visit in 1679, the building's maintenance problems had suddenly become an issue and required attention. At the next visit in 1712 by the Archbishop himself, the church with its three consecutive altars was found to be in good condition again. St. Sebastian and St. Anna were mentioned as patron saints. It is noteworthy to point out that the legal situation regarding the chapel's ownership during that time period is a research question still unresolved today (n.A., 1981a, 1981b; Seywert, 1968).

On 26 May 1794, Gabriel Signitz, the convent of Orval's last abbot, blessed the foundation stone for a new church building (n.A., 1981a, 1981b; Seywert, 1968). Construction was already underway for All Saints but due to the French Revolution there were major problems because the monastery was expelled and their goods confiscated. Consequently, the parish itself was charged to complete the construction but did not have the means to carry it out. Under the priest, Martin Schmit, who took over the parish on 29 April 1807, the church was completed in 1808. On 22 July 1827, two new bells dedicated to St. John the Baptist and St. Donatus were inaugurated. Shortly after that, in November 1827, pastor Schmit died at the age of 70. On 2 November 1851, under the pastor Wilhelm Hess and at a meeting of the church council, it was held that the altar, the communion bench and the pulpit almost collapsed and that the stone-slab floor covering was in a deplorable condition. Furthermore, it was also decided that the construction of an emporia would be necessary to create enough space for the people, indicating strong growth of the village and the parish. This work was carried out from 1853 to 1856. A used altar that was purchased for 275 francs and which is still operational today replaced the main altar. The two side altars probably still date from the preceding church (n.A., 1981a, 1981b; Seywert, 1968).

In 1890, the first bridge between Wormeldange and Wincheringen was finalised (n.A., 1981a, 1981b; Seywert, 1968).

In the town council meeting on 13 April 1892, a commission was set up to deal with the church's enlargement. This work took place in the years 1892 to 1895. In this case, a cross ship (transept) and a sacristy were added. The choir and transept, like the ship, had a wooden ceiling. Moreover, a new baptismal stone and several statues had been created. On 23 July 1895, the organ was inaugurated and on 3 October 1895 the expanded church of Bishop Jean-Joseph Koppes was consecrated. In 1927, through a donation act from the marriage of Marie Muller, the church

received a free space with stables between the main aisle and the area in front of the church. On 30 December 1928, the church council decided to donate 7,000 francs to the municipality for the purchase of the purported *Köllefgeshaus*, which, together with the donation of 1927, would only allow a new, better access to the church. On 5 February 1929, the church council accepted the architect Jentgen's plans whereby the tower was raised higher and stairs were built to the right and left of it. Furthermore, the church received a new portal, which exists to this day. Formerly, the portal was in the west wall of the church ship. In 1934, a Lourdes cave was built east of the church in the lower cemetery (n.A., 1981a, 1981b; Seywert, 1968).

By the end of the Second World War, a large part of the buildings were destroyed. The building's walls and roof could be rebuilt relatively quickly after the war. For the interior, however, there was an opportunity to make a number of changes, such as a new emporia. Nine new windows were also added and the organ required restoration. The last restoration work was only completed by 1955 (n.A., 1981a, 1981b; Seywert, 1968).

The above is again an attempt to summarise Wormeldange's local historical context, based on three main resources. Since these sources are also not of scientific orientation, the above summary has to be considered with care. Moreover, since accurate referencing is lacking, no actual deductions can be made from it. What might be concluded, though, is that strong ties to the diocese of Trier, – a common feature of settlements in this region, – were present, that Catholicism has a major cultural impact and that it appears as if the village Wormeldange was apparently economically better off than its neighbour Wincheringen. While there is no actual statistical data to support this latter conclusion, such a hypothesis can be formulated based on the obvious ease with which the church was built, renovated and maintained over time, something that appeared to be more difficult in Wincheringen. One possible explanation might be a viticulture that was potentially conducted more successfully here compared to the German neighbours. However, again, there is no data supporting this. Similar to the case of Wincheringen, there is no mentioning of any significant transformations in the course of the 19th or early 20th century industrialisation. The society appears to have been living a modest, self-sustained life style, relying on farming and viticulture. Wars, such as the Thirty Years' War and more recently World War Two, left their mark, though.

Notable examples, bearing in mind a general caveat in terms of local historical research, can be found in Norbert Franz' publications dealing with the interaction between public government and church in rural areas in the 19th and early 20th century (Franz, 2014, 2016). One of his sampled locations is Wormeldange. While he offers interesting insights concerning the issue of public finance around that area for a rural place such as Wormeldange, unfortunately his texts offer little or no historical context that would permit a more coherent picture of the village. In both of his

above-mentioned publications, he focuses on the role government began to take in administration, especially in post-French Revolution times, highlighting that related administrative transformations very much influenced a village such as Wormeldange, allowing government to extend itself in more spheres of public and private life. Franz (2014: 457ff.) describes the example of the church renovation during the 1870s and the complex interplay between the municipal government's and parish agents' interests. The shifting power relations between civil government and church are very well illustrated here; what is also illustrated very well is that while the population was growing finances were tight. Similarly, Franz (2016) illustrates, using the example of the Mosel bridge built between Wormeldange and Wincheringen (finalised in 1890), how civil authorities mainly engaged in schooling and infrastructure projects, while welfare issues remained with the church. In the end, such a major project created many issues regarding the possible advantages and disadvantages as well as the cost and benefits, which now had to be mediated between former and modern forces of power. Nonetheless, while these publications allow a glimpse at a few aspects of social transformation, i.e. the role of government and the church, the local inhabitants' actual social circumstances and financial situation remain unknown.

The actual demographics can be retrieved from STATEC (2020) – the official online statistical information about Luxembourg. Between 1821 and 2020, Wormeldange's population rose from 1,999 people to 2,970. What is also visible from Table 2, is that this population increase was not linear; there was a significant decline of inhabitants during the first half of the 20th century until approximately the 1960s. Although more details are lacking, it might be safe to assume that this may have had to do with the two world wars and also, – judging from this region's history as it is also described in other chapters of this thesis, – from the changing economic and demographic circumstances after World War Two during which it might have been more attractive or even necessary for many people to move to economically more prosperous regions in order to find income. Since the 1970s, however, the population has been growing steadily again. According to the communal webpage, the population is 2,930 persons in 1,108 households in June 2020. 54 different nations live here, 60% of which are Luxembourgish and the remainder come from other countries (Administration Communale de Wormeldange, 2020).

Table 2: Development of the population of Wormeldange between 1821 and 2020.

(STATEC, 2020b)

1821	1900	1947	1960	1970	1981	1991	2001	2011	2015	2016	2017	2018	2019	2020
1999	2422	1976	1888	1969	2013	2129	2280	2478	2654	2685	2784	2836	2921	2970

Table 3: Migration movements in Wormeldange between 1990 and 2019.

(STATEC, 2020a)

1990			2000			2010			2018			2019		
Arrives	Départs	Solde migratoire	Arrives	Départs	Solde migratoire	Arrives	Départs	Solde migratoire	Arrives	Départs	Solde migratoire	Arrives	Départs	Solde migratoire
↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓
175	113	62	142	136	6	177	173	4	264	195	69	230	195	35

Table 3 shows certain details about the migration movements affecting Wormeldange from the 1990s until almost today. What becomes clear, is that the balance of migration has been positive during these years, although it varies significantly in quantity. Recently, the municipality appears to have become more attractive for an influx of other people again. Unfortunately, as in the case of Walferdange, the STATEC data do not allow an aggregation of other interesting information, such as denomination, occupation, income, etc., over a longer period of time and on the municipal level.

In summary, Wormeldange as a community appears to be not very different from their German neighbours in Wincheringen – even by standards at their time: relatively poor, relying on subsistence farming and viticulture and under strong influence from the Catholic Church via the diocese in Trier. There appears to be no industry worth mentioning; however, the decline in population during the early 20th century is also compensated via migration since the 1970s.

2.3.2 Wincheringen

The municipality of Wincheringen, which today also includes the villages Bilzingen and Söst, was historically first mentioned in the monastery of Prüm's register in 893 (Wegner, 1993: 17). The landmark of the village, the Warsberghaus with the original defence tower, originates from the 11th and 12th centuries. It was part of a moated castle that was destroyed over the centuries, except for the manor house and the defence tower. The house takes its name from the Warsberg family who found their way from Varsberg in Lorraine to the Upper Moselle. From 1473 to 1793 the members of the Warsberg family decisively determined the history of the place and the region (see Ortsgemeinde Wincheringen, 1993). After the former Warsberg tower became the municipality's property in 1830, it served as the bell tower of the then parish church, which was located in the immediate vicinity of what is now the cemetery. The church was destroyed on 6 October 1944 during heavy fighting with US troops when the entire church roof burnt out. As a result of the French revolutionary troops taking possession of the region, the town of Wincheringen belonged to the Canton of Grevenmacher, – which is in Luxembourg today, – from 1795 to 1814. From 1798 to 1814, Bilzingen and Söst belonged to the canton of Saarburg. After

the Congress of Vienna, it was part of Prussia before becoming part of the municipality of Wincheringen in 1974 (see Ortsgemeinde Wincheringen, 1993).

Over the last two centuries, Wincheringen has shown a more or less steady population growth. As past censuses have shown (Staatskanzlei Rheinland-Pfalz, 2020), the population grew from 733 persons in 1815 to more than 1,214 in 1871; 1,491 in 1905; 1,532 in 1939; 1,543 in 1950; and 1,750 in 2011 (see Statistisches Landesamt Rheinland-Pfalz, 2014). According to a recent count by the *Statistisches Bundesamt* in 2018, 2,209 people currently live in Wincheringen (Staatskanzlei Rheinland-Pfalz, 2020). Of those, about 19% are not German; many of them are therefore actually from Luxembourg. Furthermore, over 80% of the population is Catholic, with only about 5% mentioning being Protestant (Statistisches Landesamt Rheinland-Pfalz, 2014: 17). With many vineyards in the village, winemaking is still a major source of income.

As many other places in this region on the left side of the Rhine River but especially here, the origins of this particular settlement go back to Germanic and Celtic (Treverians) settlements until the arrival of the Romans around 58 BC (Braun, 1993b). Many archaeological finds and excavations during the 1930s and 1980s indicate a flourishing community. The centuries that followed were marked by the turbulences of a region that lies in the zone of influence of Germany, France and Luxembourg. Consequently, the region under discussion has always been subject to foreign occupations or troop movements (Fisch, 1993a). Irrespective of invasions by the Normans, Huns and Hungarians, feuds between the principalities of Luxembourg, Lothringia and Trier, or especially the terrors of the Thirty Years' War, the region was subject to famines, cruelties and a life close to subsistence level even in times of general prosperity. This situation did not change during the times of the Coalition and Liberation wars in the aftermath of the French Revolution (Fisch, 1993: 53ff.). When France declared war on Austria, their allied Prussian troops were stationed in Konz; however, Wincheringen provided quarters for the troops as well. In 1792/1793, Austrian troops were quartered in Wincheringen when fighting took place in the vicinity with the French (Fisch, 1993: 53). During the French invasion, especially church buildings and church property but also the population as a whole suffered from looting and many atrocities, according to the reports mentioned in the village chronical (Ortsgemeinde Wincheringen, 1993). In 1794 the French occupied the region and within the context of the peace treaty of Campo Formio concluded in 1797 the whole principality of Trier – and with it Wincheringen – became part of the French Republic. These brief times of peace under the French were again characterised by manifold French oppressions as Fisch (1993: 54ff.) reports. Looting was a regular occurrence. Taxes were high and many supplies, especially wood and livestock, were requisitioned for the French troops. Most importantly, the local males from 20 years of age faced obligatory military service in Napoleon's forces. As a result, the region soon experienced a number of uprisings called the *Klöppelkrieg* – or Clapper War – in which mainly young people in the region and also

Luxembourg armed themselves with clappers, seized government officials and cut down the French liberty trees. The consequences for those who were poorly armed were severe, as they were no match for the French troops and, after being imprisoned in Luxembourg, many were executed by firing squad. During the 18 years of French occupation in this particular region, 14,176 men were drafted of whom 9,909 never returned from their military service (Fisch, 1993: 56). In 1814 during the liberation wars, Russian Cossacks were stationed in Wincheringen and after the congress of Vienna, Wincheringen became part of the Saarburg municipality.

Interestingly for the revolutionary years of 1848/1849, no events worth mentioning are noted for Wincheringen (see Ortsgemeinde Wincheringen, 1993). It appears that this revolutionary movement did not really affect this specific region, except for a number of farmers taking advantage of the somewhat unclear situation and cutting down the best timber in the state's forest (Fisch, 1993: 56). The Prussian wars of 1864 and 1866 likewise had little impact, if at all, despite a few members of the community partaking in the military operations. Of more relevance was the occurrence of dysentery and typhoid, which cost many lives. During the Franco-Prussian War of 1870/1871, 55 men went to war and all returned healthy (Fisch, 1993: 57ff.). Although the population was worried about the outcome of the war, feared that French troops might enter the region and prepared for the worst, yet again, these years and even the creation of the German Empire under Prussian rule appeared to have no immediate noteworthy impact on the local population's daily life. Maybe this is hardly surprising for a comparatively rural, agricultural community, such as Wincheringen, that mainly relies on self-sufficiency and wine growing for which the seasons and the outcome of the harvest as well as the many factors that have an influence on that have more meaning than grand politics that has no immediate impact at the place of residence.

Of historical relevance over the centuries was the noble family of Warsberg's temporary presence in the village at the representative building, which today is the municipal building, and that have determined a lot of the local history well into modern times (Conrad and Holbach, 1993: 113ff.). Historically, one also has to consider the proximity to the village of Wormeldange which, directly adjacent across the Mosel River, is located in what is today Luxembourg (Scheel, 1993).

As in many other places in Germany that were characterised by times of economic hardships and unfavourable living conditions, especially for young people and families, the phenomenon of emmigration during the 18th and 19th century as mentioned and described in the *Ortsgemeinde Wincheringen* (1993: 87ff.) played an important role in the village's collective memory. Braun (1993a: 87) points out that there was mainly three main periods of emmigration. During the first emmigration period before 1800, many people from the region went to Hungary, Galicia, Transylvania and all the way to the East, – to the Wolga River, – responding to the opportunities

created by the retreat of the Turks. After 1800 until about 1880, most emmigrants sought a new life in the Americas, mainly North America. After that, many people left for Lothringia, which became part of the German Empire by 1871. However, these emigrants were forced out of Lothringia after the loss of this region in the aftermath of the First World War.

The reasons for emigration could be manifold but usually had to do with the lack of opportunities and a life above subsistence level in this particular region (Braun, 1993a: 87f.). For regular and official emigrants, religious and political reasons were not relevant. However, for farming around Wincheringen the soil was not necessarily of the required quality. The splitting of land when inherited and then shared amongst several children left little agricultural land for each family. There was no larger industry close by offering industrial jobs. Even craftsmen had to conduct farming on the side in order to survive. This description illustrates the hardships that existed in these regions, despite a growing population.

These circumstances were about to change. The years before the First World War were marked by a modest improvement of living conditions, mainly due to the increasing prices for wine, which was still the region's main product (Fisch, 1993b: 61ff.). The war began in 1914 with the mobilisation of all available troops and the mustering of the cohort of 1895. Horses and carriages were already confiscated for the military. During the years of the war, a total of 240 men of Wincheringen were drafted. The nearby train station was a major hub into Luxembourg and further into France and, as a consequence, many soldiers were accommodated in Wincheringen. As such, also the trains with the wounded soldiers returning from the frontlines were visible and present during the war years. As early as 1914/15, the rationing of food and supplies began. Many horded and hid supplies or sold them to people coming from the cities in search for supplies. Clearly, the lack of food was a major concern to the people, as were the lack of men able to do the farm work. In 1916, the church bells were confiscated (Fisch, 1993b: 63). With the end of the hostilities in 1918, Wincheringen was again flooded by troops returning from the front lines. In total, 37 men of Wincheringen did not return.

As in many other places in Germany, the between-war years following 1918 were years of great insecurities and turbulence. Of significance for the people in Wincheringen were the brief accommodation of US soldiers in the aftermath of the German retreat (Fisch, 1993b: 68) and, more importantly, the French occupation that followed. The French tried to support separatist movements throughout the region, Wincheringen being no exemption, but with little success. Passive resistance brought an end to these attempts, although numerous stories could be told about those supporting secession from the German empire as well as their behaviour, which was obviously not received in a hostile manner and was rejected by the locals. Being a relatively small settlement, it appears that the immediate impact of these political schemes were negligible.

However, a few of the most decisive outcomes of the aftermath of the First World War as well as the economic impact of warfare was the subsequent reparations that needed to be transferred as well as passive resistance against French oppression and the occurrence of hyperinflation, which began right after the war and peaked in 1923 (Fisch, 1993b: 68ff.). In order to provide the required amount of money to buy scarce goods, the money press printed more and more worthless paper. Even cities and municipalities began printing their own money. At the end of 1923 when the new Rentenmark was introduced, one Rentenmark was equal to one billion Reichsmark (Fisch, 1993b: 69). An anecdote states that an innkeeper from Wincheringen offered as much beer as someone could drink for only one Luxembourgish *Franken*. For wage earners and savers the impact was most severe, as money devalued faster than it could be spent and any savings lost their value and could not be compensated – and obviously war bonds signed during the war also became worthless. As stated by Fisch (1993b: 69), before the war the village enjoyed a modest wealth because of the wine but after the war the village was impoverished. Another major outcome of these circumstances was unemployment, which would plague the German population from here onwards until well into the 1930s (Fisch, 1993b: 69f.).

The Second World War officially began in Europe with the German invasion of Poland on 1 September 1939. For years, preparations for armed conflict, especially with France in mind, had been visible in the Trier-Saarburg region, in the building of the Westwall also known as the Siegfried Line and in preparations for an evacuation of the civilian population, which were amongst the most visible of these preparations. It is difficult to imagine what it must have meant to the population of the affected villages when the day came that they had to leave behind their houses and livestock, could only take the most necessary essentials and were moved elsewhere, as the German government expected hostilities with France also within Germany's borders. The entirely Catholic population was often accommodated in regions, such as Northern Germany, which were mostly Protestant, causing inconveniences. The livestock that was left behind was mismanaged by the relevant government representatives, causing the loss of many animals. In 1940, when the population could return to Wincheringen after the German victory against France, many homes that were supposed to be under the protection of the military were plundered and the wine harvest could not be conducted as planned in 1939, causing a loss to the winemakers. Any other farming also had been put to a halt, causing a general disastrous situation. According to the record by Fisch (1993b: 75ff.), the extent of the civilian population's evacuation had caused significant damage and angered the people of Wincheringen. However, it is difficult to say whether this particular record, i.e. the record commissioned by the *Ortsgemeinde* Wincheringen (1993) of the region's Second World War history, can be considered objective or whether it was an attempt to ensure distance to this particular part of German history.

During the actual war, especially before and during the operations against France, no major fighting took place close to Wincheringen; however, the bridge to Wormeldange in Luxembourg was blocked and guarded by the Luxembourgish military until the German troops crossed the border into Luxembourg on their way to France on 10 May 1940.

While the population's economic situation improved until 1944, the second evacuation followed during the same year when US troops began to cross Luxembourg and prepared for the final push into Germany (Fisch, 1993b: 79ff.). Many locals were drafted into the *Volkssturm*, resulting in every male person between 16 and 65 years of age being also required to hastily dig trenches and man the Westwall fortifications. While, at first, an evacuation was to be avoided, the location of Wincheringen close to a strategic railroad and the Mosel River as well as air raids and artillery fire caused people not only from Wincheringen but also Luxembourg to leave their homes again and flee towards the East. During the first week of October 1944, particularly heavy artillery fire caused major damage (Fisch, 1993b: 81). The local church was completely destroyed. Since the retreating German troops destroyed most bridges, the US forces advanced via Remich and Orschholz and officially occupied Wincheringen on 20 February 1945. However, it is noteworthy that the area was, in reality, still no man's land, as fighting still continued. When the evacuated people returned, they found Wincheringen destroyed: Yet again, many homes, livestock and fields were lost or in very poor condition. The first few years after the Second World War were again marked by significant hardships and the general attempt to secure a livelihood. During the Second World War Wincheringen lost 52 men who were killed in battle and, in addition, another 31 men were reported missing in action.

During the last 200 years, the economy in Wincheringen was largely determined by agriculture and wine growing (Holbach, 1993: 172ff.). In terms of farming, however, the overall region suffered for a long time from a lack of advanced agricultural methods and also from not using fertilisers, as the farming methods had not changed for centuries. Moreover, it appears as if too much emphasis was put on horse breeding and too little emphasis on the breeding of other relevant livestock. It took until the early 20th century, shortly before the First World War, for the local government to take serious steps to improve the overall situation for the population. Agricultural mechanisation in this region did not begin until the 1930s. In the aftermath of the Second World War, most work could be found outside the region in the industrial centres, causing many people to seek an occupation elsewhere. Many people, therefore, left farming, but at the same time this opened opportunities for larger farms and higher production.

Similarly, wine growing has a long history in Wincheringen and goes back well into Roman times (Donkel, 1993: 177ff.). Its economic relevance is already evident from the village being first mentioned in the records of the monastery in Prüm (Donkel, 1993: 178) when it was also noted

how much wine was supposed to be delivered to the owners of the land. During the centuries, the municipality's weal and woe have often been defined by the success of the harvest, the prices of wine and the overall favourable conditions for wine growing in terms of the larger economies and politics. Wine growing is currently still an important economic factor and source of income for the local population. In 1974, the villages of Bilzingen and Söst became part of the municipality of Wincheringen.

Figure 10 and Figure 11 show historic photographs of Wincheringen in which the cemetery is visible.

Figure 10: View of Wincheringen around 1993.

(Ortsgemeinde Wincheringen, 1993: 7)

Figure 11: View of Wincheringen in 1933.

(Ortsgemeinde Wincheringen, 1993: 59)

As one can see in Figure 10 and Figure 11, the cemetery's location and extension remain unchanged over the last decades, as the three-terrace arrangement including the stairs and the surrounding infrastructure are clearly visible. Similarly, Figure 12 shows a more recent view, – potentially dating from the 1980s, – in which it is visible that the municipal building is renovated and that the grave marker design has changed, although details are not discernible.

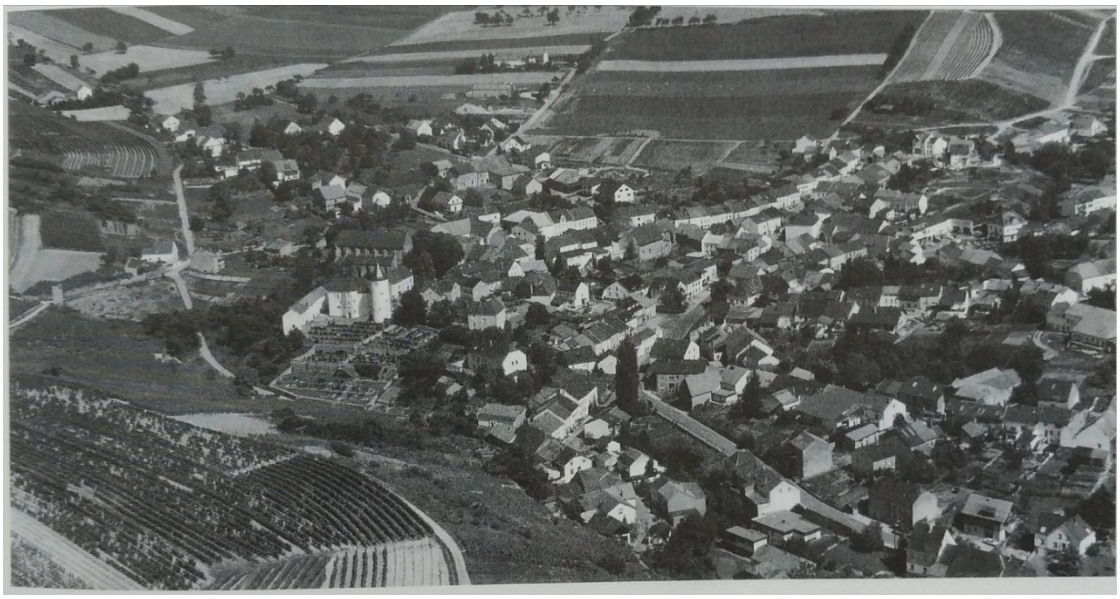


Figure 12: Aerial photograph of Wincheringen; unknown date.

(Ortsgemeinde Wincheringen, 1993: 217)

Figure 13 allows a much better view of the grave markers that were present in Wincheringen around the year 1930. Obviously, the dominating grave marker type was a cross-shaped marker on a pedestal. Granite appears to be rare, if present at all. Sandstone and bluestone dominate, although the exact materiality as well as the rest of the grave site's materiality is not identifiable in such a photograph.

Judging from the photograph, also of unknown date, in Figure 14, open graves, i.e. graves not covered by slab stone or a similar type of covering, appear to have been the norm.

Figure 13: Historic photograph of the Warsberghaus with tower and cemetery; unknown date (1).

(Ortsgemeinde Wincheringen, 1993: 115)

Figure 14: Historic photograph of the Warsberghaus and cemetery; unknown date (2).

(Ortsgemeinde Wincheringen, 1993: 334)

Figure 15: Warsberghaus and cemetery today.

(Source: Author)

When comparing the photographs in Figure 13 and Figure 15, which are taken more or less from the same angle, it becomes clear that the materiality at the cemetery has changed dramatically. The high crosses of sandstone or bluestone have been almost completely substituted by granite – or other related stone – headstones. It can be assumed – due to the limited lease of each grave site – that not only the materiality on the graves but also the ownership of the graves had changed.

2.3.3 Walferdange

According to the municipality of Walferdange's webpage (Commune de Walferdange, 2020c), the village is located in the immediate vicinity of the city of Luxembourg, the capital of the Grand Duchy of Luxembourg. Geographically, the municipality of Walferdange is located in the Alzette Valley, which is surrounded by forested heights. Two of the three towns that make up the municipality, Walferdange and Helmsingen, extend on the right bank of the river, while Bereldange is on the left bank. The Route nationale 7 and the railway line that connects the north of the country with the capital leads through the municipality, which has a total area of 706 hectares.

At the date on which this website was uploaded, Walferdange had almost 8,030 inhabitants, 51% of whom are foreign nationals from around 90 different countries (Commune de Walferdange, 2020c). Regarding employment, one finds mainly workers and employees of the tertiary sector

(services) and the secondary sector (industry) in this particular population as well as a number of traders, artisans and representatives of other liberal professions.

Rose growing and the gypsum industry, which played a relatively important role in the past, have completely disappeared. Agricultural activity, which was still very intensive at the time, has shrunk to a single company. A shaft of the former gypsum mine now houses a European laboratory for geodynamics and seismology.

The cemetery of Walferdange is prominently located next to the church and the local castle. According to the municipal webpage (Commune de Walferdange, 2020d), the church was built between 1845 and 1852 and has a classic facade decorated with two recesses that house statues of Father Kolbe and Saint Therese of Lisieux. Noteworthy objects inside the church are the statues of St. Ignanz and St. François Xavier, which come from the Cathedral of Luxembourg; the painting of the choir vault, which represents the Holy Trinity; The Way of the Cross, which date from the beginning of the 20th century; and the tapestry of the choir, which has only recently been made. The castle's history is better documented than other sites and events in Walferdange over the recent past, thus permitting an overview of relevant socio-demographic developments.

Returning to the municipality's webpage again (Commune de Walferdange, 2020a), the castle's history and development was generally closely linked to the local history; the castle went through a number of changes and alterations. In 1817, Wilhelm I of Nassau-Dillenburg in Walferdange ordered the construction of a royal stud by the Grand Duke for the King and Grand Duke Wilhem I. The Belgian Revolution, which broke out in 1830, put an end to the royal stud farm. The buildings stood empty for about ten years. When King Wilhelm II stopped in front of Walferdange Castle on his way to Luxembourg and to Diekirch, he suggested that the premises be repaired in order to set up a royal residence for the King and Grand Duke's stay in Luxembourg. On 5 February 1850, King Wilhelm III made his brother Heinrich a representative of Luxembourg. As a result, Prince Heinrich settled in Walferdange where he lived until his death in 1879. In 1853 he married Princess Amalia of Saxony-Weimar. When she settled in the castle of Walferdange a short time later, the community's citizens gave the spouses a warm welcome. The prince couple was very popular with the population of Walferdange as is evident from numerous documents, testimonials and anecdotes.

After the death of Princess Amalia, Prince Heinrich married Princess Marie of Prussia in a second marriage about six years later. With her, he continues his tradition founded 20 years earlier and distributes gifts to the children of Walferdange at Christmas. However, a number of children in the school have measles and the prince is infected with this contagious disease. Three weeks later, the prince dies from his childhood illness. After Prince Heinrich's death, hardly anyone was

interested in the castle. It was only used again as the second residence of Grand Duke Adolf between 1891 and 1905.

During the First World War, children and families who were evacuated from the vulnerable quarters of the city of Luxembourg found refuge in Walferdange. In 1930, a training centre for teachers was set up in the castle, which had its place there until 1944. At the end of the Second World War, US troops temporarily occupied the castle. From May 1945 to July 1967, the Luxembourg army used the premises as barracks. Until 2015, the castle was largely used by the University of Luxembourg's education department (Institut Supérieure d'Études et de Recherches Pédagogiques).

Such a very broad historic overview drawn heavily from municipal, i.e. public and representative, webpages might not necessarily allow for in-depth knowledge of the socio-cultural dynamics and demographic transformations of the last 200 years but allows inferring what is relevant and part of the collective memory, either actually or guided, from the local authorities' perspective. Obviously, one is aware of structural changes ranging from a local Catholic community relying not only on rose growing and gypsum mining but also farming to a more diverse community mainly employed in the secondary and tertiary sector and showing a significant number of foreigners as part of their population. The local presence of royalty displaying strong ties across the border to Germany, might also have been influential. The origin of Walferdange as a former Roman settlement, – or there used to be a large Roman villa in Helsem, – is also noteworthy. Covering an area that measures 100 m in length and more than 50 m in width, the Roman villa, which had more than 50 different rooms on the ground floor alone, is a real palace. It belongs to a small group of luxury palaces that were built in the Trever area, similar to the one in Konz (Commune de Walferdange, 2020a). Due to its architectural nature, the residence at Helsem corresponds to the common type of Roman dwellings in our area, i.e. the villa with a portico and projecting wings on the side. The building, which was inhabited for over three centuries, – the villa was built around the middle of the first century, – was rebuilt several times as was often the case with structures of this size. The excavations uncovered over 400 Roman coins of which more than 150 coins date from the period 260 AD to 280 AD. The archaeological rarities include a large number of hairpins and various pearls from a glass necklace, various bronze rings including a find with an engraved name and approximately 25 decorated clothes clasps with beautiful enamel inlays. Furthermore, an extraordinary find in the form of a very beautiful bronze *phalera* was discovered, which was neatly decorated with a lion's head (Commune de Walferdange, 2020a).

Table 4: Population of Walferdange between 1821 and 2020.

(Adapted from STATEC (2020)

1821	1900	1947	1960	1970	1981	1991	2001	2011	2015	2016	2017	2018	2019	2020
594	941	2 132	3 008	4 279	5 300	5 819	6 437	7 240	7 819	7 818	8 046	8 169	8 231	8 424

As presented in Table 4, which is adapted from the Luxembourgish statistical agency STATEC, the population shows a slow but steady growth over the last two centuries. In this table, it appears that the population growth was not interrupted by general turbulences, such as the First World War or the Second World, which is not to say that there were no disturbances. What is important to note with such a demographic overview is that the municipality of Walferdange presently also includes the villages of Bäreldeng and Helsem and the statistics do not indicate whether these numbers include or exclude the population of these villages. The population movements between 1990 and 2019 are shown in Table 5, which indicates a slow and steady growing migration balance.

Table 5: Population movements in Walferdange between 1990 and 2019.

(Adapted from (STATEC, 2020a). For each relevant year, the increase, decline and balance is shown)

1990			2000			2010			2018			2019		
Arrivées	Départs	Sold migratoire	Arrivées	Départs	Sold migratoire	Arrivées	Départs	Sold migratoire	Arrivées	Départs	Sold migratoire	Arrivées	Départs	Sold migratoire
613	**523**	**90**	**697**	**624**	**73**	**611**	**609**	**2**	**780**	**736**	**44**	**891**	**725**	**146**

Unfortunately, the data that are available on the STATEC webpages does not allow a more detailed overview of information for the municipality of Walferdange, especially historic information regarding the social structure and demographics of the last 200 years. Data regarding unemployment, industries, denominations, etc., are either not available on the STATEC webpages or the data are too recent or not aggregated down to the municipality level, thus not allowing more specific information on Walferdange. Therefore, other sources need to be used in order to try and draw a more coherent picture. The edited book published by the parish on the occasion of its 150 years of existence provides a few numbers that can be found in the parish registers (Kirchenfabrik Walferdingen, 1993: 37ff.). As mentioned before, the parish became independent from Steinsel in 1843. Consequently, the entries begin in 1843 with two baptisms and one funeral. However, it is also interesting to note that until 1847 all funerals were still conducted in Steinsel (Kirchenfabrik Walferdingen, 1993, 37). The cemetery that still exists today, although with many extensions, did not exist before 1843. It is unclear, however, why no funerals are entered for the years 1867 to 1872. Confirmations were conducted every two to three years, being registered after 1893. Usually, the actual event was alternated between Steinsel and Walferdange. Since 1978, the confirmation is held every year. Data about the first communion are available post 1900. Figure 16 shows a few graphs concerning baptisms, marriages and funerals between 1843 and 1993. As illustrated, except for a number of outliers, all three graphs show a more or less regular fluctuation around the same values until the 1930s when baptisms and funerals began to show an upwards trend indicating a population growth, while marriages remained relatively

stable. The population trend remained, to a certain degree, on a relatively higher level compared to that of the 19th century, except for the 1960s when values did not follow the trend. However, besides the general population growth it is difficult to read anything else into this data, as the values always appear to have a significant amplitude.

In an edited volume on the occasion of the Walferdange music societies for the year 1987 (Gesangvereine und Musikgesellschaft, 1987), more statistical data are presented. According to May (1987), a questionnaire dating from 1826 and sent to the head of each of the relevant municipalities reveals that, at this point in time, the overall municipality had no administrative buildings. Only the stud was under construction, which later would be converted into Prince Heinrich's residence (May, 1987: 263). According to the results of the questionnaire, the municipality had 95 horse stables with 475 horses and 251 barns with 1,255 head of cattle (May, 1987: 263). There were 92 shires and 257 ovens permitting the simultaneous preparation of 6,425 loaves of breads. There were two water mills. At that time, 1,809 people lived in Walferdange (May, 1987: 264). These data are, to a certain degree, out of synchronisation with the STATEC data presented above (cp. STATEC, 2020b). It appears as if the STATEC data for the early 19th century focused on Walferdange alone, while this data referred to the overall municipality, including all the other smaller village and settlements that belonged to the municipality of Walferdange. The cited documents are not exactly clear on these points and hence caution is advised with this data.

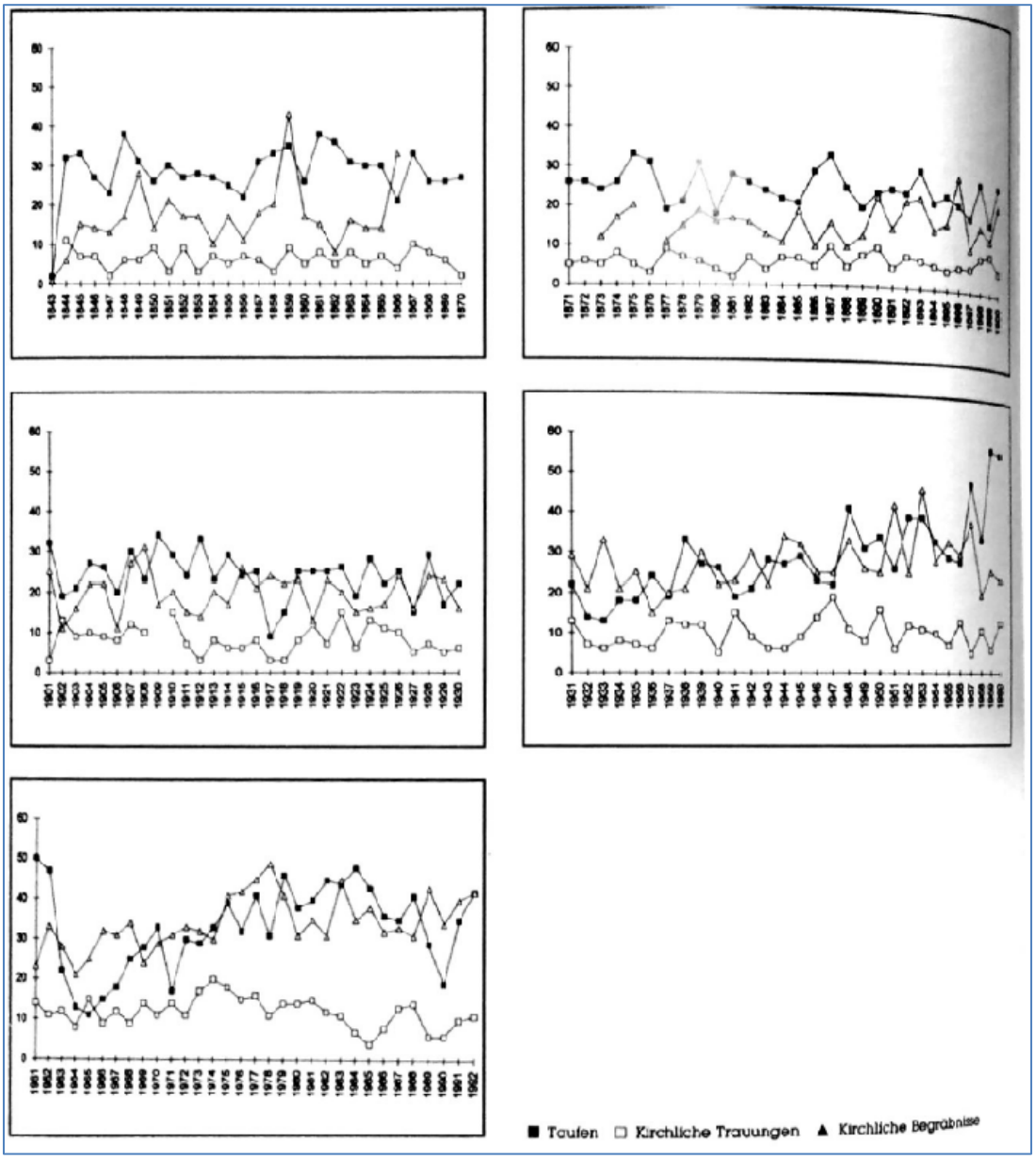


Figure 16: Snapshot taken from Kirchenfabrik Walferdingen (1993: 42).

Regarding the population and employment, the available data (May, 1987: 264) point towards 500 workers and 58 craftsmen. The average daily income for a mason or carpenter is mentioned at 70 cents, for an unskilled labourer at 47 cents, day labourers received about 29 cents and victuals, although it is not clarified how much purchasing power this amount represents in comparison with, for example, today's income levels. Eight tailors, six farriers, two locksmiths, twelve cobblers and one backer were present. On 50 hectares, clovers were harvested, presumably for the cattle. The remainder of the agricultural activities supported local subsistence (May, 1987: 264). May (1987: 265f.) also mentioned the mining of gypsum; however, he states that in 1826 only one worker was employed in this particular industry. This appears to go against the municipal reference to the gypsum production's significance for the local industry in the past (see Commune de Walferdange, 2020c). What can be stated here is that with the beginning of

and well into the 19th century, Walferdange was a rural, agricultural community of little importance with no industry and administration, even without a market. Life was simple and self-sustained, no foreigners were present (May, 1987: 266). Many locals emigrated, which also indicated a certain population surplus and regular hardships.

Bour (1987: 288ff.) provides more statistic data on Walferdange, mainly from censuses taken during the years 1806, 1851 and 1885 as shown in Figure 17.

		Haush.	M	F	Total
1806	Bereldingen	24	66	65	131
	Walferdingen	15	55	46	101
	Helmsingen	42	112	132	242
		81		Total	474
1851	Bereldingen	46	148	132	279
	Walferdingen	36	91	107	198
	Helmsingen	67	198	197	395
		149		Total	872
1885	Bereldingen	51	110	107	217
	Walferdingen	43	104	109	213
	Helmsingen	88	219	225	444
		182		Total	874

Figure 17: Population of Bereldingen, Walferdingen and Helmsingen.

(Bour, 1987: 289)

As shown, in 1806 the population of Walferdange alone was indicated at 101 people and 474 for the municipality's overall population, increasing to 200 people for Walferdange and 872 for the municipality in 1851 and only modestly increasing until 1885. Again, these numbers deviate significantly from the statistical data discussed before. However, without more information about the raw data, one can only speculate about the reasons for these deviations that might be attributed to different data collection methods and maybe unreliable data sources.

Based on these numbers, however, Bour (Bour, 1987: 289f.) makes a remarkable observation: While between 1806 and 1851 the population roughly doubles, he assumes, based on population data and the number of households, that the number of children declined. He ascribes this to the hardship during these times in which socio-economic transformations and the lack of infrastructure and industry reduced the possibilities in an agricultural society, causing a wave of emigrations not unlike other countries during this time. This again draws a picture of a rural, agricultural community with a society on the subsistence level.

Figure 18: Walferdange around 1850.

(Source: Kirchenfabrik Walferdingen (1993: 35))

Figure 18 provides a sketch of the centre of Walferdange around 1850. What is clearly visible by looking at the sketch is the overall road structure, which is more or less the same today, as well as the site of the church and the cemetery in a relatively small extension, obviously its original size.

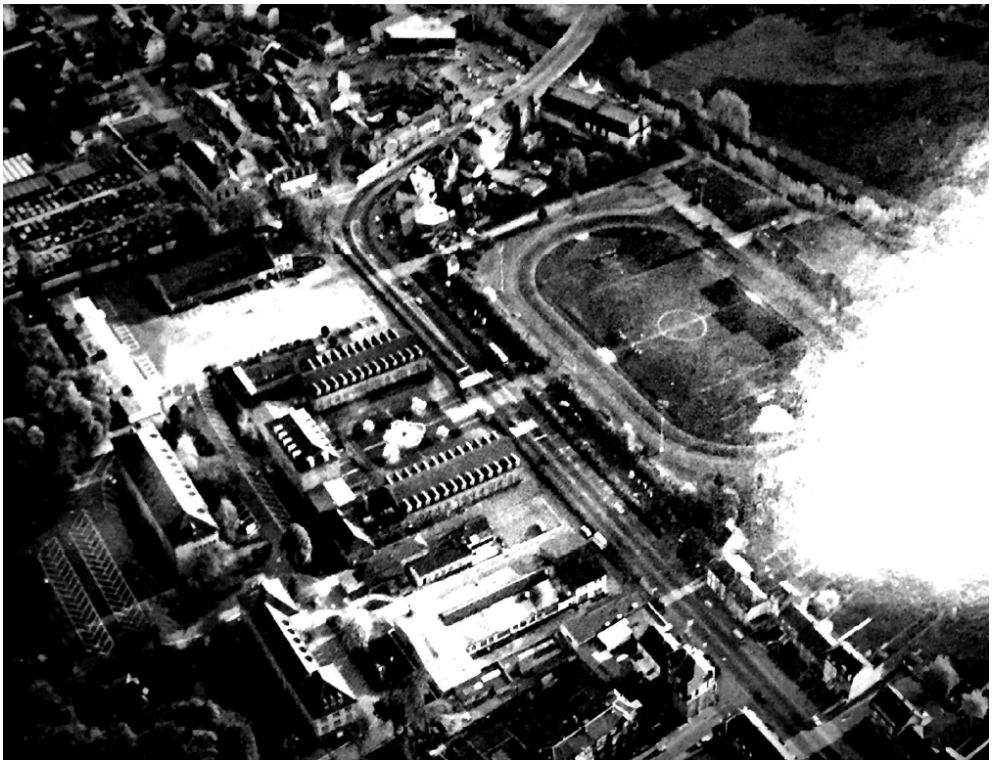


Figure 19: Aerial photograph of Walferdange with church and cemetery in the upper left.

(Unknown date; Source: Gesangvereine und Musikgesellschaft (1987: 480))

Figure 19 shows one of the few older photographs of Walferdange, allowing a glimpse of the cemetery. Unfortunately, the date of this photograph is not known to the author of this thesis and very little details are noticeable in this picture.

Returning to the historical origins of this village, the book *Walferdange – Histoire, Culture, Site Naturel* provides a brief overview of the history, which will be summarised here onwards (L'administration communale de Walferdange, 1993: 45ff.). According to this treatise, the area around Walferdange is an ancient settlement area. Local field names, such as "Am Mies", "Am Päärchen", "Tescht den Kueschten", "Op der Thonn" and the numerous archaeological finds apparently indicate a Roman heritage, according to the municipal administration (L'administration communale de Walferdange, 1993: 45). After the Roman times, the Franks took over the area; the settlements Bereldingen, Walferdange and Helmsingen were founded, forming what today is known as Walferdange. Until the French Revolution and after the impact of the developments in France also reached the Luxembourgish region, these settlements belonged to three different lordships: Bereldingen belonged to Koerich and before the French Revolution to the Count de Marschant von Ansemburg, Walferdange belonged to Count de Villers and von Batringen, while Helmsingen belonged to the monastery of the Holy Spirit in Luxembourg. Politically and clerically, all belonged to the parish of Steinsel under the auspices of the abbey St. Maximin in Trier, a circumstance which would not change until Walferdange became an independent parish in 1843 (L'administration communale de Walferdange, 1993: 46). Already

here, the interrelated and overlapping influences of French and German political and clerical powers that would shape Luxembourg until today become noticeable.

However, according to the same municipal overview, before the 18th century, these settlements had so little importance that they were not even noted on any maps. Only later, the importance and the relevance of livestock farming was mentioned, a trade that must have brought in a bit of prosperity, as the livestock could also be traded. Apparently, certain family names are especially linked to this trade, such as Conrardy, Elvinger, Feidt, Nesen and Kongs (L'administration communale de Walferdange, 1993: 46). In 1795, Luxembourg became part of France as Departement des Forets and it fell under the jurisdiction of Steinsel. After the Thirty Years' War, the population was approximately 150 people, – around 1700 there were 250 inhabitants and in 1806 there were 475 inhabitants, – living in 81 households (L'administration communale de Walferdange, 1993: 46). The population is described as agricultural for most of the past, with no major farms and mainly smaller farming families. Certain craftsmen, such as tailors, carpenters, cobblers, etc., were amongst them. No church but only a chapel existed throughout the 16th, 17th and 18th centuries; the chapel was dedicated to St. Georg and later to the Holy Trinity (L'administration communale de Walferdange, 1993: 46). In 1850, Walferdange became an independent municipality.

The reasons for this development in the 19th century with a growing population were manifold (L'administration communale de Walferdange, 1993: 47). As stated, from 1850 until 1879 Prince Heinrich made Walferdange his residence. The building of a railroad and, in 1929, the construction of a tram, sparked the industry and made it prosper. The relevant administrative needs as well as the growing prosperity of the nearby city of Luxembourg created additional jobs and led to a strong influx of people from outside. The villages were continuously extended and grew together. The relatively growing relevance of industrial and service-oriented jobs, especially during the 20th century, have led to a marginalisation of agriculture – today there is only one major farm left – and the proximity to Luxembourg currently makes Walferdange part of its suburbs, with a growing number of older inhabitants. Today's challenges are marked by these developments, mainly in terms of housing space, traffic infrastructure and the needs of an elder population.

Meintz (1987: 481ff.) elaborates on the current issues of the municipality, mainly resulting from a growing population also during the 20th century, the shortage of housing space and a lacking infrastructure. Clearly, many of these issues have already been addressed in several major projects, such as a town hall, public pool and athletic facilities. However, improvements continue until today. The growing population has also attracted more local business since the 1960s,

resulting in an overall higher tax income for the municipality, which made this infrastructure investments possible in the first place.

2.3.4 Konz

Only about 8 km south of Trier, Germany's oldest city, Konz, qualifies as a mid-sized city with a refined infrastructure and was, thus, promoted to full city status in 1959 (VG Konz, 2020b). Similar to Trier, the origins of Konz are traced back to Roman times. These origins are most prominently indicated by the remains of a Roman villa that can be found on the site of the St. Nikolaus parish church and the cemetery under scrutiny in Konz, which is built upon the remains of this villa (VG Konz, 2020b). Konz' Roman name was Contionacum and it was positioned on a prominent location where the Saar River and the Mosel River unite and on the road between Metz and Trier. Bridges crossing the Saar and Mosel underlined this location's prominence and relevance.

At the end of 2018, the city of Konz had a total of 18,348 inhabitants of whom almost 14% were foreigners. This translates into a population density of approximately 412 people per square kilometre (Statistisches Landesamt Rheinland-Pfalz, 2020a). In the same year, 259 people died, 149 babies were born but due to migration into the city a positive population balance was still achieved and, thus, the city is still growing modestly (Statistisches Landesamt Rheinland-Pfalz, 2020a). In 2018, the overall municipality also including the villages of Könen, Niedermennig, Krettnach, Obermennig, Oberemmel, Kommlingen, Filzen and Hamm had 32,288 inhabitants of whom 14.5% were foreigners, translating into a population density of 247.6 people per square kilometre (Statistisches Landesamt Rheinland-Pfalz, 2020b). In 2018, 342 people died in this municipal area and 265 babies were born; but again, due to migration there is an overall population growth of almost 8% (Statistisches Landesamt Rheinland-Pfalz, 2020b).

In terms of land usage, forestry and agriculture dominate in both the city and the municipal area (Statistisches Landesamt Rheinland-Pfalz, 2020b, 2020a). Regarding politics, although the Christian Democratic Union (CDU) is in charge of the city and municipality, the Green Party achieved extremely strong results as well (Statistisches Landesamt Rheinland-Pfalz, 2020b, 2020a). The city itself describes its economic main focus as resting on the three pillars of wine, commerce and tourism (VG Konz, 2020a). While wine is certainly based on its Roman heritage and related commerce is due to Konz' favourable climate and location, tourism often appears to be applied in regions that have little industry and require other sources of income than agriculture. Despite this, the third largest municipality in Rheinland-Pfalz is proud to have a stable economy and a growing population.

The Trier-Saarburg region in which the municipality of Konz is located has historically been mostly Catholic. According to data from the state's statistical offices (EWOISneu, 2020a, 2020b), in the

city, as in the rest of the municipal area, between 56% and 60% of the people are Catholic and about 8% to 10% are Protestant. One can safely assume that Islam is the third largest religious community.

It can be stated that Konz, – embedded in this region close to what is today Luxembourg and located where the Saar and Mosel unites, – has always been subject to numerous influences and has always been of strategic importance. Historically, especially during the last 200 years, the influence of France and the neighbour, Luxembourg, was strong.

In 1801 after the peace treaty of Luneville, the land situated to the left side of the Rhine River was officially handed over to the French, with Napoleon's troops securing the gains of territory factually already realised during the Revolutionary Wars in 1794 when French troops took Trier and Konz. An immediate effect foreshadowing the developments that followed this occupation, was the secularisation of church property, such as the well-known Kartäuser monastery. Around that time, the number of inhabitants of Konz was counted at 400 people (Molter, 2009: 258) and while oppressions against members of the church ceased and the parish of Konz was reorganised entailing more villages, remaining church property was auctioned for the benefit of the state during the years 1804 and 1805 (Molter, 2009: 258ff.). Farmers were now permitted to own land and any feudal burdens were lifted without compensation; however, such financial advantages were soon offset by the French introducing new taxes, such as property, occupational and even a window tax. Moreover, all males between the age of 20 and 40 were now subject to obligatory military service (Molter, 2009: 260), which did not contribute to the appreciation of the new French government. Wine played an important role, as the new classification of vineyards were introduced for tax reasons and the private ownership of land led to a generally better quality of vine (Molter, 2009: 259).

Generally, the society one encountered in Konz during the first few years of the 19th century and under official French rule is one that is almost entirely Catholic, with the church reduced in power. However, Konz is still able to maintain its societal influence. Economically this is an agricultural society relying on farming and wine as a main export product. Agriculture generally plays an important role for the people of this region, as the land situated within the municipal area was considered to be of good soil quality and consists of easy-to-reach fields. A three-field crop rotation system still dominated, alternating wheat, rye and barley as well as a time of rest for the soil (Molter, 2009: 263). The distribution of an estate amongst the heirs was problematic, since it resulted in smaller and smaller parcels of land, which became poorly connected and difficult to reach. New agricultural land had to be regularly gained through a process of removing the upper grass layers and burning remaining vegetation as well as fertilising with chalk. Modern farming methods were not yet widespread and production is estimated to have been around a third of

what it is today (Molter, 2009: 263). At the beginning of the 19th century, the greens and crop rotation is introduced, which makes forage crops more available. This provided more supplies for all kinds of livestock, which, in turn, provides more fertiliser allowing better harvests (Molter, 2009: 263). Generally, the local farmers' output is on the increase in those early years of the 19th century – mostly for wheat, barley, buckwheat and potatoes. However, innovations in farming are adapted very slowly (Molter, 2009: 265). According to a contemporary economic report for this specific region (see (Molter, 2009: 266), the Saar River is difficult to use for inland water transportation due to its limited depth. Around 1810, the overall municipality of Konz already has 1,626 inhabitants, which indicates a rapid growth and which could indicate generally prospering economic circumstances and good harvests (Molter, 2009: 266).

After Napoleon's withdrawal from his Russian campaign in 1812 and the defeat at Leipzig in 1813, the region becomes flooded with returning troops, many sick and/or wounded. Thus, typhoid and dysentery spread rapidly. In nearby Grevenmacher (Luxembourg), more than 300 people die in 1813 (Molter, 2009: 270). In January 1814, Prussian, Austrian and Russian troops occupy the area around Trier, including Konz. In February 1814, General York von Warthenburg crosses the Mosel River and heads for Luxembourg city (Molter, 2009: 271). Until 1815, Konz is officially part of an Austrian-Bavarian occupation zone before the overall region becomes part of Prussia after the Peace of Vienna in the same year.

However, the first few years under Prussian rule would become known as famine years (Molter, 2009: 271f.). Most likely as a result of the war but also crop failure and unfavourable climate, the death rate increases significantly. In 1814, for example, the church register of the St. Nikolaus parish church notes 56 deaths out of a city population of about 330. A normal average for deaths around that time would have been 15 to 18 people. The year 1816 was the coldest since official record keeping began and the harvest was destroyed by frost during late summer, while in early summer storms and rain had caused flooding (Molter, 2009: 272f.). The price of potatoes rises by more than 500%, infant mortality is about 40%. Moreover, the region is troubled by wolves. All in all, these years are marked by the population suffering significant hardships. Nonetheless, by 1818 the records show that the population has grown to 541 (Molter, 2009: 273).

With Napoleon defeated and the Restoration of the old regimes under way, it generally appears as if the economy is slowly picking up by 1819. The harbingers of industrialisation also appear to be on their way, as coal transports on the Saar River and the Mosel River begin to increase all the way to Metz and Cologne. A steam engine that is supposed to be used in a nearby coalmine arrives but cannot be assembled (Molter, 2009: 290). Despite such attempts, the floating of timber is still relevant, as the discussion concerning the canalisation of the Saar and Mosel now comes to a conclusion: The idea of building a channel between the Maas and the Mosel to gain access to the

Belgian and Luxembourgish coalfields is eventually abandoned (Molter, 2009: 293), as the general attempts to improve the navigability of the Saar and the Mosel during the 1830s took longer than expected.

The population continues to grow. By 1832, Konz already has 677 Catholic inhabitants (Molter, 2009: 293). Wine continues to be an important economic factor. However, following 1828, a series of harvest failures results in a general crisis in the region, which is made worse by high taxes and inflation that last well into the 1850s. In 1836, calls for help and support go unheard when, for example, the well-respected citizen and landowner, Nikolaus Valdenaire, – of French origin, – hands a petition to the Prussian crown prince upon his visit to the region, highlighting the economic situation as well as the farmers' and wine growers' desperate circumstances. For this he was imprisoned for six months, as his actions were considered an affront to the crown (Molter, 2009: 293f.). To make matters worse, the infrastructure, – especially the roads, – are considered to be in extremely poor condition and the region's location at the far edges of the Prussian Empire leads to a marginalisation that also affects economic ties across the Western border towards France. These economic ties hardly exist anymore and French businesses close down. 1837 is generally considered a year of famine and forced sales are common.

River transportation on the Saar and the Mosel is, however, still relevant at this point in time, as coal is transported up the river and iron and manufactured earthenware products are transported down the river to French and Dutch trading places (Molter, 2009: 295). A trip from Konz to Saarbrücken takes about four to five days under favourable conditions. Despite the water often being too shallow hindering shipping at times, these trade routes are relevant until the railroad takes over this role by the turn of the century, basically bringing shipping in this region to an end (Molter, 2009: 295). In 1839, the first steamboat passes Konz coming from Metz (France), marking the official beginning of steam navigation on the Saar by 1841. During the same year, the municipality of Konz counts 1,498 inhabitants of whom 1,473 are Catholic, two Protestant and 23 Jewish (Molter, 2009: 297). It is remarkable to note that Judaism is the second largest denomination before Protestantism and no one is registered without any religious conviction.

1846 marks another time of severe famine as well as poor social and economic conditions for the region's inhabitants. Taxes and tariffs as well as the resulting lack of competitiveness with products from other German states and draconic punishments for taking necessary firewood from the state-owned forests create a general anti-Prussian sentiment and civil unrest, adding to the overall turmoil created around the March revolutionary movement of 1848/1849 in many German states. The Valdenaire and Wallerath families are amongst the names that are popular with the revolutionary movements, as they are also considered befriended with Karl Marx

(Molter, 2009: 300). To add to the difficult times, cholera rages in Konz, causing an increase of the death rate.

Of great importance for the economy and further development of the region is the construction and commissioning of the Saartal-Railroad from 1856 to 1860 (Molter, 2009: 303f.). The main reasons for this railroad that was located exclusively on the Eastern side of the Saar and Mosel was of military-strategic as well as economic nature. It was necessary to create a link to the fortification in Luxembourg city as well as access to the coalfields in the Saar region and the manufacturing facilities of Villeroy and Boch in Mettlach. By 1858, the Saar-Mosel railroad bridge near Konz is completed. The significance of Konz as a railroad hub for the overall region is still relevant and visible today. At that time, this railroad caused a massive influx of people from other regions. These people aimed to benefit from a potential economic boom despite the population's general economic hardships as well as another cholera epidemic in 1866 and a resulting emigration movement of many towards North America.

The Franco-German War of 1870/1871 caused more hardships for the population that was already used to hardships by bringing about troop movements, quartering of troops and the requisitioning of horses and carriages (Molter, 2009: 314f.). The drafting of men into war during harvesting season as well as the unfavourable climate during summer caused a sharp increase in food prices. After the German victory, the railroad is significantly extended in the region and keeps increasing in its economic significance (Molter, 2009: 325ff.). This again leads to a change of the population's demographic composition not only in terms of new families immigrating but also religion. For 1897, the priest of St. Nikolaus, Heinrich Schmitz, notes 3,790 people in the parish, which includes 2,377 Catholics, 280 Protestants and 49 Jewish for Konz itself (Molter, 2009: 346). This means that the building of the railroad together with its related influx of people from other areas of Germany altered the demographic composition, increasing the number of Protestants absolutely and relatively. The impact of industrialisation is finally also demonstrated with a bit of actual production taking place in Konz in the form of the Hubert-Zettelmeyer-Konz steamroller plant (Molter, 2009: 342f.). In the year 1913, a few of the jobs most popular in Konz are metalworker (15.12%; most of these metalworkers work for Zettelmeyer or the railroad), assistant conductor (9.98%), conductor (7.30%), engine driver (5.28%), farmer or wine grower (5.20%) and 3.46% have no specified profession (Molter, 2009: 362f.), underlining the relevance of the railroad and offering an interesting insight into the social-occupational structure, as one can observe a shift from agriculture towards industrial occupations.

With the beginning of the First World War on 3 August 1914, the region around Konz becomes a concentration area for the Western operations involving a corresponding number of troops flowing through and the protection of critical infrastructure like the Saar and Mosel river bridges

by the military. At this point, the municipality has 6,025 inhabitants of whom 3,050 are employed at the railroad (Molter, 2009: 366). The duration of the war causes shortages of all sorts of food and supplies – especially metal – already as early as 1915, which is evident from rationing and collecting urgently needed material and supplies (Molter, 2009: 366ff.). The situation at the front line becomes visible with the returning wounded and the dead. Canon fire from Verdun can also be heard as far as Konz. War is also present when French airplanes attack near Karthaus and the Euren airfield in 1915. Enemy air raids would continue on Trier and Konz during all the years of the war and spread terror amongst the population. In 1916, food was rationed severely. Each person was permitted a maximum of 200g of meat per week (Molter, 2009: 367f). Starvation and the general lack of supplies become a serious problem during the extremely cold winter of 1917. Although Konz was not subject to immediate fighting, it was a back area for Western front operations and subject to bombing. After the ceasefire on 11 November 1918, Konz was flooded with soldiers of whom many were wounded. During the war, Konz lost 52 men in battle. Already on 1 December 1918, US troops enter the region under General Pershing in order to control strategically relevant points (Molter, 2009: 370). These troops will be relieved by French ones in 1919.

The years immediately after the war are again marked by shortages of food and supplies and the general hardships under French occupation. A major problem is inflation setting in. Settlers who had moved to Alsace-Loraine after 1871 are forced out by the French and return to the Konz region. Despite this, the Konz municipality counts 8,019 inhabitants in 1921.

The French occupation and the French government's attempts to permanently occupy the left side of the Rhine River as well as increasing reparation demands in the aftermath of the Versailles Treaty relentlessly worsen the region's situation. In 1923, the population reacts with passive resistance to which the French responds with confiscations and evictions of entire families. In the same year, the infamous inflation reaches its peak. One pound of butter, selling for 11.20 Reichsmark in 1920, now costs 1.4 billion Reichsmark (Molter, 2009: 377). After the introduction of the Rentenmark, inflation comes to an end. Many people have lost everything as a result of the inflation but the economic situation improves again. Nonetheless, for Konz the moving of the switch yard from Konz to Trier in 1925 is problematic, as a number of people lose their jobs (Molter, 2009: 377f.). By 1928, the worldwide economic crisis, especially in terms of job losses, also becomes visible in Konz when 116 families working for the railroad, i.e. 502 persons, move away (Molter, 2009: 381).

The people of this region, under strong influence of the Catholic Church, tend to vote for the Zentrum party (50.9% in 1932). However, also in Konz the Hitler’s NSDAP becomes more and more powerful until, in 1933, Hitler becomes Chancellor of Germany and in 1936 the Wehrmacht

enters the region again, making Trier a garrison city. In 1935, despite efforts to return people to jobs, Konz still suffers from a downturn in the railroad business. By 1921, for example, more than 3,100 people were working for the railroad but by 1935 there were only 565 left (Molter, 2009: 391).

Commencing in 1938, the construction works of the Westwall are remarkable (Molter, 2009: 400ff.). Major infrastructure in terms of tank barriers and bunkers required a large amount of workers to be transported to the region, creating a lot of consumption and, thus, income for the locals. When the Second World War began in the West, many people of Konz had to be evacuated from their homes and could only return in October 1939. The first years of the war was mainly marked by food and supply shortages. On 11 May 1944, however, Konz becomes the victim of a US air raid: 51 people die, 1,170 people lose their homes, the archive in the municipality building is entirely lost (Molter, 2009: 425ff.). By September 1944, Konz is under allied artillery fire (Molter, 2009: 439) causing severe damage and by March 1945 Konz is taken by US troops.

The after-war years are marked by severe shortages of many necessities, damaged and dismantled infrastructure, men still being prisoners of war, streams of refugees and the cold winter of 1946/1947 (Molter, 2009: 456ff.). In May 1945, the overall municipality counted 7,315 inhabitants compared to 14,306 in 1939. The years immediately after the war are marked by survival but also the renovation of important infrastructure and administration (Molter, 2009: 476ff.). In 1950, the municipality counted 12,743 inhabitants. In 1956, the railway workshop in Konz is closed for good, ending this industry and, thus, its importance for this region.

A historical event for the parish that has especially shaped the overall cemetery and also allows a bit of insight into the specific social circumstances of the local population during the time after the Second World War was the demolition of the church built in 1873 and its substitution with a larger, modern church building. The previous neo-Romanic building was designed according to the plans of the Luxembourgish architect, Charles Arendt These plans included the original 15th century tower from a previous church on the same location as well as the further remodelling of the church in the 17th and 18th century (Katholische Kirchengemeinde St. Nikolaus, Konz, 1961: 25). Demolition works began in 1958. In 1959, the construction of the new church began and it was officially completed with the consecration in 1961 (Katholische Kirchengemeinde St. Nikolaus, Konz, 1961: 21). The main reasons for this new church were threefold (Katholische Kirchengemeinde St. Nikolaus, Konz, 1961: 9ff.; Molter, 2011: 25ff.): Firstly, the material of the vault and the brickwork of the previous church were of a lower quality than expected and therefore required attention (Mayers, 1986: 27). Secondly, as a result of the city and parish constantly growing, the previous church no longer provided enough space for the churchgoers. A count conducted in 1957 showed that, on a Sunday, 2,400 people would attend the service, while

only 300 seats were available (Mayers, 1986: 26). Lastly, heavy bombing and artillery fire during the Second World War had caused great structural stress on the building, which became worse over time. In 1958, a police order closed the church because of the immediate danger to its visitors.

According to the 1961 *Festschrift* on the occasion of the new church's consecration, the following constructions can be documented (Katholische Kirchengemeinde St. Nikolaus, Konz, 1961: 28):

- A church in 1330,
- the 1480 addition of a tower, still visible today,
- a complete rebuild in 1659,
- a new church building in 1725,
- the church built in 1873, and
- lastly, the current church building completed in 1961 according to the plans of the architect, Hermann Baur, from Basel.

The constant use of this site and its constant reconstruction allow the inference of a growing and flourishing, – over many years predominantly Catholic, – parish with obviously enough financial resources and/or enough relevance to afford such endeavours. According to Marx (1986: 66), Konz had about 200-300 inhabitants in 1563. By 1621, the population had not grown by much more and after the Thirty Years' War there was a decline of the population to 160-260 people or about 33 houses. In 1787, 353 people are registered. The same author also refers to Jakob Marx' historic overview of the diocese of Trier's parishes when he indicates the rapid growth of Catholics during the 19th century: In 1828, 465 Catholic inhabitants were counted in Konz alone, a number that doubled by 1866, making a larger church necessary (Marx, 1986: 79). In 1901, the overall parish already counted 4,016 Catholics and in 1912 5,792 Catholics.

These reconstructions of this site are important, as they might also have impacted on the cemetery: For example, for the current church building finalised in 1961, it was also necessary to move 58 grave sites, as they were located on the planned footprint of the building (Marx, 1986: 28; Molter, 2011: 12). Likewise important is that by 1962, soon after the opening of the new church and after also extending the cemetery, it was now also permitted to bury Catholics and Protestants together and not in separate areas of the cemetery (Molter, 2009: 527). By 1959, Konz is officially declared a city (Molter, 2009: 519ff.). By 1964, the Mosel River can finally be used for larger shipping.

Figure 20 to Figure 27 show a few current and historic photographs of Konz where the cemetery is visible. From Figure 21, Figure 24 and Figure 25 one can gain an impression of the materiality that was present during the early 20th century. The materiality mainly consists of high crosses on

pedestals. The actual material is difficult to identify. Presumably, it is mainly sandstone and bluestone. Interestingly, Figure 21 shows that a portion of the area below the cemetery wall was not yet used. Figure 21 and Figure 22, on the other hand, show that there was a part of the cemetery right next to the old church building and that the hill opposite the church building was already in use as a cemetery, at least during the 1930s.

Figure 20: View from Pilsert onto the old parish church in Konz and the cemetery around 1910.

(Molter, 2009: 322)

Figure 21: View from the train station onto the old parish church in Konz around 1920.

(Molter, 2009: 323)

Figure 22: View from the train station onto the old parish church in Konz around 1938/1939.

(With the priest's home on the left and the garden in front. (Molter, 2009: 395))

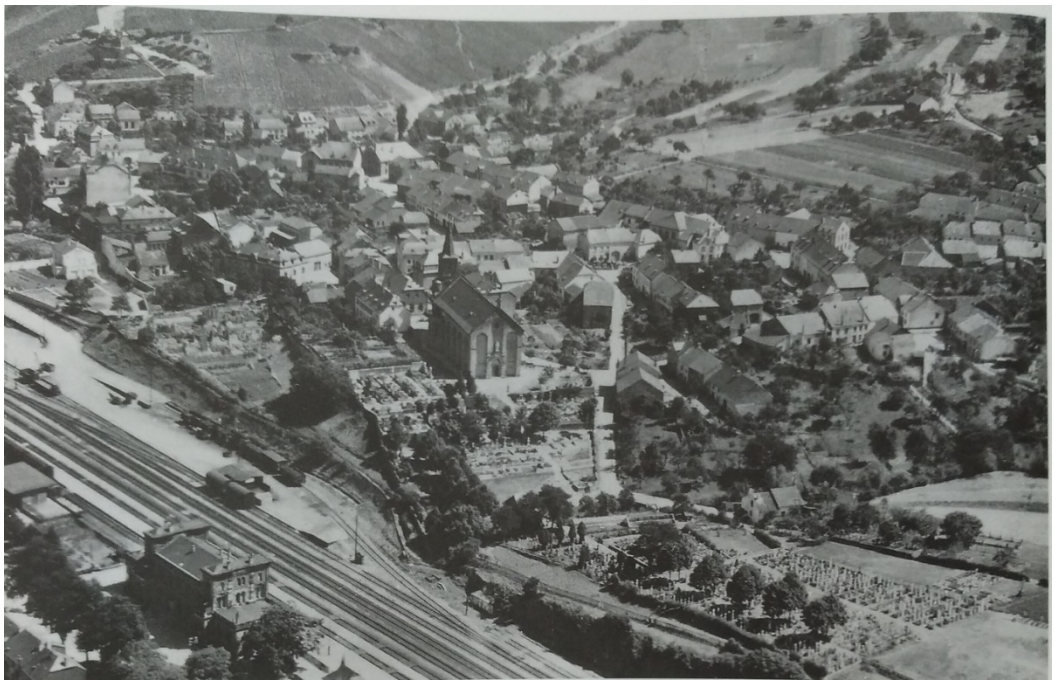


Figure 23: Aerial photograph of Konz and cemetery, 1937.

(Molter, 2011: 20)

More details are visible in Figure 24 and Figure 25.

Figure 24: View downhill from parish church in Konz, with the former market garden in the centre.

(Around the 1950s; Source: Molter (2009: 496))

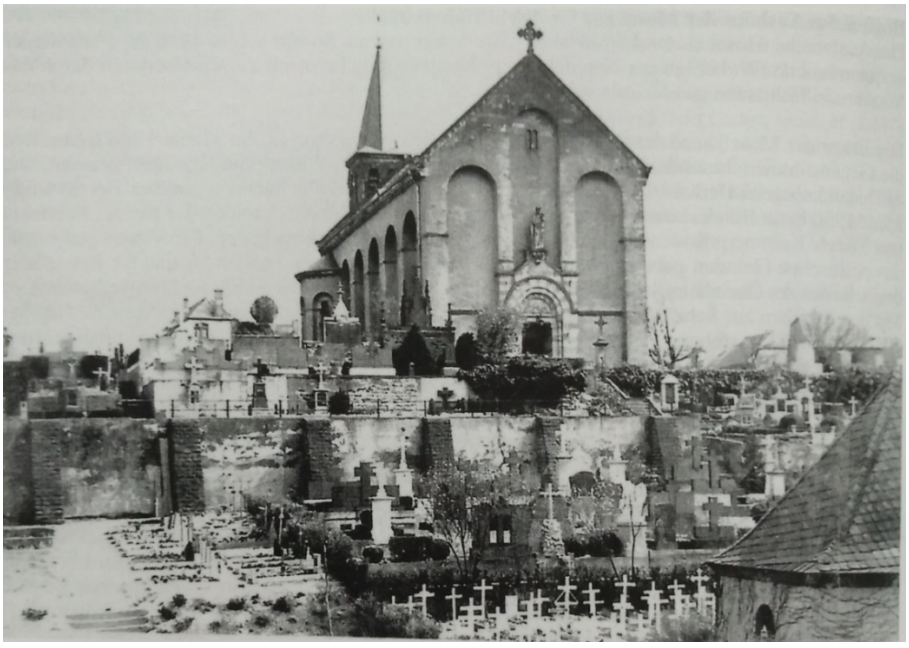


Figure 25: View uphill towards the old parish church in Konz before its demolition in 1958.

(Molter, 2009: 512)

Oncea again, high crosses on pedestals dominate. In Figure 25 the grave sites in front appear poorly organised and give the impression of having simple crosses on top. None of these appear to have survived.

Figure 26: View of the new church building in Konz, unknown date.

(Molter, 2009: 526)

Figure 27: Aerial photograph of Konz St. Nikolaus church in 1969.

(Molter, 2011: 32)

Figure 28: View downhill from Konz St. Nikolaus church onto the cemetery in 2016.

(Source: Author)

Figure 24 allows to compares the situation at the cemetery as it was around the 1950s with that of 2016 as shown in Figure 28. As can be seen, not only the materiality but also the infrastructure, – the market garden is now substituted with a morgue, – has changed dramatically.

2.4 Grave Monument Industry

When it comes to the changes that the funeral culture underwent in Luxembourg since 1800, Kolnberger (2017a: 849) states that these changes enables us to analyse the " (1) […] incomplete transition from a traditional (rural, agrarian) to a modern (secular, urban, industrial) funeral practice; (2) to ask whether the modernisation of sepulchral practice, particularly of cemeteries, points to a specific area of secularisation or to a more general transition; and (3) to show that modernisation, i.e. the road towards modernity, represents a continuous and open-ended process resulting in a multitude of modernities". Basically, he appears to refer to a tautological development of funeral culture in Luxembourg as a small state surrounded by relatively larger states, especially France and Germany, that has led to specific characteristics, which are distinct from other states. To be more specific, he continuous that "[…] Luxembourg's foreign relations and its exposure to the vagaries of international politics, issues of security, economic competition, as well as national identity in the past and the present, are shaped by an attentiveness to external demands, which also materialised in sepulchral culture. The Luxembourg's small size, also in sepulchral affairs, therefore needs to be conceptualised in terms of the country's internal features (size, population, economy, religious traditions) and in terms of its relations with other states"

(Kolnberger, 2017a: 850). Consequently and concerning the region under scrutiny for this thesis, one has to acknowledge that the German and Luxembourgish funeral culture has influenced each other but that the Luxembourgish one also shows influences from France.

With regards to the stonemason's industry, how it works and the historic reasons for that, unfortunately very little material has come to the author's attention. It is remarkable, though, that when one searches with search engines for grave monuments in Luxembourg and in the immediate border region in Germany, the results are quite different. Not only does there appear to be, except for the notable mentioning of one stonemason from Trier, no overlapping offers, – i.e. stonemasons that officially offer the same products on both sides of the border, – also the type of company appears to be very different. In Luxembourg, the stonemason companies appear to be medium-sized and larger companies with strong international value chains, collaborating with undertaker businesses and providing a standardised product assortment. While such corporations also exist in Germany, the relatively larger number of small and medium-sized businesses and craftsmanship stonemasons offering individual grave monuments crafted to individual design concepts and local material stands out. As highlighted elsewhere in this thesis and as will also be illustrated below, a possible explanation for how the stonemason's industry developed in Germany could be the reform movement's impact during the first half of the 20th century on Germany's funeral and grave marker culture; apparently the reform movement did not have a notable impact in Luxembourg. On the contrary, in Luxembourg there appears to have been a much stronger concentration and consolidation of the funeral industry. This entailed moving away from small craftsmanship towards industrially run small and medium-sized enterprises, including stonemason businesses. In Germany, by contrast, grave marker crafting and sales, even of mass-produced samples, still takes place on a local, often relatively small-scale level.

While the idea of differences between diverse funeral cultures also impacting on grave marker design is one of the next chapter's subjects, the question arises what other data would support a different development to that which the stonemasons have historically taken in Luxembourg and Germany? During the course of data collection for this doctoral thesis, a number of interviews have also been conducted with stonemasons on both sides of the border. These interviews are part of and are stored in the Project Archive RIP of the research project entitled "Material Culture and Spaces of Remembrance – A Study of Cemeteries in Luxembourg in the Context of the Greater Region". Although the historic development of the stonemason's industry and/or a particular company was not the subject of the interviews, it was notable that the Luxembourgish stonemasons mentioned a concentration and institutionalisation of funeral culture via the large undertaker businesses in Luxembourg, the *Pompes Funèbres*, as well as the integration of their industry into an international network and supply chain that favoured a consolidation of small

business into larger organisations. This is so simply because corporate size compensated for the relatively smaller market power of a small state like Luxembourg, i.e. the larger the local Luxembourgish company, the better business conditions could be negotiated. In Germany, on the contrary, the local market was always large enough to also support smaller businesses and craftsmen. More relevant, however, was the organisation of craftsmen in *Innungen*, – or guilds, – that could counterbalance the relative smaller size of the craftsmen's businesses within the overall market, while at the same time supporting the local craftsmen and protecting their businesses against too much influence from larger, international businesses. Together with the impact of the reform movement that favoured small-scale, local production and craftsmanship over industrial, global production, – a notion that is still present today, – this resulted in the survival of craftsmanship and small stonemason's businesses on the German side of the border and a dominance of larger, fully industrialised companies on the Luxembourgish side of the border. The interviews contained in this project's archive, summarised above, are under disclosure by the project leader to ensure full anonymity of the interviewees and confidentiality of this sensitive data.

The process of accessing the stonemason with a request for a grave monument is the same on both sides of the border: In the event of a death, a stonemason is contacted – usually in the context of funeral preparations. In an interview conducted with a Luxembourgish stonemason (Interview Stonemason S5, 2017), this process is described as the bereaved entering the business premises, sometimes by appointment but often without, and requesting a grave monument. After clarifying the available budget, the bereaved look at showroom samples, the stonemason's own catalogue and industry catalogues in order to clarify the design and material choice as well as any paraphernalia that are required. The result is an offer that details the design, material, paraphernalia and price. Upon agreement, the stone is ordered, – usually globally, –customised if needed at all in the local workshop and set up in the cemetery approximately a year after the funeral. Stonemason S9 (2017) in Germany confirms this process exactly, also confirming that the duration of such a sales talk is approximately 30 minutes to two hours. Customers usually consult several stonemasons in order to compare prices and are concerned about the maintenance work required. The catalogues have a key role when choosing a design. At times, a joint meeting and/or visit at the actual cemetery might be conducted in order to inspect the grave plot and other available grave monuments that are present and might be to the customer's liking.

While this procedure is true for small and medium-sized enterprises on both sides of the border, two craft stonemasons in Germany, S8 (2016, 2017a, 2017b) and S10 (2017), highlight the role of grave marker design and the crafting process in the grief and commemoration progression. They are concerned about their own craft and skill and whether the grave marker they design mirrors the deceased's individuality; the two stonemasons are also concerned about the overall design

and crafting procedure as a means for the bereaved to deal with loss and grief. Standardisation and business aspects are less important than the bereaved's needs and the stonemason's craftsmanship. The process can take up to several hours per meeting, with several meetings over the course of months.

While it might appear obvious that the different processes can lead to different results, – but may also attract different customers, – what might be the historic reasons for the presence of these different types of businesses? Trompette (2011) analyses the development of the French funeral market since the 1800s. His analysis indicates a strong consolidation development not only fuelled by the state-church interplay but also by the role of the entrepreneur. In a first phase from the Year XII Prairial Decree promulgated by Napoleon in 1804, until 1880, this provided the "first legal framework for the way the funeral parlour monopoly was to be run, awarding this monopoly to the vestries (fabriques)" (Trompette, 2011: 17). Trompette continues as follows:

"In Paris and its suburbs, as well as in other major French cities, the following decades witnessed the emergence of a broad range of organisational set-ups for the administration of funerals: the vestries grouped together into unions, the organisation was entirely or partially abandoned to the municipal authorities (Lyon), or there was a leasing arrangement with a company covering all or part of the service. Each solution was the result of local political history, including the conflicts between the clerics and the republicans, the relations between civil and religious administrators, but also aspects specific to the population (proportion of paupers within the municipality or between bordering municipalities)" (Trompette, 2011: 18).

Professionally set up funeral companies solved the problems of a professional, modern funeral service of the post-revolutionary era and created profits for themselves and further stakeholders. In a second phase from 1880 to the 1950s, "[…] the funeral market developed alongside the appearance of the first large undertaking businesses. These were initially concentrated in Paris and its suburbs" (Trompette, 2011: 23), a trend that continued in a third phase from the 1950s to the 1990s. While it is not the within the scope of this thesis to criticise or evaluate the complex political, institutional and public interplay with regards to the consolidation of the funeral industry in France, this development is remarkable and distinct from Germany where such a trend only recently appears to be repeated on a smaller level and under different circumstances – and with an unknown outcome (cp. Daumann and Breuer, 2009). That this development in 19th century France might have had a significant impact on the Luxembourgish funeral culture as well, is illustrated by the impact of related movements in the context of 19th century reforms in funeral culture (cp. Harison, 2008: 156ff.). Yet again, this development is by no means natural or inevitable as is evident not only from the development in Germany but also from Trompette's (2013: 370) consideration of the "… articulation between the formatting of economic value and

the pursuit of political concerns" within the relations between the *Pompes Funèbres* and the other institutional actors involved in such a process. What is important to note here is that it appears as if the funeral culture in Luxembourg shows a stronger French influence than a German one, at least in the region under scrutiny.

Based on interviews with stonemasons in Luxembourg and Germany, it has been noted before that grave marker catalogues, usually provided by larger retailing businesses, play an important role in presenting and selling grave markers to the bereaved. Moreover, the author noticed a surprisingly large body of literature that has been written in Germany for stonemasons, educating them about necessary skills and the latest trends in the industry. Especially for those stonemasons relying more on pre-fabricated grave markers and less on actual craftsmanship, these catalogues will provide an important basis for the sales process.

Historically speaking, these catalogues appear to have been around since at least the second half of the 19th century, i.e. during the early peak of industrialisation in Germany. The author of this thesis identified a number of sources that are, however, not necessarily specific to the region under scrutiny. Lacking any extensive chronological overview to date and since the author of this thesis had to request related literature from a number of antiquarian bookshops and private collections, such an overview can only be selective and cursory, and by no means has any claim to be complete.

Examples of the German stonemasons' educational approach are the reprint of the original *Der Steinmetz* book (Opderbecke and Wittenbecher, 1912) in which young stonemasons are introduced to the general architectural concepts and techniques of their craft, and the work by Thiele (1912) in which he suggests selected grave monuments as samples to the stonemason, based on several public exhibitions by the Dürer Society. Similarly, the seminal Grässel (1913) has been extremely influential with regards to the related reform movement and his assessment of contemporary cemetery and grave marker design. This work appears to have been a must-read for many stonemasons and their educators in the German craftsman educational system. The stonemasons' educational background is also underlined by works such as Otto's (1949) focusing on materiality of masonry and also a number of other works, such as Gaedke's (1979), Kolbe's (1983) and König's (1990) dealing with the legal dimension of grave monuments, i.e. any possible legal limitations and the context of the cemetery regulations that might be relevant to the stonemason.

The utilisation of catalogues has been common for an extended period of time since the 19th century, although the author is not able to determine an exact date. The earliest sample he could obtain is the *Bildhauerkalender* of the Sächsische Glasmanufaktur C. Hey in Rosswein, which obviously was a promotional gift to a stonemason, promoting paraphernalia products that the

company produced (Sächsische Glasmanufaktur C. Hey, 1911) (e.g. Figure 29). As can be seen here, stylistically this porcelain appears to be still very far removed from any of the reform movement's ideals.

Figure 29: Examples of porcelain paraphernalia.

(Sächsische Glasmanufaktur C. Hey, 1911: 85)

Published between 1925 and at least 1926, the publication called *Das Deutsche Grabmal* focusing on grave monument design and aiming at establishing the reform movement ideals in masonry, was not a catalogue but without any doubt influential, read by stonemasons and in context of the reform movement. Examples of such ideals can be found in the catalogue of the Rupp and Moeller Steinwerke (Steinwerke Rupp and Moeller, 1928). As Figure 30 shows, the grave marker is simple, clear cut, with modern engraving and neutral, i.e. non-denominational, symbology. The material here appears to be a granite, though, which is less in line with reform movement ideals. However, these publications point out that the material is still from German production.

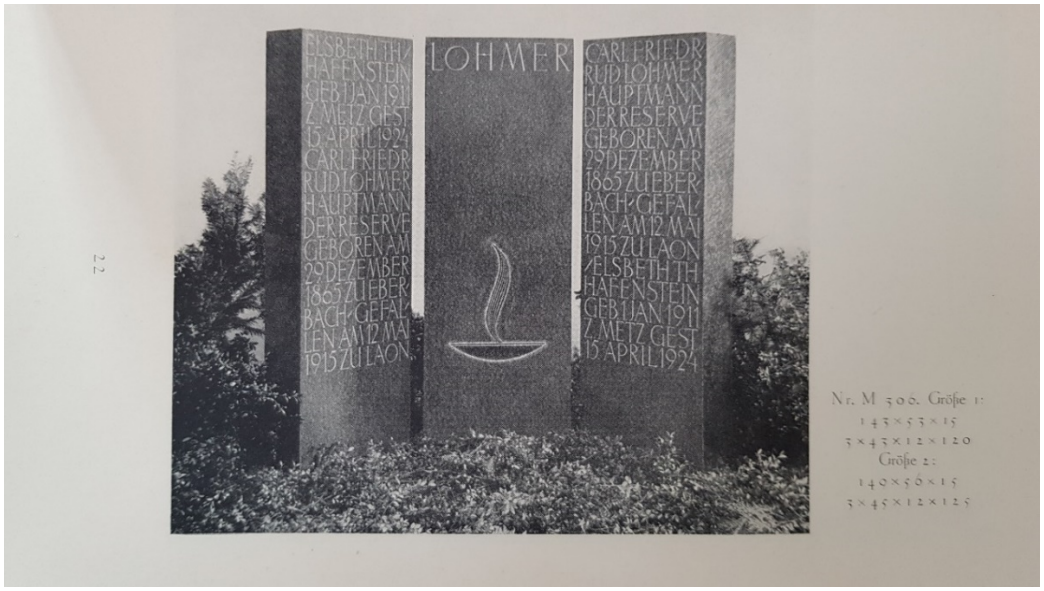


Figure 30: Example of a reform movement grave marker 1928.

(Steinwerke Rupp & Moeller, 1928: no page number)

The idea of a design for the stele appears to be dominant until the 1930s at least as is evident from samples published in the brochure of the Verband Deutscher Granitwerke e.V. (Verband Deutscher Granitwerke e.V., 1935). As Figure 31 shows, domestic granite is again dominant with a lean and simple design, concentrating on the most essential.

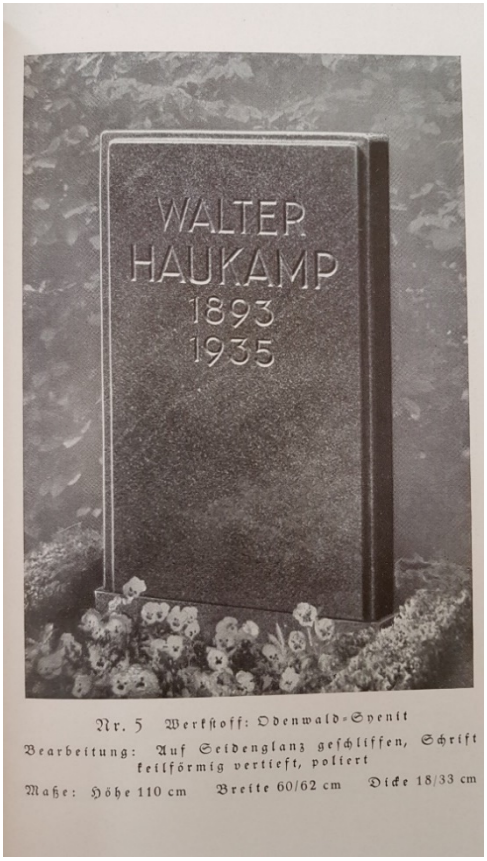


Figure 31: Example of a reform movement grave marker 1935.

(Verband Deutscher Granitwerke e.V., 1935, no page number)

Choosing domestic material, limestone is often displayed in Ulrich's (1933) work. Again, it is a simple headstone with neutral symbology and a clear inscription in a modern font (see Figure 23).

Figure 32: Example of a reform movement grave marker 1933.

(Ulrich, 1933: 63)

A difference can be found in the catalogue of KBL Natursteine (KBL Natursteine, 1929) where most samples show a conventional headstone design with the headstone made of granite and often having a rounded top as shown in Figure 33.

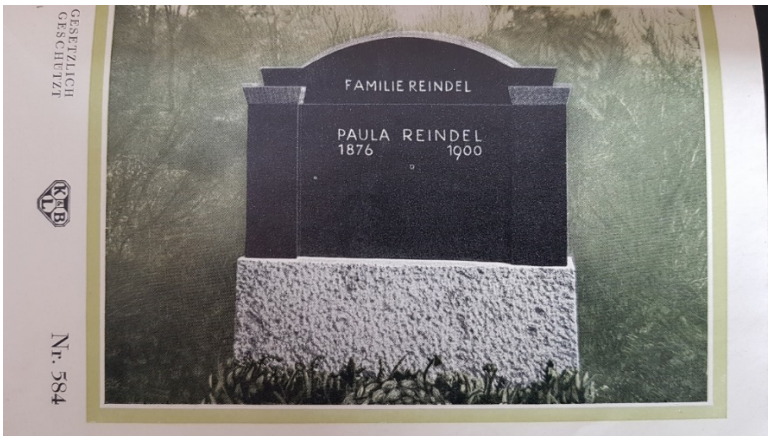


Figure 33: Conventional granite headstone design.

(KBL Natursteine, 1929)

As will be shown later in this thesis, this conventional, industrial design might have been more influential for the actual assemblage at the cemeteries than the design samples found elsewhere.

Nonetheless, as the document published by the Reichsinnungsverband des Bildhauer- und Steinmetzhandwerks (Reichsinnungsverband des Bildhauer- und Steinmetzhandwerks, 1939) shows, the reform movement's impact on the cemetery regulations in Germany during the 1930s and 1940s, especially under the nationalsocialist rule, was strong. All the samples in this file show the design trades of the reform grave marker (e.g. Figure 34): the use of domestic materials and a strong emphasis on one's trade, profession, military service, etc. It must be highlighted again that actual samples of such examples appear to be scarce in reality; the other possibility is that they have not survived, i.e. that they have been destroyed.

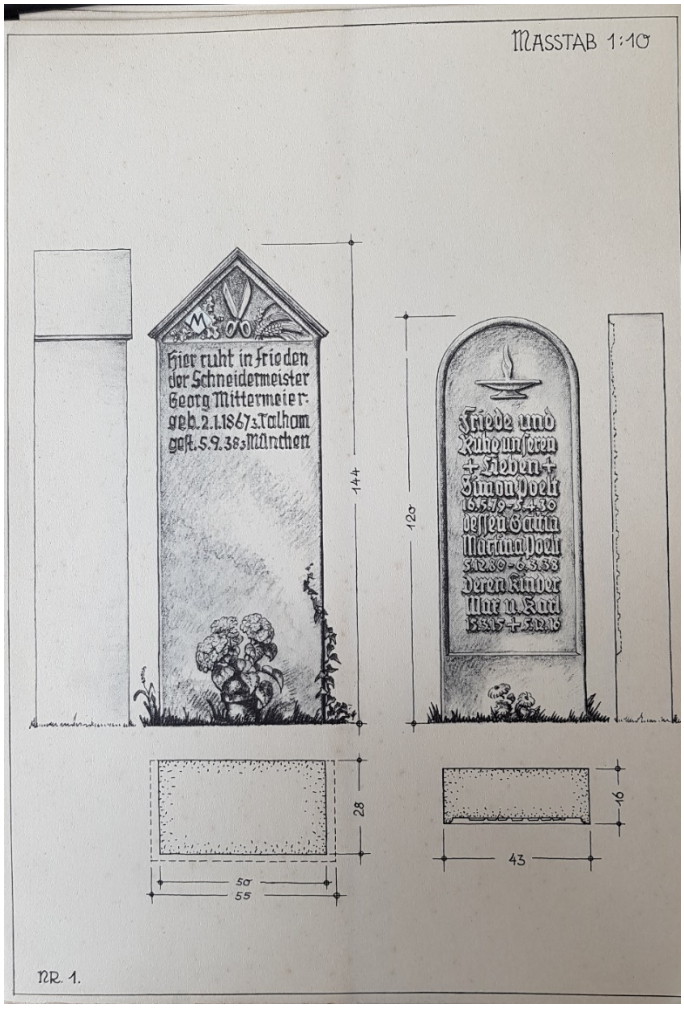


Figure 34: Grave marker draft from 1939.

(Reichsinnungsverband des Bildhauer- und Steinmetzhandwerks, 1939)

There appears to be a distinction between publications that were published during the nationalsocialist rule and catalogues that aim at an audience who is interested in architecture and the like and that focus on the customers, i.e. also the publications that first and foremost serve to educate the stonemason, thereby functioning as a sales tool. There appears to have been string

lobbying by the larger industrial companies, offering not the crafted samples but industrially produced and globally sourced grave monuments.

For the post-World War Two era, the publication by the Verband der Granitindustrie und Grabmale (Verband der Granitindustrie e.V., 1960) appears to have set standards. If one compares the available assemblage, even in today's cemeteries, and a number of the most characteristic samples of grave monument design, they are very well presented here as Figure 35, Figure 36 and Figure 37 show. Figure 35, Figure 36 and Figure 37 also mirror a bit of the typology that could be found during the CSA development process. Most models show the use of black granite, simple, clear-cut shapes with rounded corners, a flat or rounded top or even the left-to-right sloped top, all examples that dominate the sample of the 1960s and 1970s at the cemeteries in the region under scrutiny.

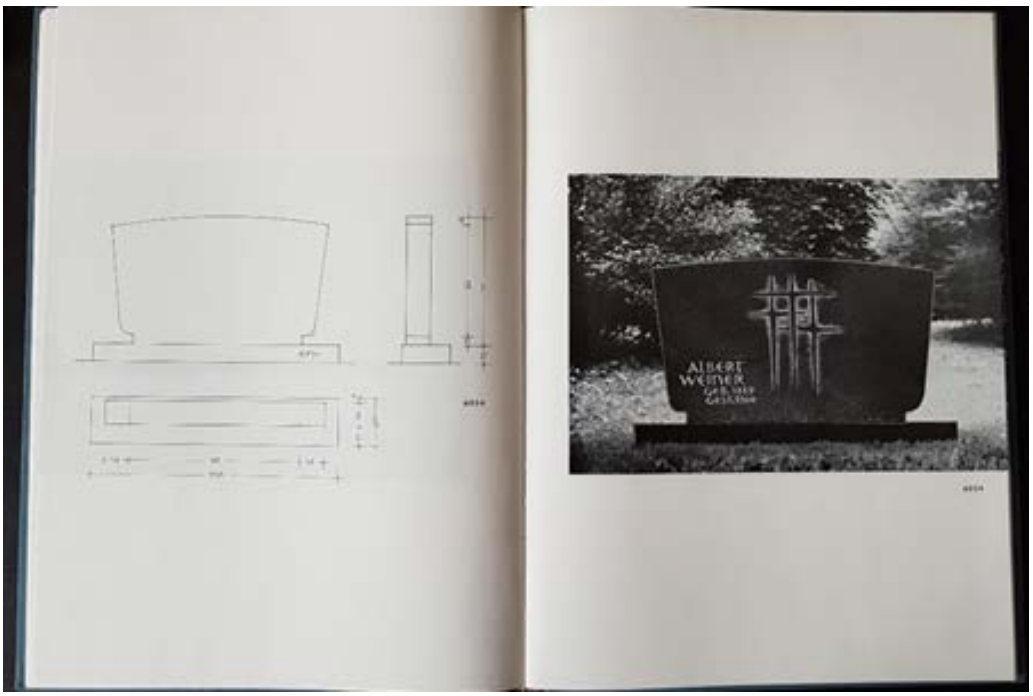


Figure 35: Headstone design around 1960 (1).

(Verband der Granitindustrie e.V., 1960)

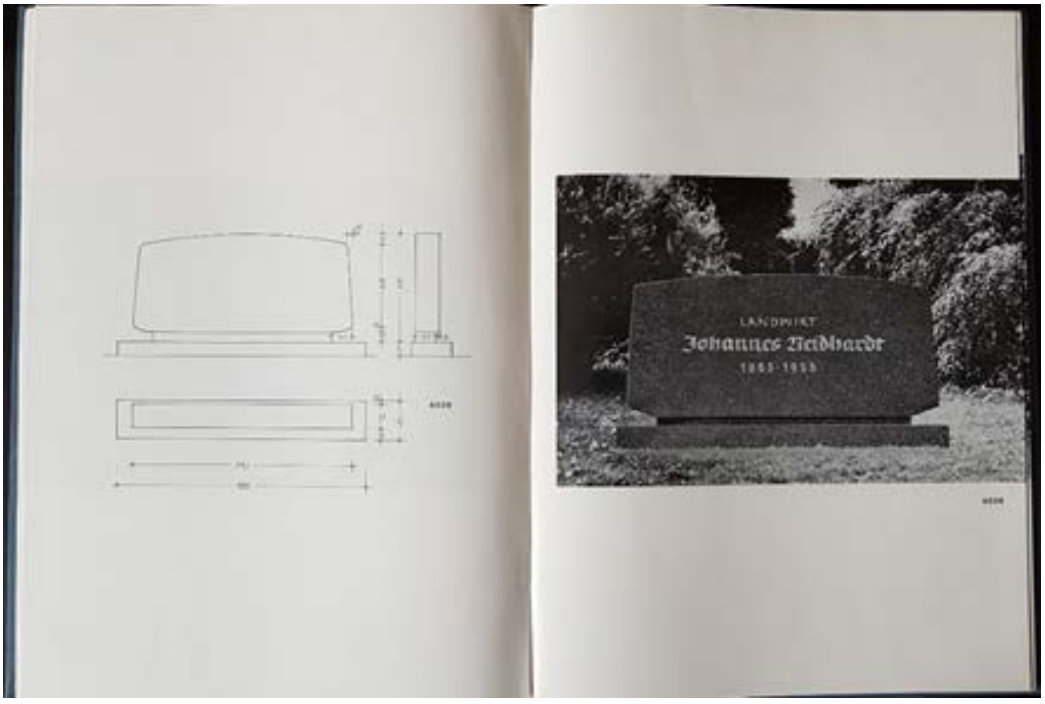


Figure 36: Headstone design around 1960 (2).

(Verband der Granitindustrie e.V., 1960)

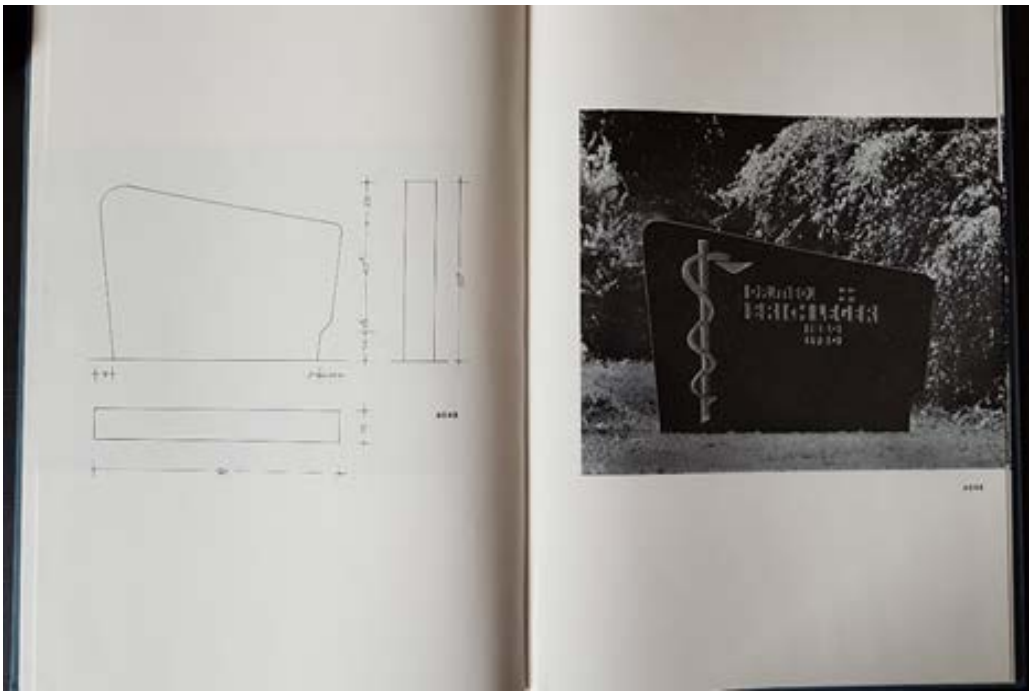


Figure 37: Headstone design around 1960 (3).

(Verband der Granitindustrie e.V., 1960)

In contrast to these catalogues, the work of Wanetschek and Wanetschek (1988), for example, again draw an idealistic picture of modern grave markers made by craftsmen (e.g. Figure 38). These grave markers are rarely if ever encountered at cemeteries in the region under scrutiny.

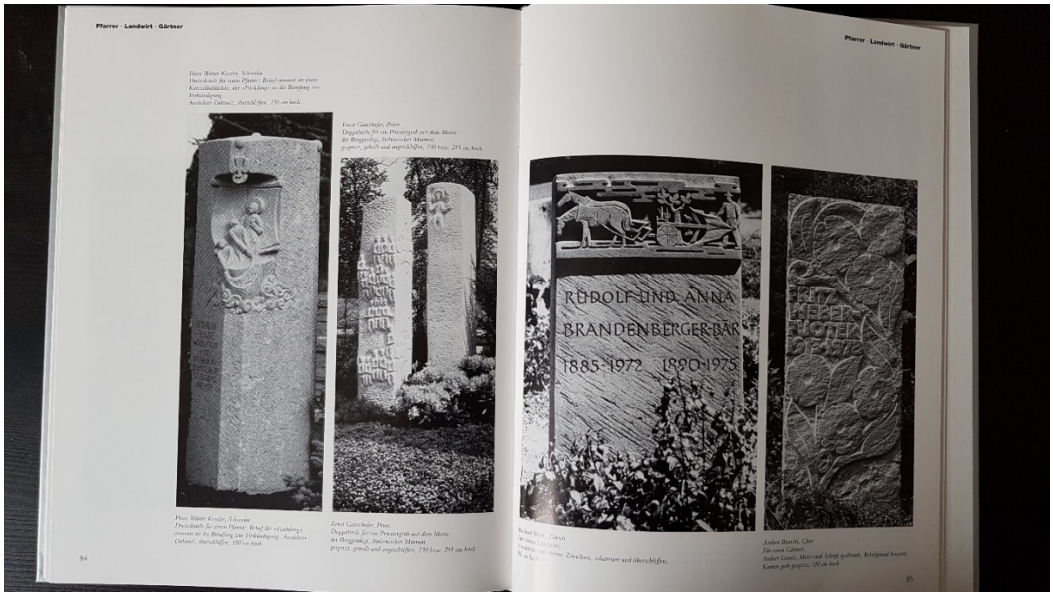


Figure 38: Grave marker design around 1988.

(Wanetschek & Wanetschek, 1988)

This appears to confirm the notion that what is sold or what sells is not necessarily compatible with the technical capabilities of local craftsmen but could be the result of global mass production.

More recent examples of catalogues are manifold, obviously, and much easier to obtain. A very well-known provider's catalogues are sent to the stonemasons is Budde Grabmale in Warendorf. In one of these catalogues, the whole variety of current grave monuments is illustrated: mainly granite, in a variety of colours, with a unique design and a specific focus on stele (e.g. Figure 39). Maybe this is a late reminiscence to the stele designs of the reform movements?

Figure 39: Contemporary grave marker design around 2015.

(Firma Budde Grabmale, 2015)

Unfortunately, the author of this thesis was not able to produce the same samples of prior grave marker literature for France and Luxembourg, except for one example. The stonemason Rombaux Roland (1935) presents a set of examples, which is very different from contemporary examples in Germany. Roland's monumental, art deco samples of heavy, completely covered graves as massive monuments (e.g. Figure 40) can still be seen today in Luxembourg cemeteries; this will be addressed later in this thesis again.

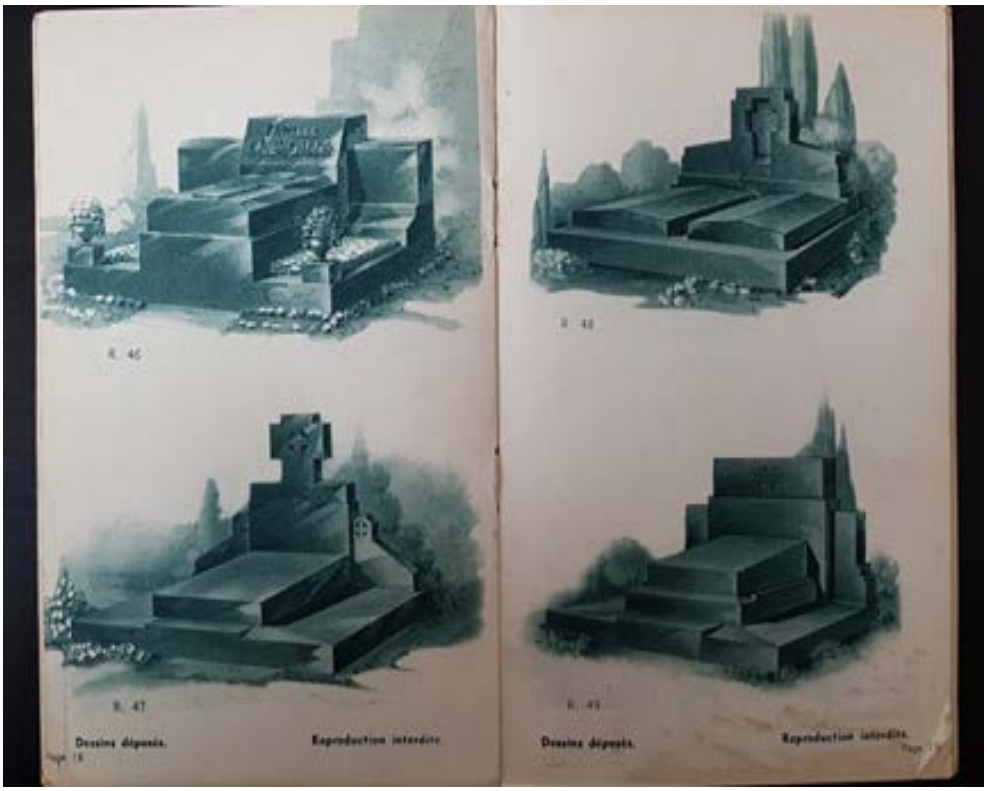


Figure 40: French mid-1930s grave monument example.

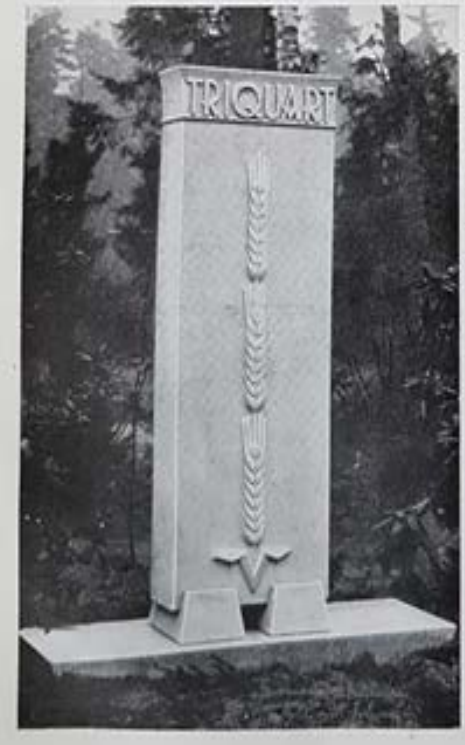
(Rombaux Roland, 1935: 18f.)

However, despite the author's best efforts, the above addressed literature cannot present a complete overview of the grave marker catalogues in France, Luxembourg and Germany. Obviously, much more material could be identified for Germany. What has become clear is that there appears to be a possible discrepancy not only between countries but also within Germany when it comes to the grave monument designs propagated in feasibility studies and exhibition catalogues as well as brochures that are meant as sales tools. Moreover, what is displayed in such catalogues only represents reality to a certain extent.

It had been noted above that France, – in contrast to Germany, – had experienced a consolidation, centralisation and professionalisation of the funeral industry since the 19th century, impacting also stonemason businesses. In Germany, instead, such centralisation did not take place on the actual stonemason level, as guilds and also associations acted as spokespeople on behalf of the craftsman whose membership was often obligatory and whose education and training was also

controlled and influenced by these associations. Consequently, it appears as if this led to the survival of smaller craft stonemasons, while simultaneously also leading towards a very different architectural ideal. Deutscher Naturwerkstein-Verband e.V. (2000) summarises the historical development of such a major association over the course of more than 100 years, also allowing conclusions that there was a strong interest to promote the ideals of a reform movement grave monument, while simultaneously facing not only economic constraints but also possibilities, driving the sales of industrialised grave markers.

The specialist journals such as *Naturstein*, – formerly *Der Naturstein*, – a monthly periodical that has been published since 1946, is another example in addition to guilds and associations of the decentralised but organised German stonemason industry, focusing on industrialised production while promoting craftsmanship in the context of the German masonry traditions and reform movement. During the course of the research for this thesis, the author was fortunate to acquire a large convolute of this publication, more or less complete from 1955 until 2005, thus covering half a century's information that is relevant to the stonemason industry. Although it is well beyond the scope of this thesis's research question to provide a full analysis, a cursory view into the grave monuments that are depicted here might give an idea of the changing design trends that were promoted in this periodical, which aimed at the specialist and expert reader. Figure 41 to Figure 52 show snapshots of the full pages of the journal for all five years, depicting grave monuments from that period, including advertising of the time.



Heft zeigen, was hohes künstlerisches Können in Verbindung mit edlem Gestein hervorzubringen in der Lage ist. Die gezeigten Werke kunstkritisch zu beleuchten, ist nicht Zweck dieser Zeilen, sie sollen aber zeigen, daß Marmor in vorzüglicher Weise in der Lage ist, den Willen des Künstlers in vollkommenster Form zum Ausdruck zu bringen.

In starkem Maße wird Marmor auch zur *Ehrung unserer Toten*, für *Grabdenkmäler*, *Grabtafeln*, *Urnen*, *Sarkophage*, für *Kriegergedächtnisstätten* und *Heldenfriedhöfe* herangezogen. Wir bringen einige Aufnahmen, die eindrucksvoll und nachhaltig veranschaulichen, in welch würdiger Form das Gestein dieser Bestimmung gerecht wird. Einfache, glatte Flächen, auch rohe Bearbeitung, schlicht in Form und Gestaltung, mit oder ohne Bildhauerarbeit — Marmor wird immer nachhaltigen, tief empfundenen Eindruck hinterlassen.

Es sei noch kurz auf weitere Anwendungsmöglichkeiten von Marmor verwiesen.

Zu einer behaglichen Wohnung beansprucht man auch ein praktisch, hygienisch und gut ausgestattetes *Badezimmer*. In welch vollendeter Weise sich gerade Marmor hierzu eignet und die vorerwähnten Eigenschaften in jeder Weise erfüllt, zeigen die auch von Badezimmereinrichtungen gebrachten Aufnahmen. Man kann diese Zweckräume einfach, mit geringen Mitteln ausstatten und trotzdem, wie die Abbildung es bestätigt, eine vorzügliche Wirkung erzielen, oder aber durch reichhaltigere Auskleidung höheren Ansprüchen gerecht werden.

Zum schönen Wohnen gehören ferner schöne *Möbel*. Auch hier kann Marmor, selbst bei solchen einfachster Art, ungemein veredelnd und wertsteigernd wirken. Ziertische, Rauchtische, Blumenständer, Bücherborde, Bufetts usw. mit Marmorplatten belegt, geben eine besondere Note. Für Küchenschränke haben sich sogenannte Marmorschiebeplatten, ebenso für Küchentische die Marmorauflegeplatten, da immer sauber zu halten, immer gut aussehend, daher praktisch, wirtschaftlich und schön, vielfach eingeführt und erfreuen sich großer Beliebtheit.

Nicht vergessen darf auch die Verwendung von *Marmor für kunstgewerbliche Kleingegenstände* werden, wie Schmuckschalen, Ziergegenstände, Vasen, Bücherstützen, Postamente für Kleinbronzen, Lampenfüße, Schreibzeuge u. a. m. Diese Arbeiten werden noch in einer besonderen Abhandlung besprochen.

Zusammenfassend ist wohl die Feststellung berechtigt, daß die Verwendungsmöglichkeit von Marmor, sei es für erhabene sakrale oder für profane Zwecke, für privaten oder industriellen, praktischen oder technischen Gebrauch, für bildnerische Kunst oder für Totenehrung, wie die kurz besprochenen Beispiele, die auch nicht annähernd vollzählig erwähnt werden konnten, überzeugend bestätigen, als überaus vielseitig bezeichnet werden darf. Es steht also fest: Marmor ist und bleibt der edle und unersetzliche Naturwerkstein — der bewährte Baustoff.

260

Figure 41: Grave monument example in German stonemason magazine 1950.

(Der Naturstein, 1950: 260)

Seit mehr als 40 Jahren tobt der Kampf um den Grabstein. Je schärfer er wohl oder übel werden mußte, um so deutlicher war zu erkennen, daß Konkurrenzneid eine der treibenden Kräfte ist, die Erzeugnisse der Granitindustrie zu verunglimpfen. Man verbrämt den Neid fein säuberlich mit Argumenten ästhetischer Art. Man redet in der erwähnten Fachzeitschrift von der „Aussage unserer inneren Bindung an die Toten", sogar „die Macht des Todes" muß herhalten. Und man versteigt sich zu der Behauptung, daß die Steine durch die Politur „häßlich" werden.

Für die Granitindustrie besteht kein Anlaß, angesichts des massiven Angriffes der Gegenseite auch nur einen Millimeter vom seither beschrittenen Weg abzugehen. Im Gegenteil. Die große Menge der Käufer wird das Grabmal aus Granit in polierter Bearbeitung bevorzugen. Die weitaus überwiegende Anzahl der Grabmalgeschäfte hat, einer Umfrage gemäß, die Maßnahmen des Bundes für Denkmalgestaltung (BfD), soweit sie sich gegen überspitzte Friedhofsvorschriften richten mußten, gutgeheißen. Eine böse Schlappe für einige Landesinnungs-Obermeister, die glauben, sich einfach über den Willen der erdrückenden Mehrzahl ihrer Innungsmitglieder hinwegsetzen zu können. Ferner hat der erste Prozeß, der um die Aufstellung eines Denkmals aus schwedisch-schwarzem Granit in polierter Bearbeitung vor einem Verwaltungsgericht geführt wurde, eine absolut klare und eindeutige Entscheidung gebracht: er wurde im Sinne der Granitindustrie 100prozentig gewonnen. Dabei handelt es sich um eine Entscheidung von grundsätzlicher Bedeutung. Der BfD hat sich daher veranlaßt gesehen, das Urteil auszugsweise allen Steinmetzgeschäften bekanntzugeben. Mögen es auch alle die recht genau lesen, die glauben, ihre egozentrischen Auffassungen von Kultur und — vom Geschäft in Form des behördlichen Diktates dem Grabmalkäufer aufzwingen zu können.

Immer hatte die Granitindustrie zu Unrecht den Sündenbock für schlecht gestaltete und schlecht beschriftete Grabsteine machen müssen. Es ist bekannt, daß in den letzten Jahren für Entwurf und Anfertigung guter Grabmale aus Granit sehr hohe Beträge ausgegeben wurden, um dem Käufer, dem letzten Abnehmer, mittels Ausstellungen und bestem Bildmaterial vor Augen zu führen, was untadelig ist. Wenn die Verkaufserfolge aus diesem Bemühen gleich null waren, weil die Entwürfe offensichtlich dem Geschmack der Interpreten entsprechen, aber nicht „publikumsnahe" sind, wer kann daraus der Granitindustrie einen Vorwurf machen? Der Geschmack des Grabmalkunden läßt sich nicht durch Diktat formen. Nur durch das gute Beispiel kann dies glücken. Und dazu wird Zeit, viel Zeit nötig sein.

Die Industrie wird auch weiterhin die Herausgabe guter Vorlagen fördern, keine „Kataloge", sondern Beispiele, die dem Steinmetz Anregung für Formgebung und Inschrift geben wollen, denn ihm obliegt es, den industriell vorgefertigten Stein zum Denkmal zu machen. Hier liegt ein weites Betätigungsfeld offen. Und dazu brauchen unsere sehr ehrenwerten Freunde mit hohlen Phrasen weder „die Macht des Todes", noch die mittelalterliche Handarbeit zu zitieren.

Dr. Carl O. Künzel
Vorsitzender des VDG

Schwarzenbach (Saale), September 1955.

Diabas. Grund gestockt

Basalt. Grund gestockt, angeliefte Schrift

Zwei Grabdenkmäler von Waltraud Kunsmann in Wittlich (Mosel), über deren Schaffen wir bei nächster Gelegenheit ausführlicher berichten werden.

233

Figure 42: Grave monument example in German stonemason magazine 1955.

(Der Naturstein, 1955: 233)

Figure 43: Grave monument example in German stonemason magazine 1960.

(Der Naturstein, 1960: 349)

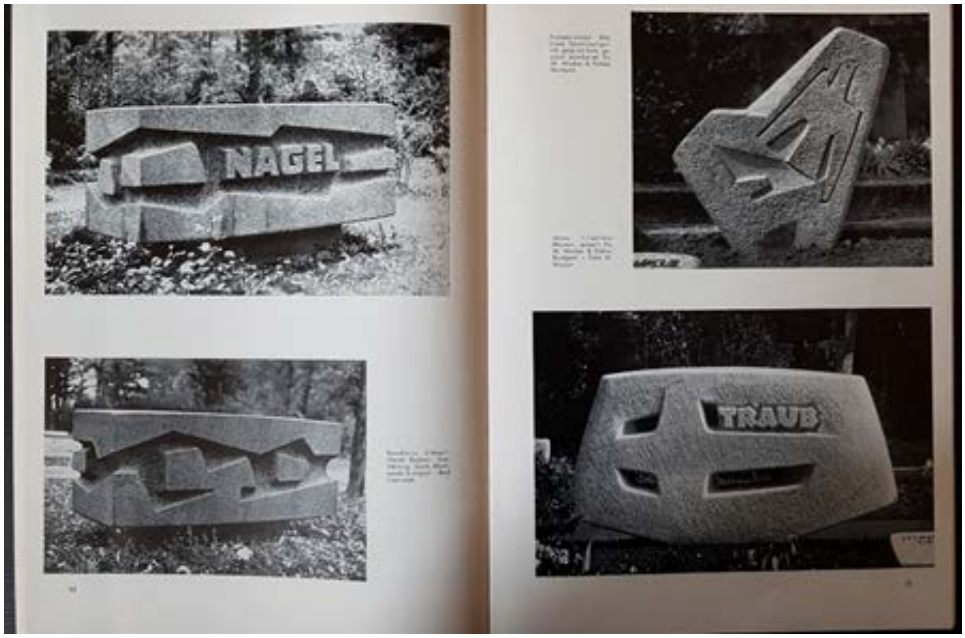


Figure 44: Grave monument example in German stonemason magazine 1965.

(Der Naturstein, 1965: 14f.)

Figure 45: Grave monument example in German stonemason magazine 1970.

(Der Naturstein, 1970: 311)

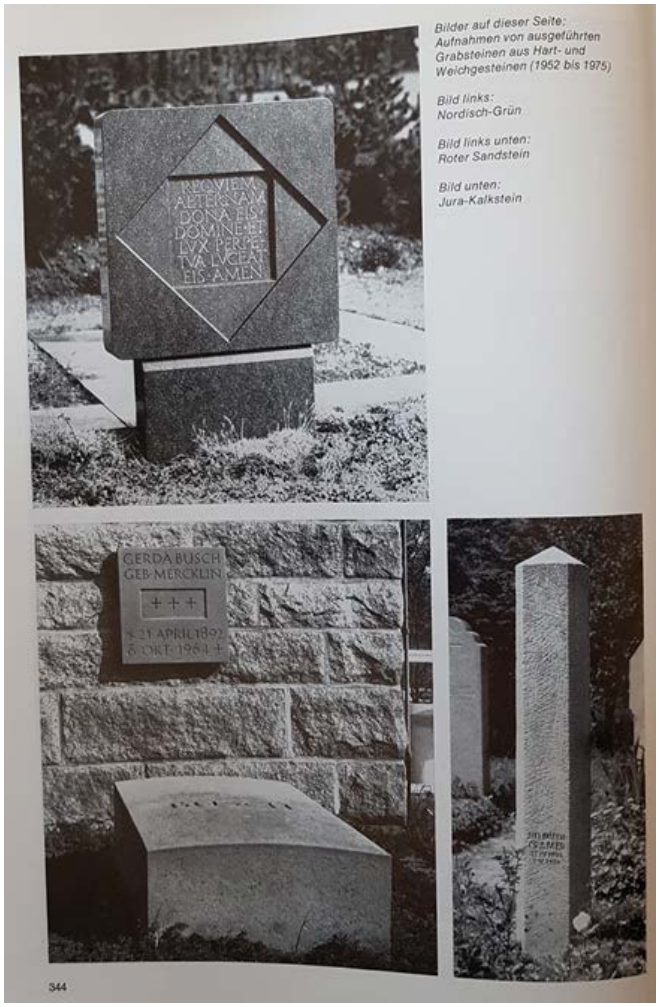


Figure 46: Grave monument example in German stonemason magazine 1975.

(Naturstein, 1975: 344)

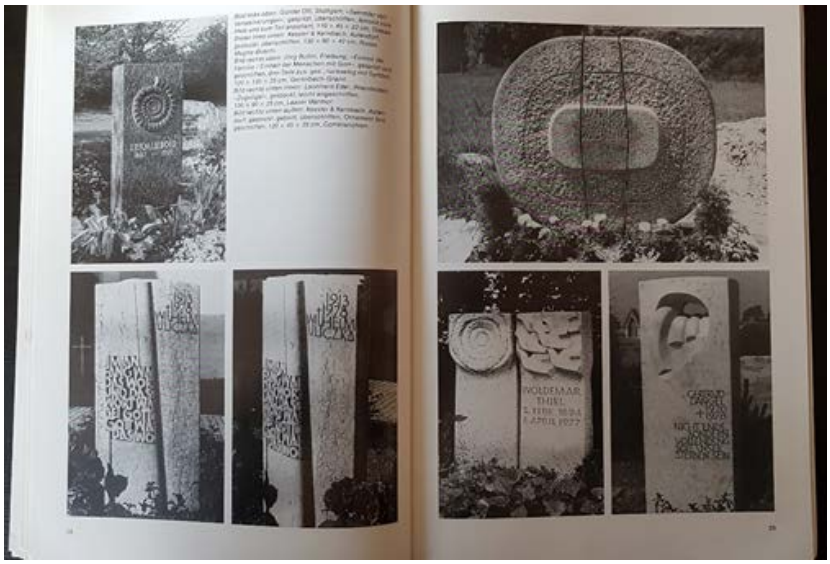


Figure 47: Grave monument example in German stonemason magazine 1980.

(Naturstein, 1980: 28f.)

Figure 48: Grave monument example in German stonemason magazine 1985.

(Naturstein, 1985: 564f.)

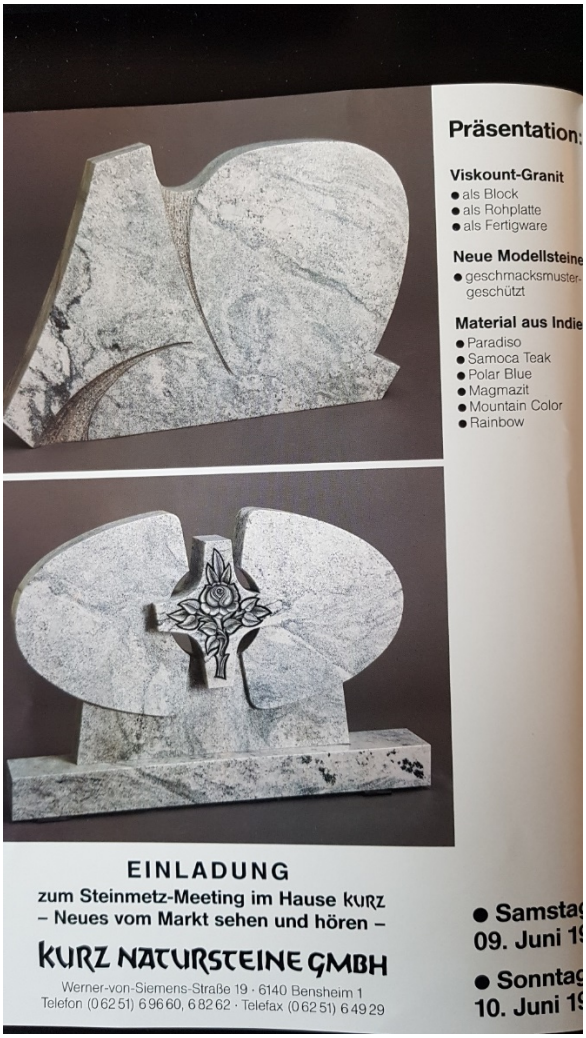


Figure 49: Grave monument example in German stonemason magazine 1990.

(Naturstein, 1990: 572)

STONE+TEC

Bavaria Rustikal neben Jura-Sol

Naturstein aus dem Altmühltal präsentiert die Firma Alois Schöpfel GmbH & Co. KG auf der Stone+tec in **Halle A, Stand 1004**, kann der Besucher Jura-Marmor, Solnhofer-Naturstein, Jura-Sol bruchrauh, Bavaria-Rustikal-Mauersteine, bossierte Mauerstein-Verblender und Fassaden in Augenschein nehmen.

Alois Schöpfel GmbH & Co. KG Natursteinwerke Postfach 1342 85072 Eichstätt-Wegscheid

Solnhofer Naturstein bruchrauh als Bodenbelag im Wohnbereich. (Werkfoto)

Hochwertige Grabmale aus moderner Produktion

Grabdenkmäler aus musterrechtlich geschützten Entwürfen und hochwertige Bildhauerarbeiten zeigen die Natursteinwerke der Gebrüder Böse in **Halle I, Stand 114.**

Die *Max Böse GmbH* in Großenlüder bei Fulda und die *Böse Natursteine AG* im schweizerischen Lengwil verwenden ausgesuchte und geprüfte Natursteine aus aller Welt. Der Kunde kann zwischen unterschiedlichen Graniten, Syeniten, Marmorsorten, Kalksteinen und Naturlehen wählen, die aus Indien, Brasilien, Afrika oder Skandinavien importiert werden. Der Direkteinkauf und die Kontrolle während des gesamten Produktionsablaufs durch geschultes Fachpersonal garantiert hochwertige Qualität.

Beide Werke sind mit moderner Technik ausgestattet. Die Produktion erfolgt mittels CAD-Konstruktion, CNC-gesteuerten Maschinen und EDV-überwachter Produktion. Dies führt zu kurzen Produktionszeiten und schneller Lieferbereitschaft. 10000 m² Produktionsfläche machen die Böse Natursteinwerke zu einem leistungsfähigen Partner.

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Spezialsilicon gegen Randzonenverfettung

Verfärbungen im Randbereich von Dichtstoffen, die sogenannte Randzonenverfettung, werden durch Weichmacheröle aus dem Dichtstoff verursacht. *CT-Chemie* stellt den Dichtstoff »Maxitec Marmor« her, bei dem auf Weichmacher verzichtet wurde. Diese Lösung bietet die Vorteile einer absoluten Auswanderungsfreiheit, ein Absperren mit Primer ist nicht mehr notwendig. Die unvernetzten Polymere schränken die Endeigenschaften nicht ein, die Verarbeitungseigenschaften sind deutlich verbessert, die Optik wird nicht gestört.

Seit neun Jahren ist Maxitec Marmor ohne Reklamation im Einsatz und geht über die Anforderungen der DIN-Vorschriften hinaus, z. B. Temperatur-Wechselschock, Dehn- und Reißbeanspruchung, UV-Belastung etc. Dies wird auch mit einer schriftlichen Garantieerklärung untermauert. Das Spezialsilikon ist in 19 Farben erhältlich.

Mit Ralf Francescon als neuen Produktmanager und techni-

Zwei Beispiele aus der Grabmalkollektion der Böse Natursteinwerke. (Werkfotos)

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FAX: 02947/4131
IHR PRODUZENT FÜR ANRÖCHTER DOLOMIT MARMOR QUARZITE GRANITE BASALT...

Figure 50: Grave monument example in German stonemason magazine 1995.

(Naturstein, 1995: 112)

Figure 51: Grave monument example in German stonemason magazine 2000.

(Naturstein, 2000: 93)

Figure 52: Grave monument example in German stonemason magazine 2005.

(Naturstein, 2005: 48f.)

It is remarkable how, over time, examples that reminded very much of earlier reform movement grave markers were substituted by almost cube-shaped monuments, until the variety of designs that appeared around the 2000s.

It would be interesting to see whether these samples are mirrored in the actual assemblage at the selected cemeteries in this research. Such a find could help hypothesise about the possible impact of such publications on stonemasons' products and, consequently, on the choice for customers.

2.5 The Role of Cemetery Regulations

Unfortunately, it was not possible to obtain the cemetery regulations covering an extended period of time for the four selected sites. It appears that these regulations are usually not regularly kept or archived.

Consequently, in order to show historic differences between cemetery regulations in the immediate border region between Luxembourg and Germany, the available cemetery regulations will be used to deduce information concerning a potential impact on grave appearance and grave marker appearance. The following is adapted from a book chapter written by Streb (2019) and published in “Concession à perpétuité?: Cultures funéraires au Luxembourg et dans les régions voisines”, edited by Kmec et al. (2019), translated from German into English. The main premise

when examining the different cultures with regards to the cemetery regulations and their enforcement is that the reform movement of cemetery culture in Germany had a strong influence in Germany but little if any impact in Luxembourg.

The actions of the early 20th-century cemetery reform movement represented a turning point in the design of cemeteries and tombs. The right, park-like angelic tombs of the second half of the 19th century became the ideal reflections and representations of a bourgeois industrial society in many parts of Europe (Rugg et al., 2014; Schoenfeld, 2002; Streb, 2019; Streb and He, 2017). The cemetery reformers dismissed this form of design as pompous and unaesthetic and made an effort at a partly radical aesthetic and ideological counter-design (cp. Fischer, 2002).

The cemetery reformers' ideas can certainly be understood in the contemporary context of the reform movement in general. It is a phenomenon especially of the late 19th and early 20th centuries and particularly of Germany and Switzerland, which, however, persists in many respects to this day (Buchholz, 2001). Certain forms of this multifaceted movement have become part of everyday social life and self-image. The main focus of this worldview, also known as the life reform movement, was found, for example, in the *Heimat*, a nature and monument protection movement, which responded to the social and landscape changes caused by urbanisation and industrialisation. This movement wanted to protect the environment (Klueting, 1998). Self-reform, which was aimed primarily at the individual, included, amongst other things, free-body culture, vegetarianism and the anti-alcohol movement (Baumgartner, 1998). The First Women's Movement (1848-1933) and the youth movement, – especially the *Wandervogel*, – but also efforts in the field of eugenics and sexual reform aimed at an indirect, profound change in society (Klueting, 1998).

Even the areas of business had to be reformed. Soil reforms, organic farming and the garden city movement primarily focused on this (Farkas, 1998). Reform pedagogy and Waldorf schools are still known in education. The *Dürerbund, Werkbund, Bauhaus* but also artist collectives, such as *Die Brücke* or *Der Blaue Reiter* excelled in art and culture (Hepp, 1987). Lastly, one can refer to the cemetery reform, the cremation movements and also anthroposophy (Ulbricht, 1998).

The life reform movement of the early 20th century was the result of a certain "social, cultural and mental history climate" (Kerbs and Reulecke, 1998: 12), borne and influenced by the special conditions of an industrialised society and the resulting new role models and self-perception, including the emerging youth culture, the fin de siècle and the socio-cultural effects of the First World War.

For the design of the tomb, this change in consciousness and the new ideals initially meant that the mass production of tombs from non-native materials as well as an indiscriminate variety of

styles was rigorously rejected and instead local, locally sourced materials were to be used, which were both individually crafted and stylistically homogeneous.

The First World War's social impact changed the cemetery reform's goals again: An attempt to counter the unpleasant excesses of urban burial sites before 1900 and, – from the reformers' point of view, – an artistically worthless and mass-produced industrial tomb with something original, homeland-related and artisanal-individual, changed to its opposite:

“After the First World War, the cemetery reform became a typical expression of the urban-industrial society that it was initially opposed to. The gravestones developed into standardised building blocks of a new cemetery aesthetic, the most important principles of which are functionality and efficiency. […] The once celebrated individual was demoted to the mere addition of that functional system that now increasingly determined the urban infrastructure and transformed everyday life”. (Fischer, 2002: 9)

As is clear from the relevant literature, the cemetery reform movement was initially a German phenomenon. The effects on the design of cemeteries and tombs, indirectly first and foremost through the formulation of reformed cemetery regulations, are omnipresent in Germany. But did the cemetery reformers exert any influence across Germany's borders? And if so, how did they work in practice? The border region of Germany and Luxembourg appears particularly interesting for this, since three cultural areas, – Luxembourgish, German and French, – come together in a relatively narrow space and different influences, especially in the design of tombs, should be very noticeable.

In order to investigate the extent to which the cemetery reform is noticeable in Germany and Luxembourg, there are two main options for review: firstly, the inclusion of special grave design regulations in the cemetery regulations and, secondly, the design of the material culture in the cemeteries.

In fact, the influence of cemetery reformers in Germany is initially most evident in the design of cemetery regulations. Until around 1900, the regulations were essentially aimed at ensuring that grave sites were actually marked and that occupancy lists were kept – and a tone that was more bureaucratic was developed before the First World War.

The cemetery regulations of Ayl (Rhineland-Palatinate) from 1898 state in §5 (L 124,3: Friedhofsordnung Ayl, 1898):

“So as to keep the order in the burial ground exact, an occupancy register will be kept from the day this ordinance comes into force. All corpses that are buried in the burial ground are to be

chronologically entered in this register according to name, age, day of death and burial of the buried".

The same cemetery regulations state the following for the design of the tomb in §6 (L 124,3: Friedhofsordnung Ayl, 1898):

"From the same point in time, each grave must be provided with permanent number stones (number post); the number post must give the exact number under which the corpse in question is entered in the occupancy register. The number stones (number post) must also reflect the relevant year. The numbers can also be placed on the crosses if they are sufficiently permanent".

In the event of an infringement, police punishments were to be expected, as is the case today.

The Ayler Cemetery Ordinance from 1918 is already much more detailed and regulates almost all areas of the cemetery, such as who may be buried in the cemetery and at what point something has to be done, which is specified, with the human remains of a previous burial; the ordinance also contains details on exhumation and stipulates with what dimensions a grave is to be created and how it should look. Paragraph 10 (2) on actual tombs states:

"A good and dignified overall effect of the cemetery can only be achieved if each gravestone shows atmospheric and beautiful shapes made of durable and dignified material and are well crafted. According to these principles, monuments made of purported grotto stones, photographs under glass, porcelain figures in concrete, imitated tree trunks and the like cannot be admitted. Wood, iron, natural stone and good artificial stone are permitted as materials. German rock types and especially those that are mined in the immediate vicinity deserve priority. Polished stones are not permitted. Standing tombstones for row graves of adults must not exceed 1.20 m in height and 0.75 m in width. […] The formation of the inscription is of particular importance for the effect of the grave marker; the inscription must be well distributed on the surface of the grave marker and be composed of good, clear characters. Inscriptions that are highlighted by colour must not be awkward and intrusive". (L 124,1: Friedhofsordnung Ayl, 1918)

These details on the tomb design are hardly inferior to today's cemetery regulations. The earlier regulations may even outperform today's regulations and the earlier regulations already show a clearly reformed manuscript at the end of the First World War.

In 1910, a similar level of detail is already visible across the Moselle in Luxembourg's Walferdange. Especially, the body transportation and the actual funeral are regulated. Of particular importance are the concessions that appear to have no counterpart in Germany at the time and that are dealt with the following cemetery regulation (Ministère de l'Intérieur, Affaires générales (1861-1941),

Int-003: Cimetières, funérailles, inhumations, incérations, police des cimetières (1886-1940): Walferdingen, 1910):

"Art. 13. Terrain concessions can be granted for the establishment of family graves to endure in perpetuity, for 30 years or for 15 years. The perpetual concessions are granted by the local council, those for a limited time by a college of lay judges. A list of concessions issued is submitted to the government for review at the end of each year".

However, there are no detailed requirements for the design of the actual tombs.

The Remich cemetery regulations from 1924 are very similar. Here, too, the transport of corpses is regulated, including a breakdown of costs depending on the desired transport class. The regulations concerning the concessions are also detailed. Regarding the design of the grave, only the following can be found in §9 (Ministère de l'Intérieur, Affaires générales (1861-1941), Int-003: Cimetières, funérailles, inhumations, incérations, police des cimetières (1886-1940): Remich, 1924):

"The outer edge of the monuments and borders to be erected on the graves may not exceed the dimensions specified in Art. 8 in terms of length and width. Bordering with living hedges is not permitted. Standard trees should not be used. In any event, trees must not protrude beyond the borders and should not hinder traffic or hinder access to the graves next to them from any side. Nobody is allowed to make a border without first submitting their plan to the lay councillor for approval".

At least for the above-mentioned selection, potential differences in the cemetery regulations have already become clear on both sides of the Moselle: If the meaning of the actual tomb and its design are already early on the main issues in Germany while other regulations are less emphasized, in Luxembourg the actual funeral procedures and concessions appear to be the main issues. The tomb design is hardly mentioned in Luxembourg. It appears that the basic ideas of the cemetery reform gained a foothold early on in Germany, whereas these ideas did not initially apply in Luxembourg.

Decisive for the later cemetery reformers, is the work *Grab und Friedhof der Gegenwart*, published by the architect Stephan Hirzel in 1927. Hirzel was one of the leading figures in the cemetery reform movement. In several articles not only the main features of this reform are summarised but also a concrete cemetery order is proposed in detail. Hirzel himself emphasizes the change in burial culture under the influence of modern mass and industrial society but also strives to balance industry and craft when he writes:

"... that these two modes of production will and must exist side by side if the original spirit is recognised on both sides and implemented in the work: the mechanical method, which in the form of series will produce tombstones in a materially and aesthetically perfect manner, at low prices and available through shipping to all locations; then the manual method, in which the craftsman creates a unique value, at a higher price, of course, through form and ornament tied to the place and landscape of the origin and can only be sold within these limits". (Hirzel, 1927: XI)

While many readers may find the original reading by Hirzel tumultuous, anti-modern or at least conservative in its criticism and opportunistic in its inclusion of industry and handicraft, one must nevertheless take note of its sense of reality and its proposals designed to compensate. The point is not to replace one mode of production with another or to pursue a "romantic feeling" (Hirzel, 1927: IX) but to return the tomb and the cemetery to the people and their needs by means of modern production methods and local craftsmanship.

As Fischer (1996: 18) rightly points out, it was precisely this level of modernity and functionality coupled with the reformers' opportunism that made Hirzel's reform proposals serve almost word for word as a template for the uniform cemetery order under the Nazi dictatorship from 1937 onwards. This ordinance is now all the more important, since it remained almost unchanged in many places in the Saar-Mosel region until the 1960s. Therefore, the ordinance left a lasting impression on the appearance of tombs and cemeteries in their entirety.

While the Luxembourg cemetery regulations of the border region in the selection presented here almost did not explicitly address the design of tombs until the 1960s, this was decidedly regulated – and regulated early in Germany.

In 1968 in Lorentzweiler in Luxembourg, only the following could be found regarding the tomb (Ministère de l'Intérieur, Affaires générales (1861-1941), Int-003: Cimetières, funérailles, inhumations, incérations, police des cimetières (1886-1940): Lorentzweiler, 1968):

"Article 46. Everyone is entitled to have a tombstone or a similar funeral feature placed on the grave of his relative or friend.

Article 47. The construction and size of the monuments must comply with the rules on hygiene, security and public order. The mayor and council of councillors are authorised to prescribe the mass in detail with regard to compliance with this provision, and the mayor ensures that they are carried out.

Article 48. The tombs and plants must never exceed the dimensions of the areas or graves that have been designed and must not be more than 1.60 m high".

In contrast, the Ayl cemetery regulations from 1937, which remained almost unchanged until 1962, include several well-described pages and 15 sub-items, which can only be reproduced here in part (L 124,1 Friedhofsordnung Ayl, 1937):

"41.

The tomb must be artistic and well designed in shape and material and fit into the overall picture of the cemetery. Good tomb art cannot be created solely through regulations on the shape, material and proportions of the tombs. The one-off product, as valuable as it may be in an artistic relationship, only works well if it harmoniously adapts to the overall picture. Adjacent and related tombs must therefore be coordinated in shape and colour. Tomb rows only satisfy if they are rhythmically structured, tomb groups if together they give a favourable overall impression. Therefore, each tomb has to be subordinate to the basic idea that is determined when the occupancy plan is drawn up. The location of the tombs must be shown on the floor plan of each department.

[…]

1) The general height determinations for tombs are very important. Such provisions are intended to achieve a calm and satisfactory impression of the different parts of the cemetery.

[…]

42.

(1) The tomb receives its value and its effect:

a) through quality and processing of the material in accordance with the factory, and

b) through a beautiful shape and by using good lettering and ornaments.

(2) Even small and modest tombs must meet these requirements. The smaller a tomb is, the simpler its shape has to be.

[…]

44.

(1) The use of deep black and dark materials, mirror polished materials, as well as bright white materials, is not permitted.

[…]

c) In the case of tombs made of deep black material, the highest possible degree of finishing is ground grinding".

This type of cemetery order not only regulated the design of the tomb in detail – the following sub-items contain the most precise specifications for the permitted tomb dimensions – but also offered detailed reasons for this and detailed explanations of the general design ideals.

How similar are the different cemetery regulations actually, even across national borders? A text analysis of selected cemetery regulations with the help of the MAXQDA software can allow at least a bit of insight into this. Based on manual coding of the selected cemetery regulations' entire text, it is possible to compare them with each other. If the specified value is 1 as shown in Table 6, it is practically the same document. The lower the value, the more different the documents are. As is evident from Table 6, the regulations are generally quite similar.

Table 6: MAXQDA Analysis of selected cemetery regulations in Luxembourg and Germany.

Dokumentname	Ayl 1898	Ayl 1918	Ayl 1937	Ayl 1962	Walfer 1910	Remich 1924	Lorentzweiler 1930	Lorentzweiler 1968
Germany\Ayl 1898	1,00	0,66	0,56	0,76	0,79	0,73	0,76	0,72
Germany\Ayl 1918	0,66	1,00	0,73	0,79	0,79	0,79	0,79	0,77
Germany\Ayl 1937	0,56	0,73	1,00	0,66	0,69	0,69	0,72	0,73
Germany\Ayl 1962	0,76	0,79	0,66	1,00	0,83	0,75	0,83	0,76
Luxembourg\Walfer 1910	0,79	0,79	0,69	0,83	1,00	0,86	0,94	0,85
Luxembourg\Remich 1924	0,73	0,79	0,69	0,75	0,86	1,00	0,92	0,87
Luxembourg\Lorentzweiler 1930	0,76	0,79	0,72	0,83	0,94	0,92	1,00	0,90
Luxembourg\Lorentzweiler 1968	0,72	0,77	0,73	0,76	0,85	0,87	0,90	1,00

Only the Ayler Friedhofsordnung of 1937 differs significantly from the same ordinance implemented in 1898, although the 1937 ordinance is somewhat more similar to the ordinance promulgated in 1918. It is only with the introduction of a new text in 1962 that there are greater differences. Interestingly, the cemetery regulations of the Luxembourg Lorentzweiler from 1968 come closer to the 1937 Ayler ordinance than the contemporary German Ayler equivalent. Also striking is the relatively high similarity of the Luxembourg cemetery regulations analysed here over time. As is at least partially clear from such an analysis, there appears to have been a much more coherent, evolutionary development of cemetery regulations in Luxembourg than was the case in Germany. It could be hypothesised that the implementation of cemetery reform ideals and ideas, which culminated in the Reich-wide order of 1937 in Germany, meant a break or perhaps a revolutionary turning point – an incision that had no major impact on Luxembourg. The Luxembourg cemetery regulations, therefore, appear much more homogeneous and similar than is the case within Germany, at least in relation to the region examined. Even if there is hardly enough data to support such a hypothesis, it can be concluded, at least for the selected cemeteries, that the cemetery reform in Luxembourg was not written into the cemetery regulations to the same extent as in Germany.

However, what does today's reality look like in the cemeteries of the border region? As part of the RIP research project at the University of Luxembourg, cemeteries in the border region are fully recorded by means of photographs and statistics. Amongst other things, the cemeteries in Wormeldange in Luxembourg and Wincheringen in Germany are only 1.5 km apart as the crow flies. Was one political and geographical border – the Moselle – therefore enough to make the cemetery reform work differently? In fact, despite the relative spatial proximity and very similar size and layout of both cemeteries, the viewer has quite different images. In Wormeldange (see Figure 53), the tombs that dominate are the ones completely covered with slabs in which the cobblestone – the actual tombstone – is integrated. The cross shape is often found, if not as a tombstone itself, then at least as a symbol. Granite in different colours dominates as the material but mainly in black and grey as well as bluestone. The high number of older family graves with crosses in all variations is striking. This is most likely due to the role of concessions in the Luxembourg cemetery regulations, which secure many older burial sites for long periods. Fully covered, polished granite tombs that have obviously been mechanically produced but also high crosses, – a number of them 3.5 metres tall and even higher, with statues and decorations as already described at the beginning, – do not correspond to the ideal of the cemetery reform.

Figure 53: Graves in Wormeldange.

(Photo: © JPRemiche, 2018)

In Wincheringen (see Figure 54), despite many exceptions, the open, planted tomb with cobblestones dominates. There are hardly any crosses, not in the same form as in Wormeldange – or not anymore. The gravestones have a higher variety and are processed in more detail. Granite

also dominates here as a material in a wide variety of colours. It is striking that the tombstones' height is relatively uniform at between 1 metre and 1.50 metres. Nevertheless, there are also gravestones that even if they have the same appearance as others, are more elaborate and are made from different materials such as migmatite. There are hardly any older graves; most of them (after the date of first occupancy) appear to have been established in the second half of the 20th century. What is striking is the higher number of empty grave sites, which are not found in this number in Wormeldange. Overall, it can be said that this design should also not meet the ideal of the cemetery reform, even if the classic cobblestone with clear size specifications and with a planted grave mirror at least a number of the formal requirements.

Nevertheless, in spite of all the differences, which can also be traced back in detail to the different formulations and interpretations of the relevant cemetery regulations, not only the Luxembourgish example but also the German one lacks a clear reformist language. It is therefore questionable whether the visible differences in the design of the tomb can be attributed to the presence or absence of reform requirements.

How else could these differences have occurred? A possible explanation lies outside different cultural and traditional ideas on both sides of the Moselle or the possible influence of the cemetery reform. Accordingly, the design of tombs could have been much more dependent on the ideas, the technical possibilities and the business conditions of the producers, for example, the stonemasons. In the past as is the case today, the decision to buy a tomb also depends on what is available. If this varies in different regions, the cemeteries as a whole are designed differently. The Luxembourgish, closed grave with cobblestone as if from a single cast was found in a French tomb catalogue as early as the 1930s (see Figure 54). At about the same time, the idea of an ideal tomb in Germany was completely different as the example of a German tomb catalogue shows (see Figure 55). Here, not only different ideas regarding the ideal tomb become clear, – the reforming features are clearly recognisable in Figure 5, – there are also clear parallels to the relevant tomb design in Wormeldange and Wincheringen: here the monolithic tomb stylistically based on Art Deco and there, as before, the ideal of the handcrafted cobblestone on the planted tomb. Instead of the cemetery regulations, the relevant fashions in art and architecture come into play here, which the stonemasons presented in the form of catalogues as sales and demonstration objects but often only as a model. The reality in the cemeteries was obviously based on fashion but it did not simply copy it.

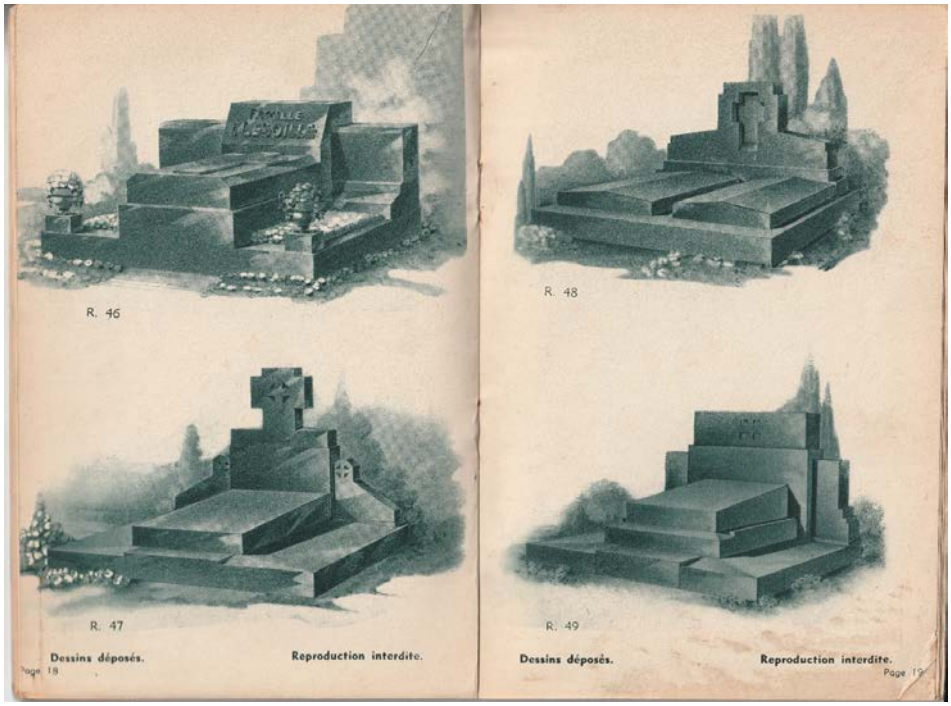


Figure 54: Catalogue example found in *Monuments Funeraires* by Rombaux-Roland.

(1935: 18f.)

While it is therefore clear that the cemetery reform movement only found its way into the cemetery regulations in Germany, the different ideas become even more impressive when looking through contemporary catalogues. One can assume that the Luxembourg tomb design was based much more on French models than on German ones. Whichever of the many possible socio-cultural factors were responsible for these different stylistic orientations, it becomes clear that the cemetery reform probably did not move across the Moselle.

The different forms of gravestone design rather appear to be the result of stylistic fashions. These stylistic fashions found their way into the catalogues of the tombs, above all via the craftsmanship, via the technical conditions and for business reasons. This occurred in the context of mass production and, therefore, represented the relevant offer. French Art Deco appeared to be ground-breaking for Luxembourg, presumably because the stonemasons were mainly embedded in the corresponding artistic, technical and business context, for example, via sales channels. Despite the immediate spatial proximity to Germany, the contemporary cemetery reform ideals are hardly detectable, as the comparison between Wormeldange and Wincheringen has shown. An exploration of the artistic, craft and economic interdependencies of the border region could give more clarity.

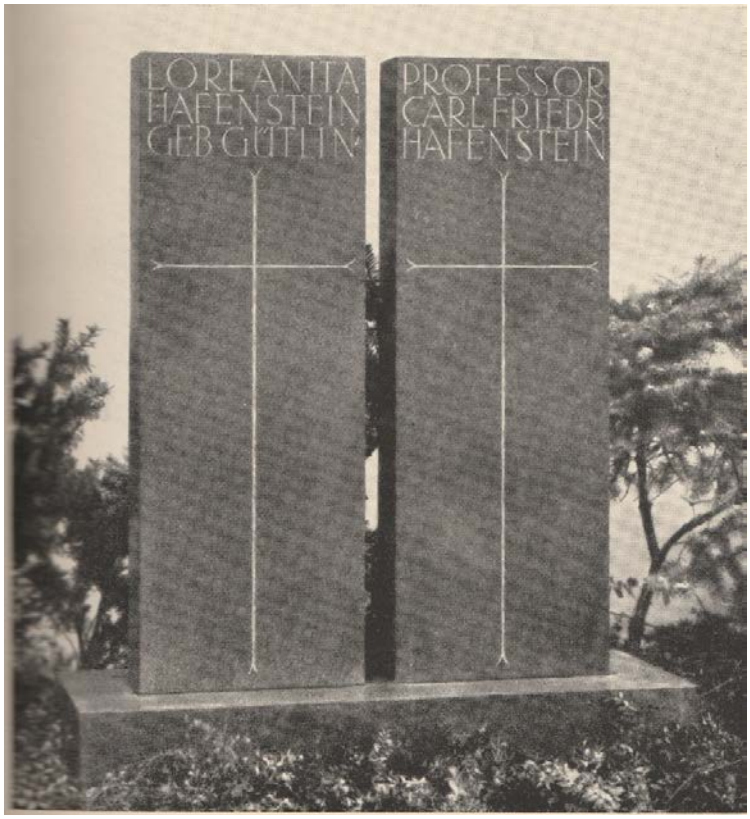


Figure 55: Example from the gravestone catalogue *Grabsteine* by Rupp and Möller, 1928: 26.

With regards to the current cemetery regulations of the sites under scrutiny (see Table 7 to Table 10), however, it becomes clear that the potential impact on grave marker design and any other materiality that can be found at a cemetery is actually limited. However, the cemetery regulations regulate a number of things regarding materiality – especially of the grave monuments; the regulations focus on dimensions only. Neither in Luxembourg nor in Germany are there any detailed design regulations beyond the dimensions that could influence the actual design. Even the lease time differ only within a certain range. There clearly is a similarity between the cemetery regulations within national borders, based on relevant legislation, etc. However, the impact of the reform movement appears to have vanished.

Table 7: Walferdange cemetery regulation overview.

Place	Date of Engrossment	Dates of Amendments	Legislation	Types of Graves and Relevant Lease Periods	Arrangement of the Grave	Arrangement of the Gravestone
Walferdange	1977	1987 1999	1789 Decre of Municipal Constitution 1790 Decre of Judical Organisation 1843 Article 36 of the Organisation of Municipalities and Districts 1906 Article 5 of Law for Public Sanity 1913 Legislation concerning the Transport of Corpses 1930 Local Police Legislation 1972 Legislation concerning the Inhumation and Cremation of Bodies 1976 Legislation regarding Medical Inspection	All grave types have a lease period of 30 years. Eternal grave sites remain active, as long as they are maintained properly.	Conventional Grave: (Grown-Ups) Depth: 1.5 metres Length: 2.0 metres Width: 0.8 metres (Children under two years) Depth: 1.2 metres Length: 1.0 metres Width: 0.5 metres Vaults: Height: 0.9 metres Length: 2.1 metres Width: 0.9 metres Graves must be 0.3 metres apart.	A grave marker is obligatory. It has to conform to local health and safety standards and public policy. There must be a foundation and erecting the grave marker has to be conducted by a specialist. No further design details are required. The maximum height is 1.2 metres and the width must not exceed the width of the grave.

Table 8: Konz cemetery regulation overview.

Place	Date of Engrossment	Dates of Amendments	Legislation	Types of Graves and Relevant Lease Periods	Arrangement of the Grave	Arrangement of the Gravestone
Konz	2011	2012	1973 § 24 of Municipal Legislation of Rheinland-Pfalz 1983 §§ 2 Abs. 3, 5 Abs. 2 und 6	All grave types have a lease period of 25 years. For deceased under six years of age, the lease period is 15 years. Urn grave leases	Conventional Grave: Depth: 0.9 metre Urn Grave: 0.5 metres	Explicitly, specific requirements are now mentioned, besides keeping the design within the context of the site in Konz and pious. Permitted measurements:

Place	Date of Engrossment	Dates of Amendments	Legislation	Types of Graves and Relevant Lease Periods	Arrangement of the Grave	Arrangement of the Gravestone
			Abs. 1 Satz 1 of Funeral Legislation	are for 20 years. The grave types are: Row-graves Anonymous urn graves Lawn urn graves Graves of choice Urn graves of choice Honorary tombs Muslim graves	Graves must be 0.3 metres It is not permitted to cover the grave; it has to be planted completely.	(Children below six years) Row-graves: Height: 0.55 metres to 0.8 metres Width: up to 0.45 metres Thickness: at least 0.14 metres (Grown-Ups) Row-graves: Height: 0.70 metres to 0.9 metres Width: up to 0.45 metres to a maximum of 0.7 metres Thickness: at least 0.16 metres Graves of choice: Height: 0.70 metres to 1.0 metres Width: 0.55 metres to 0.7 metres Thickness: at least 0.18 metres Urn graves can be covered by a plate measuring either 0.4 metres x 0.4 metres or 0.4 metres x 0.5 metres and 0.04 metres thick, inscribed with the name and dates of the deceased and only made of Himalaya granite.

Table 9: Wormeldange cemetery regulation overview.

Place	Date of Engrossment	Dates of Amendments	Legislation	Types of Graves and Relevant Lease Period	Arrangement of the Grave	Arrangement of the Gravestone
Wormeldange	1965	n.a.	1789 Decre of Municipal Constitution 1790 Decre of Judical Organisation 1843 Article 36 of the Organisation of Municipalities and Districts 1913 Legislation about the Transport of Corpses 1930 Local Police Legislation1972 Legislation about the Inhumation and Cremation of Bodies1965 Legislation regarding Medical Inspection	Two types of concessions are mentioned: those for 15 years and those for 30 years. The concessions can always be extended, for example, for family graves.	Conventional Grave: (Grown-ups) Depth: 1.5 metres Length: 2.0 metres Width: 0.8 metres (Children under two years) Depth: 1.2 metres Length: 1.0 metre Width: 0.5 metres Vaults: Height: 0.9 metres Length: 2.1 metres Width: 0.9 metres Graves must be 0.3 metres apart. Furthermore, the dimensions of the vault walls and the horizontal arrangement of coffins in vaults are detailed.	No further design details are mentioned.

Table 10: Wincheringen cemetery regulation overview.

Place	Date of Engrossment	Dates of Amendments	Legislation	Types of Graves and Relevant Lease Periods	Arrangement of the Grave	Arrangement of the Gravestone
Wincheringen	1985	2014	1973 § 24 of Municipal Legislation of Rheinland-Pfalz 1983 §§ 2 Abs. 3, 5 Abs. 2 und 6 Abs. 1 Satz 1 of Funeral Legislation	All grave types, including urn graves, have a lease period for 25 years; for deceased under 15 years of age, the lease period is 15 years. Leases for family graves and urn graves of choice are granted 30 years. The grave types are: Row-graves Family graves Urn graves as row and family graves Honorary tombs	Conventional grave: Depth: 0.9 metres Urn Grave: 0.5 metres Graves must be 0.5 metres apart. It is not permitted to cover the grave; it has to be planted completely	Explicitly, specific requirements mentioned, besides keeping the design within the context of the site in Wincheringen and pious. Permitted measurements: (Children under five years) Row graves: Height: 0.55 metres to 0.8 metres Width: up to 0.45 metres Thickness: at least 0.14 metres Flat monuments: Height: 0.40 metres Width: up to 0.50 metres Thickness: at least 0.14 metres (Grown-Ups) Row graves: Height: 0.80 metres Width: up to 0.75 metres Thickness: at least 0.18 metres Flat monuments: Height: 0.50 metres Width: up to 0.70 metres Thickness: at least 0.14 metres Graves of choice (single): Height: 0.80 metres Width: 0.75 metres Thickness: 0.18 metres Graves of choice (multiple): Height: 0.80 metres Width: 1,4 metres Thickness: 0.18 metres Flat Monuments (grave of choice/single): Length: 0.70 metres to 0.90 metres

Place	Date of Engrossment	Dates of Amendments	Legislation	Types of Graves and Relevant Lease Periods	Arrangement of the Grave	Arrangement of the Gravestone
						Width: 0.50 metres Height: 0.14 metres to 0.30 metres Flat Monuments (grave of choice/multiple): Length: 0.80 metres to 1.20 metres Width: 0.75 metres Height: 0.14 metres to 0.30 metres

As is evident in the above chapter, the socio-cultural and economic development of the selected locations has been relatively similar over the past 200 years. Often this region is considered to be of a joint historical and cultural background. Even more remarkable, it appears as if there has been little if any guidance with regards to materiality of grave monuments and other related artefacts, including actual design, despite a number of different historic developments with regards to cemetery regulations during the last decades. Instead, even in relatively older cemetery regulations, the bereaved and the stonemasons appear to enjoy significant liberty regarding monument design. What is regulated, though, is the depth of a grave, the distance between each grave and especially the dimensions of grave monuments. Consequently the question remains, why, despite of that, grave monuments often appear relatively homogenous and show often similar materiality, well beyond the issue of dimensions.

Since the research context and background has now been illustrated, the next chapter will introduce the general research project's theoretical, epistemological and methodological background, including a discussion of the applied ethical standards.

3. Theoretical, Epistemological and Methodological Background of the General Research Project

After having introduced the research gap, research questions and the relevant socio-cultural and socio-economic context, the following chapter will discuss the complex interactions between space and materiality as this is discussed in the relevant literature in order to set the methodological context. This is necessary, as the theoretical and social contextual background might not be enough to illustrate the underlying assumptions and hypothesis of this thesis, especially with regards to such interplay between space and materiality and resulting agency. As will be detailed below, such interplays are not considered neutral and passive but important in understanding the assemblage at today's cemeteries. Addressing the explorative nature of this research again, the chapter concludes with a consideration of the required ethical standards.

The following is taken, in parts, from the introductory article for a special issue of the journal *Mortality*. The article was written by Streb and Kolnberger (2019), and addresses issues related to the materiality and spatiality of death, burial and commemoration.

3.1 Materiality in Historical Archaeology

It may appear foolish to oversimplify a statement claiming that there might be a scholarly discipline essentially preoccupied with and centred on the interrelationship of materiality and space, often in the context of death or its by-products. Clearly, such a trivialisation must be considered a gross misconception of the realities in any field. But as soon as materiality, space and death as well as burial and commemoration as key ingredients of a field are contemplated, archaeology might come to mind quickly. Moreover, although there are many exceptions within this particular discipline, the analysis of material culture in its spatial context over time is certainly at the heart of the grand research objective. Granted that the relationship with death or with any of its aspects is not always a given, but related finds make up a fair share of excavated artefacts. However, even without this particular focus, archaeologists are often interested in the nexus between materiality and space, especially in the interaction with humans, whether dead or alive. Examples are numerous. Cochran and Beaudry (2006) discuss material culture in historical archaeology with regards to individuals and groups, and point out that material forms transformative interrelationships that are practiced in everyday life. Galloway (2006) discusses the interrelatedness of materiality and text, and its importance for the discipline, while Orser (2004) dedicates a whole book to the subject.

Consider James Deetz' (1977) seminal work titled *In Small Things Forgotten* in which he takes up the cudgels for the seemingly plain objects of everyday life all around us that can create meaning even after a long time has passed, *en passant* breaking ground for what we presently call historical

archaeology. Or the work of Kenneth Foote (1997) who addresses the purported landscapes of violence, that is spaces of past tragedies and their changing meaning for future generations. Sharon Macdonald (2009), on the other hand, researches the painful material, i.e. the architectural legacy of Nazi materiality and space at Nuremberg, integrating fascinating perspectives on what kind of impact such architecture has on people until today. What becomes clear in such examples is that the materiality of artefacts, as well as the space they take up, has an effect on people. Things, space, the living and the dead – they are all intertwined. We might not always be consciously aware of it, but this interrelation is at the very heart of who we are. One might even say that it is at the very heart of understanding human nature. Ian Hodder (2012) called this relationship between humans and things *entangled* and while his work allows a glimpse into the complexity of that relationship, one might argue that it falls short of considering spatiality in more depth, although it cannot be ignored, of course.

Materiality is more than simple matter that is void of meaning or relevance. It is charged with significance and has symbolic, as well as interpretative, value – perhaps a form of selfhood. The apparently inanimate has meaning, which originates from the interaction with the animate. By interacting with materiality, one creates meaning consciously and unconsciously, while materiality retroactively provides a form of agency. Spatiality provides the context that permits and shapes this interaction. Artefacts, mementos and memorials are therefore exteriorised, materialised and spatialised forms of human activity: They can be understood as cultural forms, the function of which is to sustain social life. However, they are also the medium through which values, ideas and criteria of social distinction are reproduced, legitimised or transformed. Death, dying and burial produce artefacts and occur in spatial contexts. The interplay between such materiality, spatiality and the bereaved who commemorate the dead yields interpretations and creates meanings that can change over time. Physical properties of things have consequences for how objects are used or treated. Their particular materiality encourages certain cultural behaviours. In this regard, human remains represent a specific form of recalcitrant objects because they literally remain and request explicit care.

In the 2019 special issue of the journal *Mortality*, the paper titled “The materiality and spatiality of death, burial and commemoration”, edited by Christoph K. Streb and Thomas Kolnberger, explores this interplay by going beyond the consideration of simple grave artefacts, on the one hand, and graveyards as a space, on the other hand, to examine the specific interrelationships between materiality, spatiality, the living and the dead. Not surprisingly, many papers in this special issue are rooted in archaeology. The collected articles present historical and contemporary examples of the nexus between mortal remains and their places of burial or, in other words, the corporeality of dead bodies in relationship to their specific location. The area of investigation is mainly continental Europe (Germany and France).

Historically, the Christian belief in the Resurrection of the Flesh made a definite place of custody for mortal remains mandatory: the churchyard. Based on archaeological evidence, Hauke Kenzler (2019) describes the origins and development of medieval and post-medieval cemeteries in Germany. Burials are ritual acts of location which, as spatial fix, is part of the funeral customs. Kenzler points to convergence and divergences, as well as the spatial and ceremonial order of the Catholic and Protestant traditions over time. Dead bodies of Christians were not simply inhumated, they were embedded in all kinds of accompanying objects: coffins, clothing and grave goods, which referred to the person as part of the mortal and ephemeral world, thereby making the naked corpse complete before the eternal soul meet his maker. In the area of investigation, charnel houses were part of any god's acre until the Reformation, at most until the Age of Enlightenment. Elizabeth Craig-Atkins et al. (2019) offer new perspectives on this particular curation of human remains. The case study of a medieval parish church in England is rather unique, but nevertheless sheds wider light on medieval channelling practice across Europe. The interpretation of the bone deposit's location and the micro-location of the bones within the sacral architecture points to a secondary burial in the narrow sense in which skeleton remains are used to upgrade the spiritual condition of the departed due to the closeness to the altar. Human bones have a special presence. They can be professionally consumed as objects of scientific investigation. The possibility to examine and contextualize them, make bodily remains irresistible objects not only for osteoarchaeologists. While the ethical standards have fundamentally changed the procedures, Natalie Polzer (2019) investigates the same agency as consumption by the tourist gaze in one part of her paper. The author's ethnographical approach further reveals the vicissitudes of the non-decaying corpses as an ongoing co-presence of the dead. In Polzer's interpretation, the Capuchin Catacombs in Palermo (Sicily, 17th-late 19th century) as a place and as its individual mummies work as a generator of cultural and social meaning. While mummies are one well-known solution to the problem regarding the decaying materiality of the human flesh, cremation represents the other extreme: the annihilation of any bodily form. Embalming takes an intermediate position. Ann Carol (2019) links the rise of embalming with the emergence of the modern cemetery and its multiplication of plot allocations. In France, the 1830s are the golden age of embalming. This technique of post-mortem preservation prolongs the bodily familiarity of the deceased at his finest, while the new cemeteries became the actual place for mourning and the grave the spatial centre of the cult of the dead. It appears that in present days the materiality is more an obstacle that needs to be overcome than a quality to be preserved. Following Carol's argumentation, it is not a paradox that the rise of cremation (also in France) goes hand in hand with the renewed success of embalming. In their article, Philippe Charrier and Gaëlle Clavandier (2019) explore the question, according to four types, of what to do with bodily remains, which had lived no life or, rather, no independent life: foetal death in utero, pregnancies terminated for medical reasons, late-term miscarriages and stillbirths, i.e. infants born alive but

not viable. What are the places foreseen, as they write, for the lifeless infants in French cemeteries? Cremation had a profound impact on burial location: the potential dispersion of sites. In certain cases, human ashes can even be transformed into new materiality like synthetic diamonds, which make the remnants of a deceased hypermobile. Cremation transcends limitations of all kinds. In their article, Anna-Katharina Balonier et al. (2019) investigate the limitations of cemetery regulations in Germany leading up to related developments and the illusion of natural burial. Last but not least, Thorsten Benkel and Matthias Meitzler (2019) offer a sociological exploration of body and materiality. Based on practical research on the thanatopractical environment (cemeteries, hospitals, hospices, forensic departments etc.) in Central Europe, their theoretical well-informed contribution summarises approaches and perspectives about the nexus between bodily remains and their location.

3.2 Ontology of Materiality

A post-phenomenological-inspired manner of research is not textuality-driven and opposed to the object-centred nature of thinking (Verbeek, 2005; Ash and Simpson, 2014). From this perspective, even things can be agents: “Like humans, objects can make things happen, but unlike humans, no alternative decisions are possible for them” (Langer, 2010: 86). In other words, artefacts do more than fulfil their functions: They shape relations, but they do not make them – a property which Alfred Gell (1998) has coined the “secondary agency of the non-human world”. In such a world, there is a strong correlation between material things and space: Objects are by nature spatially extent and their position in space – be it at random, be it on purpose – shape a place, for example, a cemetery (Habermas, 1999: 77). Thus, in their individual set of approaches, the purported material turn and the spatial turn have a strong correlational denominator in common: the production of space as an agency of things. A cemetery, so to speak, is not a container space because it contains objects, but a relational space (Woodthorpe, 2010: 121). A cemetery displays a historically evolved spatiality, which has become “reified in a series of sedimented enactments” (Law, 2002: 96).

How can this correlational ensemble, this opaque mass in time and space, be disentangled? The authors suggest beginning with the analysis of an event horizon, a stratigraphy of object-oriented events via archaeological means. The stratum, however, does not need to be unburied because it is the surface of a present-time cemetery. Sørensen, 2010: 116 states that an

“… archaeology of contemporary material culture does not so much pursue the intentions and perceived strategies of contemporary individuals. Its strengths instead reside in taking material forms seriously and allowing them to formulate implicit as well as explicit agendas, taking its point of departure in the affective agency of materials rather that the verbalised or written narratives of human agents”.

As mentioned in the previous chapter, the material turn and the spatial turn are correlated by the production of space being conceptualised as a relational space that includes interactions between humans and things (Woodthorpe, 2010: 121). Similar to any built environment, a necropolis reveals a historically evolved spatiality that has become "reified in a series of sedimented enactments" (Law, 2002: 96). This reification, however, has an agency of its own. In the terminology that Alfred Gell proposed, the material entity can be described as an index, which motivates effects, such as inferences, responses or interpretations. Gell's research is concerned with the efficacy of an art object. The question is whether this indexicality type of an object could be applied to arts and crafts or even to an industrially reproduced item. Gell's reflections are directed at a tribal society and magic objects; he describes how an index relates differently to artists, to the recipients, but also the patients of sorcery. Without seeking to replicate or build on his very intricate formulas, we suggest that graves may be understood as indices representing a departed person or even death itself. Graves enable transactions, such as expressing and dealing with grief. Grave owners may be understood as recipients who decide on the grave's design within the range of options that the artist or stonemason proposes – in a process of consecration) or, indeed, as patients who are affected by their grave and those of others. The graves themselves achieve something: They remind, they console, they open old wounds, they distract. They certainly fulfil the "minimum qualification for social agency" (Gell, 1998: 16).

The cemetery, with its nested enclosures and cellulous structure, is an ideal setting for a case study to investigate "material things as an ever-changing bundle of relations, to emphasize the way they are constantly fluid and in flux" (Fowler and Harris, 2015: 128; compare Geismar and Horst, 2004; Pels, Hetherington and Vandenberghe, 2002). Firstly, a standard cemetery is clearly delineated. Secondly, the surface of a present-time cemetery is dynamic (see Sørensen, 2010). Thus, there is no need for physical excavation to identify contexts because it is possible to establish the sequences of grave object sedimentation on the surface. Old and brand-new graves share the same event horizon wherein the *old* never stops being present unless a concession expires and a grave is cleared. In this case, the plot is either vacant or a new grave occupies it. In a Heideggerian manner, graves are constantly *ready* (*zuhanden*) for grave owners who do not think about their existence, but at the same time they are *available* (*vorhanden*) for our scientific analysis. Thirdly, this dynamic surface is subdivided into self-similar units where flux can be charted, detected and correlated.

It is not farfetched to suggest that a cemetery, graveyard or burial ground *results* from the above-mentioned multiple interrelationships between materiality and subjects. However, despite many researchers acknowledging and appreciating such issues, their results are often limited to diachronical presentations of sampled gravestone features, such as the size, material and design, and their changes over time, which originate from James Deetz and others' seminal works (Deetz,

1996; Mallios and Caterino, 2007, 2011; Streb, 2017; Tarlow, 1999). These authors, for example, applied battleship diagrams to illustrate and support their interpretations. In order to understand the becoming of materiality and spatiality, one needs to go beyond traditional cemetery research about the changes over time, by, for example, adding the graves' spatial relations and the interplay between objects and subjects. In an object-centred approach, things are not only "good to think with", to paraphrase Lévi-Strauss's famous quote, but also "good to analyse with" (Harvey, 2009; Gerritsen and Riello, 2015).

3.3 Social Spatialisation

The analysis of that which has been labelled social spatialisation (the English translation of *production de l'espace*, a concept that Lefebvre propounded in 1974), is based on the premise that space is not a passive or neutral geometry but that social actions produce and reproduce it. This process includes three elements that may interact closely in cemeteries. Firstly, spatial practices, such as property, inspection and care, have a direct impact on the environment. Secondly, representations of space, for example, the planning and rules that local (and sometimes religious) authorities define, organise a given space. Thirdly, there are spaces of representation or collective experiences of space that Lefebvre regards as potential forms of resistance or transgression although they may also reinforce social order (Urry, 2004: 11). Cemeteries, for instance, try to ensure enduring bonds with the dead and to embody their and their bereaved families' social status (Streb, 2017). In other words, a grave's presence indicates and – at the same time – alleviates the absence of people (see Bleyen, 2010; Bille, Hastrup and Sørensen, 2010; Meyer, 2012). Moreover, burial sites are places of demarcation: Etymologically, *Friedhof* – the German term for cemetery – refers to an enclosed (*eingefriedet*) area (Sörries, 2009a). The English word cemetery and the French *cimetière* are derived from the Ancient Greek *koimeterion* or resting place (Kselman, 1992). These resting places were increasingly set apart from the living. Cemetery research highlights the specific character of "the boundaries between the living and the dead, between death space and domestic space" (Meyer, 2012: 106). However, Stavrakopoulu has pointed out that "the territorial potency of burial places expresses the claims of the descendants of the dead to the land in which their ancestors are materially present" (cited by Ramanillos, 2015: 570). Spatially speaking, like a Russian nesting doll, a cemetery gives the impression of private enclosures of graduated size in a public setting (Benkel, 2013: 47ff.).

In this respect, the notion of heterotopia comes into play. Cemeteries may be regarded as heterotopias – less in the sense of Lefebvre who used the term, according to Harvey (2009) as quoted by Johnson (2013) to indicate that "liminal social spaces of possibility were 'something different' and not only possible, but fundamental for the defining of revolutionary trajectories" – and more in the sense proposed by Foucault (Foucault, 1984; Johnson, 2006). Indeed, cemeteries

figure prominently amongst the examples that Foucault gives of spaces of otherness, caught between the physical and mental worlds and fraught with their own rules of conduct and access rights. Within this line of thinking, the individual grave may likewise be understood as subjected to conflicting regimes: consumer choice, on the one hand, and duty towards the deceased, on the other. Consumer choice, based on the available choice of, for example, the material and designs of gravestones within the immediate sphere of information collection, as well as any notion of duty towards the specific wishes of the deceased, can be investigated by using ethnographic and sociological methods.

For this research, one needs to be aware of the many possible variables that determine the grave owner's choice, because it is difficult to clearly separate such variables from each other. Besides countless individual decisions, cemetery regulations can account for the assemblage of materiality that constitutes the space referred to as a cemetery. These regulations are usually readily available to researchers. However, these regulations have been interpreted rather liberally over time and provide details mainly about the size, especially the height, of a grave monument, while further design details are more or less up to the issuing party, resulting in the question, how such details are selected and/or created then. It is practically impossible to determine causality in such a complex process. The focus is, therefore, on the spatial effects and, more precisely, on the neighbourhood effect, a term that the geographer K.R. Cox (1969) originally proposed. Taking its cue from Cox's argument that the people whom others deal with on a daily basis influence their voting decisions, this article examines also the choice of grave type, material and décor in terms of its spatial proximity to other graves. When people are confronted with the death of a close relative and buy a funeral concession for burial purposes, they have time – in Luxembourg up to three years – to decide on the gravestone and slab's physical appearance. Within this time, they consult one or various stonemasons who propose certain options within the same price range. Why, then, are certain options more popular than others? Why are there higher concentrations of one option in certain areas of the cemetery? Although a stonemason may promote a specific option, one could propound that existing graves in a new site function as silent advertisements. Inspired by the surrounding graves, consumers often seek to fit in rather than to stand out. Based on the consideration of space, especially spatial proximity, one can hypothesise an emulation effect in cemeteries: Grave owners copy elements based on existing artefacts and spatial proximity, resulting in unique cemetery patterns made visible once the spatial component is considered.

3.4 General Research Paradigm

With regards to the overall research paradigm, this PhD research project aims to position itself in the broader field of historical archaeology with a critical studies perspective (e.g. Leone, Potter, Shackel, 1987; Leone, 1995). The reason for this choice is twofold:

Firstly, the basic understanding of historical archaeology as a methodological approach towards material culture of modernity, distinct from a simply periodic definition – usually after c. AD 1500 – will be followed (cf. Brunner, Conze and Koselleck, 2004). Orser (2004: 19), for example, defines historical archaeology as "…a multidisciplinary field that shares a special relationship with the formal disciplines of anthropology and history, focuses its attention on the post-prehistoric past, and seeks to understand the global nature of modern life", while highlighting that it includes all elements of human expression consciously created, independent of a specific temporal limitation (Orser, 2004: 90); generally, it therefore enables the application of related methodology to any temporal setting. An example of this is Newman, Cranstone and Howard-Davis (2001: 211) who highlight the role of artefacts to express social status and refers to the increased demand for and supply of material culture in the historical context, especially the time between 1540 and 1900. They state that artefacts "… characterize the environment in which, and by which, individuals and groups with a common identity or purpose define themselves" (Newman et al., 2001: 212). Orser (2004: 92) takes a similar stand when he states that "… artefacts impose structure on people's lives in the same way that people impose structure on an artefact in the process of fashioning it", hence referring to a complex socio-cultural interrelation between people and their material culture. Orser (2004: 93) suggests interpreting artefacts as documents, commodities or ideas. Firstly, artefacts can provide information similar to what a historical text could because of, for example, certain styles, shapes or production technology applied. This allows one to deduce the cultural conventions of the people related to the artefacts, especially when one can observe how changes of a specific type of artefacts developed over time. This not only allows deducting socio-cultural changes but also possible dating. The use of artefacts to date certain layers of soil in excavations is one of the most common applications (Orser, 2004: 95). Thanks to the increase of remaining material culture in post-medieval times and the available detailed records about such artefacts that have been found in, for example, corporate archives, much more precise work in this respect is possible. A common example of this approach is the Coca-Cola bottle: The development of its design, as well as its imprinted patent coding (similar to ceramic makers' marks), can be traced and dated rather accurately (Orser, 2004: 95f.). As briefly indicated above, the increase in both supply and demand of commodities, although not a recent phenomenon, also found significant expression from the 16th century onwards, due to mass production and consumption. Hence, such artefacts, created especially for exchange, can be traced easily and used for purported commodity research, for example, in understanding long-distance trade

connections and/or relations or consumption habits (Orser, 2004: 103ff.). Finally, archaeologists can use artefacts to study what they meant to the people who made and/or used them. As Orser (2004: 111) explains, this approach is related to the theory of structuralism "… that has as one of its main goals the understanding of the basic, universal patterns that structure human ideas and, thereby, actions". Orser's (2004) seminal contribution, therefore, paths the way to combine material culture and archival records as a general means of historical archaeological approach.

Secondly, the general stance of critical theory needs to be considered. Inspired by the Frankfurt School of Critical Theory, Leone, Potter and Shackle (1987: 284) state that "critical theory aims at 'producing enlightenment […] enabling those who hold [it] to determine what their true interests are'. Its goal is emancipation from coercion, including coercion that is self-imposed. To this end, it is 'reflective'". Today, this generally translates into a critical stance when it comes to one's own ideologies, underlying assumptions, research approach and even research findings. At every stage of research the questions need to be asked: From what point of view are certain assumptions made and conclusions drawn? (Leone et al., 1987: 284). Moreover, this approach acknowledges that neither the historic record nor the archaeological findings alone might be sufficient to answer questions such as "…how we […] got to be where we are now" (Leone, 1995: 265). Wilke and Bartoy (2000) provide a critical review of that which can presently be referred to as the Annapolis School and criticise the lack of agency in previous research, especially by Leone, Potter and Shackel (1987). They suggest a stronger integration of concepts, such as Althusser's (1971) notion of ideology and Bourdieu's (1998) concept of habitus based on Giddens' (1984) research regarding the dualities of agency and structure. When it comes to a deeper understanding of materiality, modernity and its meaning, these approaches appear worthwhile to be further investigated during the course of this study. Considering this general paradigmatic perspective, what does it mean with regards to the proposed methodology?

Different theoretical approaches attempted to help the archaeologist answer questions, such as why artefacts look the way they do and what this might tell us about the past. Lewis Binford suggested middle-range theory (MRT), bridging the gap between the static record of archaeological data in the present and the dynamics of past societies. This happens by making propositions that link "… statics to dynamics, and particular observations of the archaeological record to general theories about the past" (Johnson, 2010: 52). In order to actually link a set of activity patterns with a certain outcome of archaeological record, one would actually have to observe such process first hand, which is only possible in the present – which is why Binford (1983: 24) states: "My aim was to study the relation between statics and dynamics in a modern setting. If understood in great detail, it would give us a kind of Rosetta Stone: a way of 'translating' the static […] into the vibrant life of group of people who in fact left [it] there". Binford called this ethnographic or actualistic studies, that is the archaeologist researching present processes to

research the past. While MRT has been applied until today with mixed results, it comes with a number of disadvantages and problems that cannot be detailed in this proposal (cf. Johnson, 2010: 61ff.). Most importantly, it is doubtful whether processes that are observed today have any resemblance whether to the actual activity or even to its meaning with past processes, assuming that societies go through fundamental social transformations that make it difficult or even impossible to draw parallels between them. However, one needs to keep in mind that Lewis Binford drew such parallels between the present and the Palaeolithic period as well as across cultures.

More suitable and maybe less contested for its more modest aim, might be the application of behavioural archaeology, which follows the general model of Michael Schiffer. Schiffer (2010) suggests a systemic context in which artefacts are created and an archaeological context in which they are excavated. In attempting to explain the archaeological record through past behaviour, he exemplifies depositional, reclamation, disturbance and reuse processes, all of which can also be found at graveyards (Schiffer, 2010). Furthermore, post-processual archaeology reacts to all the approaches that are too positivist, especially approaches, such as Binford's MRT, by emphasizing issues like interpretation of data, past values, active agency, material culture as text, as well as the context and political relevance of archaeological research (cf. Johnson, 2010: 105ff.). While potentially unsuitable as an applicable methodology, its perspective might enable the researcher to apply aspects of MRT, especially its ethnographical approach, without the burden of unrealisable positivistic demands that can be disputed when attempting to produce strong claims about past societies.

Returning to ethnoarchaeology as a potential means to presently explain the material culture record of gravestones from the early 20th century and what could be potentially deduced from it, it is clear that the general idea of drawing analogies is not new in archaeology (cf. Johnson, 2010); however, ethnoarchaeology offers a developed methodology to do so. Following, for example, the model described by David and Kramer (2001), in an ideal world it should be possible to observe how gravestones as surviving artefacts of death, burial and commemoration during the first half of the 20th century, are produced today by considering all sorts of agency (similarly suggested by post-processual archaeology); furthermore, by following depositional, reclamation, disturbance and reuse processes as suggested by Schiffer and by applying the historic knowledge of the 20th century, one can try to deduct how processes leading to the available sample of artefacts might have been like and what they mean with regards to the particular society. This would be possible, since the same space, environment and cultural embedding will be considered for the past and the present. Adjustments for social transformations, which have been tremendous and numerous over the course of the last 200 years, could be made; however, it would be wise to follow Binford here, by first making propositions about the past that based on

present behaviour and by assuming that deviations could be caused by social differences. Via a diachronic perspective, social transformations might become noticeable over time. Hence, a potential disadvantage of this methodology could become an advantage. Last but not least, while acknowledging and being aware that the Luxembourgish/German society during the course of the 20th century is not the same or directly comparable with today's society, the differences are negligible compared to the traditional field of ethnoarchaeology, for example Palaeolithic (cf. Gould, Koster and Sontz, 1971). Stiles (1977) draws a clear distinction between common ethnography and ethnoarchaeology; he suggests a number of important approaches, which will be useful for this study. Similar to Schiffer, he refers to a pattern of archaeological remains and the process that led to it. This includes observing "… the life of artefacts from raw material procurement through to discard in order to understand better the aspects of variation in what is left on an occupation site …" (Stiles, 1977: 93), as well as the "… relationships between populations of artefacts and the sociology of the people who produced them (Stiles, 1977: 94). Stiles (1977: 94f.) suggests three potential uses for such data: a) for ethnographic analogy, b) for the generation of hypotheses or models and c) for testing the hypothesis. Since a strong degree of historical and cultural continuity between past and present can be assumed in the region under scrutiny, analogy, hypothesis building and modelling, as well as subsequent hypothesis testing, should be possible. For the purpose of this thesis, though, it shall suffice to assume that the application of material, as well as the geo-spatial data collected today, can be used in order to hypothesise about design, manufacturing and consumption processes in the very recent past, within the same region, without leaving a sound methodological basis. Such a process, however, can only be proposed to future research, as it is outside the scope of the study at hand.

3.5 Ethical Standards and Conduct

This thesis contains data collected on active cemeteries as well as limited interview data from cemetery administration representatives. Upon the examination board's request, no interview data from grave tenders, the bereaved or stonemasons was used. This thesis is embedded in a research context that requires a proper ethical conduct of research. To generalise, every time research includes humans and/or their personal data, caution is advised. For the interviews, the interviewees were inquired about their professional function as cemetery administrative staff. For data collection at the cemeteries, not only personal information on grave monuments needs to be considered but also the sampled cemeteries that are active and still in use, i.e. not only is there is a chance that funerals or disinterments take place but the presence of mourners and the bereaved must also be considered.

Despite numerous publications addressing research ethics and the ubiquitous existence of guidelines, research misconduct can still be a problem (Komic, Marusic and Marusic, 2015).

Wallace and Sheldon (2015) even claim, at least for the field of business research ethics, that the relevant ethical parameters adopted by doctoral candidates in their work is an under-researched topic that requires more attention. It would presumably come as no surprise that social sciences in general, even though in dire need of benchmarks, are instead fragmented and that the inclusion and application of ethical research conduct, especially in graduate work, is largely a matter of practical requirements and convenience. Wallace and Sheldon (2015: 275) conclude that the main issues arise in "close personal contact with participants […], the implications of research design and imposition on participants […], and finally, difficulties of applicants in articulating or recognising risks associated with their research and benefits to the individual in participating in the research activity".

While the aforementioned perspective is certainly true and applicable, other authors addressing research ethics run the risk of obstructing any meaningful social research by proposing a rather positivistic, Newtonian understanding of science and by opposing strict and inflexible standards that do no justice to the manifoldness and diversity of social sciences or the requirements and realities of non-laboratory research. Koepsell (2017), for example, states that science "must be universal for research programs to succeed or indeed have any meaning. The truth must not be specific to any one culture, time, or place but rather inherent somehow in nature and discoverable by the methods of science". While it is understood that this is a common, positivistic perspective suitable to natural science, the simple, unthinking transfer to social science would limit the very nature of the multifaceted, diverse, multi-cultural, multi-local and contemporaneous dissynchronisities social realities are confronted with. These kinds of considerations and limitations of research must be rejected, while they must at least be understood and considered. Nicholls et al. (2015) acknowledge the lack of consensus in the area of research ethics standards and make a number of suggestions how to remedy this. However, the question should rather be whether such universal standards are desirable at all or whether open, critical and unlimited research does not, instead, require a case-sensitive approach.

It is not the objective of this thesis to discuss research ethics in general or to produce a new benchmark of standards and ethical research conduct. This is especially true considering the lack of any universal standards. It is, however, critically important to be aware of the issues in dealing with humans, their personal data as well as the relevant issues as they were presented by Wallace and Sheldon (2015).

As mentioned before, the cemetery administrators talked to the author in their official capacity as municipal representatives. No personal data, neither of the cemetery administrators nor of other people, were addressed. Nonetheless, upon approaching them and scheduling a meeting, the cemetery administrators were fully and transparently informed about the research project

and the purpose of the interviews. Moreover, they were supplied with an information sheet and consent form (see Annex 11.7 and 11.8). Only if the interviewees consented, were data from the interviews considered. It was key to inform the participant in detail about the background and nature of the research, – verbally and in writing, – and to grant and guarantee full control and transparency of any personal data, especially since the intention was that the interviews would be taped, if possible, and permitted. Details about these procedures can be found in Chapter 6.

The cemetery itself, at least within the regional context of this research, is considered a public space governed by the local cemetery regulations. Consequently, legal requirements for data collection at the cemeteries in the region under scrutiny is rather straightforward. With regards to collecting data at the cemetery, especially the taking of photographs, it is necessary to inform the cemetery administration and request permission to do so. A written acknowledgment and consent to data collection, even as informally as an email, is required. To achieve this, the relevant cemetery administrations have been informed in detail – usually in writing – about the research project, what data would be collected, how and to what end, i.e. what research it would be used for, and how the data will be stored and secured.

However, even with approval from the authorities as mentioned above, it needs to be considered that a cemetery, despite being a public space, is also a space of mourning and grieving that requires a certain demeanour and conduct, especially when in the presence of the bereaved. While a strict observance of the cemetery regulation is self-evident, any disturbance of the other visitors of the cemetery had to be strictly avoided. No grave site was to be touched or altered in any manner. Should, for example, a funeral take place, any data collection had to be immediately aborted. At no time during data collection at any of the cemeteries did any of the other visitors ask to be excluded from data collection or expressed the wish that the author should leave; in fact, the opposite was the case: A number of visitors, also the bereaved visiting graves, were curious and approached the author to inquire further details about his activity. These questions were usually extremely friendly and supportive and the author made sure to take time and answer all questions. Although relevant documents and information were taken along, such as letters of permission from cemetery administrations, phone numbers of cemetery administrations and principal investigators of the research project and, of course, personal identification, these were never required. Regarding photographic data collected, all personal data are completely anonymised.

The practical approach outlined above is developed and adopted by fully applying the policies on ethics in research of the University of Luxembourg and Durham University, as this PhD thesis is conducted in a double degree programme in an academic collaboration between the two aforementioned institutions.

From the University of Luxembourg's perspective, the following considerations are most important when it comes to the involvement of human participants (University of Luxembourg, 2010: 2):

"[…]

12. All research involving human participants must respect the rights, dignity and safety, health and welfare of participants, faculty, staff, students and visitors (including contractors on campus) involved.

13. The benefits of the research must outweigh the risks to the human participants

14. Researchers should consider the impact any publication of research findings may have on participants under investigation, on the groups they represent, on those directly involved in their life, and on others involved in the research.

[…]

Informed consent and respect for confidentiality.

19. Participation shall be voluntary.

20. Informed, competent and understanding consent by participants is essential to good research. This involves a full and careful explanation in language that is understandable by lay persons.

21. The consent of the participant must be obtained without duress, deception, or the withholding of information. This means that the purpose of the research, the procedures to be followed, the possible risks involved, and the benefits to result from the activity, are clearly explained to the participant and the participant's rights are clearly represented.

22. The participant should also be told that he or she is free to withdraw from the research at any time without penalty.

23. The confidentiality of information given anonymity of participants, must be respected by participants, and the privacy and anonymity of participants must be respected.

24. When existing data, documents, records, pathological specimens, diagnostic specimens, or established cell lines are used, these should have been de-identified, i.e. it should not be possible to identify participants directly or through combining identifiers linked to the participants.

25. Existing material as described under 24 should have been collected in a way that complies with national and European ethics guidelines and legislation.

26. Researchers should not attempt to identify participants from existing, de-identified material.

[…]".

According to Durham University's Ethical Policy, similar considerations apply whenever humans and/or personal data are involved (Durham University, 2018: 1). This means especially that any "[…]

projects involving people, their data or tissues, particularly those which are high risk either due to their participant profile, design or methodology. Significant risks include:

a) Potentially vulnerable groups, e.g. children / minors, prisoners, those with cognitive impairment or those in unequal relationships;

b) Requirement for co-operation of a gatekeeper for initial access (e.g. students at school, members of a self-help group, nursing home residents);

c) Requirement for participants to take part without full knowledge and consent (e.g. involving covert observation or deception of participants);

d) Sensitive topics (e.g. sexual activity, drug use, politics, illegal activities);

e) Administering drugs, food or other substances to participants;

f) Obtaining tissue samples (including blood) from participants;

g) Any invasive, intrusive or potentially harmful procedure;

h) Prolonged or repetitive testing;

i) The collection or processing of sensitive personal data (including from secondary sources) without explicit consent;

j) Sensitive personal data transfer to partners outside the EEA;

k) Members of the public in a research capacity ('participant research');

l) Offering financial recompense to participants beyond reasonable expenses".

Therefore, even though both guidelines might differ in the detail and the requirements are formulated rather vaguely, it is clear that both institutions are concerned about the well-being of

the people involved in the research as well as the ethical treatment and processing of the data gained. The lack of any universal rules and procedures is less of a downside, as it responds to the requirement to allow for flexibility in any social science research. In summary, both policies provide the necessary ethical framework in which this thesis has to be executed. This is evident in how the data are collected, stored and processed for this research.

Hennink et al. (2010: 63) suggest, in summary, the following crucial considerations:

"Informed consent. Individuals should be provided with sufficient information about the research, in a format that is comprehensible to them, and make a voluntary decision to participate in a research study.

Self-determination. Individuals have the right to determine their own participation in research, including the right to refuse participation without negative consequences.

Minimisation of harm. Researchers should not do any harm to participants or put them at risk.

Anonymity. Researchers should protect the identity of research participants at all times.

Confidentiality. Researchers should ensure that all data records are kept confidential at all times".

Summarising the above-mentioned standards of ethical research procedures that were adhered to in this thesis, an application for approval has been submitted for the broader research project entitled "Material Culture and Spaces of Remembrance" (FNR: C14/SC/8333105/R.I.P.), of which this thesis is part of, and approval has been granted by the Ethics Review Panel of the University of Luxembourg in February 2016. While cemeteries are considered a public space, permission to collect all kinds of data on-site has been requested directly with the relevant authorities. For any interviews that have been conducted as part of the overall research project, the approval by the Ethics Review Panel is considered formal methodological approval. Further details of this can be requested from the project leader.

As is evident from the above, in researching cemeteries a more complex perspective on the interplay of space and materiality might be considered, allowing a more explorative approach but nonetheless requiring attention to ethical conduct of the research. The following chapter introduces the pilot project that has been conducted at the Walferdange cemetery, which provided the necessary data for extending the research, and illustrates the application of the above-mentioned issues.

4. Pilot Project Walferdange Cemetery in Luxembourg

This chapter illustrates the pilot approach that was conducted at Walferdange cemetery, applying the before-mentioned contextual considerations and methodological issues but still requiring an actual test of the methodology and overall approach. In describing the data collection and analysis and the lessons learnt, this chapter focuses on the quantitative-spatial findings on this particular cemetery. As it will be shown, there appears to be an indication of a neighbouring effect of materiality in this clearly defined space, which is the cemetery, allowing the hypotheses that in deciding on grave monuments, materiality that is already present is relevant. From a critical review of the pilot project, lessons learnt for extending the study are deduced. As will be shown later, a more detailed spatial analysis of the findings will, however, challenge the results presented here.

The following text is taken directly from an article that was published in the *Journal of Material Culture* (Streb, Kolnberger and Kmec, 2019). For the purpose of developing and testing methodology, the exploratory research on the Walferdange cemetery in Luxembourg serves as a pilot study. This particular case was chosen, because it covers a long enough time horizon and it is still active, that is new graves are added and old ones are suspended and used for another body as is common in Central Europe. These types of cemeteries demonstrate, therefore, a much higher level of complexity and dynamics over time than comparable Anglo-American examples. Moreover, its particular layout and design make it an ideal and representative case for cemeteries in Luxembourg.

4.1 Data Collection

At first glance, the cemetery space is chronologically ordered. There is usually an older section and a sequence of new extensions. In Western Europe, cemeteries are usually clearly demarcated by walls and gates. Internal subdivisions that reflect social status are often less visible (see Herman, 2010: 305, 312, Sørensen, 2010: 116; Oliver, 2004: 241). Richard Francaviglia (1971: 506) noted the following about cemeteries in the US: “[t]here are *good* and *bad* neighbourhoods in cemeteries as well as cities and towns”. This social segregation is, however, far from being the rule. In this case study, as in most modern cemeteries, it was noticed in the border region between Luxembourg, Germany and France that grave plots are assigned to customers strictly in sequential order and that they cannot be chosen freely. There might be a limited choice between available vacant plots. The historical distinction between so-called *Reihengräber* (sequential grave plots) and *Wahlgräber* (grave plots of choice) is no longer relevant in Luxembourg.

There are, however, two major obstacles to this chronological order whereby time and space are adapted. Firstly, grave sites are only rented for fifteen to thirty years. If a concession is not

renewed, the old stones are destroyed, kept as decoration in a different part of the cemetery or, more rarely, transferred to a museum. Human remains are either relocated or left in place. These secondary burials are conducted covertly and the excavated bodily remains reburied anonymously in assigned areas. The space is cleared, reassigned and reused for a new grave. The exceptions are Jewish and Muslim burial places, military cemeteries and tombs of celebrities. Continental European cemeteries that have no eternal resting place for human remains thus show far more complexity and dynamics over time than comparable Anglo-American examples.

Secondly, a grave can be used for up to nine bodies. Such family graves change over the years. Sometimes grave owners merely add the name and dates of an additional occupant, but sometimes the entire grave design is altered. The exact dates of these changes are often impossible to trace and the grave itself has to be examined as if it were a palimpsest showing traces of many interventions. While all possible data on the surface of graves and grave markers were collected, it needs to be emphasized that all data that could be gathered from *below* the surface were excluded.

For this research, it is assumed that the changes in style are not only due to changing fashions and mentalities (see Deetz, 1996) but also to the grave owners' active choices as influenced by the materiality surrounding their site; that is, the microgeography's spatial influences due to the grave's mediated agency. In order to investigate this, the research was conducted in two phases. Firstly, a temporal analysis based on the oldest date of death indicated on a grave to show trends in terms of grave material, shape and design. Secondly, an examination of the spatial distribution of these trends showing that they do not coincide with the chronological trends but have an additional spatial dimension. Since all the materials, shapes and designs were available during the entire researched period (1900-2010), the question is why one was chosen and not another. It can be argued that graves in close proximity with identical features influenced the choice.

The data collection thus needed the exact spatial coordinates and all available dates. Sampling was not an option because it would leave gaps in the data's overall spatial coverage. All this cemetery's grave plots (417 dated graves, 296 undated graves and 26 vacant plots) were surveyed with as many material characteristics as possible and noted each grave's spatial coordinates. The cemetery chosen for this study is a medium-sized graveyard in Walferdange where the graves date from before 1900 to the present. In order to make all data comparable, it was organised into full decades from 1900 until 2010. Figure 56, Figure 57, Figure 58 and Figure 59 show the location of Walferdange cemetery in the Grand Duchy of Luxembourg, as well as a satellite image with further site details, a grave allocation plan and a photographic overview.

Luxembourg is a small state with a total surface of 2,586.4 km^2, a total population of 602,005 and a high ratio (48%) of non-nationals. In 2018, the biggest town of the Grand Duchy is Luxembourg

City (116,300 inhabitants), followed by Esch-sur-Alzette (35,000) and Differdange (26,200). The degree of urbanisation is high (EEA 2018).There are only three cemeteries with several thousand grave plots, not including the meadow of the crematory at Luxembourg/Hamm: Notre-Dame and Merl in the capital, as well as Esch/Lallange. Cemeteries used to be linked to parishes and/or villages and therefore they usually have only slightly more than one hundred plots. This case study, the cemetery of Walferdange, is medium-sized with 739 grave plots, not including the columbarium and the newly erected urn-grave section.

Figure 56. The location of Walferdange in Luxembourg.

Figure 57. Satellite image of Walferdange cemetery, ca. 2015.

(Source: Service technique de la Commune de Walferdange. Scale and explanations added by the authors)

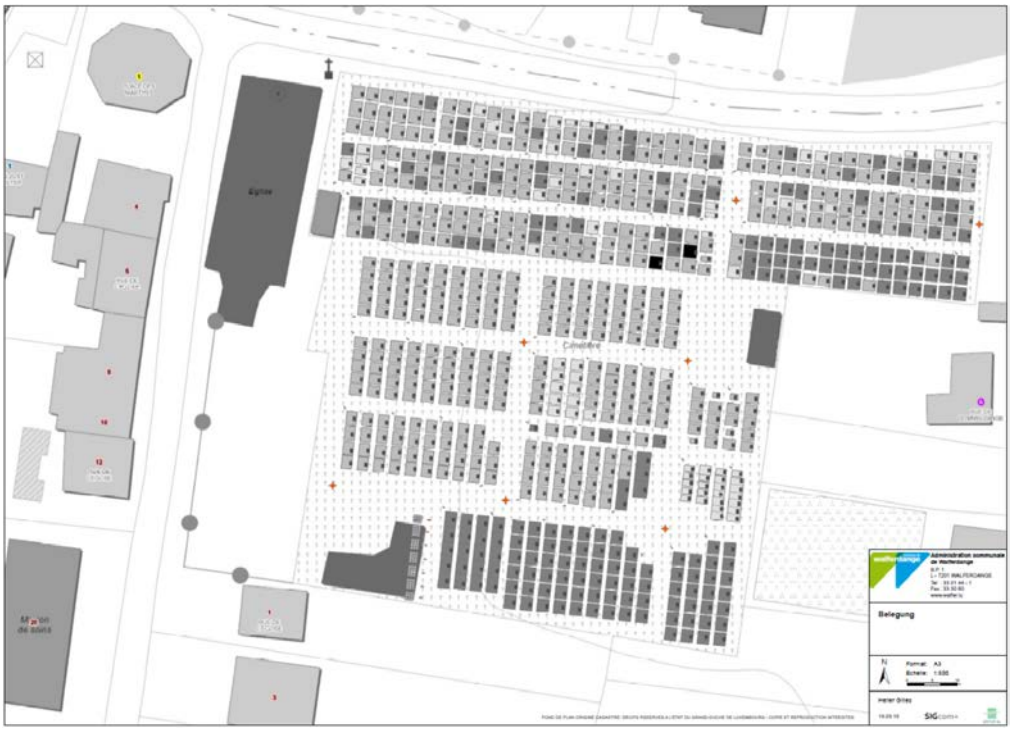


Figure 58. Grave allocation plan: Walferdange cemetery.

Figure 59. An overview of Walferdange cemetery.

(All Saints Day, 2016). (Showing the orderly alignment of the grave plots. (Photo: courtesy of Tom Alesch)

In contrast to the churchyards of the Old Regime, this modern cemetery adjacent to the new Catholic parish church was laid out strictly geometrically between 1845 and 1852. Additional grave sections to the south doubled the cemetery's capacity after World War Two (National Archives of Luxembourg: ANLux, INT-0077 *Cimetières et corbillards*/1885-1940 and INT-0083/1892-1937; H-1024-299a-b, 300/1857-1880). These historical data and the cemetery

regulations of Walferdange dating from 1910 (Int-003 *Division de l'Interieur*) and kept at the National Archives were complemented by information kindly provided by the Cemetery Administration (*Service technique*) of the Walferdange municipality. The latter uses a satellite image (Figure 57) as basis for grave allocation. Due to data protection issues, it was not possible to use the burial register, which would have allowed to date more graves. Moreover, the dates of death do not reflect the date on which a grave was constructed, especially in the case of family graves.

After obtaining official permission to collect data on-site, first digital photography and Excel-sheets were used to collect and organise the data before using this input to develop a beta version of a digital data collection tool that was specially developed for these purposes. The Cemetery Surveyor Application (CSA), which the University of Luxembourg (http://transmortality.uni.lu) developed, runs on any Android device (e.g. a smartphone or tablet) and enables a researcher to enter and organise various field data (see Annex 11.3). All the data, including photographs, are linked to a unique ID that identifies each grave and provides an organised table in a comma-separated value (CSV) file format as output for further analysis. Figure 60 provides a screenshot of the user interface. A total of 114 variables for the Walferdange cemetery were created and entered and organised them into four categories: (vertical) *gravestones*; (horizontal) *grave surface* (both according to type, dimensions, materials, colours, finish, etc.); additional *paraphernalia* found on the gravestone and/or grave surface (e.g. crosses, flower arrangements, holy water containers, stonemason marks, etc.); and *inscriptions* on the gravestone and/or grave surface. Photographs support and document all the features. Figure 61 shows standard photographs taken of each grave during the process. While most data for this particular project still had to be entered and organised manually, for future applications the manual input required is as simple as clicking on an icon, for example, of a pre-specified type of gravestone or entering measurements; today, the process is completely paperless and no extra camera is required.

Figure 60. A screenshot of the Cemetery Surveyor Application (CSA).

(Developed at the University of Luxembourg by Cyrille Médard de Chardon. https://transmortality.uni.lu/Project-RIP/Survey-Tool)

Figure 61. An example of a detailed photograph of a grave at Walferdange (here grave W-B1).

Most of the existing typologies of graves, gravestones and all related paraphernalia are based on data collected in Great Britain or the USA (Deetz, 1996; Buckham, 2000; Mallios and Caterino, 2011 etc.) and they thus lose relevance when applied to funeral and commemoration traditions of other cultural spheres. Therefore, a new typology needed to be developed, but the research profited from these studies' methodological insights into the challenges of classification (Whittaker et al., 1998).

During the pilot data collection, which included iterations and methodological improvements, two researchers worked full-time for three months (March-May 2016) to survey the graveyard. With the finalised version of the CSA tool, a survey of a similar-sized cemetery should only take two to three weeks. 739 graves with 114 variables each were documented and 3,519 photographs were taken. Figure 62 provides an overview of the number of stones per decade, based on a gravestone's inscribed date of death or, in the case of a family grave, on the oldest date.

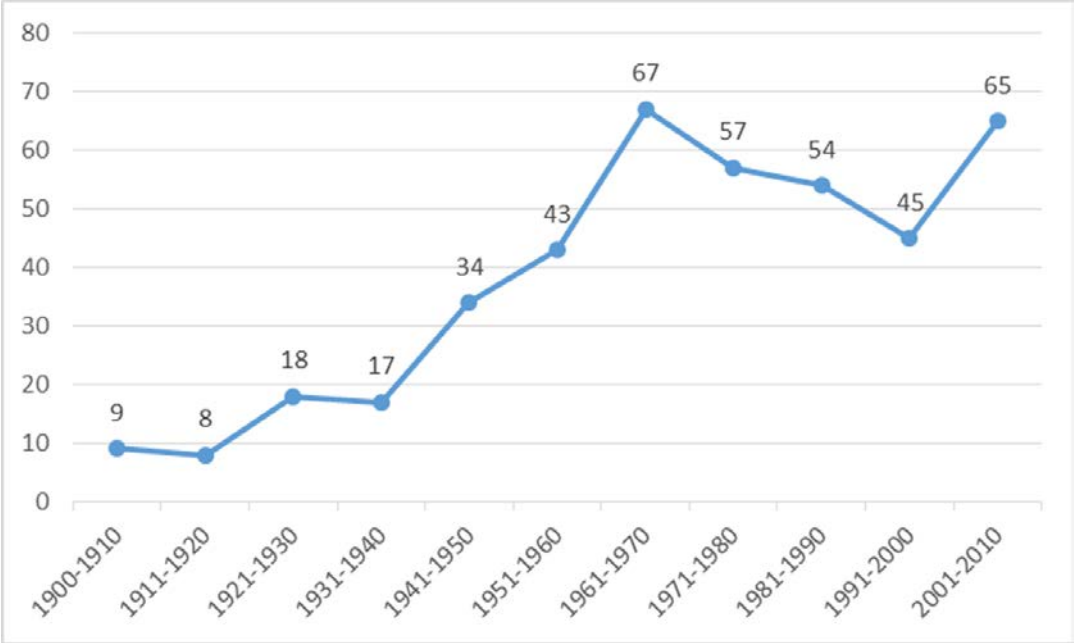


Figure 62. Number of graves (vertical scale) according to oldest date of death indicated on the gravestone (horizontal scale) at Walferdange (n = 417) (note that 322 graves showed no dates).

4.2 Data Analysis

In order for this data to be comparable and in keeping with established standards in related research, the statistical software *RStudio* was used first to organise the frequencies of the collected variables and to categorise them. *RStudio* is a professional and open-source statistical analytical software package that enables its users to examine the manually-entered data for redundancies, encoding and typing errors and to clean the data. The resulting output was used to identify the top five most common variables and their frequencies. Similar to all prior seminal research, it was thereafter ensured that a diachronical overview of certain variables over time

(exemplified by Deetz, 1996) was conducted. Given 114 variables, it was aimed to identify the top five (1) grave types, (2) grave materials, (3) gravestone types, (4) gravestone materials, (5) grave colours, (6) gravestone colours, (7) cross types and (8) holy water container types. Besides showing the chronological developments, it was also sought to show how certain variables interrelate. Therefore the selected variables were matched in a simple correlation to identify further patterns. This is an important step that no previous research has undertaken.

Based on the results, the most common combinations of grave surface and gravestone paraphernalia were identified. This step was key in respect of using the spatial component to extend the descriptive statistical analysis of the materiality. Input from the archives was used, especially the satellite imagery, to match the graves with their geospatial position in the graveyard and their relative positions to each other. The data were merged in *QGIS* — the free and open geospatial analysis software — with the data organised in *RStudio* and analysed them geospatially and statistically. It was also sought to show certain variable and feature *hotspots* of their correlations and combinations. These efforts resulted in *heatmaps*, which indicate concentrations of selected variables and/or their combinations. The hotspots were calculated by adjusting the software to consider similarities within an 8m radius around each grave — a distance we consider relevant and within the grave owners' visual range, as it was empirically experienced and which is generally suggested for such a scaled space. According to the software manual (Sherman et al., 2004), GQIC's heatmap function "… uses Kernel Density Estimation to create a density (heatmap) raster of an input point vector layer. The density is calculated based on the number of points in a location, with larger numbers of clustered points resulting in larger values".

Undated graves and graves with no headstone were included in the spatial analysis, since the absence of such a stone could be a conscious choice. Qualitative social research may enable one to find out more about consumer choice. This is not the focus of the present article, but it may be useful to briefly outline the overall research design at this stage. The first step is to make salient objects speak, meaning that the spatial analysis of the cemeteries' material ensemble was approached in an inductive way by collecting quantitative object-related data. This enables us to develop certain hypotheses in a grounded theory approach. The cemetery of Walferdange was singled out for the pilot study, followed by more fully investigated burial places in Luxembourg and neighbouring Germany and France (e.g. Graas, 2017). In Walferdange, expert interviews were conducted with members of the cemetery administration and technical service: four spontaneous investigative interviews with grave owners at the site followed by expert interviews with the two foremost stonemasonries of the area. After the survey, the cemetery of Walferdange also became the place for a video-based eye-tracking experiment. Using mobile devices including a retroreflector, standard sales negotiations/conversations were simulated for designing a fictive

grave on a vacant plot (Schmitt et al., 2018). The most relevant result: Both the real stonemason and the fictive clients used the living cemetery as open-air showroom and reference for their design decisions.

4.3 Quantitative-spatial findings

The spatial concentrations of certain materials, grave designs and markers enable a more detailed chronological analysis of their distribution. As mentioned above, previous research in this field has mainly relied on such a chronological frequency analysis of certain grave features to determine sociocultural or even socioeconomic transformations over time. In a first step, the data were submitted to this rather conventional analysis and then compared the outcome with that of a spatial analysis.

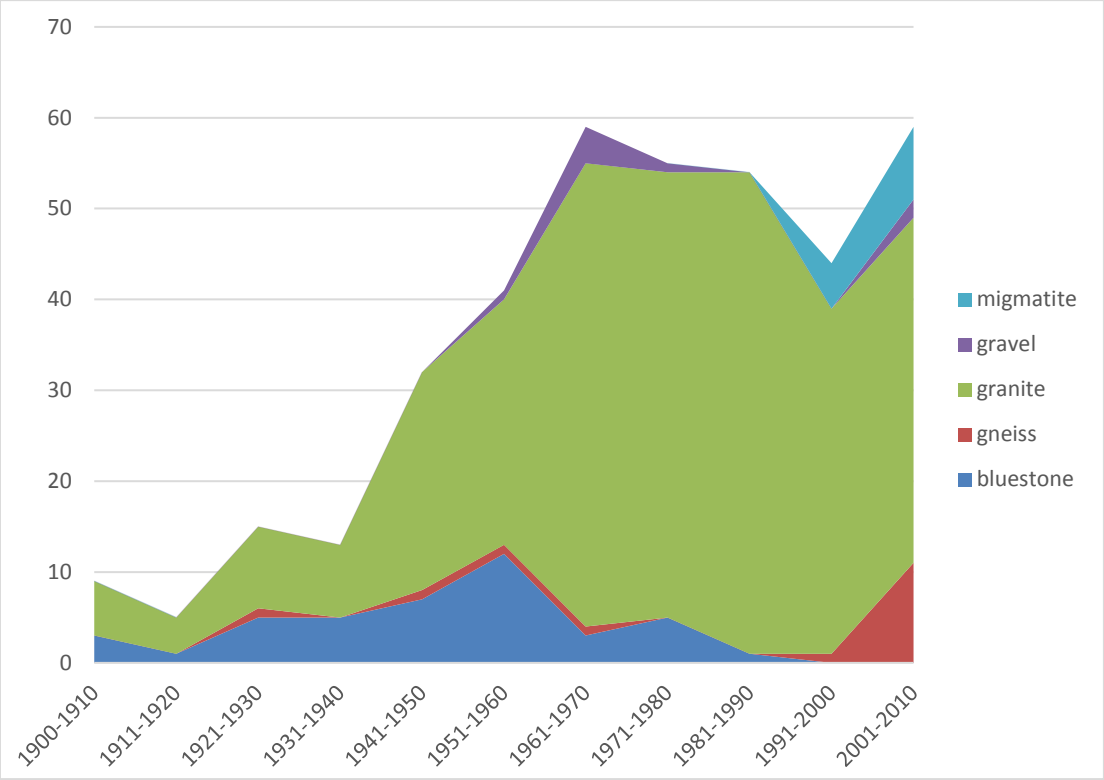


Figure 63. Number of top five grave material types (vertical scale) and their chronological distribution (horizontal scale) at Walferdange over decades (excluding undated and/or empty plots n = 386).

As Figure 63 shows, granite has always strongly dominated all other materials during the observed time horizon. Based on the premise that there is no material bias in the surviving graves sampled in 2016 and that they are representative of their construction time, the results are as follows: Gneiss experienced a strong revival between 2001 and 2010 when migmatite also became more common. Gravel appears to be a standard material choice in the 1960s. Between 1981 and 1990, granite reached an all-time peak; a wider choice of materials only slowly complemented it later on. Bluestone, which peaked in the 1950s, had virtually disappeared by 1990. The entire

observation allows one to deduce the development of granite dominance over time, the almost complete substitution of bluestone and a general trend towards a higher variety of materials in cemeteries over time. Figure 64 shows the top five (by count) grave types over time. Again, the *1a-stepped (raised)* type appears to clearly dominate during most periods, continuously peaking between 2001 to 2010 when it comprised the majority of grave types by far. While other grave types have always existed, they appear to have been part of a far less visible trend. For instance, the grave type *1f-stepped (middle plate shorter)* type shows several peaks during the 1920s, 1940s and, finally, between 1971 and 1990. The *3b-half-sarcophagus (cover stone)* type peaked during the 1960s. There were larger numbers of the *1e-stepped (2 plates)* second type under scrutiny in the spatial analysis during the 1940s, peaking during the 1970s and again briefly during the first decade of the 21st century.

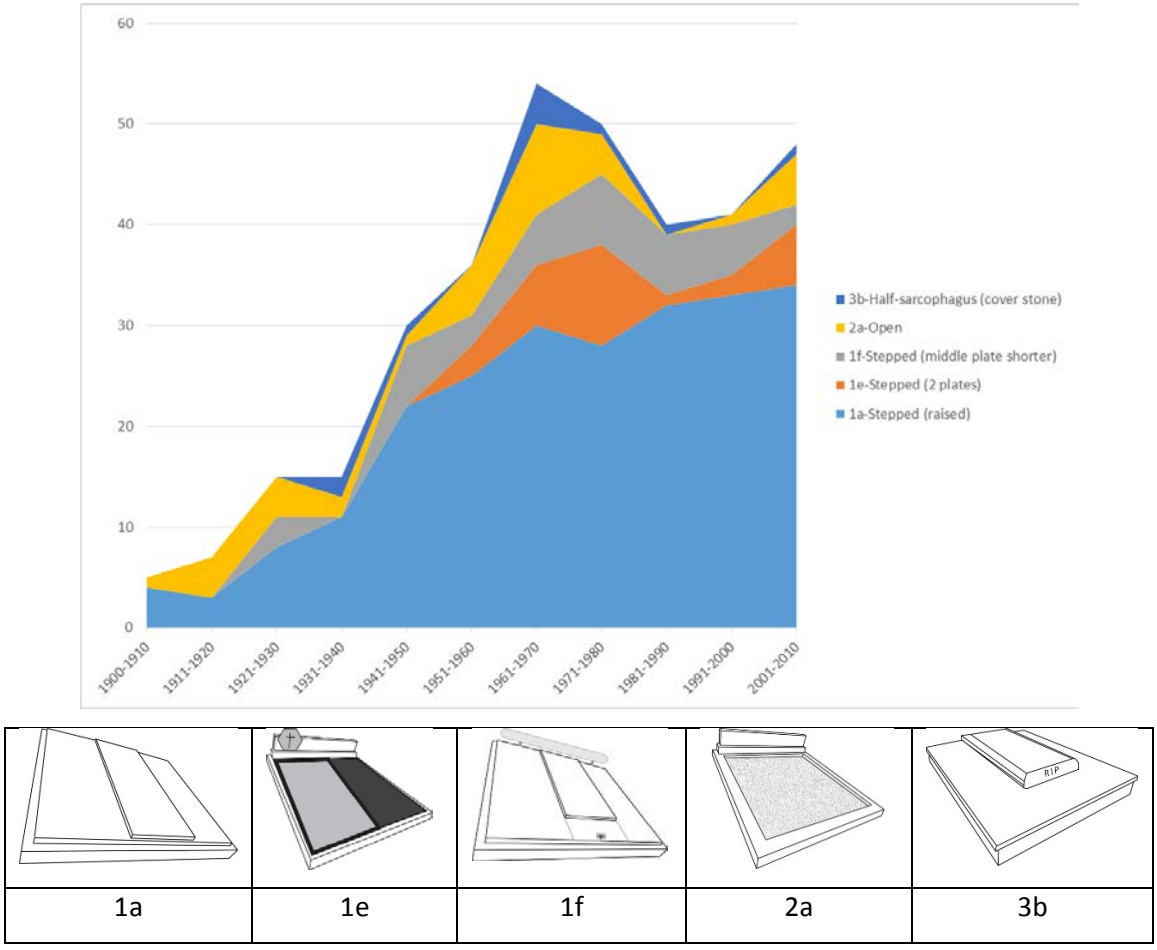


Figure 64. Number of top five grave types (vertical scale) and their chronological distribution (horizontal scale) at Walferdange over decades (excluding undated and/or empty graves n = 341).

There is a far greater variety of holy water containers, potentially a feature that in itself is unique to the examined region. Figure 65 shows the top five (by count) types of this particular paraphernalia identified during the data collection. Again, different types appear, peak and disappear during specific periods. Firstly, all of the top five container types have more or less been

present at the cemetery during the entire period under research. It is worth tracing the chronological distribution of one of the containers, the *4a-knob-rectangular* type, in greater detail. It clearly comprised a relatively large share of all holy water container types on pre-1900 graves, which makes it a fairly standard design. It almost disappeared during the 1920s, before eventually peaking during the 1950s. Thereafter, it declined sharply, eventual disappearing by 1980.

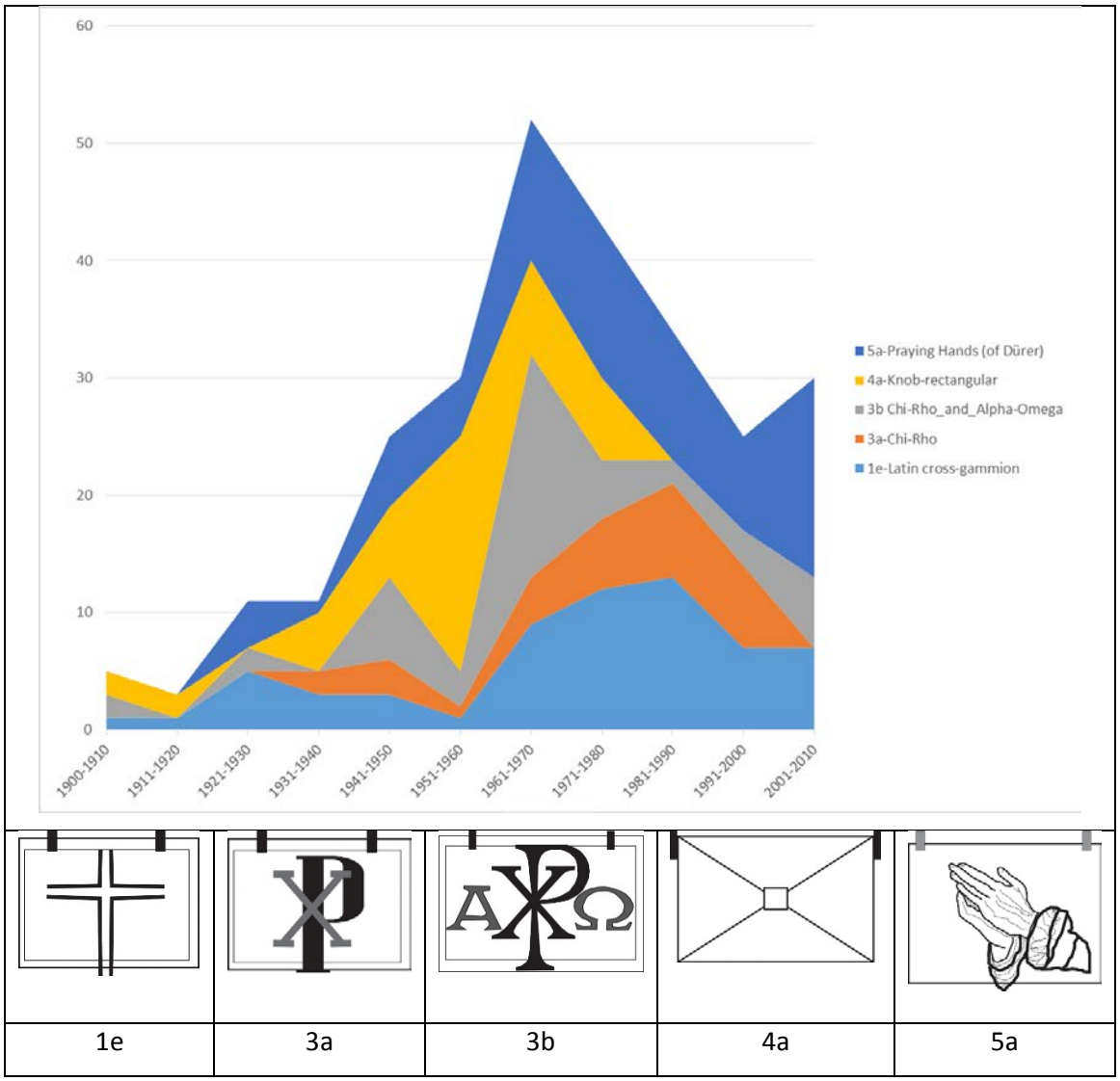


Figure 65. Number of top five holy water container types (vertical scale) and their chronological distribution (horizontal scale) at Walferdange over the decades (excluding undated, empty graves or lost holy water containers n = 285).

(Note: they are usually small, they usually have a lid and are made of bronze or brass; they contain holy water and are firmly fixed to the slab/curb of an individual grave)

Similar to the above graphs, one can, like prior studies, produce very similar ones to diachronically depict the rise, peak and potential decline of specific grave features. Other variables could also be examined and placed into the context of sociocultural and/or socioeconomic developments and – eventually – draw connections between the materials and changing habits. However, there is a fundamental flaw in this approach: The graves' construction dates are often unavailable

(almost a third in this case) or impossible to verify because the design may have been altered over the years when other occupants were added. Merely using chronology to account for trends in materiality seems scientifically unsound.

This approach was therefore complemented by using a geospatial analysis, which renders frequencies visible in space and traces similarities in design. Contrary to chronological charts, maps also enable us to include graves that were built before 1900 and after 2010.

Figure 66 maps concentrations of granite grave material that is the main material of the horizontal grave surface. Granite is clearly an omnipresent material choice that is well spread throughout the cemetery; however, certain areas have higher concentrations than others. This phenomenon becomes clearer when one considers bluestone as another horizontal material. Figure 66 clearly indicates that this particular material is only present in the northern part of the cemetery, again with certain concentrations. Most importantly, the southern part contains no bluestone.

Figure 66. The concentrations of granite graves (n = 514) at Walferdange.

Figure 67. The concentrations of bluestone graves (n = 58) at Walferdange.

By combining information from the chronological chart (Figure 62) and spatial analysis (Figure 67), it was concluded that although the northern part is the oldest, bluestone mostly survives in graves dating from the 1940s to the 1960s because the oldest graves were re-used and often rebuilt by new grave owners who then used granite. The granite hotspots in the northern part reflect this finding.

Moreover, granite is not as dominant everywhere as the diachronic chart (Figure 63) would suggest. There are clear pockets of granite, which may point to neighbouring and/or emulation effects on the choice of materiality, since the same material is used in close spatial proximity. A comparison with other cemeteries, using the same tool, may verify the hypothesis that space matters more than time. This type of analysis is especially useful when there are no or few archival records on the evolution of the cemetery.

The heatmaps of certain grave models (Figure 68 and Figure 69) and accessories (Figure 70) confirm the utility of combining diachronical and spatial indicators. The chronological chart (Figure 64) shows a growing preference for the *1a-stepped (raised)* grave type. However, the heatmap reveals that there are explicit areas of concentration, again indicating a certain neighbouring effect. Conversely, the second most prominent grave type (*1e-stepped (2 plates*) is found in a particular part of the cemetery, together with graves from the 1980s and 1990s.

Figure 68. The concentrations of the *1a-stepped (raised)* grave type (n = 382) at Walferdange.

Figure 69. The concentrations of the *1e-stepped (2 plates)* grave type (n = 54) at Walferdange.

This spatial analysis becomes even clearer when examining the distribution of a certain type of holy water container, which is a common sight in Luxembourg cemeteries. The *4a-knob-rectangular* type only appears in the northern and central parts of Walferdange, with hotspots concentrated in the far north-eastern corner. Again, the spatial consideration of certain grave features could lead to interesting hypotheses, especially if, as in seminal studies, this

consideration is combined with the conventional approach of tracing material features' frequencies over a specified time horizon. While the spatial concentrations of such features are clearly linked to time, this does not fully explain all the areas of high concentration, since all choices of materials and/or material types have generally been available for this grave population throughout the researched period.

Consequently, the spatial explanations for certain concentrations of grave designs need to be explored, since these could be due to, for example, neighbouring effects, that is deciding on certain features because they appear on the graves close by. The observed concentrations, thus, support the hypothesis that concentrations of certain grave features are no coincidence but are due to the conscious or unconscious actions of numerous agents, thereby resulting in a unique assemblage of individual decisions comprising the cemetery as a material culture and a space. A deeper understanding of such agency might be key to fully understand what one could learn from such materiality and spatiality in previous and current societies.

Figure 70. The concentrations of the *4a-knob-rectangular* holy water container type (n = 67) at Walferdange.

4.4 Discussion of Pilot Project Findings

When considering the interrelationships between all three dimensions (grave type, grave material and holy water container type) in their entirety, it becomes apparent that the observed spatial concentrations of each separate feature do not necessarily overlap. A simple calculation can reveal this. The two most prominent combinations are C1 (granite with a *1a-stepped (raised)* grave type and a *5a-praying hands* type of holy water container) and C2 (granite with a *1a-stepped*

(raised) grave type and a *1e-Latin cross gammion* type of holy water container), which together form 33.25% of all graves.

A traditional chronological analysis of these two combinations (C1 and C2) enable us to shed light on another challenge: How to use the dates of death inscribed on the gravestones.

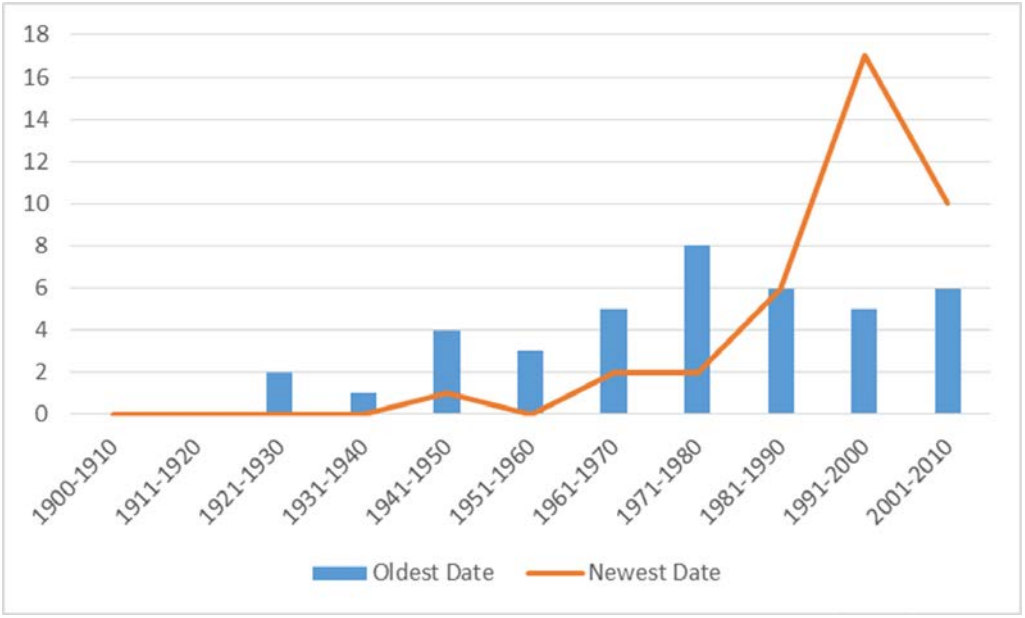


Figure 71. The chronological frequency of C1 graves made of granite, type *1a-stepped (raised)* and *5a-praying-hands* holy water container type at Walferdange (# vertical scale, dates horizontal scale).

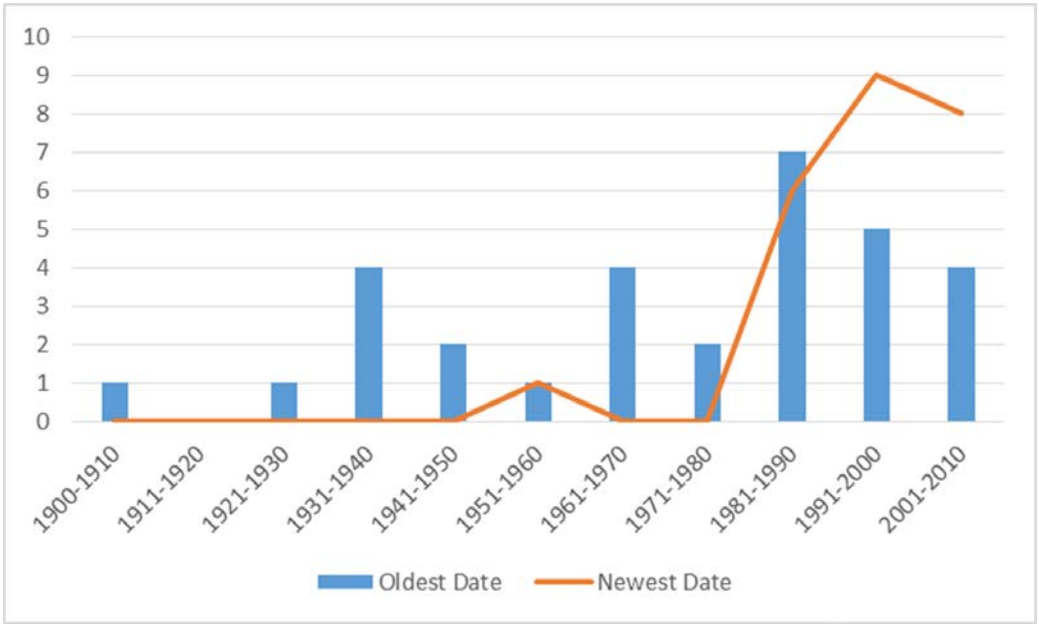


Figure 72. The chronological frequency of C2 graves made of granite, type *1a-stepped (raised)* and with the *1e-Latin-cross gammion* holy water container type (# vertical scale, dates horizontal scale).

The difference between the oldest and the newest date on a gravestone (see Figure 71 and Figure 72) points at the difficulties underlying all chronological charts: Up to nine people can be buried

in one grave at any period for which the grave has been paid. Furthermore, graves can be refitted after decades of use or they can be refitted when sold. A grave can therefore undergo significant design transformations over time, thereby rendering the general dating and the dating of specific design features imprecise. The only reliable finding is that, during specific periods, specific design features and/or types of grave, gravestone, paraphernalia, etc. appear, peak and decline. It is therefore almost impossible to rely on only this data to determine at which time a certain feature was added.

The Figure 64 heatmap shows that C1 graves (granite with *1a-stepped (raised)* headstones and *5a-praying hands* holy water basins) are found almost all over the cemetery. However, there are several high concentrations in the older, northern part. By comparison, C2 grave types (similar, but with *1e-Latin cross-gammion* holy water basins) are concentrated in the southern, more recently developed part of the cemetery (Figure 65). This is far more obvious than on the chronological chart above. This reinforces the hypothesis that there is not only a time-dependent choice of materials but also a neighbouring effect.

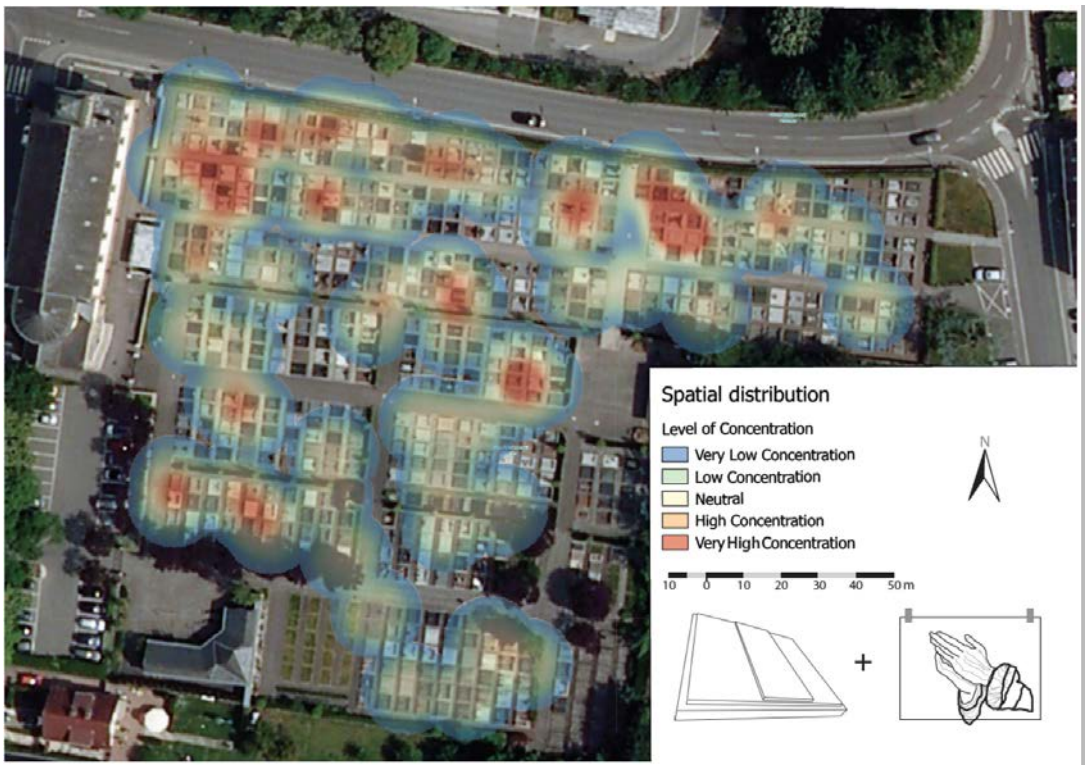


Figure 73. The concentrations of C1 graves made of granite, type *1a-stepped (raised)* and *5a-praying hands* containers at Walferdange.

While the chronological charts (Figure 71 and Figure 72) show that neither of these two types has been around during the entire period under examination, the heatmaps prove that this design is not limited to new graves but was also applied to older graves, potentially when new bodies were added to the grave and/or during refitting, which is why they show up throughout the cemetery.

This would also mean that the newest (not the oldest!) date is a potentially better indication of the dating.

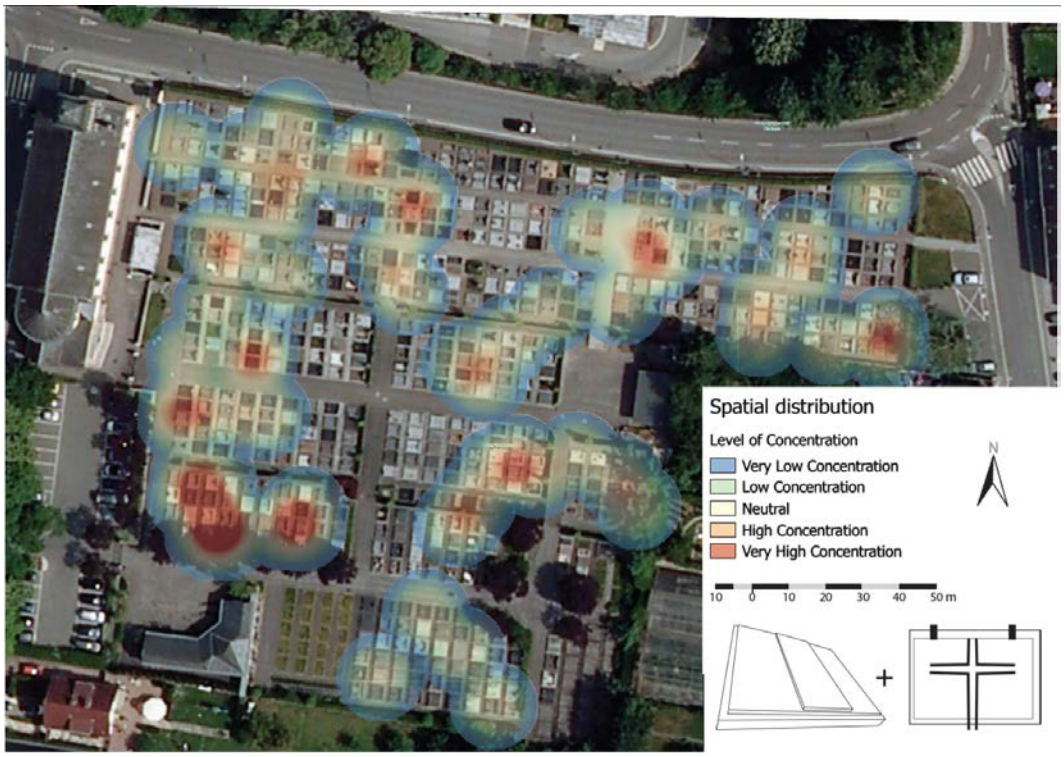


Figure 74. The concentrations of C2 graves made of granite, type *1a-stepped (raised)* and *1e-Latin Cross-gammion* at Walferdange.

The observed spatial concentration of these features also supports the finding that, during certain periods, people chose the same grave features as those found close by. This observation indicates that there is a concentration in time and in space. Besides the strong interrelatedness of certain grave features, which may be responsible for the modern cemetery's general homogenous appearance, certain feature types appear at a certain time, spread via a neighbouring effect and become spatially concentrated in certain areas of the cemetery. The interrelated agencies of materials, space and people co-create the unique heterotopia referred to as a cemetery.

After applying a somewhat work-intensive approach with a comparatively complex statistical computing analysis and graphic presentation, the main conclusion appears unspectacular at first glance: The immediate material proximity of things influences the material design of single grave plots and vice versa. In other words, a material trend analysis of sepulchral design is linked to its micro and medium spatial setting, seeking to explain the growth of trends, fashions and fads.

Cultural studies investigate material modes, customs and fashion by asking why certain styles are popular and deemed socially appropriate and others not. While such trends can be observed in a sociological or ethnographical context, they are very difficult to measure: Counting and classifying the results and entering the records chronologically on a timeline do not yet offer an explanation.

Consequently, the factor space is first added to the calculation. In the case of graveyards, the literal manufacture of space includes the production of a material culture and an engagement with norms, traditions and new trends. These processes are inseparable and their practices interdependent. A trend is not only linear and progressive; by recalling its etymology (from the Old English *trendan*: to revolve, to rotate), it needs to be emphasized that a trend also has a spatial component — it gravitates more towards certain areas than to others, thereby forming hotspots of objects. Given this strong presence of things, another factor represented a challenge for us — the absence of people. Cemeteries are densely populated but only by the dead. While grave owners are usually absent, their design and decoration of the graves, as well as their chosen materiality, are very present. The research design was adapted to this dominant face-to-thing situation by making use of archaeology – the social science that engages most directly with material culture, often without people and written sources. Akin to contemporary archaeology, the findings were combined and fine-tuned to the questions by talking to people and consulting archival records. Interviews were conducted with experts, – mainly local stonemasons and cemetery administrators, – and with users, that is grave owners, while exploring and charting the material culture in parallel. This chapter, however, focuses on the archaeological, not the ethnographical, methodology. The latter may also point us in the direction of neighbourhood effects (Schmitt et al., 2018) but the question was whether one could prove this by means of quantitative methods.

Is this combination of diachronic and spatial analysis transferable to other fields? The author thinks so, particularly to studies of the recent and contemporary past and to those of any face-to-thing, rather than face-to-face situation, whether in a public or semi-public setting, such as architecture, the design of front gardens, market stands and retail. Like a cemetery, the spatial contamination of trends could be investigated in all kinds of micro to medium spatial settings dealing with material series.

4.5 Critical Assessment of Pilot Project Approach

Since the above description of the pilot study was prepared for publication in a scientific, peer-reviewed journal, it is only a relatively brief and condensed summary of the overall findings and lessons learnt. Obviously, it was conducted to develop the necessary experience and skill set of involved researchers in order to extend the study to other cemeteries. First of all, it was necessary to understand the cemetery's materiality before it was possible to identify what data to collect and how. Closely related to this is the before-mentioned development of the Cemetery Surveyor Application. In order to use this application as indicated above, two researchers of the RIP project, including the author of this thesis, spent several months collecting data via photography and measuring; then they entered this data into a Microsoft Excel data sheet consisting of 114

columns of data as described in Annex 11.1. As the data accumulated, it was possible to identify reccurring patterns or types of the observed materiality, for example, types of graves, grave markers, crosses, stoups and even colours. Once all data were entered, it was used to standardise this typology. Consequently, the Microsoft Excel sheet was revised to confirm that this typology was consistent. Only then was it possible to directly analyse the data statistically and spatially as described in the previous chapter. Moreover, this typology became an important input for the development of the Cemetery Surveyor Application.

A number of lessons can be learnt from this pilot study, as well as the subsequent testing and refinement of the data collection process. First of all, it became very obvious that for a cemetery of that size and when planning to conduct further statistical and spatial analysis, the data need to be collected in a much more time-efficient and work-efficient way, also allowing for data consistency throughout the data collection process. As mentioned before, this has largely been achieved by the developed typology and Cemetery Surveyor Application that allows consistent and accurate data collection, while simultaneously allowing for altering or extending typologies if needed. As will be shown in the following excursus about the Cemetery Surveyor Application (see Chapter 5), the initial intention to collect data directly via this application on a smartphone or tablet was, however, rejected at a later stage for practical reasons: Entering the required amount of data directly on-site at the cemetery exposed the researcher to the elements more than was convenient. Rain, heat, sun glare on the device's screen, limited battery life and inconvenience when working with a touch screen with large amounts of data caused the researchers to question the efficiency of this process. Hence, a desktop version of the data collection tool was developed that allowed the researchers to enter the data collected via photography without having to consider weather conditions, time and place, thereby providing much more work convenience and still improving the quality of the data collection process. Entering the data directly on-site can only be recommended for smaller samples.

Secondly, the pilot study enabled the researchers to develop a basis and quasi-standard for data analysis whereby it became the blue print for other cemeteries. The typology developed at Walferdange cemetery is now included in the basic standard package of the Cemetery Surveyor Application. It is meant to provide a starting point, not a limitation, to data collection anywhere by simply altering or extending the typology as well as any form of data entry mode. When it comes to the general approach, it is recommendable to take detailed photographs of the cemetery, the sections and each grave and either enter the data directly into an Android device or into the desktop version of the data collection tool. The exported data can then be used as Microsoft Excel or Comma Separated files to conduct basic descriptive statistical analyses directly in Excel or more advanced statistical analyses in software, such as SPSS or R. The results of these analyses can be used to identify the most interesting issues to be analysed spatially with software,

such as ArcGIS or QGIS. The result would be a relatively complete assessment of the statistical and spatial conditions and realities at any grave site with the possibility to visualise chronological and spatial patterns, if present. In keeping with this process and toolset, the aggregation of additional data from other cemeteries, especially across borders and cultures, would allow for interesting possibilities of comparative research.

However, this pilot study has a number of limitations, some of which were brought to the author's attention via feedback from the anonymous reviewers of the *Journal of Material Culture*. The feedback will be included here. Firstly, a possible point of criticism is that the study focuses only on the cemetery's materiality while ignoring other factors that might be responsible for a hypothesised neighbouring effect, for example, consumer choice or cemetery regulations. While it is certainly true that these factors influence the materiality of a cemetery, it needs to be emphasized that these aspects are not the focus of this particular study. The pilot study particularly focuses on answering whether it is possible to find indications of a neighbouring effect based on the observable materiality and spatial analysis. This thesis, as will be discussed in the following chapters, will include limited data from interviews to identify which other specific factors are potentially responsible for any observable patterns. However, the following needs to be emphasized: At the time when this pilot study was conducted, there was and still is a significant lack of reliable data and scientific research regarding consumer choice in grave marker design as well as actions driven by duty to the deceased, and so forth.

Secondly, and linked to the above stated issue, it might come as a surprise to the reader of the pilot study that choices are apparently made within a remarkably limited repertoire. Certain grave types appear to be much more common than others. It might be interesting to find out whether this is also the case in other countries. While answering this question is clearly beyond the focus of the pilot study, this PhD thesis is designed to cross national boundaries. Although this issue is of less relevance when it comes to the pilot study described here, it can be observed that certain grave forms are also present across national borders in Belgium, France and Germany, although with very different distributions. A closed grave, for example, is very common in France and Luxembourg but less common in Germany. From the study of historical data, that is gravestone sales catalogues, it becomes clear that this grave form is particularly popular with neighbouring Francophone areas. This issue will be addressed in more detail at a later stage in this thesis.

A third issue is the lack of administrative data used in analysing the cemetery and individual graves, most importantly with regards to 296 graves that could not be dated by any kind of information found on the grave or grave marker. It might have been possible to close this information gap by checking the cemetery administration available information. However, this proved to be problematic. Most cemetery administrations appear not to have such data readily

available. This might seem surprising and requires explanation: Firstly, Luxembourg only very recently adopted an archival law (*Loi du 17 août 2018 sur l'archivage*) and local authorities were, until now, not required to keep records beyond the time of administrative usage. Of course, the cemetery management, usually local government, notes the dates of occupation, abandonment or alteration. Such data are, however, often only recorded in paper format, that is on index cards, and only updated occasionally. Data about alterations, such as renovations or new grave markers, are only kept for administrative purposes until permission is granted and often not added to the original files. Furthermore, often only the most recent dates are kept and all older data are lost, since index cards are overwritten with markers, stickers and in handwriting. During the course of related research for this pilot study, the author encountered one cemetery administration working with a map that is more than fifty years old in which all new information is added by hand, while older information is cut out or glued over with Tipp-Ex. Archival data older than the past ten years are often non-existent. Obviously it may be a harsh oversimplification, but the impression was created that certain administrations do not actually know exactly what is going on at the site, especially when it comes to the specifics of grave monuments, etc. Responsibility is usually delegated to the cemetery keepers who are trusted with the everyday maintenance, such as abiding by the regulations. Moreover, while cemetery administrations are usually happy to share and grant permission to collect data on-site, their archival data are very difficult to access and – once obtained – very problematic to use due to this significant lack of reliable and coherent content. Moreover, for data protection issues, municipalities now prefer to aggregate such data themselves – or rather, not to, as it is too time consuming for them. It needs to be emphasized, though, that the data from graves that lack a date are not missing in the actual spatial analysis or all descriptive statistics. As one can observe in the sample size used for the spatial analysis, for example the concentration of granite graves, all data are present. However, it is not possible to show undated grave markers in a chart that is organised on the x-axis by date. Hence, they were excluded from this particular type of chart.

Fourthly, another possible point of criticism is that the pilot study did not build more explicitly on previous research that has developed similar typologies. Via Buckham (2000), Mallios and Caterino (2011), as well as the more recent research by Streb (2017), etc., the author is familiar with gravestone typology beginning with the early works of Deetz (1967). However, the problem with these is that they only work for the data sets from which they have been derived. As a matter of fact, there are many studies that create a typology from a certain, clearly defined data set, eventually reaching certain conclusions based thereupon. However, once you leave the specific spatial region, such typology becomes redundant. This means that typologies, which have been developed at a certain location, are by definition place-specific and do not allow for application elsewhere. The author actually believes that this is one of the most relevant hurdles for such

research across time and space. Many of the studies mentioned earlier are based in the Anglo-American realm. Their classification would not have worked in Luxembourg. It was necessary to do what all of these studies did, that is to begin from scratch and to develop a new typology. Also the existing data collection schemes were excluded, because the data collection, based on 114 variables, is much more extensive than any previous ones.

A fifth issue is the lack of a more detailed analysis when it comes to a correlation that is less about spatial density, i.e. visible from a particular grave, and more about travel-to-grave pathways through the site. Historically speaking, certain Luxembourgish cemeteries featured (as in Germany and Austria) what was called *Alleen der Hochmut* (alleys of pride and haughtiness). The most expensive sections were the plots along the front rows and on particularly visible corners. Visibility was and is a factor. However, one can observe a quite different pattern: strolling, rushing to the grave, promenading the different main and minor paths to the plots, etc. Moreover, the proximity factor was most important for the pilot study. In any event, this issue was somewhat beyond the scope of the pilot study. A more relevant and related issue might be the question as to why an 8m radius was chosen and whether a 3D model of the cemetery, including elevation, obstacles and, thus, actual view sheds, etc., would not have been more appropriate and realistic. The 8m radius was based on the observation that 8m is the distance people are more or less able to handle, – which they actually do, – when they take a more intense look around from various standpoints within the cemetery while examining other graves. Admittedly, it is not possible to give a more precise number because, as criticised correctly, it actually depends on where exactly one is standing. Certain graves might be close to the viewer but covered by trees, bushes, other markers or it may simply be less visible because they are elevated relative to one's position. When the radius is changed slightly, the results of the analysis did not change significantly, which deals with a 3D model of the cemetery not being run. Therefore, the author is comfortable with this measure, although it admittedly lacks a more rigorous basis. This should be considered in further research.

Sixthly, it is advisable to be more precise about identifying the actual material. The pilot study appears to be rather general when it comes to this aspect and a lot of interesting information, for example information regarding the origin of material, is neglected. This is certainly true. When it comes to, for example, a more detailed analysis of the actual types of granite, admittedly it was realised that this would be impossible without a mineralogical analysis of each grave marker. At the outset of the study, a specifically developed encyclopaedia was used to identify certain types of granite and other stones, but the differences are so subtle and the trade routes so globalised that even salespeople and stonemasons fail to identify the proper terminology these days. The proper identification of the stone would enable trade routes, prices, etc., to be analysed more precisely. This is an interesting field of research, but it requires data that fall outside of this

research's scope and the author's skill set. In order to be as precise as is humanly possible, the identification of granite, gneiss, migmatite, etc., was sufficient because it is relatively easy with a little experience; but there is still a margin of error.

Seventhly, and most importantly, one can argue that while there is a correlation with regard to material proximity, there appears to be no evidence as yet of causation. This is certainly true. However, the author proposes that this is also beyond the scope and abilities of any study in that field. One simply does not know exactly what happens during the process of designing and buying a grave marker – even when following such processes from the beginning of the grave marker design until the erection of the actual grave marker. However, this shortcoming is acknowledged throughout the paper and this thesis makes an effort to advance our understanding of exactly this issue.

Finally, the hypothesized neighbouring effect is mainly based on visualization via heatmaps, which in turn are based on algorithms applied by RStudio. It would be necessary to test such results with other software, utilizing other algorithms and to use data collected at additional sites.

This chapter can be considered the direct input for the excursus in Chapter 5 where the development of the Cemetery Surveyor Application is described. The lessons learnt from the pilot study led to the development of this tool.

5. The Cemetery Surveyor Application

As has been shown in the pilot study at Walferdange cemetery, especially the data input and preparation for analysis have been a major issue for this research. Consequently, a tool was devised allowing convenient, digital data entry and coherent data processing for further spatial and statistical analysis. This tool, its development, use and further improvements are discussed below.

5.1 General Overview and Introduction

The Cemetery Surveyor Application (CSA) is the direct result and one of the major outcomes of the before-mentioned pilot study at Walferdange cemetery. The specific requirements for data collection and data input for all further analyses led to the development of this tool within the context of the National Fund for Research (FNR) that funded the project titled "Material Culture and Spaces of Remembrance: A Study of Cemeteries in Luxembourg in the Context of the Greater Region". This project was conducted under the supervision of Assoc. Prof. Dr. Sonja Kmec (University of Luxembourg), and researched numerous aspects of funeral culture over a 200 year time frame from a historical and archaeological perspective. It was developed together with Cyrille Médard de Chardon who provided the necessary programming experience to translate these requirements into an actual and running application.

The Cemetery Surveyor Application enables researchers to collect data and photographs of the graveyard and its surroundings to gain an impression of the graveyard as a whole. The tool was developed in two forms, both of which are open source. An Android tablet-optimised version was created in 2015/2016. This application allows for the device to be taken into the field so that the researchers can take pictures and complete a predefined survey on-site. The data can be exported, thereby providing a database of cemeteries, subsections and graves with all their attributes and photos linked together. In addition to statistical analyses, a catalogue of graves or individual features in pictures is possible. When joined with the associated spatial file, an analysis of features distribution is also possible. The application is freely available on the Google Play Store (play.google.com/store/apps/details?id=net.frakturmedia.cemeterysurvey) and can also be modified, updated or altered in any manner, since the source code is available (github.com/serialc/CemeterySurveyor). Extensive documentation for support (re)development and usage (github.com/serialc/CemeterySurveyor/raw/master/Documentation/documentation.pdf) is available. In 2017, the second application was developed. It is similar, also allowing for the export of data for analysis purposes, but web-based and containing additional features, such as survey customisation, multiple projects and multiple concurrent users. This application is also freely

available to install and modify; the source code is also freely available (github.com/serialc/WebCemeterySurveyor).

At the first stage of this tool's development, the researchers of the RIP research project aimed at facilitating the data collection process on-site and making it more efficient. At the same time, it was necessary to organise and revise incoherent data and eliminate simple typing errors when entering data manually in a simple Microsoft Excel spreadsheet by applying standardised and consistent data entry on cemetery, cemetery section and grave level for all – until then – 114 identified variables (see Annex 11.2). The further goal was to enable on-site data entry, provide each grave with a unique ID and to link it directly with photographic pictures to be taken with the device's camera. The intention was to make the application public and to also make it available to the larger academic community for further research. Figure 75 gives an impression of the first mock-up the researchers provided to Mr. Médard de Chardon.

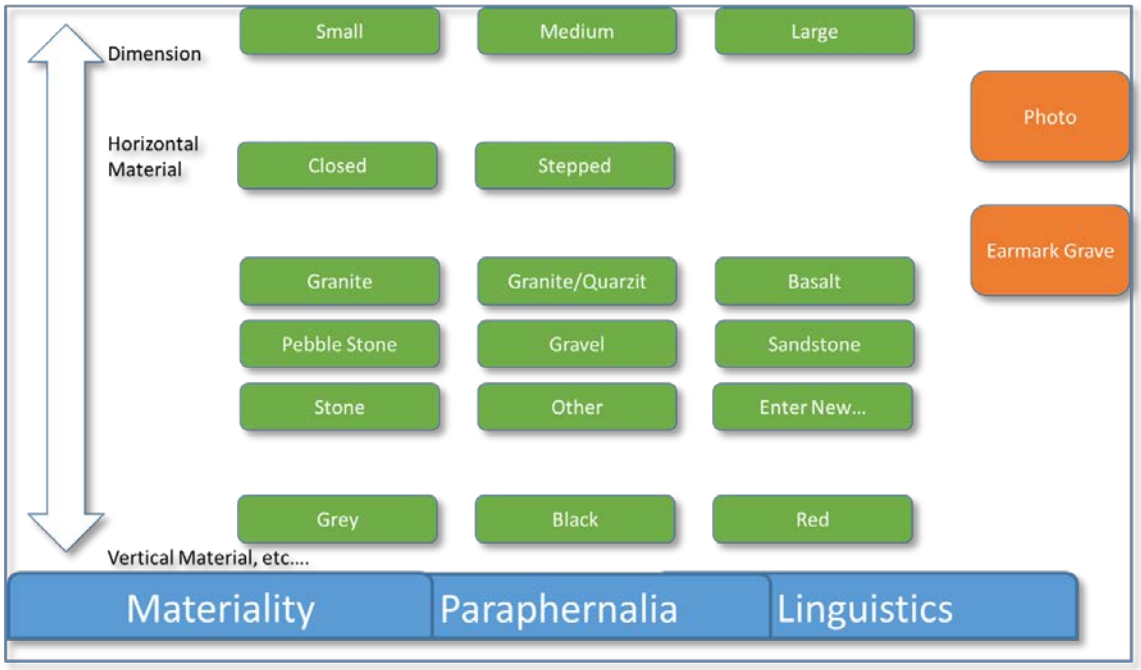


Figure 75. The first mock-up the researchers provided to Mr. Médard de Chardon.

As Figure 75 shows, the intention was to organise the identified variables and, thus, the data entry itself into three categories (here in blue tabs): “Materiality” (which contains all material properties of the grave and grave marker), “Paraphernalia” (all other objects or properties) and “Linguistics” (all written text). In the actual tool, Materiality was split into a Grave and Grave Marker category. Within these categories, which are organised as tabs so that the user can move from the one to the other, the user can enter the same variables as those that were identified at Walferdange cemetery (see Annex 11.2). Data entry should be possible via simply pushing the relevant buttons or entering numerical values, such as counts or measurements. Annex 11.3

provides a procedural walk through that was sent to Mr. Médard de Chardon in order to illustrate the expected functionality.

The CSA input template uses JSON code. JSON is an acronym for JavaScript Object Notation. This code is open source and can be adapted at the user's convenience for other research projects, for example, with the help of a code emulator, such as ATOM. Mr. Médard de Chardon was also provided with a number of thumbnails depicting the typology of graves, grave markers and paraphernalia, which were integrated into the application as buttons. Figure 76, Figure 77, Figure 78 and Figure 79 show screenshots of the actual application.

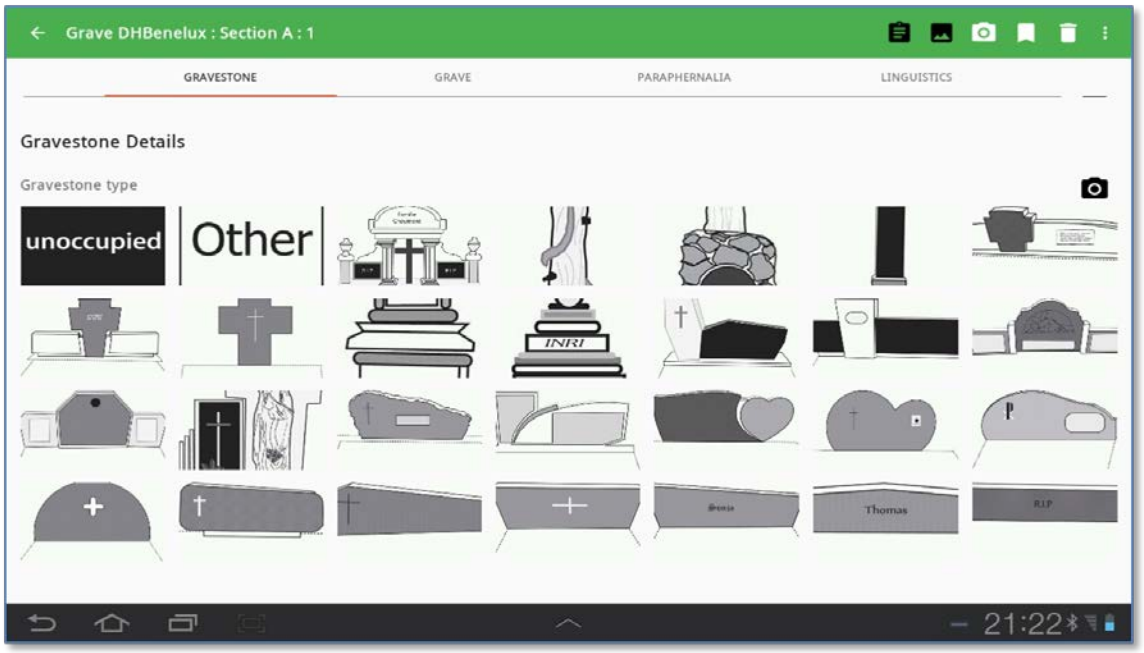


Figure 76. CSA gravestone details.

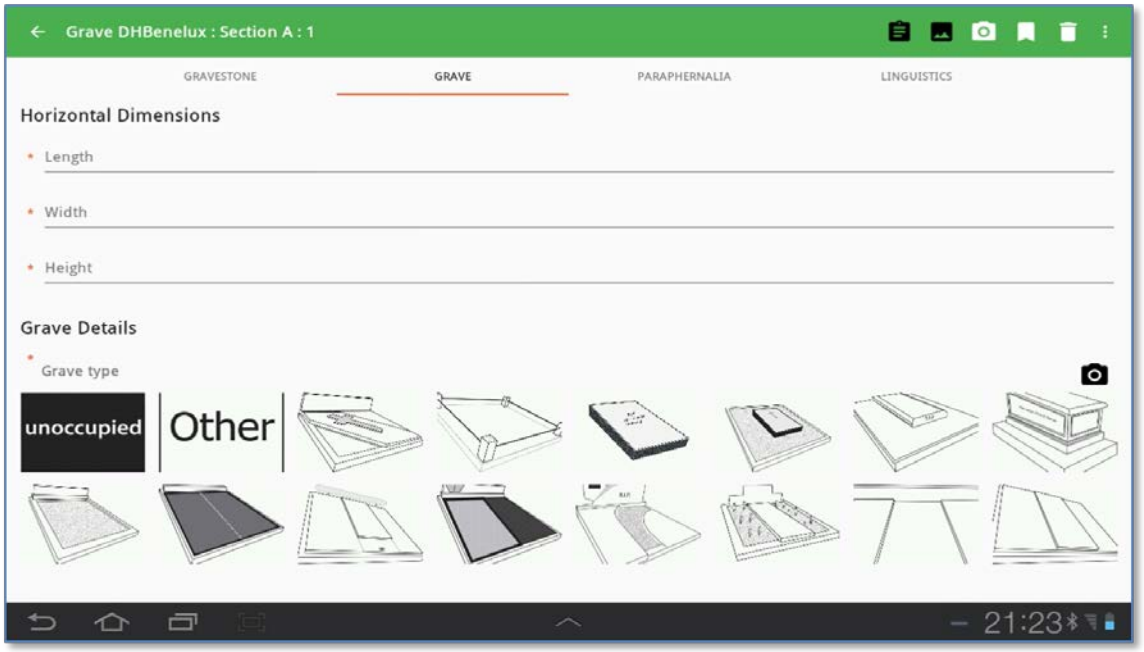


Figure 77. CSA horizontal dimensions.

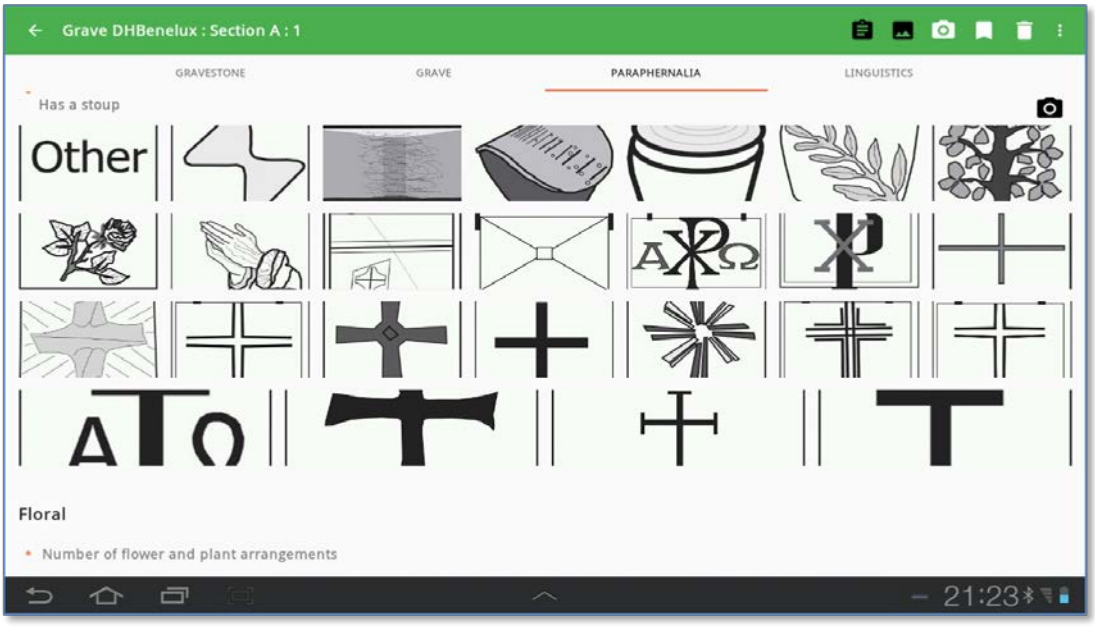


Figure 78. CSA stoup details.

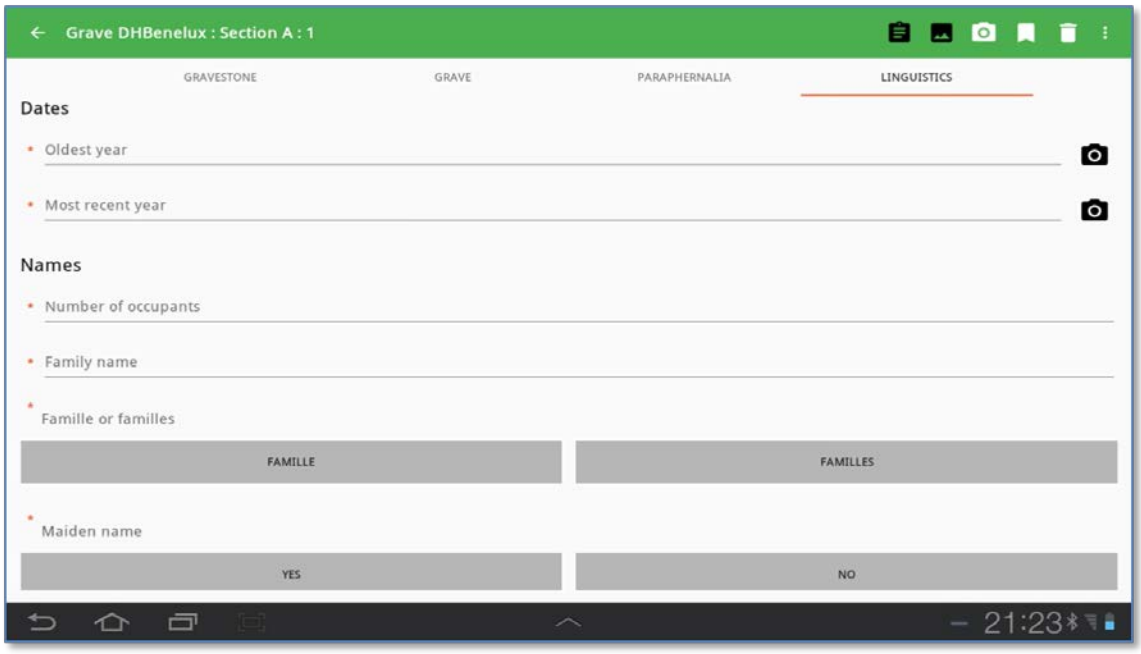


Figure 79. CSA linguistic details.

The top green banner contains the name of the cemetery, the section and the actual grave data. It is also possible to enter general data about the cemetery and section, such as location and interesting features, before beginning with the more detailed questionnaire on the grave level, which, as explained before, is organised into four tabs, that is “Gravestone”, “Grave”, “Paraphernalia” and “Linguistics”. Within these tabs – each screenshot is taken in a different tab – it is possible to scroll up and down in order to enter data by clicking on buttons and icons or by entering numerical data, such as measurements. A few of these buttons or fields have a little camera icon next to them, meaning that for this particular feature a photograph can be taken,

which is then directly linked to the particular feature. The buttons on the top right-hand side of each tab – from left to right – enable the user to jump back within the menu, view all pictures that were taken, access the camera, bookmark a cemetery, section or grave, or delete them. The last button in the far right-hand side enables the user to access the main menu with, for example, the possibilities to adapt the questionnaire and, most importantly, export the entered data as a comma separated values (csv) file Figure 81. Figure 80 shows that the data are split in several csv files according to the information that was entered.

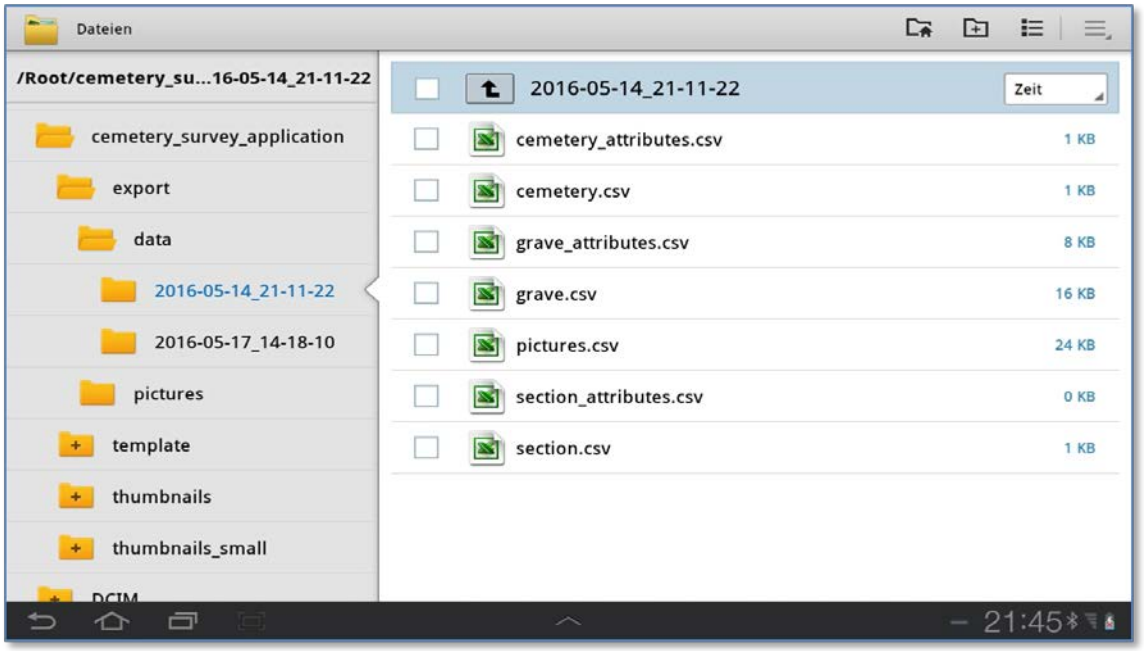


Figure 80. Content of exportable csv file.

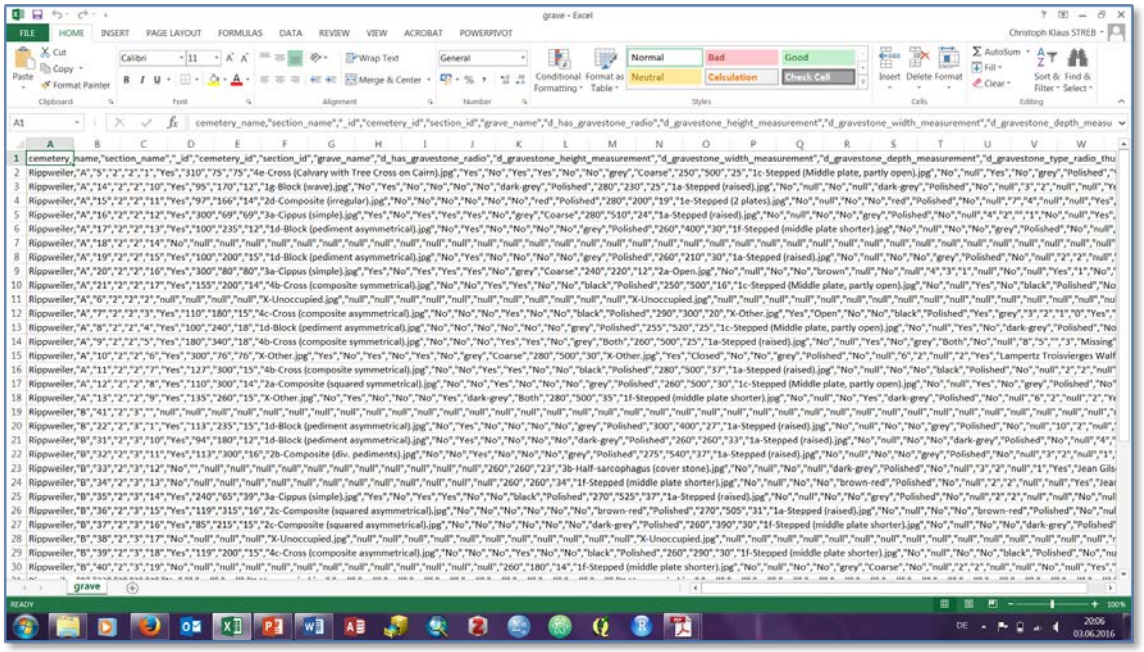


Figure 81. CSA data output sample.

For the convenience of data entry, taking into account the disadvantages of full, on-site data collection and data entry as explained in the previous chapter about the lessons learnt during the Walferdange pilot study and early testing of the Android application on mobile devices, only the web-based version was used for the further data collection for this thesis. In order to do so, data were collected on-site via photography and stadia rod, while entering the data in this tool happened in the office. This process and details about the tool will be illustrated below.

By applying GIS software, such as ArcGIS or QGIS, and a newly developed JSON-based data collection tool running on Android devices, it is not only possible to conveniently collect the complete grave marker population of a graveyard as well as all of the material and linguistic features but also the precise spatial relationship to each other. Such a toolset for data collection and analysis enables researchers to analyse the interrelatedness of materiality and spatiality across the full chronological dimension of a graveyard. Hence, by applying this digital and spatial approach to this established field of research, a completely new and much more extensive perspective can be gained, which might also invite scholars to revisit data that have already been published.

5.2 Methodological Issues and Criticism

As mentioned before, the CSA in its current state is the immediate result of the pilot project RIP at the Walferdange cemetery. As indicated in Chapter 4, the intention was to use the data collected on the Walferdange cemetery to also identify a specific typology of material culture. Based on an in-depth literature study, part of which is also outlined in this thesis, it became apparent that there is a large number of typologies available in the general field of grave marker studies and also in historical archaeology generally. These typologies have usually been developed based on the available material culture, i.e. the grave monuments as artefacts that are present at a certain cemetery or, more often, a certain assemblage of grave site-related material culture on a sample of cemeteries within a more or less clearly defined region. While this might be due to research projects often having a regional focus and while it makes a lot of sense to adjust any kind of typology to what is present in the region under scrutiny, these purported standards complicate the application to other regions. It might even be impossible to apply a certain approach and typology across regions if they are distinct not only by space but also in terms of local history and/or culture, which is related to various social and/or economic influences. For example, the typologies presented in works by Mallios and Caterino (2011), Mytum (2009) or Tarlow (1999) might work well in the United Kingdom or North America; however, the distinct material culture that can be found in these countries does not necessarily overlap with those in other countries.

During the course of the pilot project RIP, cemeteries within Luxembourg's larger border region, i.e. Luxembourg, Germany, France and Belgium, were visited and studied. During these explorative studies it became apparent that there is a significant difference between cemeteries in the UK and North America when it comes to current, modern cemeteries, especially those that are still active and in use. Although one needs to caution against stereotyping or oversimplification, differences are clearly visible. However, it needs to be stated clearly that each country depicts a variety of cemeteries and styles and customs, and that there are no absolutely representative examples. For the sake of comparison and making a point, Figure 82 shows a sample picture of Green-Wood cemetery in Brooklyn (USA). This is by no means representative of the versatile Northern American funeral culture. What can be observed there are, for example, what Mallios and Caterino (2011: 442) have identified as Total Tall, Total Tablet, Slant Marker, Bevel Marker, Raised Top or Flush Marker in their Southern Californian sample (see Figure 83), many of which are visible also at Green-Wood cemetery despite the spatial distance. It is not clear whether Mallios and Caterino would also have added the tall examples of cross shaped grave markers that are apparently present in Brooklyn to the Total Tall category or whether those cross shaped grave markers would have required a separate category. Unfortunately, it is also not known whether such examples have been present at all in California.

Figure 82: Green-Wood cemetery in Brooklyn (USA).

(Source: The Arch 2019: 6)

Figure 83: Southern Californian grave marker sample.

(Adapted from Figure 9 in Mallios and Caterino (2011: 442))

This issue actually addresses an important question: How general or how specific can or must a typology be? Where can one draw the line? Obviously, such decisions greatly influence how the data are selected and, most importantly, how the data can be presented. If such grave markers would have been present in Mallios and Caterino's (2011) sample, the added questions are: How many? Is it worthwhile to collect certain samples into separate categories although their actual or relative numbers are low? Again, where does one draw the line? For example, if such cross shaped tall monuments were summarised under a category such as Total Tall, would such a summarising typology, if presented alone, not represent a loss of data? In contrast, having too many categories that contain only a very limited number of cases must be considered problematic and almost prohibitive to any rigorous data analysis. Ultimately, a far too detailed typology might, much like a too general one, prohibit the possibility to see the big picture and recognise patterns. Consequently, it appears as if the aforementioned choices need to be made with care and transparency; however, they cannot be avoided. This issue will be addressed later again.

Returning to the differences of cemeteries across societies and cultures – as Figure 82 shows, a certain kind of typology and even style becomes apparent: tall, almost stele like examples, mixed with tablet or classic headstones and what Mallios and Caterino (2011) called slant markers. Bevel or Flush markers appear to be present; however, they are not entirely visible, given the angle from which the photograph in the figure was taken. Moreover, a kind of extended order or organisation of the grave markers' position is apparently lacking. The grave markers appear to be more or less indiscriminately positioned within a grass area, without any visible pathways or any further kind of infrastructure.

Figure 84 shows a perspective of Wincheringen cemetery in Germany. Again, it is not the intention to actually compare the two cemeteries, as they are very different; the intention is merely to show potential issues that can arise when creating typologies.

Figure 84: Grave monuments at Wincheringen cemetery in Germany.

(Source: Author)

The most noticeable difference is the organisation of grave sites into plots and rows. There is a clearly visible pathway and the graves are aligned. Furthermore, each grave is clearly demarcated from its neighbours. This effect is mostly created by each grave having not only the actual grave marker but also a plot in front of the grave marker's front face. In the North American examples discussed above, the grave plots are covered by grass. The actual grave plots can be open, i.e. have soil that can be planted with vegetation, or they can be partly or completely covered with a slab stone, often granite. Since this observation angle is from the back of the grave markers' actual main orientation, their obvious homogeneous design becomes even more visible. Most of these grave markers can be described as relatively thin headstones covering a significant part of each grave plot's width and slightly more than one meter high. Several of the headstones have coarse edges and most are polished. Their top edges are flat or curved, and a few have a number of more distinct design features on the top left of the grave marker, creating an angle from the top left towards the bottom right. Without adding any further details, it should already become clear that it is difficult to distinguish a certain typology here. What material characteristics or distinct categories can be identified in a case like this where height, width, depth and even material is extremely homogenous? If, for example, categories are created containing grave markers with flat tops, curved tops and a sloping angle, does that provide a sufficient level of detail? Would gravestones not falling into any of these categories form a new, separate category or simply be summarised into a category “others”? How should grave markers that match these categories but

show a coarse edge be dealt with? Would that be sufficient to create a new, separate category? Would that help better understand the data or would that result in a loss of data?

These decisions have to be made and they must be transparent, as they have an influence on how the results will be presented. What is apparent is that a typology like the one mentioned above by Mallios and Caterino (2011) and many other authors working in the Anglo-American realm could not be applied here. Not only do the categories not match the sample that is visible in Wincheringen (Germany), a simple extension of that typology would be equally futile, as new categories would have to be created in any event and non-applicable categories would disappear during data analysis at the latest. Such a simple example should be adequate to show that it might be highly recommendable to not simply copy and apply existing typologies and standards from different societies and cultural backgrounds. Each region requires a more reliable and specified approach. If such a regional approach does not yet exist, it needs to be created with the help of an explorative study, but before the extension of the data collection. This was exactly the purpose of the before-mentioned pilot study at Walferdange (Luxembourg). In that sense, however, this approach does not differ from, for example, what Harold Mytum (2000) described in his book *Recording and Analysing Graveyards*.

Before the CSA was ready to be used by the RIP research project ream, all sample data, – especially for the pilot project cemetery at Walferdange, – had to be collected manually. The approach was very similar to the many approaches discussed in Chapter 1.3. Firstly, before even entering the cemetery under scrutiny, an attempt was made to collect as much information as possible regarding the site. Most importantly, a current map and plan of the cemetery, which had to be as up to date as possible, was requested from the cemetery administration. This map was crucial in order to plan and organise data collection in advance, especially regarding how to organise the overall site, which had 739 grave plots at that time, into sections that can help organise data collection but also make sense according to the cemetery's overall temporal organisation. Moreover, it needed to be decided how to approach each section with regards to the grave plots it contained. Upon the first arrival at Walferdange, the decided approach was reviewed again as a result of the reality on-site and adjusted where necessary. Since the research team applied an exploratory research approach, first with the help of digital photography and then by measuring the dimensions of all the graves and grave markers by hand, all data that could be identified were collected. Consequently, each grave was similarly photographed from the same angles, with the photographs making all details visible, including engravings, inscriptions and any paraphernalia attached to or placed on the grave or grave plot. Even the plants and vegetation on the graves were photographically recorded.

The above-mentioned photographs were collected and organised into folders, with each folder named after the unique ID given for each grave, indicating the cemetery, the section and the grave precisely. In the process, the researchers took 3,519 photographs, the size of which came to 12.6 gigabyte (GB). All of these photographs concerning each single grave had to be viewed and studied in detail in the office. All details were noted, irrespective of whether they were perceived important and relevant or not. At this point, of course, the researchers sought guidance from existing literature, such as the literature mentioned in Chapter 1 in general, in order to ensure that they cover information that is usually also collected at other sites, such as dimensions, material, colour, etc. However, as detailed above, in terms of a detailed typology for each type of material culture, all decisive steps were postponed by detailing in wording the material characteristics of an artefact, such as a grave marker. These descriptions were kept brief with the purpose of making it a type of signifier of a particular materiality. For example, grave plots that were not covered by any kind of slab stone but which were left open for planting vegetation on it or grave plots that were simply covered with rubble stones were identified as “2a-Open”, the number simply standing for the order in which this kind of terminology was conceived. Another example is “4b-Cross (composite symmetrical)” for a symmetrical cross shaped grave marker and consisting of several parts of material as opposed to “4a-Cross (single)”, which identifies any kind of cross shaped grave marker. Hereby, all kinds of materiality, inscriptions and engravings – text was actually written out completely – were detailed and entered into an Excel sheet, organised by individual graves and sections. The objective was to first note anything of interest regarding any kind of materiality that was visible, regardless of whether such information had been noted and recorded in previous studies or not. Furthermore, it was of no concern at this stage whether this process would result in any kind of typology. The purpose of this approach was to not become limited in what can be observed and to avoid any predefined categorisation – and thus limitation – regarding the unique patterns that might unfold. This process was extended to all materiality on the horizontal grave level, the vertical level, – i.e. the actual grave marker and any paraphernalia, such as crosses, crucifixes, holy water fonts, vegetation, – and any further objects. In certain cases, the conditions of artefacts were noted, such as material, colour, perishable or non-perishable, etc. The result was an Excel sheet with 739 rows – one for each grave – and 114 columns including the unique grave ID. These columns included information on the horizontal characteristics as described above, the material and the colour, whether a grave is open or closed with a slab stone, if it is a single stone or consists of several ones, whether it is cross shaped or not, whether there is a curb stone or not, if the grave and grave monument is monumental with regards to its dimensions, whether there is any fixed or non-fixed vegetation, whether the vegetation is perishable and how many there is. If a stonemason was mentioned, his/her name was noted, together with specific details about any crosses or crucifixes, the holy water fonts, any other religious or non-religious symbols and any other objects, such as little angels and cherubs,

candles or eternal lights. Regarding the inscription, the oldest and most recent dates were recorded, the exact inscriptions, family names and even the mentioning of maiden names.

This brief list is not complete in terms of the level of detail that was recorded and transferred into a list; however, the intention was clearly to be as detailed as possible without being arbitrary. The main issue was to exploratorily collect and screen the data in order to identify the patterns, i.e. to ascertain whether there is an emerging typology. Consequently, all data were deliberately entered with no structure and in an open coding form (see Glaser, 2000; Mey and Mruck, 2011).

Naturally, this led to a number of iterations within the applied Excel sheet. During data entering, the number of columns increased because not each grave plot showed the same features or the features were very obvious. In a sort of learning-on-the-go approach, each new interesting feature that was added, i.e. a new column with new information, required the double checking of the already entered data as well as the checking of to-be-entered data for the same feature. The end result was the Excel sheet with 739 rows and 114 columns containing very rich data. However, since this explorative approach has an emerging and almost hermeneutical element, it was necessary to clean the data in a next step, i.e. to harmonise the entered data in terms of their spelling and terminology. Specifically, in order to explain the same material phenomenon, the same term had to be used. Almost automatically, this led to the creation of categories, – or typologies, – of corresponding material characteristics. For instance, if a grave showed a slightly lifted or elevated middle slab stone, – usually the middle slab stone of a total of three separated slabs, – on a completely covered grave plot, this would be categorised as “1a-Stepped (raised)" despite slight details that differ but which did not affect the overall impression or differences regarding colour and/or material. Since a team of two researchers collected the data of Walferdange cemetery, inter-researcher reliability was always ensured if there was any lack of clarity at all. If a holy water font, – or stoup as it was called in this study, – showed a Chi-Rho symbol and nothing else, this was categorised as “3a-Chi-Rho” stoup despite any subtler nuances in terms of design that might have been present but which did not impact the overall impression.

As mentioned before, as a result of the explorative and almost hermeneutical approach taken in this pilot study, a form of typology for the observable materiality of the graves and grave markers emerged almost automatically and independent of the researchers’ idiosyncrasies or existing models that obviously could not be applied here in any event.

The before-mentioned methodology of approaching the cemetery, organising the overall site into sections, identifying and dealing with the individual graves, recording data via digital photography and the information that was deduced from this data as well as the typology that emerged became a key input for the development of the CSA.

Early in the pilot project it became clear that collecting data with a paper and pen method, – which is in addition to taking the photographs, taking the measurements and noting them down on a cemetery map for later entering in an Excel sheet, – is cumbersome and tends to create mistakes, especially during data entry into lists. Typing errors, for example, can cause the analyses of such data via SPSS, R or any spatial analysis tool to create wrong and/or confusing data output. Hence, such a sheet had to be cleaned manually in a time-intensive manner. In order to facilitate data collection on the cemetery, standardise the data and save time, the researchers then envisioned creating an application that can be run from any mobile device, such as a tablet and/or a smartphone, and that permitted easy and reliable data entry and collection of photographs, which could equally reliably and swiftly be exported and processed for analysis by any statistical and/or spatial analysis program.

For this purpose, the approach that was applied during the pilot was reviewed and standardised, i.e. the researchers tried to establish how best to collect this kind of data within the specific context as it emerged during the explorative procedures. As described before, – and only focusing on what was actually done on-site in order to collect data of the materiality of grave marker artefacts, – this translated into an approach whereby the researchers configured the entire cemetery into sections and, based on that, derived the numbering and, thus, the unique identification of each grave as described above. This also included a more or less standardised method of photographing the grave sites, usually moving towards the grave from the left beginning with a total perspective and zooming in on the details before concluding with another total perspective from the right. The approach of shifting the focus from the more obvious and general of what can be seen at each grave site towards the details was also adopted in the manual data entering into an Excel sheet. To reiterate a point that was made earlier, the explorative data that were entered often showed an almost hermeneutical spiralling from the general to the specific, from the big picture to the detail. This data could be roughly organised into data collected and noted regarding the materiality of the grave site's actual horizontal dimension, i.e. the actual grave, the vertical dimension, which refers to the grave marker, if present, and any other paraphernalia belonging to the grave and/or grave marker as well as the inscription. Within these broad data categories, it should be possible to actually enter all the before-mentioned kinds of data that the RIP research team had come across. As stated, certain typologies for the materiality have emerged during this explorative and hermeneutical process. These typologies should now also become the standard input mode of this application.

The above-described procedures were laid down in writing and became the first input for a discussion with the developer to formulate this approach into a code permitting the use of these procedures as an application.

The following text box contains the information provided to the developer, slightly adapted from the original submission for the purpose of better readability:

Data Collection Walk-Through

Goal: To collect materiality and spatiality data about individual graves on a graveyard, which can be easily imported and applied in ArcGIS – most likely as output directly into an Access data base or, similarly, as a CSV file.

The researcher arrives at a new graveyard and first takes photographs of the whole cemetery from different angles, etc. Hereby the researcher aims to provide an overall impression of the site. This includes relevant key features, such as chapels, walls, etc. These features should be saved in a separate folder.

Ideally, we have a map/plan of the graveyard, identifying and organising the individual graves. This kind of data have ideally been entered as a specific layer into ArcGIS already. In an ideal case, the graveyard is already, – or can easily be, – organised into clearly identifiable graveyard subsections, almost like a checker board. However, this might not always be possible. Next to identifying the actual graveyard, identifying the sections and eventually also the individual grave with a unique ID is key. As we move through the graves, these unique IDs should simply be organised in a consecutive order.

Once we start with an individual grave, all the following data should be linked via an Access database to the specific grave's unique ID:

We start with an overall photograph of the grave. We take detailed photographs of the material (usually the stone), any paraphernalia like crosses, photographs of the deceased, figurines, grave lanterns, flowers, plants, stonemason plaques, etc., and eventually also any inscriptions. The attached Excel sheet might provide a complete overview of what we currently search for. At the moment, this Excel sheet is organised into “materiality”, “paraphernalia” and “linguistics”. Would it be a good idea to structure the tool accordingly (see mock-up)?

Besides pictures, we also need to separately enter the exact dimensions (in cm) of the horizontal grave site and also of the actual grave marker, for example, a headstone.

It would be great if the photographs could somehow be directly linked to the additional data we collect, such as the material and colour of certain features/artefacts.

For example, I see a bronze cross on a grave. I therefore need to enter under “paraphernalia” that there is a cross (which kind? dagger, square, etc.), where it is (on the headstone or on a tomb slab with no headstone, etc.), which material it is (mostly bronze but can also be iron, engraved, etc.)

and if it has any other features that are unique or otherwise worthwhile noting. It would be great if we could have simple buttons we can use for data entry, – except, of course, if there is new, unexpected data for which we have no predefined categorisation yet.

For example, I see that a grave has a vertical headstone. I need to note that because certain graves only have tomb slabs or nothing at all. Then I need to note the grave's dimensions (length, height and width), its material (e.g. granite, gneiss, gneiss migmatite, marble, limestone, slate, basalt, concrete or others), its type (headstone, obelisk, tree-shape, etc.) and also any associated features, such as crosses, Jesus portraits, photographs, engravings and inscriptions.

As you can observe, it is complex and sometimes features have multiple relations to each other! A headstone can have more than one material, several features, all of which relate to the overall grave. Regarding the photographs we take, obviously they can also relate to several features we are researching.

It might be very important for us to be able to enter new categories for features on-site, i.e. when they are noticed for the first time in the graveyard, For example, the first time we find a chest tomb, we would simply enter this new category.

[…]

Further, the RIP team members provided the following input, which will be presented without further editing, to highlight the emergent and iterative nature of such an application design process:

Preliminary tasks before we start surveying …
- We have the permission from the cemetery administration and first take a look at the site.
- Ideally we already have a scanned copy of the cemetery plan or a satellite image of the site.
- We have predefined (a) the fields (= section and subsection of the cemetery) according to the plan or after the first investigatory check and (b) we have created and assigned codes (WA_WAA, i.e. **WA**lferdange_**WA**lferdange[cemetery section]**A**; WA_WAB; WA_WAC etc.).
- Most of the cemeteries are organised like checker boards, which means we determine (a) the sequence in which we survey one section after another and (b) how we sequentially

record these rectangular fields (sections) consisting of single graves from one corner, row by row, to the last corner like:

1	2	3
4	5	6
7	8	9

- Grave/field/section 1 becomes WA_WA01 up to WA_WA09 for grave/field/section 9; then we go to the next section and repeat the procedure.
- In case of an irregular graveyard like old-style churchyards around parish churches, we predefine a route or freehand section to subdivide the cemetery into a grid. The coding is similar to the coding we used for the checker-board approach.

On the site …

Action on the spot	**Surface of the tablet**	**Data action**
- Taking general photographs (overviews, specifics)	START: ICON MENUE: ICON	- To start - To open a new file: WA (for Walferdange) - Open/connect to folder with - "General Pictures of the Cemetery" and save data
- Taking the first overview photograph of the first field (section)	Open SUBMENUE (new WA) Press OVERVIEW: ICON Press NEXT: ICON	- Open/connect to folder with - "Overview WA_WAA" and save data
- Taking the first overview photograph of the first single grave of the section	Press GRAVE: ICON Press NEXT: ICON	Open/connect to folder with "WA_WAA01_Pictures" and save data
- Taking pictures of survey groups: - "Materiality" - "Paraphernalia" - "Linguistics"	(Open one of these icons) Open: MATERIALITY: ICON	

In order to create a design as described above, the overall pilot project's approach was formulated into a procedure; an ideal procedure for data collection was described as well as the manner in which the data should eventually become available for further processing, i.e. ideally as an Excel and/or CSV file. The result of this input and several virtual meetings can be found in Annex 11.9, outlining the design elements for a first prototype.

A key element were the icons of the derived typology whose outlook was designed by the RIP project coordinator, Thomas Kolnberger. The basic function of these icons is that of a button, which, when used, would apply the selected category to an observed artefact. These icons were designed to anticipate the main design features of each identified type of materiality to allow categorisation and application in the field. This was achieved by clearly highlighting the main features without limiting the possibility to make an educated choice whether to add a certain phenomenon to a certain category. If a phenomenon could not be added to an existing category, it could be added to "other" with the possibility to earmark and revisit this element at a later stage and, based on the overall frequency of its appearance, to create a new category, thus extending the typology in the process. This design element of the CSA again underlines the emergent, explorative and hermeneutical character of the overall process, which extends to the tool itself.

Figure 76, which was introduced before in Chapter 5.1, shows a screen shot of the final tool. The application allows a user to organise a cemetery into sections and to individually identify graves within each section with the automatic assignment of a unique ID. Information can be added in respect of the overall cemetery, each section and, most importantly, each grave plot. On the individual grave level, this is what Figure 76 shows: The tabs at the top permit data entry regarding the grave marker, the actual grave, any paraphernalia and linguistics. As the manual in Annex 11.10 shows, the user can in each instance design the data that should be entered and the choices that should be available. For example, the user can choose whether certain information is required to be entered or whether the information can be omitted, for instance, if there is no grave marker or particular information is not applicable, etc. The user can also choose whether a certain material feature can be supplied via a photograph or not.

The flexibility in organising the tool for the user's specific purposes and the specific requirements of a particular data collection points to a very important issue: The CSA is, by design, not a standard grave marker data collection application that is ready to be used and applied anywhere. The CSA is extremely simple code lines in JavaScript Object Notation (JSON) format that can be altered at the user's discretion, adapted to the purpose at hand and that requires substantial preliminary input by the user. Most importantly, the user already has to have a very good understanding of what is being researched, how such data are approached and what information is eventually required for what kind of analysis. The CSA is just a tool, – nothing more, – and it requires a deliberate application by the user. The CSA does not predetermine in any manner what can be done with it or which data can be selected and how, nor is its application limited to the subject of grave markers. It is key for the reader to understand that the CSA is first and foremost a colourful front with underlying code that can be adjusted to the user's liking for any kind of data collection. Any related data collection methodology and procedures as well as the underlying

theoretical background is independent of the CSA in its basic version. Thus, the notion that the CSA in itself has a strong influence on which data are collected and how, needs to be rejected, as it does not exempt the researcher from his or her responsibility and required work. Ultimately, what the tool provides as an output is not a full analysis but only clean and organised raw data. This is the tool's sole purpose. This obviously does not ignore that any decisions as to what data are collected and how, especially with regards to a potentially still emerging typology, always have an impact on the results as well. However, this limitation is inherent to any research methodology and is not unique to the CSA.

Returning to the reasons for developing such a tool, the intention was to collect all data on-site and to export the data when back in the office and to proceed directly to the analysis stage. Consequently, as stated earlier, the researcher should already have a good understanding of the procedures that are required on-site for data collection. Preliminary knowledge of the data and procedures would support the installation and individualisation of the application on a mobile device, such as a smartphone or tablet. Annex 11.11 describes the installation of the required application package. The actual data could then be collected on-site at the user's discretion, i.e. data, such as dates, measures and/or inscriptions, could be entered in text form; an already determined typology and material characteristics could be assigned if such data existed and new categories could be added, if so required, and thus the typology could be altered or created in the first place. Each material characteristic, if so wished, can be supplemented by a photograph that can also be linked to a certain feature. To reiterate the point: The overall approach and, thus, the CSA can be altered as needed. Ultimately, several CSV files and folders containing the photographs and all of the above-mentioned information can be exported. The information is then ready for processing.

What is important to note is that the application – in its first workable developmental stage – was tested on several cemeteries in Luxembourg and Germany. The results, however, discouraged the RIP research team to extend the use of the application that was run on mobile devices for several reasons: Firstly, battery life can be an issue, especially with larger cemeteries and/or locations that limit the chance to charge spare batteries – if the mobile device allows switching batteries at all. The use of several devices would have been a solution, but then the data would be collected on different devices, resulting in several different data output files that eventually would have to be combined with each other, creating more work later on and potential for human errors and/or data loss. Moreover, by using the mobile device, all data entry, including measurements, photographs, the addition of new material characteristics and even the addition of a new type and category would take place on-site, outdoors. While this was the initial intention, it suddenly became obvious that data entry on a mobile device is extremely time intensive and dependent on the weather and environmental conditions, thereby rendering data entry inconvenient or even

impossible. If used on a smaller device, data entry becomes difficult if symbols and entry masks are relatively small. Sun glare or generally strong sunshine makes it difficult – if not impossible – so see details on the screen, while rain will prevent the use of a touch screen. Generally, all of these factors made the use of the actual mobile application only applicable for smaller data sets or for the spontaneous data collection of sub-samples. Owing to these inconveniences, there can be a tendency for the user to speed up the process, becoming negligent and focusing more on actually entering the data than observing the artefact, thus potentially overlooking important new details.

Consequently, a desktop version of the application was developed, providing the same features. The desktop version, however, allows the user to simply drop the photographic data, which was collected in the field, in a specific folder, to organise the photographs according to each grave and to enter all relevant data ex-post, for example, in the office. These functions enable the researchers to limit the time they have to spend on-site and therefore they become less reliant on weather conditions and more flexible with time management for data entry. Moreover, the risk of neglecting the attention to detail becomes limited. Annex 11.11 shows exemplary how the desktop version would be installed and how to begin with entering a project. To reiterate a point that was made earlier, for a quick and mobile solution to especially collect data from smaller sub-samples, the mobile application is a sufficient and convenient solution that researchers can carry with them at all times for spontaneous data collection. Both the mobile and the desktop version of the application offer a convenient standardisation for the data collection process. The application can be used for any setting and location, even ex-post, and allows for the export of a clean data file that is ready to be processed. Since the application is based on an emergent, explorative and hermeneutical research design, both versions allow the design of particular typologies that are unique to a specific region and/or the adaptation of existing typologies to fit a new setting.

As stated, it is important to note that the CSA is a tool and does not exempt researchers from making all methodological choices themselves. Specifically, the manner in which a research object like a cemetery or any other data set or any kind of typology is approached, is the input to and not the result of the CSA. Emphasizing this aspect does not ignore that the CSA's above described emergent nature allows the user to adapt and further refine a typology during the data collection process. To this extent, a typology can be further developed and refined. As long as such a process also becomes part of the description of the data collection and analysis, this is an important advantage.

Nonetheless, there are a number of potential downsides when using a tool such as the CSA and these shortcomings concern both the mobile and the desktop versions. Firstly, as already

mentioned above, there is a risk of becoming too limited and almost forced into using existing categorisations and typologies when applying such a tool. As soon as an existing typology is provided, any researcher will first attempt to match a phenomenon with the existing categories. Occasionally, another risk that might emerge is that of forcing certain material characteristics into categories that are debatable and that might not be accepted by another researcher. The integration of an extended typology, for example, by adding another category, does not only require the definition of such an extended typology and proof of a large enough number of cases to support such a step but also the design of new icons and buttons. Most importantly, once a new category has been created, the researchers have to work through all the data that have already been entered and confirm whether such a category had existed before but was thus far overlooked. This is natural, as the simple one-time appearance of a certain material or characteristic does not necessarily justify the creation of a new category, especially since too many selective categories will prohibit any constructive analysis. It is the researcher's task to make an educated judgement about when to add a new type or category and to make such a decision transparent and part of the overall research process. It is this responsibility and difficulty that can prohibit that kind of step and thus impede the potential of the tool. Therefore, research should not disregard the responsibility of using a standardised tool. Moreover, the tool in its current state, – whether the mobile version or the desktop version, – is still a beta version that includes challenges concerning a rather complex and inconvenient installation process, a non-self-explanatory user interface, especially for first-time users, and many small bugs that require attention should the tool find a more wide-spread user community and application to other topics and fields. For example, depending on how one wants to use the tool's desktop version, a File Transfer Protocol (FTP) client might be required. Furthermore, one might find it useful to have certain basic programming skills for JavaScript and a very good understanding of how the tool functions based on the program elements and the user manual. These issues need to be addressed in future versions of the application.

As stated, the CSA is simply a tool and a means to organise and standardise data collection, to make the process convenient and to permit the export of a clean and processable data file. The use of a tool like the CSA does not exempt the researcher from applying all other necessary methodological steps, precautions and measures of prudence as the researcher would have applied had the data collection been conducted with the conventional paper and pen methods discussed before and exemplary detailed in, for example, Mytum (2000). What the CSA does, is to use an approach and a methodology that already exist, integrate a typology and allow the entering of particular data. Consequently, this tool is not limited to grave marker studies. Any application fulfilling the above-described key elements and goals can adapt the basic code of this application to literally any purpose. Obviously, in archaeology, each kind of typology is important

and a key element of a materiality-focused field of study. This is mainly so owing to the underlying assumption that changes in the physical characteristics of materiality over time reveal a form of seriation and, therefore, the illumination of transformation processes as a typology can basically be defined as the categorisation of any kind of artefact based on its physical characteristics. Classic examples of such typologies in archaeology are the numerous typologies applied to different kinds of ceramics from any location and/or period. The body of literature in that respect is significant, for example, as shown by Frotscher (2003). In historical archaeology specifically, clay pipes are used for dating, as their stems show easy identifiable transformations over time (e.g. Bollwerk and Tushingham, 2019; Davey, 1986). Another example would be the archaeology of standing buildings (Glassie, 2000). As stated, the application can be applied virtually anywhere, as it allows a significant amount of flexibility and freedom in designing the data entry and data output.

From a practical point of view, how would a researcher proceed with the CSA as it was used for this research project? Figure 85 to Figure 91 show what the tool looks like upon successful installation and integration of the JSON files determining the structure and layout of the menu and the corresponding icons. On the top level, it would be possible to add new cemeteries by clicking the bottom right button with a plus symbol and entering a name. When entering a cemetery by clicking on its name, the user reaches the section level (see Figure 86) where sections of the cemetery can be added in the same manner before graves can be added within each section (see Figure 87). While any text can be entered, one needs to consider that, upon data export, the grave names will affect the unique ID assigned to each grave.

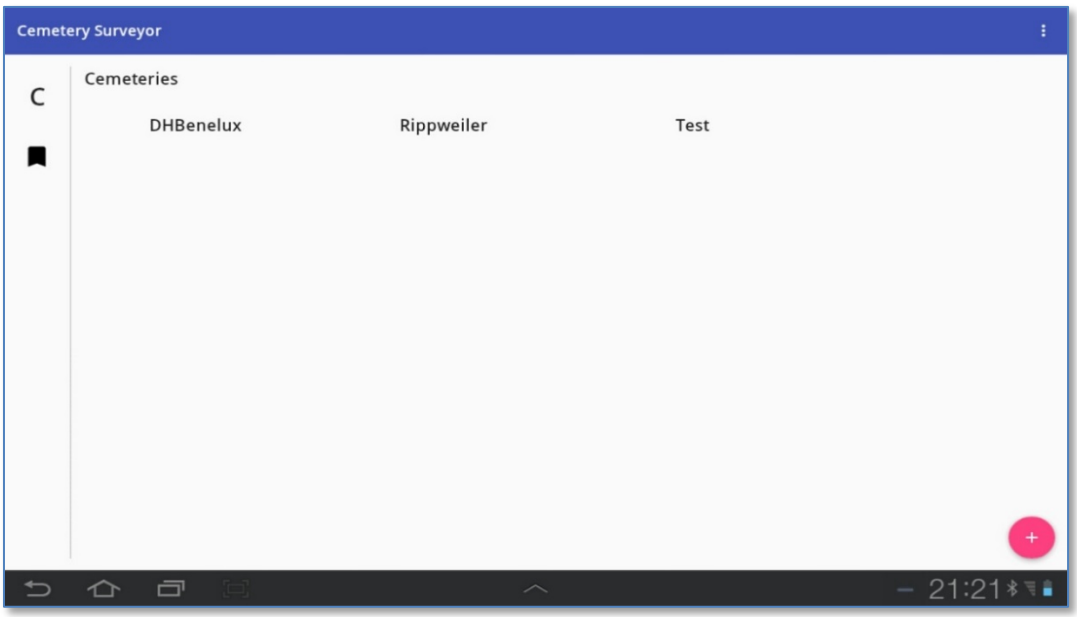


Figure 85: CSA data entry mask on cemetery level.

(Source: Author)

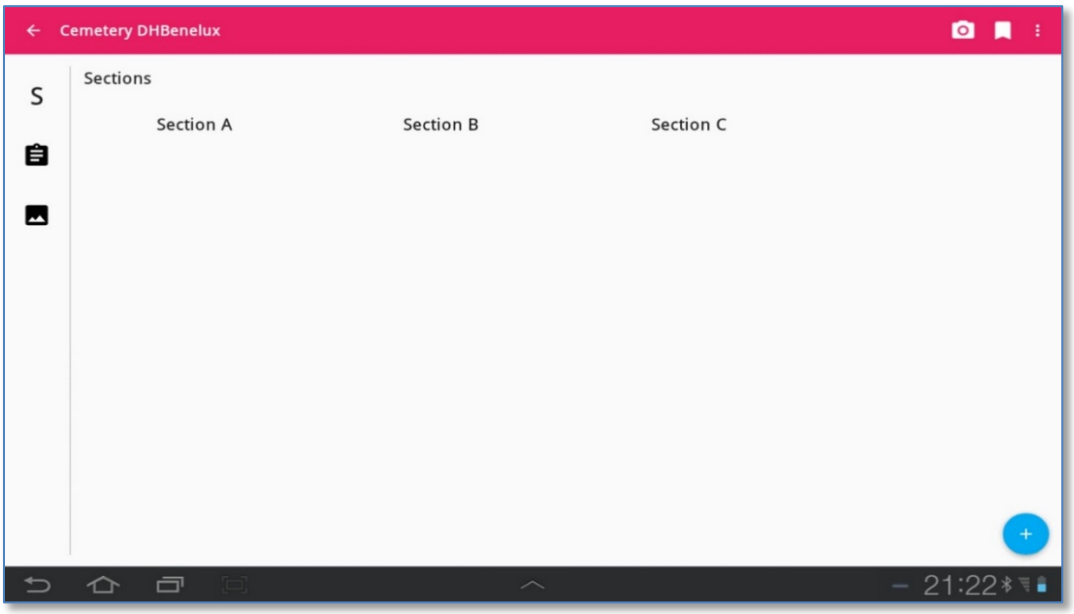


Figure 86: CSA data entry mask on section level.

(Source: Author)

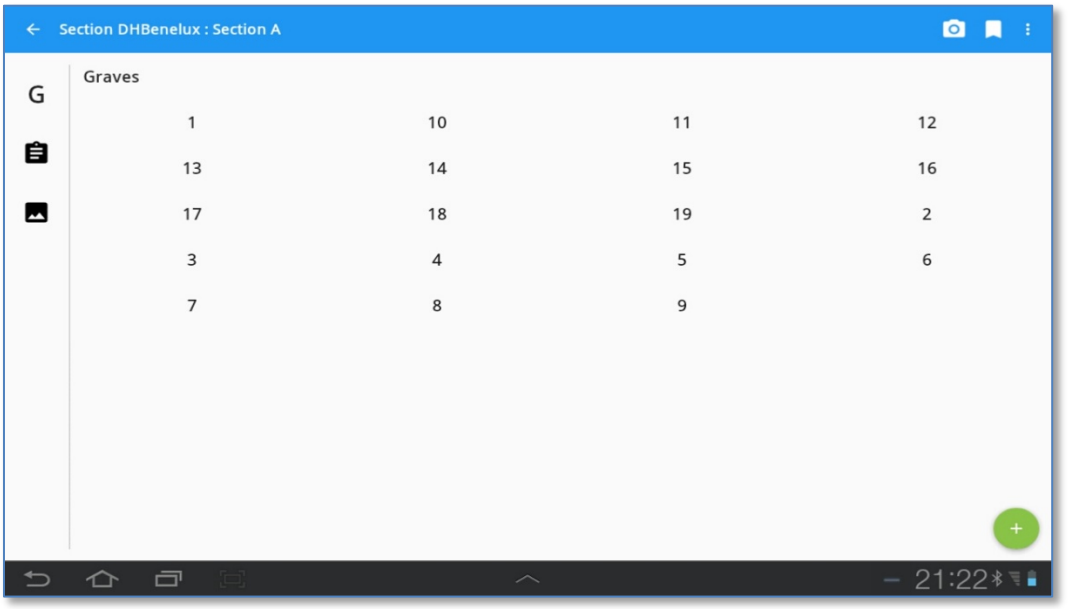


Figure 87: CSA data entry mask on individual grave plot level.

(Source: Author)

Once on the grave level, numerous data can be added as discussed before, structured according to the tabs containing data regarding the gravestone, grave, paraphernalia and linguistics, either by entering text or clicking corresponding buttons and/or icons mirroring the underlying typology (see Figure 88 to Figure 91).

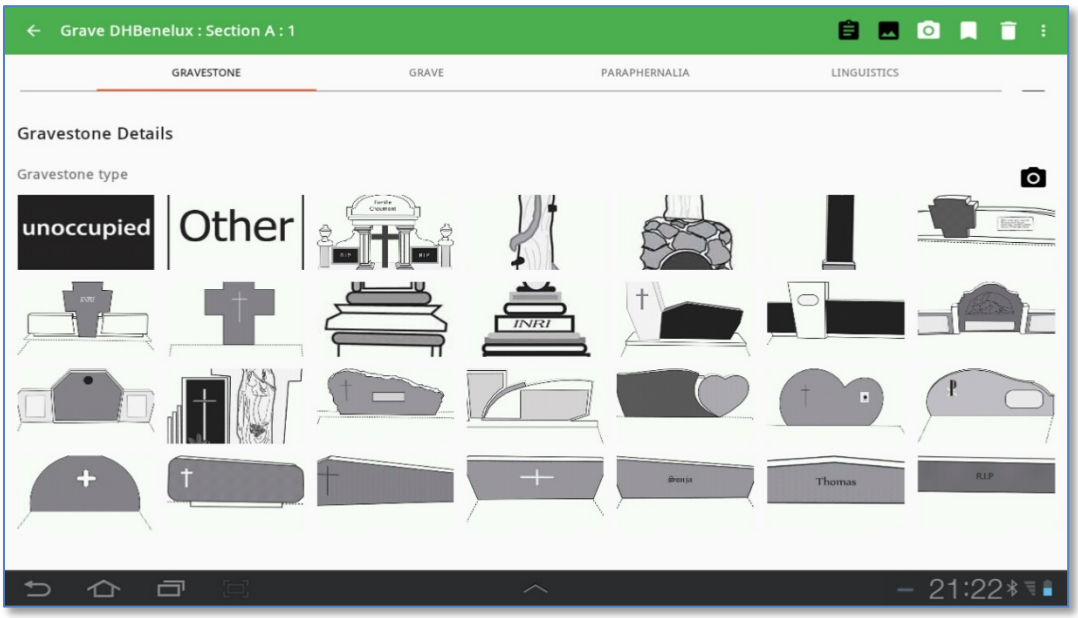


Figure 88: CSA data entry mask on gravestone level.

(Source: Author)

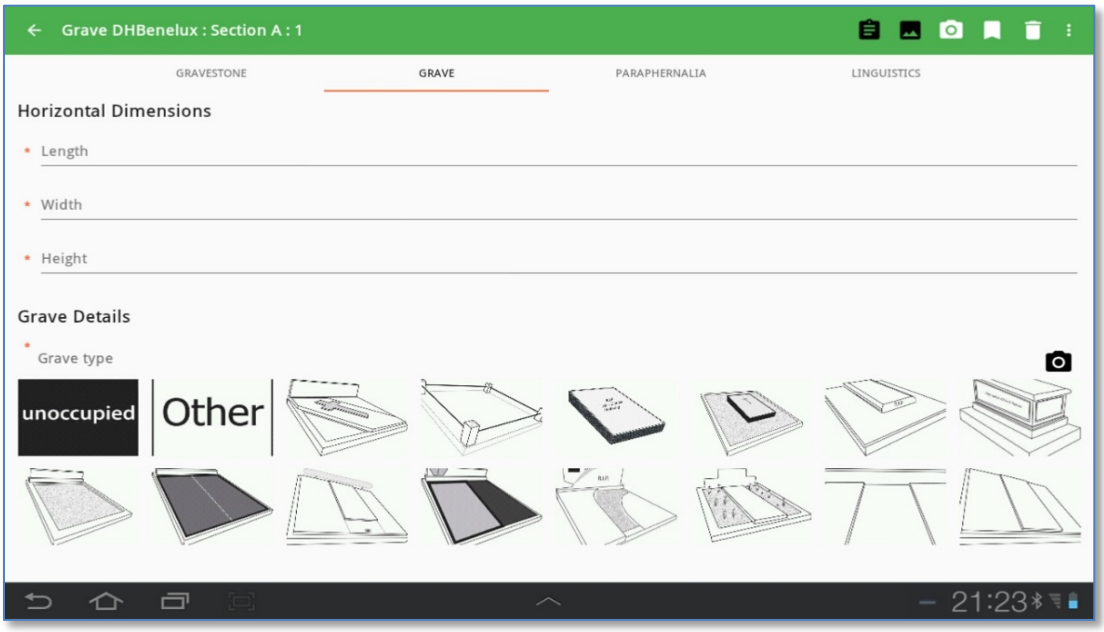


Figure 89: CSA data entry mask on grave level.

(Source: Author)

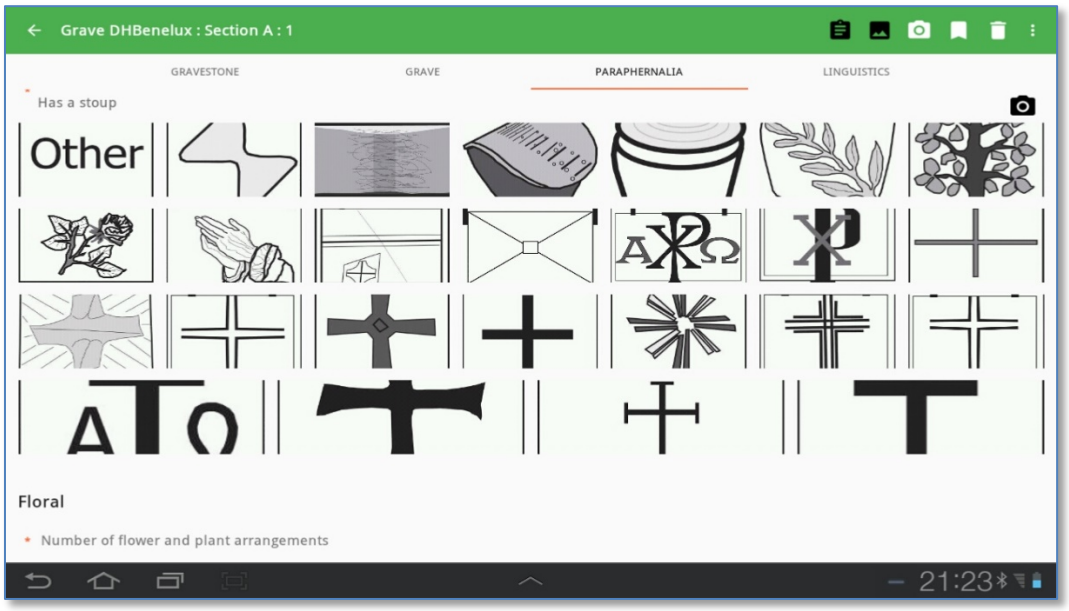


Figure 90: CSA data entry mask on paraphernalia level.

(Source: Author)

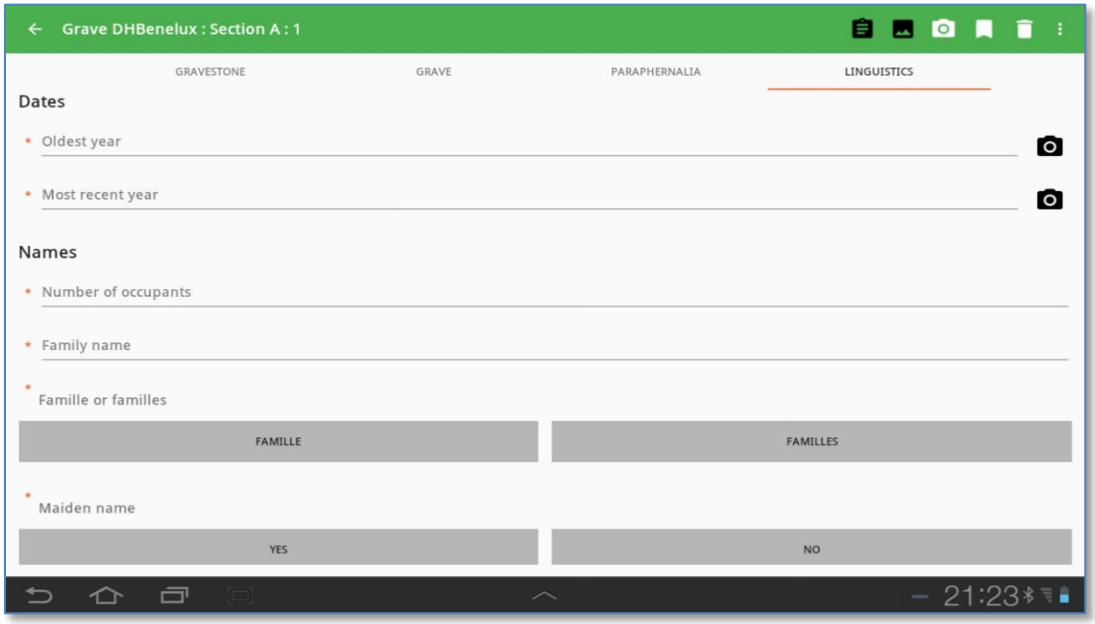


Figure 91: CSA data entry mask on linguistics level.

(Source: Author)

Any line for entering text or clicking on a button and icon with a camera symbol next to it allows the direct association of the feature with a photograph. The buttons on top of the screen enable the user to navigate through the menu, to have an overview of photographs that had been taken, to earmark specific phenomena and, of course, to delete data that had been entered.

As has been shown above, the CSA is not impeccable, but it became an invaluable help in collecting the data and preparing it for further analysis. There is serious and important criticism to such a

tool. For example, it is important to understand the limitations of such an approach, if categories and/or typologies are developed from scratch and altered as part of the overall data collection process. The reasoning behind such important steps of such a research need to be transparently discussed, to ensure the validity of any related study. Therefore, it will be necessary to develop this tool further and be aware of its potential but also its limitations. The following chapter will introduce the extended data sample, data collection and analysis in three more cemeteries.

6. Extended Data Sample, Collection and Analysis Approach

Three more cemeteries were selected to extend the pilot project sample of Walferdange, in order to test the hypotheses gained from the pilot study at Walferdange and to include a cross-border perspective. The cemeteries had to be within the region under scrutiny, be spatially approximately on the same latitude and show comparable distances from the Luxembourgish-German border. Furthermore, the cemeteries should not be too distinct from each other in order to allow a certain level of comparison; a direct comparison was certainly not the objective of this study. The data of the three additional cemeteries, Konz, Wincheringen and Wormeldange, were collected applying the CSA as explained above and subjected to statistical and spatial analysis.

The RIP research project gained valuable insights from the pilot study at Walferdange cemetery and it appears that there are concentrations of certain grave features in time and space, which might be interrelated, that is, certain features are more or less likely to appear in context of others. These features appear at a certain point in time and then spread via a neighbouring effect, thus creating concentrations that become visible in a spatial analysis. Also following the feedback by the anonymous reviewers of the *Journal of Material Culture*, the main questions arising from this study is: Can this approach be repeated at other cemeteries and would the results confirm the findings gained from Walferdange? Moreover, taking full advantage of Luxembourg finding itself surrounded by the borders of three other nations, it might be illuminating to include a cross-border perspective to diversify the data and gain potential insights derived from a different cultural context.

The border region between Luxembourg and Germany might offer an interesting spatial focus because it enables a comparison between populations that historically shows significant overlaps, but also different cultural influences. Historically speaking, a precise nation state-related definition of Germany and/or Luxembourg is relatively recent. The links between the two countries originate in the joint history as part of the Holy Roman Empire of the German Nation, a changeable history of the power struggles between the Empire, France and the Netherlands into the 18th century and, finally, during the long 19th century, a series of events, such as Napoleonic France's annexation of all left-Rhine river regions, the restoration after the Congress of Vienna as part of the *Deutscher Bund*, as well as nationalist developments and movements in 1839, 1867 and 1890, cumulating in the impact of German occupation during WW1. Such developments show a number of similarities but also differences when it comes to the development of the Luxembourg-German region, enabling scholars to consider this region as a spatial focus for further research. The specific historic background of the Luxembourg-German border region, and the selected sites for this study, have been discussed in chapter 2.

Although the different cultural influences, especially by France and Germany, on Luxembourg shall not form key issues for this research, the historic background of this particular region provides an exciting spatial research scope that, in addition to the socio-cultural changes during the long 19th century in Europe in general, provides the chance to observe important changes and to identify relevant agents of change and/or resistance to change. In principle, this sampling strategy makes use of Stone (2009) and her research on ideological-related and ethnical-related gravestone choice in Long Island, USA. Amongst other things, she found that "proximity to a cultural sphere" (Stone, 2009: 142) plays an important part on grave marker choice; she therefore suggests an extensive, cross-regional, open coded and GIS-based sampling and data collection approach, which is not too dissimilar from the study at hand (cf. Stone, 2009: 146f.). Figure 92 shows the approximate region of interest in which cemeteries should be sampled.

Figure 92. Research region.

Geo-spatial and material data need to be collected according to the above described approach at Walferdange cemetery, applying the Cemetery Surveyor Application for more efficiency and consistent data to be analysed statistically and spatially.

6.1 Spatial and Material Data Sample

For the actual data collection at cemeteries, in total four locations were selected: Wormeldange and Walferdange in Luxembourg as well as Wincheringen and Konz in Germany (Figure 93).

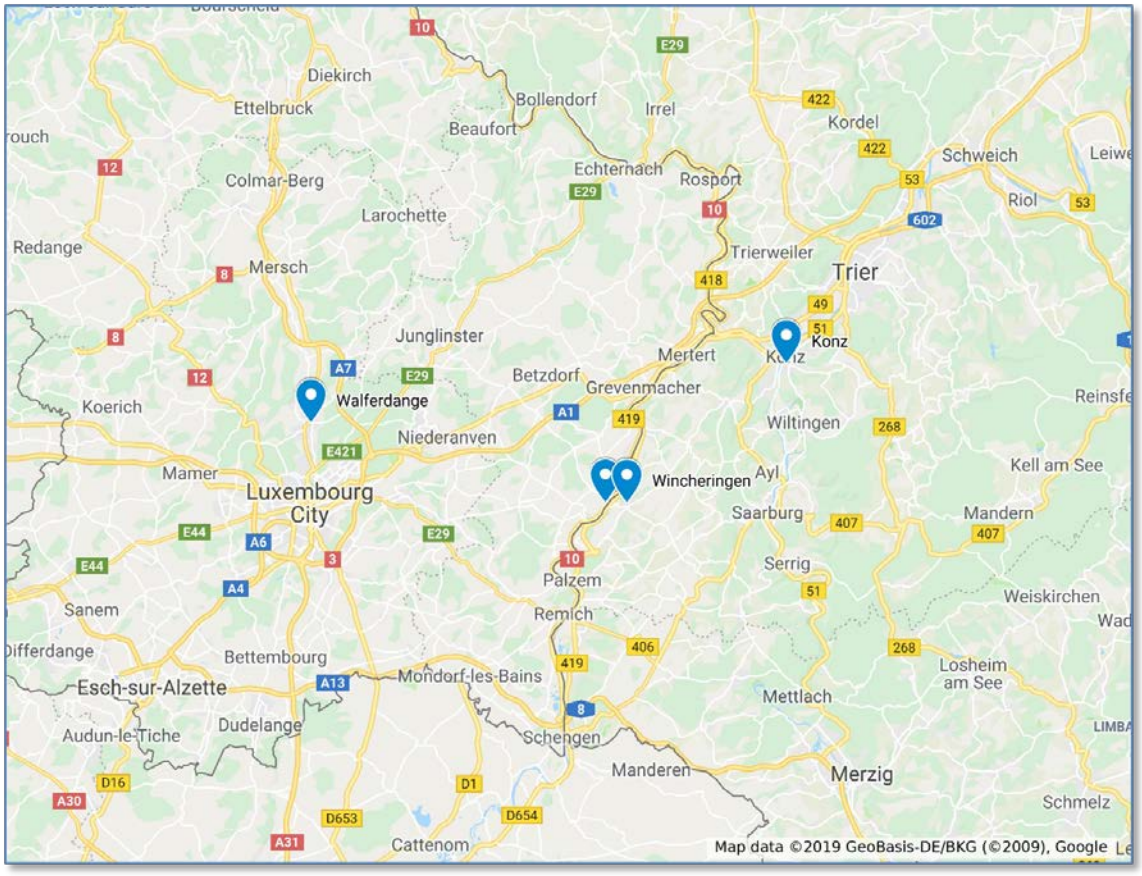


Figure 93. Wormeldange and Walferdange in Luxembourg, as well as Wincheringen and Konz in Germany.

The selection of these locations were not subjected to any formal sampling procedure. However, starting with Walferdange cemetery as a pilot project, the intention developed to extend data collection to a similar cemetery across the border in Germany and to include at least two more cemeteries, also separated by the Luxembourg-German border and not in a suburban but a rural context. By simply exploring and visiting cemeteries in the border region, the author finally decided on the above stated sample.

The exact locations of the cemeteries are as follows:

- Walferdange: 49.65863, 6.1333
- Wormeldange: 49.61098, 6.40594
- Wincheringen: 49.61062, 6.42587
- Konz: 49.69432, 6.57342

The beeline between Walferdange and Wormeldange is 20,4 km, between Walferdange and Konz approximately 32 km, between Wormeldange and Wincheringen only 1,44 km and between Wincheringen and Konz 14,1 km. Hence, all cemeteries form a polygon of about 130 square kilometres and are relatively close to each other and roughly situated on the same latitude of

49.6 degrees. The river Mosel, which is the border river between Luxembourg and Germany, forms a natural barrier between them.

These cemeteries have been chosen due to their relative proximity to each other and their seperation by the river borderline between Luxembourg and Germany, while their approximate size and layout show certain similarities. Walferdange, for example, has a church building, which dominates the site, and a morgue. The graves, while generally laid out quite openly, show at least one major step from one grave field to the other, with grave sections clearly identifiable and several pathways leading through, which are also used by pedestrian traffic. The previous chapter about the Walferdange pilot study already includes a number of pictures and a grave allocation plan. Konz, although located somewhat closer to the Mosel River, has a huge, towering church, a centrally located morgue and while there appears to be more vegetation in the form of larger trees than is the case at Walferdange, the overall grave fields are clearly identifiable and show a terrace layout declining towards the centre and then rising again. Pedestrians use a major pathway to cross the cemetery. Both Walferdange and Konz cemeteries are located in a suburban area of their city and are relatively open to the surroundings with only minor hedges or walls demarcating the site (see Figure 94, Figure 95, Figure 96, Figure 97, Figure 98, Figure 99 and Figure 100).

Figure 94. Konz cemetery (1).

Figure 95. Konz cemetery (2).

Figure 96. Konz cemetery (3).

Wormeldange is a much smaller cemetery and also clearly dominated by a relatively big church building. There is a morgue, a few graves nestle around the church building while most stretch out on a much lower level in a relatively clearly laid out order. Vegetation, if any, is scarce. A major landmark is the grotto dedicated to the Virgin Mary. A high wall demarcates the site and obstructs the view in sight.

Figure 97. Wormeldange cemetery (1).

Figure 98. Wormeldange cemetery (2).

Figure 99. Wormeldange cemetery (3).

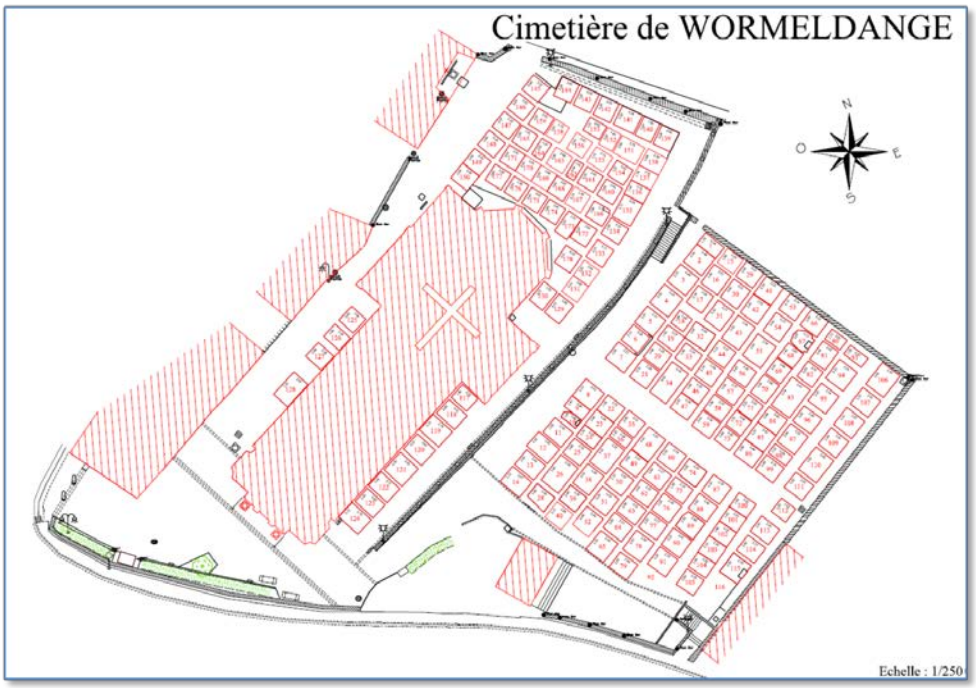


Figure 100. Wormeldange cemetery (4).

Wincheringen cemetery is somewhat larger than Wormeldange. It is also located relatively central to its town. There is a high wall on one side of the cemetery. Although there is no church or morgue, the castle Wincheringen is a landmark. On the whole, the cemetery stretches over three main terraces, declining relatively steeply towards the north where there is no significant wall or hedge to border the site (see Figure 101, Figure 102, Figure 103 and Figure 104).

Figure 101. Wincheringen cemetery (1).

Figure 102. Wincheringen cemetery (2).

Figure 103. Wincheringen cemetery (3).

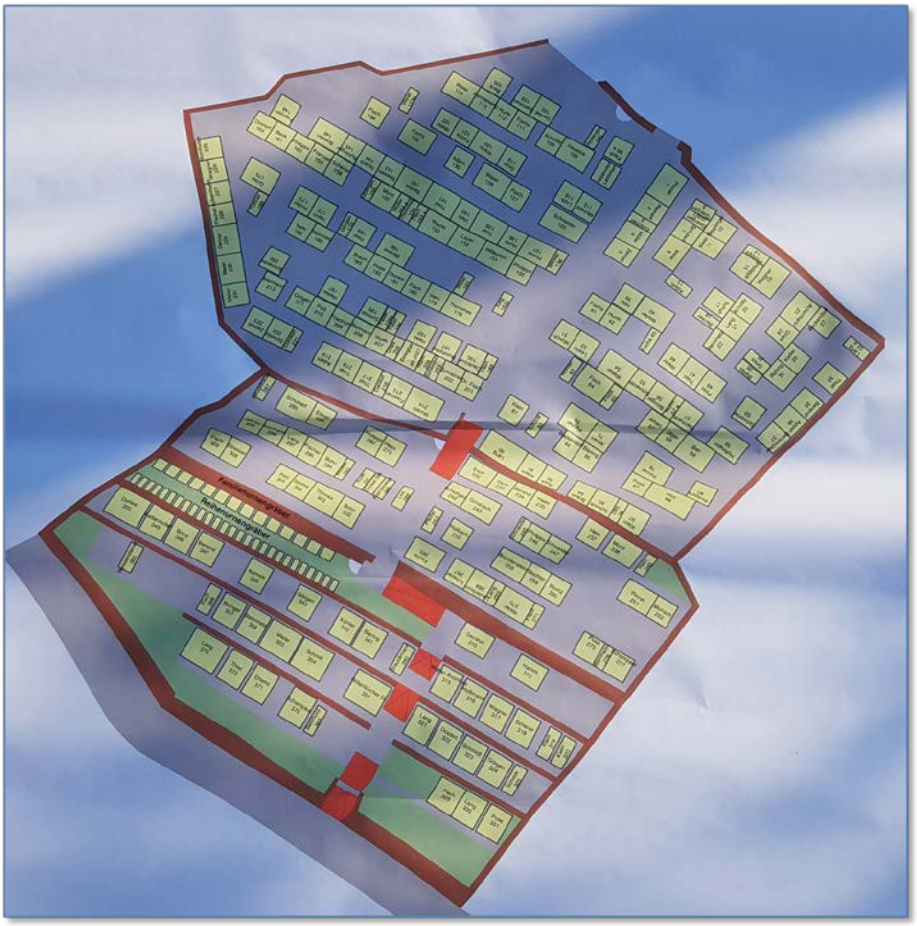


Figure 104. Wincheringen cemetery (4).

Details about the historic, socio-cultural, economic and demographic context of the four selected sites were discussed in chapter 2. While all four cemeteries presently have no limitations as to which denominations may be interred there, they are all located in a historically predominantly Catholic region. Therefore, non-Catholic burials will have occurred in larger numbers only as more people from other areas or countries began to move there, mostly since the industrial revolution. In the case of Konz, Wincheringen and Wormeldange, the relevant sites have been used for burials for a very long time and records do not permit a clear starting point as a cemetery. Konz is located on the grounds of a former Roman palace. A Christian church is located on the same site and has been there for a very long time. The surroundings are being used as a church yard – most likely for just as long. In Wincheringen and Wormeldange, the cemeteries are also churchyards, a practice extending back into the past, since the site has been used for Christian congregations. Consequently, it is not possible to clearly determine exactly how old these cemeteries really are. Walferdange is a somewhat different example, though. Walferdange was founded as an independent municipality in the second half of the 19th century; the cemetery also originates from that period. It is important to note, however, that all four cemeteries, including those with churchyards as the previous grave areas, were modernised in the course of the second half of the 19th century until the early 20th century, and adapted to the new hygienic and aesthetic requirements, i.e. church wall, checkerboard pattern, occupancy times and dismantling of ossuary depots, if present. At Walferdange, 739 graves were recorded, at Konz 1,310, at Wormeldange 184 and in Wincheringen 388.

It should be clear from this extremely cursory comparison that, despite all similarities at first glance, the cemeteries can hardly be described as mirror images of each other. While Walferdange and Konz are the two biggest cemeteries in the sample, they differ in terms of grave data collected and demographic context. The same is true for Wormeldange and Wincheringen. However, it needs to be emphasized that this study does not aim at conducting a comparative study or comparing the findings of these sites based on cemetery differences and similarities or even their immediate cultural embedment and history. For the purpose of the spatial and material aspects, all four cemeteries will be considered only in terms of their spatial and material layout and makeup.

6.2 Spatial and Material Data Collection

Since the data collection process at Walferdange cemetery was already explained before, in the following the author will only refer to Wormeldange, Wincheringen and Konz as cemeteries sampled for the purpose of this thesis. Once these three additional sample cemeteries were identified, the permission to access these for research purposes needed to be obtained from the municipalities in Wormeldange, Konz and Saarburg (Germany) for Wincheringen. The

municipalities were contacted personally – by telephone and, if possible, with a personal visit – and a formal letter detailing the RIP research project and the purpose of this PhD study was presented. In all cases, the response was swift and positive. Wormeldange, Konz and Saarburg gave written permission to research all cemeteries within their jurisdiction. However, to access Wincheringen, the author discussed the matter telephonically with the mayor of the town and gained verbal approval.

When asking permission, the author also requested access to all kinds of additional data, such as grave allocation plans, aerial and/or satellite photos, georeferenced maps, cemetery regulations, archives, etc., which was also granted in all cases if such data did existed. In the case of Wormeldange, the current cemetery regulation – older ones were not available – and a recent grave allocation plan (see Figure 100) were supplied. Furthermore, geo-referenced satellite photos/orthophotos in TIF-format and, most interesting, detailed pictures of all graves in the cemetery mostly dating back to the year 2003 were also made available. But for these, no other archival records are known to exist. For Wincheringen, the cemetery administration in Saarburg could only supply a grave allocation plan in a large, hardcopy format (90 cm x 84 cm) of unknown source, scale, etc., but which could be used for data collection and even georeferencing. Also in this case, the location of further archival data was unknown and could not be supplied. The city of Konz could supply a georeferenced grave allocation plan, orthophotos and a few older photos of the cemetery, a few of unknown source and date, one from 1955 and another from 1980.

The grave allocation plans were most important for starting with the data collection, since they enable a better orientation of the cemetery; they are, furthermore, used to organise the cemetery into sections on-site, they enable orientation amongst and organisation of the graves and they also permit and necessitate double-checking how the grave plots are actually organised. These sections are ranked and termed A, B, C, etc., to the last section. In certain cases, a grave plot might look like one grave; however, the plan might reveal that it is actually two or more, or vice versa. In order to achieve an accurate count of grave plots, it is necessary to consult this map and make a decision. Figure 105, Figure 106, Figure 107 and Figure 108 show the grave allocation plans with sections. These sections often follow the actual organisation of the sections intended by the cemetery administration or they simply follow footpaths or vegetation, such as hedges, walls, etc., that clearly divide the cemetery into sub-sections. However, in certain cases a few graves might, in reality, form a different unity than the map suggests, which is why the researcher needs to adjust this if necessary. These grave plots, which clearly form such a spatial unity, are organised in a section.

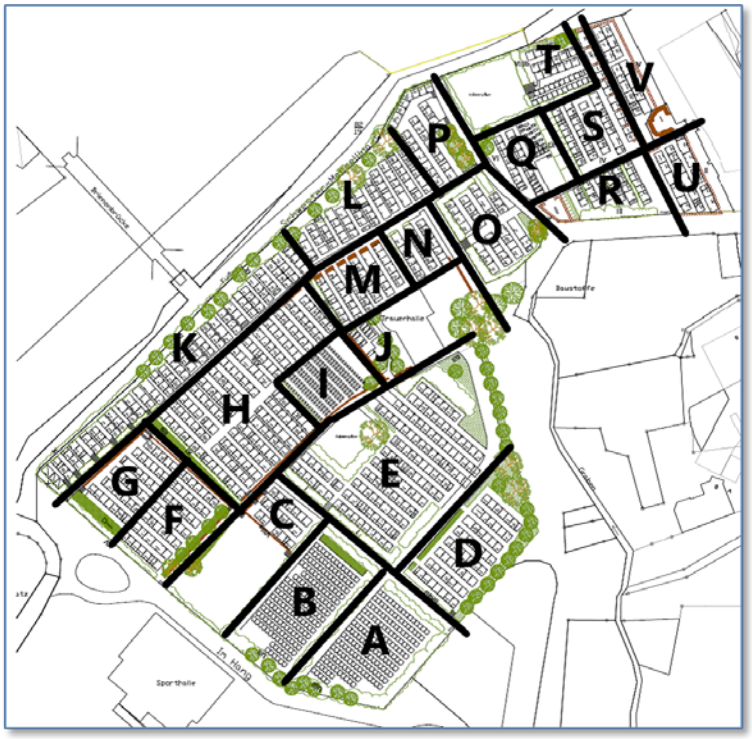


Figure 105. Konz grave allocation plan with sections.

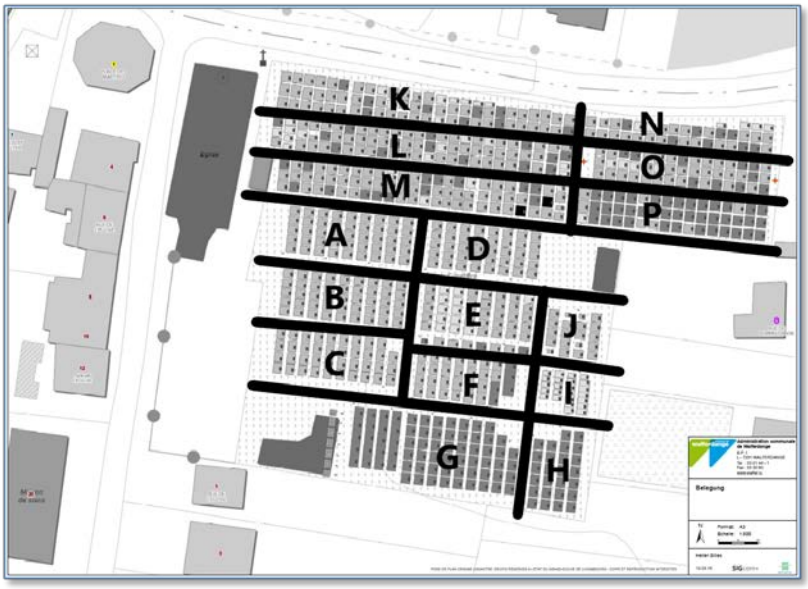


Figure 106. Walferdange grave allocation plan with sections.

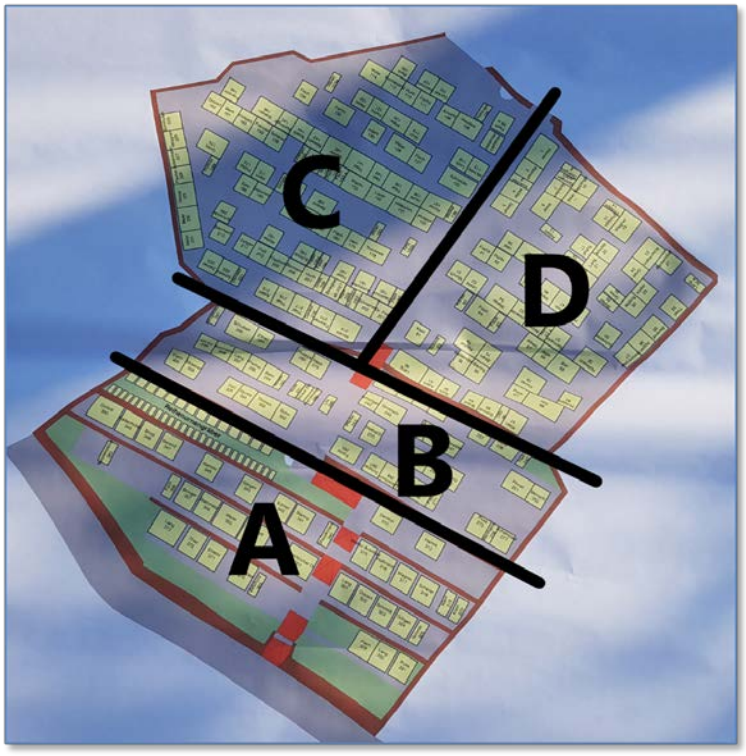


Figure 107. Wincheringen grave allocation plan with sections.

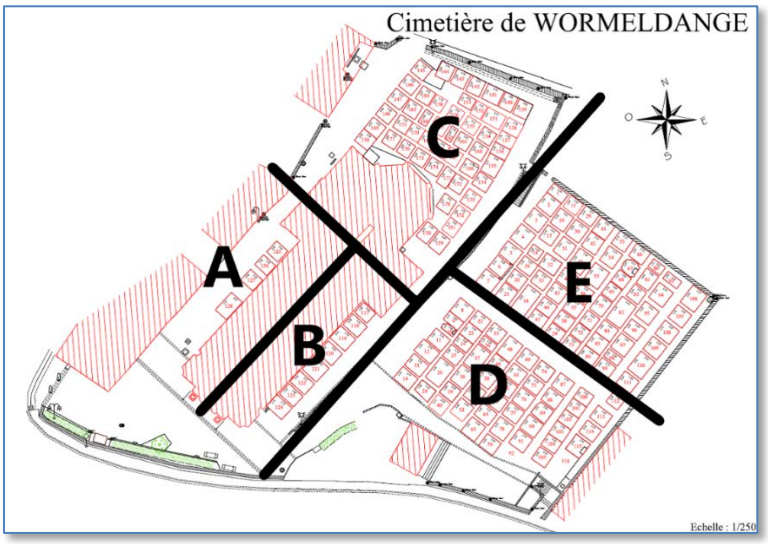


Figure 108. Wormeldange grave allocation plan with sections.

Creating and drawing sections on the grave allocation plan is the first on-site research task. This is accompanied by taking photographs of the overall cemetery and sections and of all structures, infrastructure or landmarks of significance, churches, chapels, morgues, memorials of any kind, walls, hedges, vegetation, etc. As explained before, not the Android application of the Cemetery Surveyor Application but the server-based version was going to be applied. This meant that only a good digital camera as well as a hard copy of the grave allocation plan, a pen for making quick notes and a measuring or stadia rod were necessary.

After taking photographs of the overall cemetery, deciding on sections and also documenting them, the graves were photographed starting from the top left-hand side of each section, row by row, – as long as such a row organisation was given, – counting from one to the last grave of the section and repeating this procedure within each section. This automatically resulted in a unique grave ID for the cemetery, section and order of each grave. For example, the first grave of the first section of the cemetery Wormeldange would obtain the ID "Wormeldingen_A_1", the second "Wormeldingen_A_2" and so on until the very last grave of the final section that would obtain the ID "Wormeldingen_E_62" – because there are sections A-E and there are 62 graves in section E.

In keeping with the idea of flexible, anytime and anywhere data collection and since it was intended with the development of the Cemetery Surveyor Application, all photographs were taken with a Samsung S7 smartphone. Efforts were made to follow the same procedure and sequence for each grave:

1. Photograph of overall grave/grave marker, perspective from left-front, approximately 45 degree horizontal angle;
2. Frontal photograph of grave/grave marker, central perspective, approximately ten degree horizontal angle;
3. Top-down photograph of grave, central perspective, approximately 30-45 degree horizontal angle;
4. Closeup photograph of grave and grave marker material if different;
5. Detail photographs of any paraphernalia if not already visible on previous photographs;
6. Detail photographs of inscriptions if not already visible on previous photographs;
7. Detail photograph of stonemason mark if present and if not already visible on previous photographs; and
8. Final photograph of overall grave/grave marker, perspective from right-front, approximately 45 degree horizontal angle.

The actual number of photographs taken per grave can differ significantly, since graves might require different levels of detail when documenting them. For example, urn graves tend to be relatively small, often with few paraphernalia. Two to three photographs, in certain cases even one, might suffice to capture all necessary information. Other graves show not only a larger number of paraphernalia, but due to poor condition and/or vegetation, etc., the material, colours,

inscriptions and other details might only be recorded when taking more closeup photos to ensure that everything is captured and not overlooked at a later stage.

During the whole process, it is important to document the grave in its actual condition and state without touching anything, stepping on it, etc., unless absolutely necessary: The safety and integrity of the grave site must be respected and ensured.

An important issue is measuring the grave and grave marker. At Walferdange, these measurements were taken. In order to facilitate the data collection process and since the measurements were not used for any further analysis, the author, in consultation and in agreement with the doctoral supervisor, decided not to measure the grave plot and grave marker but to show and indicate the approximate dimensions with a measuring or stadia rod. This rod is supposed to feature visibly in as many photographs as possible to show the size and make it comparable with other graves. In order to achieve this, it was sufficient to position the stadia rod such that more than one grave and grave marker can be seen in a photograph. While the exact size of a grave and grave marker is not relevant for the purpose of this study, it was ensured that, with the help of the photographs and the stadia rod, more exact measures of especially the grave markers could be reconstructed by reading the scale of the photographed rod.

In keeping with this procedure, 1,064 photographs were taken (an average of 5,8 per grave) at Wormeldange cemetery on 20 June and 24 August 2018. At Wincheringen, 1,275 photographs were taken (an average of 3,3 per grave) on 13 July 2018. In Konz, the largest cemetery, a total of 5,397 photographs were taken (an average of 4,1 per grave) on 7 September, 12 September, 17 September and 19 September 2018. For the sake of comparison: At Walferdange cemetery, 3,519 photographs were taken, which, at 739 graves, give an average of 4,8 photos per grave. It appears as if the graves in Germany required fewer detailed pictures for data collection.

As soon as all graves were documented, the photographs were digitally saved and organised into separate folders according to sections and individual graves in terms of folder hierarchy. This is an important prerequisite for actual data entry into the server-based Cemetery Surveyor Application. For convenience, two computer screens were used: one for data entry and another for browsing through the photographs. The data wwere entered into the Cemetery Surveyor Application, following the description above. However, there was one important difference compared to the approach at Walferdange: While the pilot project at Walferdange was meant to actually derive the necessary input data to develop the Cemetery Surveyor Application in the first place, this standard, in terms of categories and typology, was not the basis for these three cemeteries' data entry. The advantage in starting data entry with this standard is that the resulting data are more comparable with each other, since one must make an effort to work with the typology at hand. In most cases this works well, although it is clear that a typology is always

an oversimplification and fine nuances of data can be lost by categorising to general, while too much focus on detail results in a too detailed typology and, thus, impedes the possibility to identify patterns. The researcher, therefore, needs to make a well-informed choice about which features to add to which type and category, when to put it into the "other" category and when a certain quantitative threshold reached is worthwhile to create a new type. While entering the data into the Cemetery Surveyor Application, it became necessary – several times – to introduce a new type of feature to subsequently enable a more detailed analysis. Annex 11.4 shows which types have been introduced and subsequently applied to all cemeteries.

It is important to mention that the introduction of a new typology requires the researcher to revisit all data already entered to ensure that items matching the new typology are recognised accordingly. Hence, the data entry process becomes a reiterative process that already includes a level of analysis whereby previous typologies are altered and specified.

6.3 Spatial and Material Data Analysis

As described above, all entered data can be exported from the Cemetery Surveyor Application into csv files and split into data regarding the overall cemetery, sections, graves and pictures. This specific file format is very convenient for the further analytical procedure. Since this research will focus on the relevant data regarding the graves and since the data regarding the overall cemetery or sections are not subject to any investigation, only the csv file regarding the graves will be processed. After double checking the exported files for any errors and making sure that the data appear to be sound and in the correct order, three main steps will be taken: Firstly, a simple descriptive statistical analysis with SPSS in terms of frequencies will be conducted. Secondly, a more detailed but still simple descriptive statistical analysis in Microsoft Excel using pivot tables based on input from SPSS and, eventually, a simple geo-spatial analysis in QGIS and ArcGIS will be conducted. As explained earlier, this is not only to describe the data but also to try and answer the question whether there are any patterns or clusters that are visible.

At this stage, an additional limitation has to be added to the overall sample and also to the subsequent data analysis. In the case of Walferdange, data in the form of a manually entered Microsoft Excel data sheet with 114 columns, and thus variables, were available, each with dozens of possible types. Even after reducing this complexity with the help of the Cemetery Surveyor Application, 73 columns or variables were still present in the unprocessed csv files, with even more types than at Walferdange. Although these data are not necessarily overly complex, not only is it very detailed but as will be noticed in the SPSS analysis, a number of cases are so rare and specific that hardly any reasonable conclusion can be drawn from that alone when applying conventional descriptive statistical methods or spatial analyses. Moreover, certain variables are simply more interesting or relevant when it comes to the overall research question. For example,

the author of this thesis does not necessarily consider linguistics as relevant for his main research interest, while all variables that is relatively clearly identifiable in the cemetery and almost omnipresent on all graves are extremely valuable because they enable a more extended comparability across cemeteries and borders. This is especially true for the variables that have an inherent materiality and spatiality, – obviously, – or for those that might have an immediate distinguishable value. These variables are not necessarily subjective impressions, such as the monumentality of a grave marker or the number of names on it. This, however, applies to the type of grave and grave markers, including their material and colour as well as the presence and type of any cross or stoup and even a stonemason's mark if any. Consequently, the SPSS analysis is mainly conducted to receive, efficiently and reliably, a quick overview of the quantities and distribution of all a cemetery's variables that were collected and that show the above described quality (Annex 11.5). Since, for the purpose of this study, not all variables can be taken into account, it is sufficient to identify the top five types for each of the variables if they apply.

The results of the descriptive statistical analysis in SPSS can be found in Annex 11.6; without any further editing it is a purposefully, original and full SPSS output. If required, it will make a full overview available to the reader. Obviously, this analysis includes all graves, whether dated or not, empty, abandoned or occupied, etc. Furthermore, all possible variants of typology, for example, for the colour “brown” and “brown-red”, would be present, although these variants could be categorised into a single category for further analysis. Also the typology for the cross and stoup type can be confusing, because graves can show several different cross or even stoup types which, from the SPSS perspective, result in a different type in itself. Moreover, for certain cemeteries the category “x-other” can be numerous and therefore it needs to be considered whether or not the inclusion of this typology under the top five makes any sense from the perspective of the research and the intended further analysis. Last but not least, the reader needs to remember that Walferdange shows different variables as well as a slightly different typology than Wormeldange, Wincheringen and Konz simply because Walferdange was the pilot cemetery from which the further typology had to be developed in the first place. These limitations need to be considered when continuing to select the top five typology of the relevant variables.

The analysis with Microsoft Excel pivot tables enables integrating the temporal variable into the descriptive statistical analysis of frequencies. In order to do so, csv files need to be transformed into and saved as a regular Microsoft Excel table and opened with the program. Via the “Insert” tab in Microsoft Excel, the “PivotChart” function can be selected. It is advisable to select “PicotChart & PivotTable” from the dropdown menu, to select the full data range of the data file from the menu of the then opening window and to place the Pivot table into a new worksheet. On this new worksheet, all data to be used can be selected from the “PivotChart Fields” menu. In order to achieve a proper count of graves, the “gid” of each grave, that is its unique ID, was placed

under “Values”. In order to, for example, obtain an overview of the graves' chronological distribution in this particular data set, the “oldest date”, that is the earliest date of death that was visible on a grave or grave marker, is placed under “Axis”. In order to make the data more approachable, the dates on graves and grave markers, or at least where present and still visible, need to be categorised into categories of ten years, beginning with 1900 until 1910, and continuing from 1911 until 1920 and so forth, with any graves before 1900 being categorised into such pre-1800, pre-1850 and pre-1900 categories, since their numbers are usually too small to justify a more detailed categorisation. This is achieved by selecting the relevant dates in the table, right mouse click and “grouping” the dates accordingly. This new PivotTable Field, for example called “oldest_date2”, will be an important input for the further chronological analysis because it will be the x-axis, while any variable/feature of interest will be moved to the y-axis via the PivotTable Fields, thereby enabling the researcher to move any data content freely from table rows to columns and the other way around, corresponding with the x-axis and y-axis of a chart. Such a chart can now be created by selecting all data of the resulting table and by using the PivotChart tab again. It is recommended to select the 2D Stacked Area chart that shows the values contained in the columns or y-axis as a percentage of the grand total.

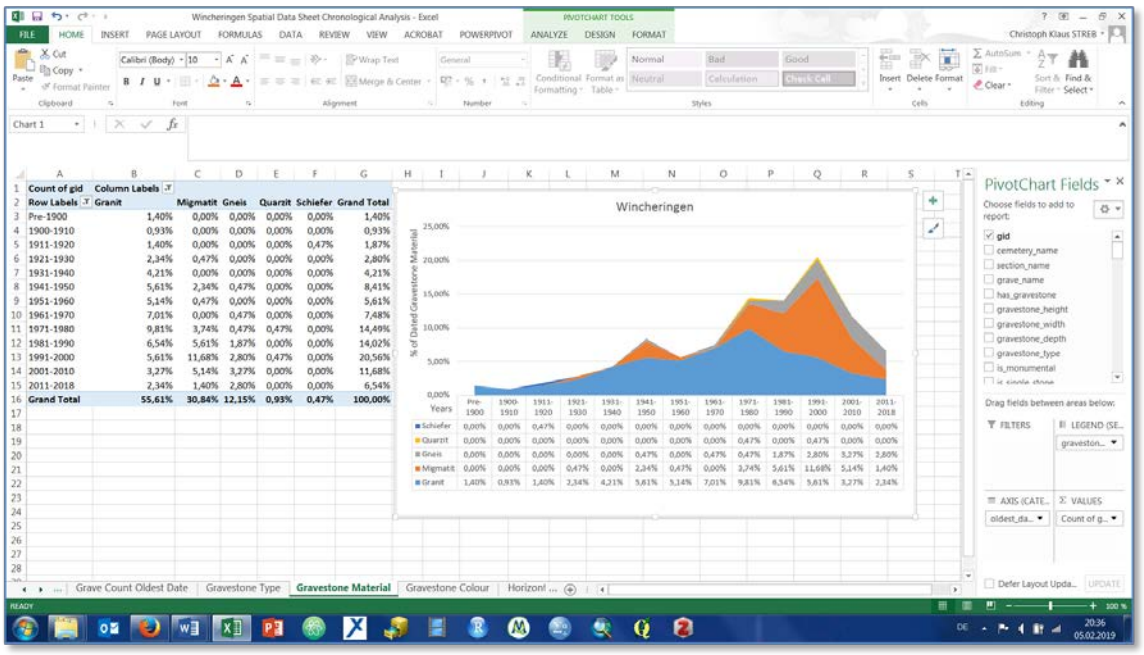


Figure 109. PicotChart and PivotTable.

An example of this approach is shown as a screen shot in Figure 109.

As will be shown below, the following variables were analysed in that manner: the grave and grave marker type, material and colour, the number of items on the grave, the stonemason's names, the number of Christian symbols, cross and stoup types.

It needs to be emphasized that the top five selection in the pivot table analysis as well as the values can vary significantly from the values in the SPSS analysis due to the following reasons. Firstly, for such a chronological analysis only such graves that provide a date and, thus, their values can be considered. All other graves are automatically excluded, which might have a certain impact on the typology ranking, since the counts change as well. However, as will be noticed in the findings section, this was seldom the case. Usually the ranking was kept more or less in synchronisation with the SPSS results or it differed only marginally to the degree that places differ within the overall top five. For this analysis, the author permitted such leeway because it does not affect the results. Obviously, if the details of grave markers were supposed to be studied, only such details show in the count that actually do have a grave marker. Moreover, the type "x-other" was included in the pivot table ranking despite its apparent randomness because it can represent a high level of variety and individualisation. If several types in the top five show the same count, the author took the liberty to extend the top five to a top six in order not to omit relevant data. Last but not least, during data entry it was possible to enter more than one observed typology, for example, for crosses or stoups in the event that a grave had more than one typology. From the SPSS perspective, as stated earlier, and also for the pivot table analysis, this resulted in unique, separated values in terms of typology. To avoid confusion and to keep the results as accurate as possible, the author decided to count the first mentioned type only – this was usually the most prominent on the grave or grave marker – and to summarise the other types as "and other secondary". Again, this is not done to omit data but to make it more approachable for analysis and visualisation.

The information and results gained from this statistical analysis is used as input for the geo-spatial analysis. The top-ranked type in each variable/feature is visualised in its spatial context in QGIS 3.2 Bonn via a neighbouring analysis that was conducted with the intention to identify and visualise clusters and to improve one's understand of whether there is a neighbouring effect or not. The first step is the setup of a separate project for each cemetery in QGIS 3.2 Bonn. The maps received from the cemetery administration are uploaded in QGIS and georeferenced either with the QGIS standard georeferenced tool or with the plugin GDAL-Georeferencer on a Google Satellite image of the cemetery. Both the Google Satellite image and the georeferenced map are saved as a raster layer with the projection EPSG:3857 - WGS 84 / Pseudo-Mercator, which will be the projection for all QGIS projects, besides Walferdange, which is in EPSG:2169 - Luxembourg 1930 / Gauss projection. The next step is creating an ESRI shapefile with polygons that are drawn exactly on top of each individual grave. Each polygon receives a unique ID, starting from 1 and continuing until the final grave, while following the exact same order in which the data were collected on-site but this time ignoring all sections. Next, the data exported from the Cemetery Surveyor Application are uploaded after introducing another column called "id", which counts

from 1 until the data set's final grave. Since both the shapefile with the polygons and the data set now have a column id that matches the exact same grave together with its data and its location within the cemetery, both the shapefile and the csv file can be joined via the field “id” thereby linking data and location. This enables a search or query for graves that have certain variables, such as grave type, grave marker type, cross type, stoup type, etc., and to visualise their location on the map. It is possible to create purported heatmaps in QGIS by exporting selected variables as a new layer; their centroids are then calculated via the tab “Vector” and the submenu “Geometry Tools”. Via the property menu of the layer, the style of the centroid presentation can be altered into a heatmap. A “Next Neighbour Analysis” can be conducted via the “Vector” tab under “Analytical Tools”.

As stated above, the location, size and certain similarities make these cemeteries an appropriate choice for extending the research piloted in Walferdange, with the help of the Cemetery Surveyor Application (CSA) tool. Once these data have been collected and exported, it is further processed in SPSS, PivotCharts and PivotTables, with regards to descriptive and chronological statistics, and also in QGIS with regards to spatiality – especially a neighbouring analysis and via heatmaps visualising concentrations of certain phenomena. The following chapter summarises the findings of these analyses.

7. Findings from Material and Spatial Data

As described in the previous chapters, the data from all four cemeteries were analysed in terms of their descriptive statistics, especially with regards to their chronological distribution and any combinations of variables that occur more regularly, as well as their spatial characteristics when it comes to any clustering and/or neighbouring effects of key variables. In the following, the results of this analysis will be presented, including certain preliminary findings and deducible hypotheses. In doing so, it will become apparent that not all data can be used for all kinds of analysis. Obviously, only data that can be dated (usually by dates on the grave or grave marker) can be chronologically presented. Furthermore, if certain variables are not present, for example, when there is no grave marker, any analysis of related characteristics is impossible. While this might appear self-explanatory, it must, however, be emphasized in order to understand the presentation of analysed data stated below and what can actually be deduced from it. Moreover, the actual number of cases under scrutiny needs to be considered. While in the following, relative data, that is percentages, will be used to enable better comparability, the absolute number of cases might be relatively low, thereby challenging the usefulness of any deeper analysis.

The following presentation will begin with the descriptive statistical preparation of data with regards to their chronology, with all four cemeteries in direct comparison regarding their top five variables and any combinations of such that might be considered characteristic for each cemetery. Grave and grave marker type, material and colour, the number of items present on the grave, stonemason marks, Christian symbols, as well as the cross and stoup type will be visualised. This is followed by an attempt to cross-match the grave, grave marker, cross and stoup type for each cemetery to identify common patterns of design. The selection of these variables, albeit apparently arbitrary, is selected because they appear as the most prominent and defining variables of the overall grave.

7.1 Descriptive Findings

Firstly, as has been done during the pilot study, the percentage of datable graves per decade is shown in Figure 110. Regarding all four cemeteries, the percentage of graves peaks at least once, only to decline during more recent times. Walferdange shows a peak during the 1960s and again in the years between 2001 and 2010. The relatively steep drop in present graves, especially post-2001, appears to be present in all four cases, although this might be partly due to the data for a full decade not yet having been collected for the time period 2011 to 2020. Numbers might be corrected slightly upwards once all data for that particular decade have been aggregated, especially in Walferdange where only graves until 2015 could thus far be collected; however, the general trend is obvious, especially in Wormeldange. Interestingly, there appears to be a certain similarity between cemeteries on the same side of the border. Even though the datable

Wormeldange sample also contains data that are pre-1800, the chronological distribution shows a resemblance to Walferdange, except the second peak post-2001. Even more striking is the resemblance between Wincheringen and Konz. However, here the peak of datable graves seems to be one decade delayed in the case of Konz. Unfortunately, the sample is not big enough to hypothesise whether this resemblance is due to different demographic developments in Luxembourg and Germany, due to changes in burial customs (e.g. the increase of cremation and of non-earth burials) or simple coincidence. With regards to the sample under scrutiny, it can be stated that the Luxembourgish cemeteries are more similar to each other than the German ones, and vice versa, when it comes to the chronological distribution of datable graves.

Figure 111, Figure 112 and Figure 113 provide an overview of the top five grave marker types as well as their material and colour in respect of all four cemeteries. It is noteworthy that, in this instance, only the chronology of grave sites that are datable and that have a grave marker of any kind can be shown. Hence, the percentages shown refer to this sub-sample. As mentioned before, this can also mean that the top five variables might differ from the overall SPSS output in Annex 11.6. As is noticeable for Wormeldange, the grave marker type 4b-Cross is most common during all times post-1900 to 2017, except for the years 1911-1920 when the 4d-Cross peaked and 2001 to 2010 when the 1d-Block gained relative share. All other top five types reach their relative summit at a certain point but cannot compete with the 4b-Cross type that shows a remarkable continuity during the 20th century. It is also interesting to note that the type X-Other ranks amongst the top five from the 1920s onwards until 2000. At Walferdange cemetery it is also the 4b-Cross grave marker type that is present during most decades and that peaks, in this sub-sample, during the 1920s and from the 1950s to 2000. The 2a-Composite type peaked during the 1930s and 1940s and to a certain extent during the 1950s to 1960s, with the 2b-Composite type gaining its largest relative share also during the 1950s and 1960s. The 4c-Cross and 1g-Block type have been present since the 1920s and 1930s, becoming more relevant – relatively – only after 1980. While the 4b-Cross type ranks highest amongst the top five at both Wormeldange and Walferdange cemeteries, the German cemeteries show no such consistency, however, with the X-Other type category ranking highest in Konz and fifth in Wincheringen, thereby indicating a higher diversity. Furthermore, relative shares appear to be lower here, which is another potential indicator with which to hypothesise about more diversity. While the 1d-Block grave marker type takes the largest share from the 1940s to the end of the 1980s, the 1g-Block type peaks during the 1990s, with all other top five types being present throughout almost the entire time period observed from the 1920s until 2018. The importance of the X-Other types stays relatively high from the 1990s onwards. In Konz this impression of diversity is equally strong, with the X-Other types ranking first amongst the top five considering the overall timespan from 1900 until today, albeit with a, at times, small relative share but becoming more relevant post-1970. A notable

exception to this trend is the 1k-Block grave marker type that peaked during the 1970s. With regards to grave marker material, only four different types could be identified at Wormeldange. All four cemeteries have the following in common: Granite is the main material to be found during the observed period, basically replacing other materials, especially bluestone, over time. In the case of Wormeldange, this means that sandstone and bluestone rapidly lose relative share after 1910, becoming marginalised after 1950. Exactly the same trend can be observed in Walferdange, including the introduction of other materials, such as migmatite, as early as the 1970s in Wormeldange, and gaining significant relative share from the 1990s onwards. Similar developments can be observed in Wincheringen and Konz, with granite leading the top five during most decades from 1900 onwards and with alternative material choices, again especially migmatite, becoming more relevant during the 1970s, making it the second most common material choice at these German cemeteries. Bluestone, on the other hand, is not present in the top five of Wincheringen and only marginally at Konz, especially until 1960. Gneis, another alternative choice also present in Walferdange, ranks third. The relative share of material choice as well as their approximate times of adoption also show remarkable similarities amongst the cemeteries of the same country. Grave marker colour is strongly related to material. While granite stones have a greater variety of colours, such as black, grey or brown, bluestone is always characterised as grey and migmatite as brown-red. Hence, the appearance or disappearance of this material is linked to the relative increase or decrease of their related colours. While grey is a very common colour at Wormeldange cemetery, black peaks occasionally, with sandstone-brown showing when there are more remaining sandstone grave markers. Grey also dominates Walferdange cemetery, with black peaking during the 1960s as it does in Wormeldange. Black dominates the German sample for most of the observed decades, with a few exceptions, with grey gaining as time progresses as do other grey tones; however, most remarkable is the peak of brown-red during the 1980s and 1990s. This coincides with the rising presence of migmatite stones during the same times. Again, this clearly distinguishes the German cemetery sample from the Luxembourgish one. The choice of material and, thus, colours occurs on a different scale and at a different time.

The cemeteries in Luxembourg also show interesting similarities when it comes to grave type (Figure 114, Figure 115and Figure 116). In both Wormeldange and Walferdange, the 1a-Stepped grave type is the most common one during most decades, in the case of Walferdange dwarfing other types in comparison and even gaining relative share over time. In both cases, 1e-Stepped, 1f-stepped and 2a-Open are amongst the top five, even in the exact same order, while Wormeldange is only distinct due to the presence of the 6e-Urn grave type amongst the top five. These grave types' relative increase and decrease of share also appear to fall within the approximate same time frame at both cemeteries. The German samples appear to be less similar

to each other, although the 2a-Open and 1a-Stepped type are ranked first or second in both samples. In Wincheringen there is a clear increase of open graves over the decades, only losing relative share to other types post-2000. The importance of the 1a-Stepped and 2a-Open grave type is similar in Konz, although in a different relative level compared to the overall sample of datable graves here; the exception in this instance is a significant increase of 6a-Urn type graves from the 1990s onwards, until they make up the majority of this particular sub-sample. Hence, although a variety of grave types can be observed, in Luxembourg the covered grave type appears to be slightly more common than at the German cemeteries where the 2a-Open grave type is ranked amongst the top two. Also interesting is that urn graves in Konz, that is the 6a-Urn and 6c-Urn type, already make up 6.51% of the top five sub-sample, which, combined, would rank them first. The choice of material is not very dissimilar to what could be observed regarding the grave markers. Amongst the Luxembourgish graves there is a strong dominance of granite and, until approximately 1980, also bluestone. During the 1980s, the variety increases, notably the choice of migmatite. In Germany, bluestone does not show in the top five of material choices. However, the three main choices are granite, migmatite and soil, plants, etc., especially in Wincheringen. This is due to the higher number of open graves. Variety increases, especially during the 1970s, with granite and migmatite becoming relatively more important. This can be linked to the relative decrease of open graves during that time. Similar to the Luxembourgish graves, however, migmatite as grave material choice increases during the 1980s. The dominance of one or two materials over the observable period of time appears to be less present than in Luxembourg. Yet again, there are similarities when it comes to the choice of colour, also compared to the grave markers. Grey and black dominate in Luxembourg, with brown-red, at least in the case of Wormeldange, becoming more popular during the 1970s, almost during the same time when more graves use migmatite. All choices of colours show a significant variance over time, which might be due to the data that were sampled, and therefore this cannot necessarily be ascribed to any outside factors. Interestingly, in Wincheringen brown and grey dominate from the 1920s onwards, with black making up only a smaller share. In Konz, the variety of colour choices is even larger, only becoming more focused on brown-red from the 1980s onwards. Black and dark-grey show a similar development over time in Konz compared to Wincheringen, again underlining a strong similarity of both cemeteries when it comes to colour choice.

The above discussed figures also show that, throughout the visible time horizon, types show a higher volatility in Luxembourg than in Germany, with several peaks of the top five types during the decades. This could be so because many graves in Luxembourg are family graves with a purported concession that permits a family to keep such a grave plot for an extended period of time. As more family members are buried there, from time to time the grave is renovated and redesigned according to current standards and fashion. This is much less common in Germany

where most graves tend to be abandoned after their useful life after which they are eventually dismantled and reused.

It might be interesting to consider how many items, that is paraphernalia of any kind, such as flowers, crosses, candles, memorabilia, etc., were counted on each grave, assuming that there can be differences across borders and that, as time passes, fewer items can be found on a grave as memory and grief wane. As can be seen in Figure 117, when it comes to graves that do have items, as well as the overall items to be found during each decade, each cemetery shows a peak and a decline. The Luxembourgish cemeteries and German cemeteries are again more similar to each other within national borders than the cemeteries that are located comparatively closer and only divided by a river border. In Wormeldange and Walferdange the most common number of items is three and four, peaking during the 1960s for the former and 1970s for the latter – note that the ranking order in the table below the figure is reversed for Walferdange cemetery to enable better visibility of the stacks. Even though certain graves have more items, it is by no means possible to say that more recent dated graves have more items or vice versa. In both cases, certain graves that have the most items ranked amongst the top five and are relatively old. A reason for this could be the family graves, which were mentioned before, that enable continuous burials – a few of these might be recent. These graves are active and in use, hence, they are maintained and decorated. In Germany, the graves with items and a higher total count peak during the 1990s in Wincheringen and during the first decade of the 21st century in Konz – interestingly, with a relatively sharp decline during most recent dates, which cannot be explained by the lacking data for 2019 and 2020 alone. The most common count in Wincheringen is six and seven items, in Konz four and five, with older graves gnerally showing a much lower count. This is quite contradictory to Luxembourg. As stated, this might be due to the presence of continuously used family graves, as opposed to the much briefer time of usage in Germany.

Figure 118 shows the top five stonemasons mentioned on the grave or grave marker. It is clearly visible that the Luxembourgish cemeteries show quite different names than the German ones. In Wormeldange, “Bertrand Munsbach” appears, but for the 1980s, most commonly throughout the observed time horizon. Furthermore, all other names appear more or less often during all the decades, even though a rise, decline, disappearance and reoccurrence of the names can be observed, which might be due to incomplete data. The same is true for Walferdange where “Bertrand Munsbach” is ranked third, while “Lampertz-Hosingen-Walferdange” is most common due to an extreme peak during the first decade of the 21st century. The reference to “Gelhausen” appears in “Tom Gelhausen Grevenmacher Luxembourg” in Wormeldange and “Gelhausen-Luxembourg” in Walferdange. Potentially the same company, the different name appears simultaneously at different times, most likely due to older graves being recently altered and redesigned, at which instance the company makes its stonemason's mark. In the German sample,

a reappearing name is “Juny”, although in different combinations, that is “Grabdenkmäler Josef Juny GmbH (…)”, “Grabdenkmäler Josef Juny (…)”, “Steinmetzmeister D.I.V. Josef Juny” or simply “Juny”. These different versions do not necessarily refer to a change of business but might be due to different manners of adding a stonemason mark. For example, in many cases an actual plaque is not attached, although the name “Juny” is engraved. In both Wincheringen and Konz, this stonemason dominates, clearly taking the first rank, especially when considering the different versions of the name. While “Juny” peaks in Wincheringen during the 1960s, “Juny” is mainly present in Konz during the 1940s to 1960s and “Grabdenkmäler Josef Juny (…)” peaks after that until 2001. “Steinmetzmeister D.I.V. Josef Juny” only briefly has a larger share during the 1970s. In Wincheringen, “Gebr. Felten Grabsteine (…)” and “Felten Grabsteine (…)” gain the major share from the 1980s onwards. There appears to be no overlap of stonemason names between Luxembourg and Germany. At the same time, different stonemasons peak during the same time frame at different cemeteries, which could indicate a strong territorial focus of this particular business.

Regarding the number of Christian symbols (see Figure 119) on the grave or grave marker, the findings appear negligible. While, in the German sample, the amount per grave is ranked in an ascending order, in Luxembourg two symbols are actually more common than one. While the general count peaks during the 1960s and 1970s in Luxembourg followed by a constant decline since then, in Germany it appears that a peak was reached more or less at the turn of the century; however, due to the incomplete date for the current decade, it is not possible to say whether there is an actual decline or not. A decline in the presence of Christian symbology would match the general trend that has been noticeable in Luxembourg for decades, although the percentage of graves or grave markers with Christian symbols is higher than in Luxembourg when it comes to this top five ranking. Nonetheless, for the author of this thesis the potential conclusion that Christian symbols are still more common in Germany than in Luxembourg and that a declining trend is actually rather recent if present at all, somewhat contradict his expectations and preconceptions. It appears that secular tendencies at the cemetery have begun much earlier in Luxembourg and have advanced further.

With regards to the cross type (see Figure 120), it is remarkable how similar the German sample is, although the actual ranking is slightly different. The chronological distribution appears extremely similar. This is different in Luxembourg. Here, Wormeldange can only produce three different main types of which two are also present at Walferdange but with a different position in the ranking. In terms of the chronology and the cross types, there are actually many similarities between Walferdange, Wincheringen and Konz. The reason for this is unclear and the author cannot hypothesise about this. However, it needs to be noted that, with the exception of Walferdange, this ranking also includes the secondary choices of crosses that are present. It

cannot be obviated that non-mentioned secondary choices might include other cross types in the ranking.

A final variable/feature to be presented, are the stoups that are omnipresent at the cemeteries of the region under scrutiny. Figure 121 again illustrates, like in many figures before, that the cemeteries on the same side of the border show strong similarities to each other. For the stoups, it means that Wormeldange and Walferdange are similar with regards to the stoup types that are present, their ranking and even their chronological rise and decline. The same is even more true for Germany, with the important difference that the type X-Other ranks first. This is interesting, since this type indicates a higher diversity of types. Hence, the similarity due to location is present as is the distinction regarding the diversity between Luxembourg and Germany.

When it comes to the above-mentioned figures, the most important finding is not necessarily which specific types of graves, grave markers, crosses, stoups, etc., are actually ranked highest or lowest. It would be futile to describe this in detail. Moreover, examining each cemetery in its own, unique context and not in context with the other cemeteries of the sample, can hardly produce any interesting new insights. What is more relevant, is how similar or different the cemeteries are based on each cemetery's particular location. Only in this regard does it become relevant which typology can be observed, how it is ranked and when it appears, peaks and declines. Yet again, what is remarkable are the similarities and differences over time. Based on the above stated analysis and visual presentation, it can generally be observed that the cemeteries on the same side of the border show more similarities to each other compared to cemeteries that are located relatively closer across a national border. The exact ranking, as well as the chronological appearance, rise and decline of the types under scrutiny might differ in detail as do their relative share over time; however, one could hypothesise that, based on such a standard temporal distribution of typology, one could judge the approximate location of a cemetery with a relatively high degree of certainty. As will be discussed later, this chronological presentation of types is very similar to the before-mentioned battleship diagram often applied in related research. It works just as well in this specific region as it would, for example, in the Anglo-American context where this is most commonly used. A major difference, however, is that a clear first appearance, rise, peak and eventual decline of a type cannot be clearly identified. Types appear to be present throughout the observed time frame. A main reason for this material mix across time might by rooted in the before-mentioned fact that graves can be used for an extended period of time, while more bodies are being added and alterations of the materiality are common. Consequently, even modern designs can be found on graves that bear older dates.

When it comes to design choices, are there any “typical” combinations? Figure 122, Figure 123, Figure 124 and Figure 125 attempt to combine grave and gravestone type, grave and stoup type,

grave and cross type as well as stoup and cross type for all four cemeteries. Obviously, more combinations would be possible. However, for the sake of convenience and readability of this thesis, these should be sufficient to find out whether certain combinations are more common than others. For Wormeldange, it can be observed that, for example, the combination of the 1a-Stepped grave type and the 4b-Cross grave marker type is very common (accounting for more than 44% of the particular grave type), while the 1e-Stepped grave type mostly has no grave marker at all. This is also the case for many of the 1f-Stepped grave type, while open graves (2a-Open) show more diversity with the 4b-Cross type, X-other type and no grave marker at all being most common choices. Obviously, the 6e-Urn wall tablets do not have a grave marker, hence this particular result. Regarding the grave and stoup type combination, it is noticeable that for the very common 1a-Stepped grave type, almost all top five ranked stoup types are represented, while the 1e-Stepped grave type shows a clear preference for the 5a-Praying-Hands stoup. The same, although with a slightly lower percentage, is the case for the 1f-Stepped grave type, while open graves often do not have a stoup at all. The 6b-Latin Cross is most common for the 1a-Stepped grave type, and is also present for the 1f-Stepped and open grave types. The 6a-Cross type, on the other hand, is the most common choice for 1f-Stepped grave type. With regards to the stoup and cross combinations, there is a clear domination of the 6b-Latin Cross type with all stoup choices besides 3a-Chi-Rho. For the 4a-Knob-Rectangular, it even makes up a 100%. Nonetheless, the exact relative distribution changes for each type. The reader should note that the combinations of typology can change here compared to the combinations before, since the calculations result in different ranking.

For Wincheringen, it also becomes clear that different types of graves or stoups show a different relative choice of grave markers, stoups or crosses. For example, the 1d-Assymetrical grave type shows a dominance of the 1g-Block grave marker type, which is not the case for others. While the 1a-Stepped grave type is quite diverse when it comes to grave markers, the 1d-Block grave markers is very common for other grave types. Unsurprisingly, empty graves also do not have grave markers. Regarding the choice of stoups for the grave types, Wincheringen shows a remarkable diversity, since the type X-Other is very common for all types that are actually present. The 9a-Diagonal-Lines is also common. Regarding the grave/cross combination, it is difficult to make a clear statement, since distributions are relatively even across grave types. An exception is the high absence of a cross for the 1d-asymetrical grave type (with more than 57%) and the 6c-Latin-Cross type, which is very common for the 1g-Closed type. With regards to the stoup and cross combination, it is interesting that while all types are more or less present everywhere, the 6b-Latin Cross, for example, stands out with the 2a-Greek-Cross stoup type, the 6a-Latin-Cross for the 2c-Greek-Cross, and the 6d-Latin-Cross type for the 9a-Diagonal-Lines stoup type – to indicate just a few obvious relations.

In Walferdange, such connections between types can also be observed. The 1c-Stepped grave type is very common with the 4b-Cross grave markers type, while the 1e-Stepped grave type most often comes with either a 1b-Block or 1g-Block type grave marker. The 1c-Stepped grave is dominated by the 4b-Knob-Rectangular stoup type, while this one never shows up on a grave type 1f-Stepped. The 6a-Cross Latin type is most common for all grave types, with the 1a-Stepped grave type showing the highest diversity. This might not be surprising, considering that it is a very common grave type. For the 1g-Closed grave type, the choice is basically the 6a-Latin or 6c-Latin cross type. Stoup and cross combinations are also dominated by the 6a-Latin cross type. The 8b-Chi-Rho cross type is only marginally present or not at all, besides its presence with stoup type 5a-Praying-Hands.

In Konz, it might be worthwhile to also consider the urn graves because they are very common there. While a grave marker is not very common at all for the 6a-Urn grave type, more than 60% of the 6c-Urn graves show a relatively high diversity. The reason for this might be due to the one type being covered, while the other one is open, which might automatically create the disregard or need for a grave marker. Interestingly, when it comes to grave and stoup combinations, most graves appear not to require a stoup. However, the more common a stoup is, the more diverse the choice becomes because the X-Other type is rather well presented. With regards to crosses, the choice appears to be less diverse across grave types; however, the top five choices are more or less evenly distributed for the 1a-Stepped, 1h-Stepped and 2a-Open grave types, while urns often appear not to require a cross. As Figure 125 also shows, graves without a stoup also do not often have a cross, otherwise the 6b-Latin Cross type is most common, especially for the 2a-Greek and 2c-Greek cross type.

As a consequence of this cross-matching of grave, grave marker, cross and stoup types it can clearly be deduced that there is a connection between these types of materiality. Certain choices appear to come with follow-up choices. In a few cases this might be easy to explain, for example, with regards to urn graves that simply might not require a grave marker. In other cases, it needs to be considered how these choices come about.

It is also possible to identify the most “typical” grave, grave marker, cross and stoup choice for each cemetery, again in an attempt to show similarities and differences. However, such calculations need to be considered with caution, since they represent very low numbers of the overall sample and can hardly be considered representative. Figure 126, Figure 127, Figure 128 and Figure 129 sum this up. In Wormeldange, this translates into two types of combinations that stand out in the overall sample of graves that are ranked amongst the top five. The first one has no grave marker, the 1f-Stepped grave type, the 6a-Latin Cross and the 5a-Praying-Hands stoup type. The second one has the 4b-Cross grave marker, the 1a-Stepped grave type, the 6b-Latin-

Cross and 5a-Praying-Hands stoup type. Together they account for 21% of all graves of this particular sub-sample. In Wincheringen, only one combination stands out, that is the 1d-Asymmetrical grave type, with a 1g-Block grave marker, a stoup of the type X-Other and a 6a-Latin-Cross. The reader needs to note here that this particular combination calculation does not consider empty graves with no grave markers because then this particular category would overshadow the overall visualisation with very little knowledge that could be gained from it. In Walferdange, several combinations achieve a relatively high overall share of the subsample. Again, leaving the unoccupied graves with no grave marker or no other paraphernalia aside, especially two types are very common, that is the 1a-Stepped grave type with no grave marker or cross but with a 5a-Praying-Hands stoup, and the same with no stoup but the 1e-Latin cross type. In Konz, the urn graves dominate (6a-Urn type) as can be seen in Figure 129. Such a grave usually shows no grave marker, cross or stoup, while a smaller number does have at least a 6a-Latin cross type. With regards to the other grave types, 1a-Stepped and 2a-Open dominate, with either a diverse grave marker or the 4b-Cross type. They usually come with either no stoup and cross or the 6b-Latin cross type. Again, empty graves are not considered in this particular calculation.

This calculation show, firstly, that each cemetery has a unique combination that is most evident, although the sample must necessarily exclude empty graves. However, it needs to be emphasized again that the overall actual numbers are so small when conducting such a calculation that this can hardly be representative. Is there, however, again similarities between cemeteries? It might be less clear than with the previous calculation; however, Wormeldange and Walferdange again appear to show similarities with regards to grave type and stoup choice, while the German sample appears very different amongst each other when compared to the Luxembourgish sample.

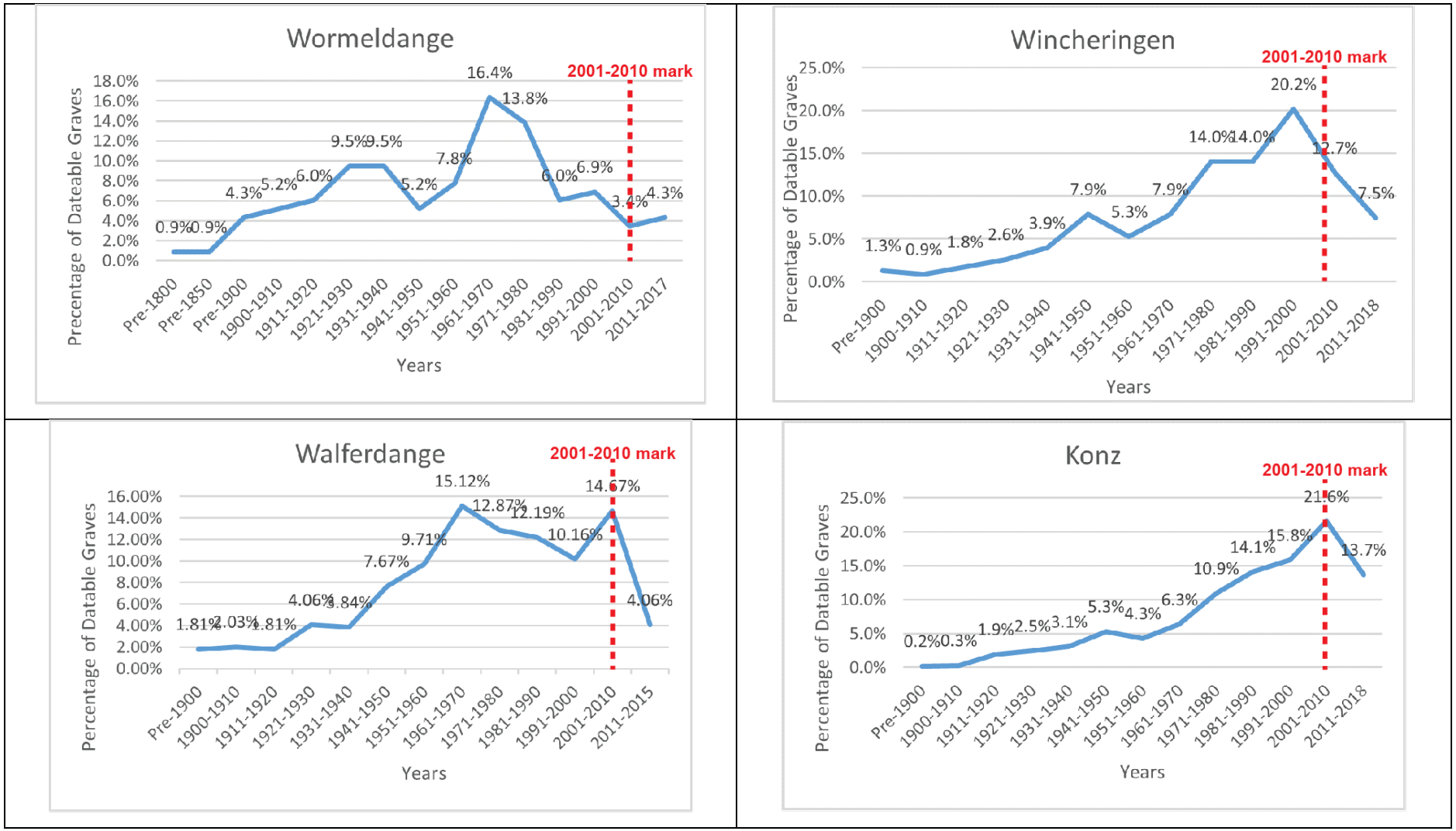


Figure 110. Percentage of datable graves according to decade.

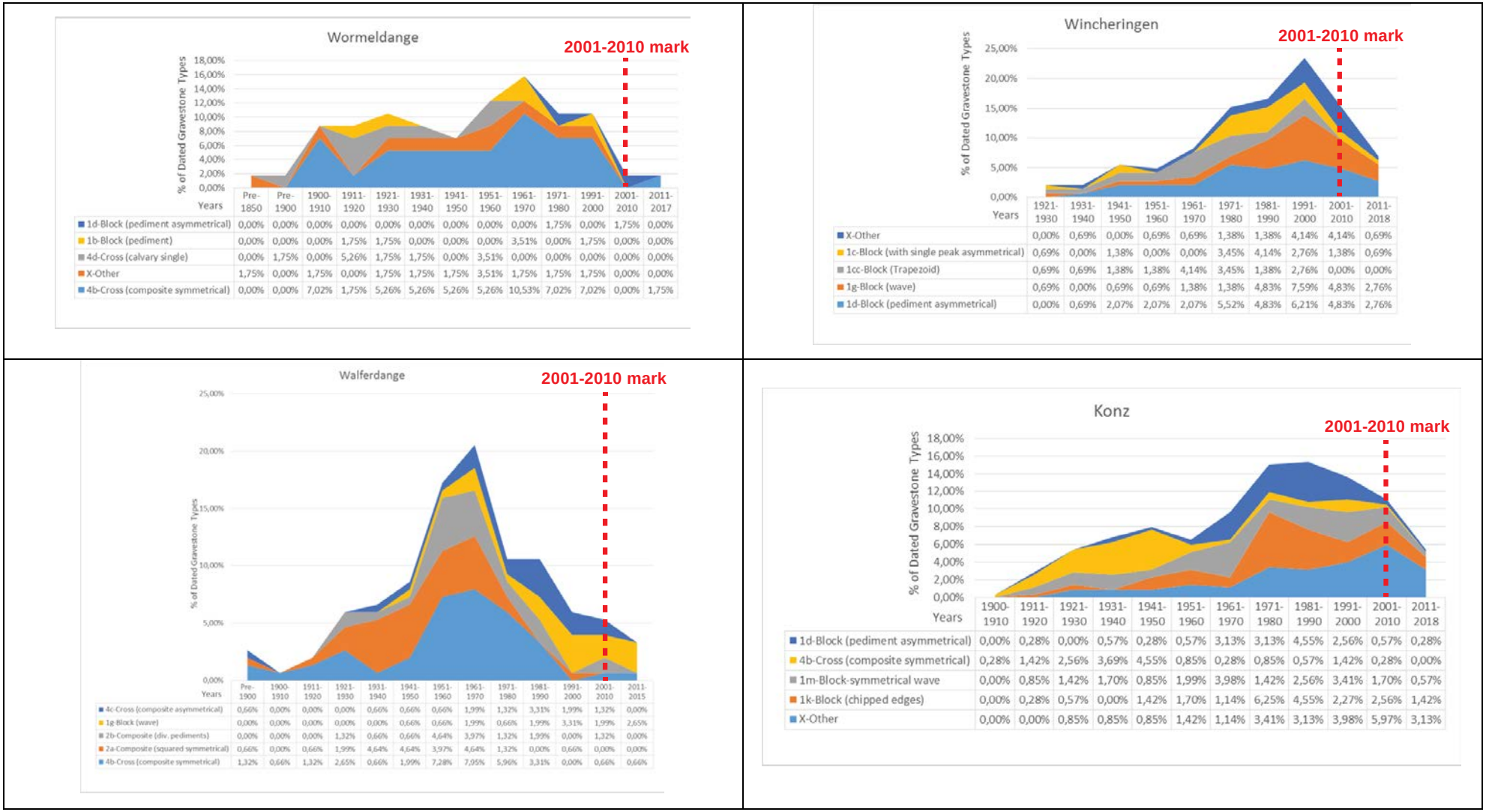


Figure 111. Percentage of datable grave marker types according to decade.

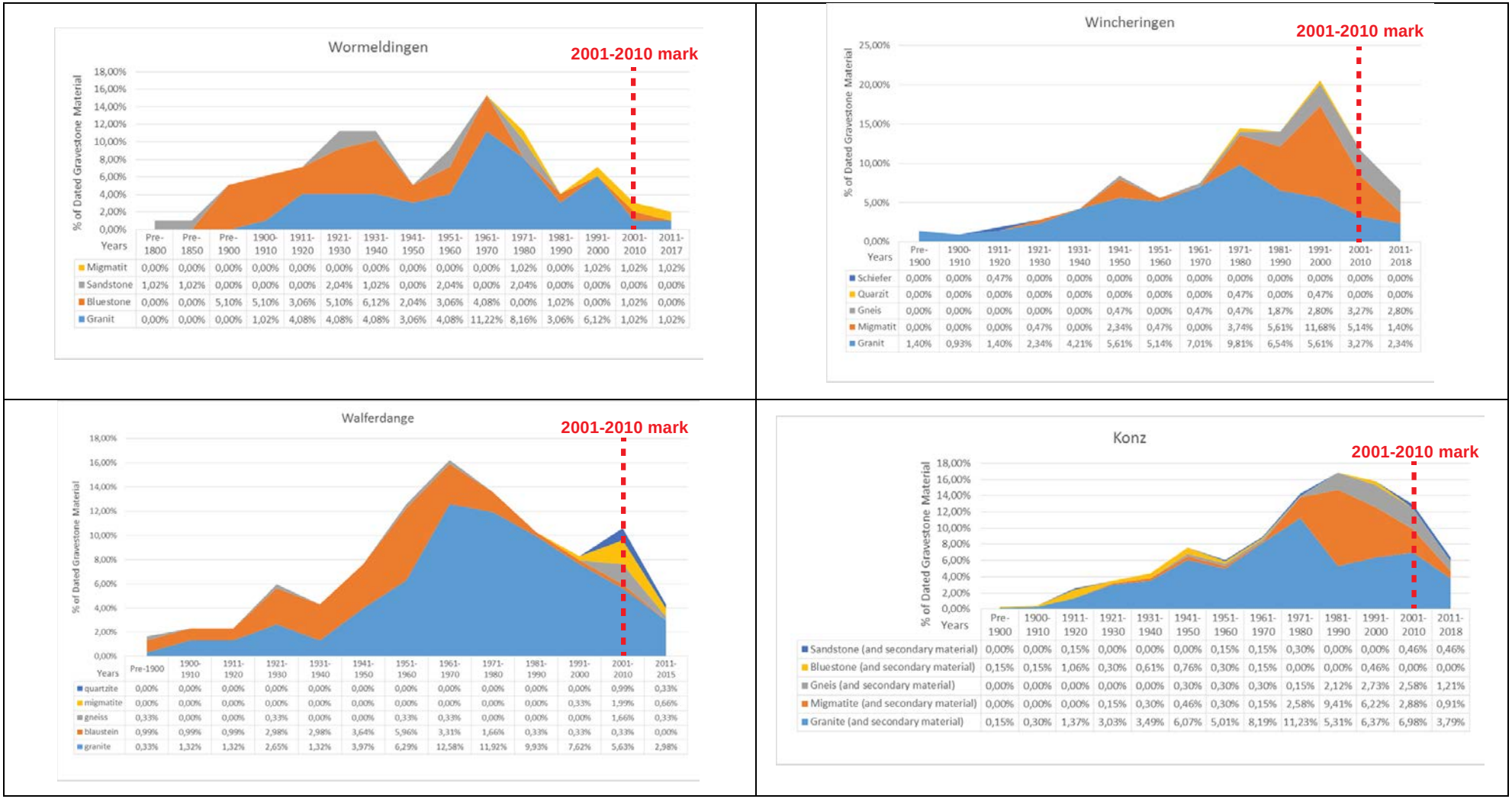


Figure 112. Percentage of datable grave marker material according to decade.

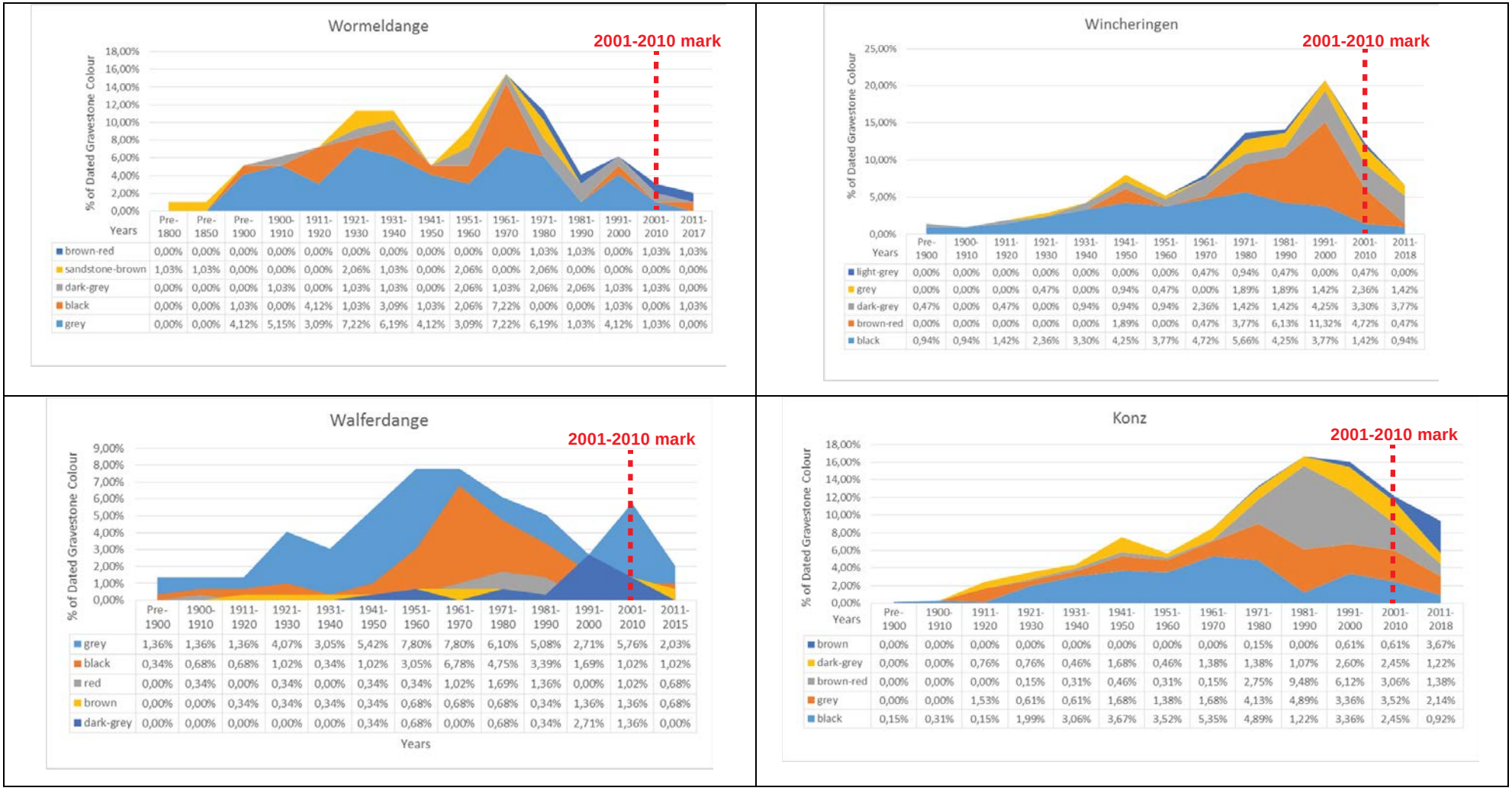


Figure 113. Percentage of datable grave marker colour according to decade.

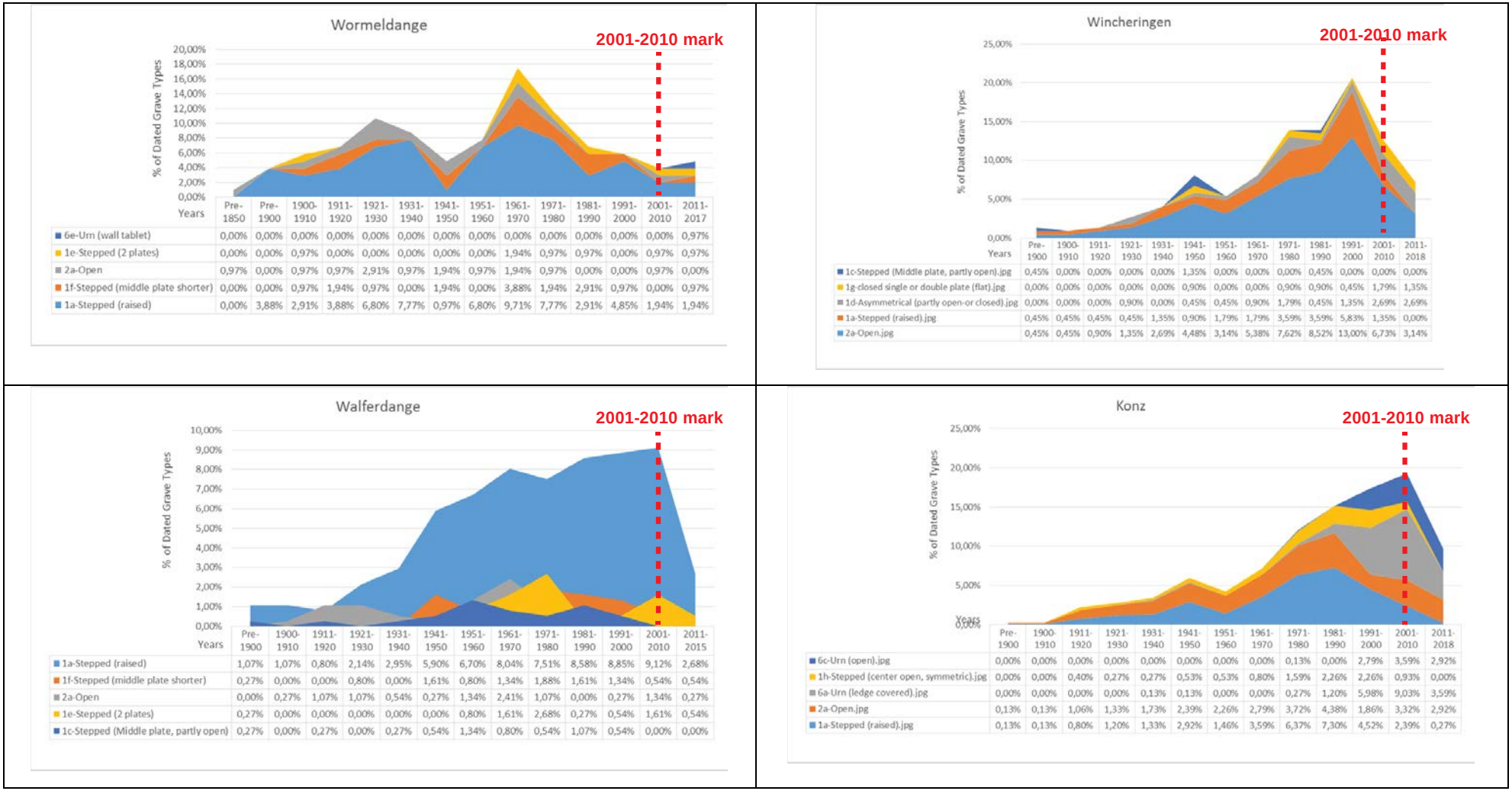


Figure 114. Percentage of datable grave types according to decade.

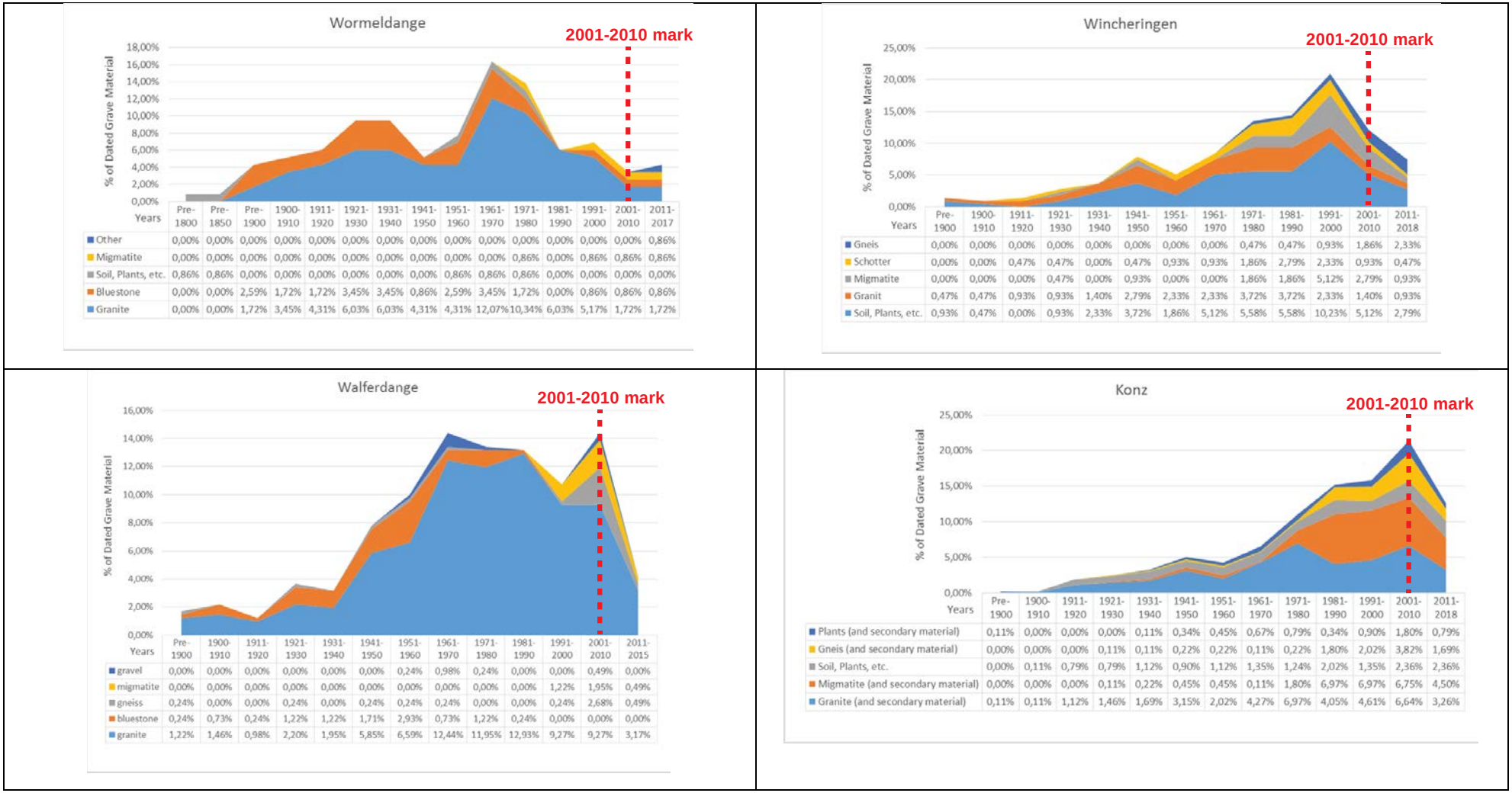


Figure 115. Percentage of datable grave material according to decade.

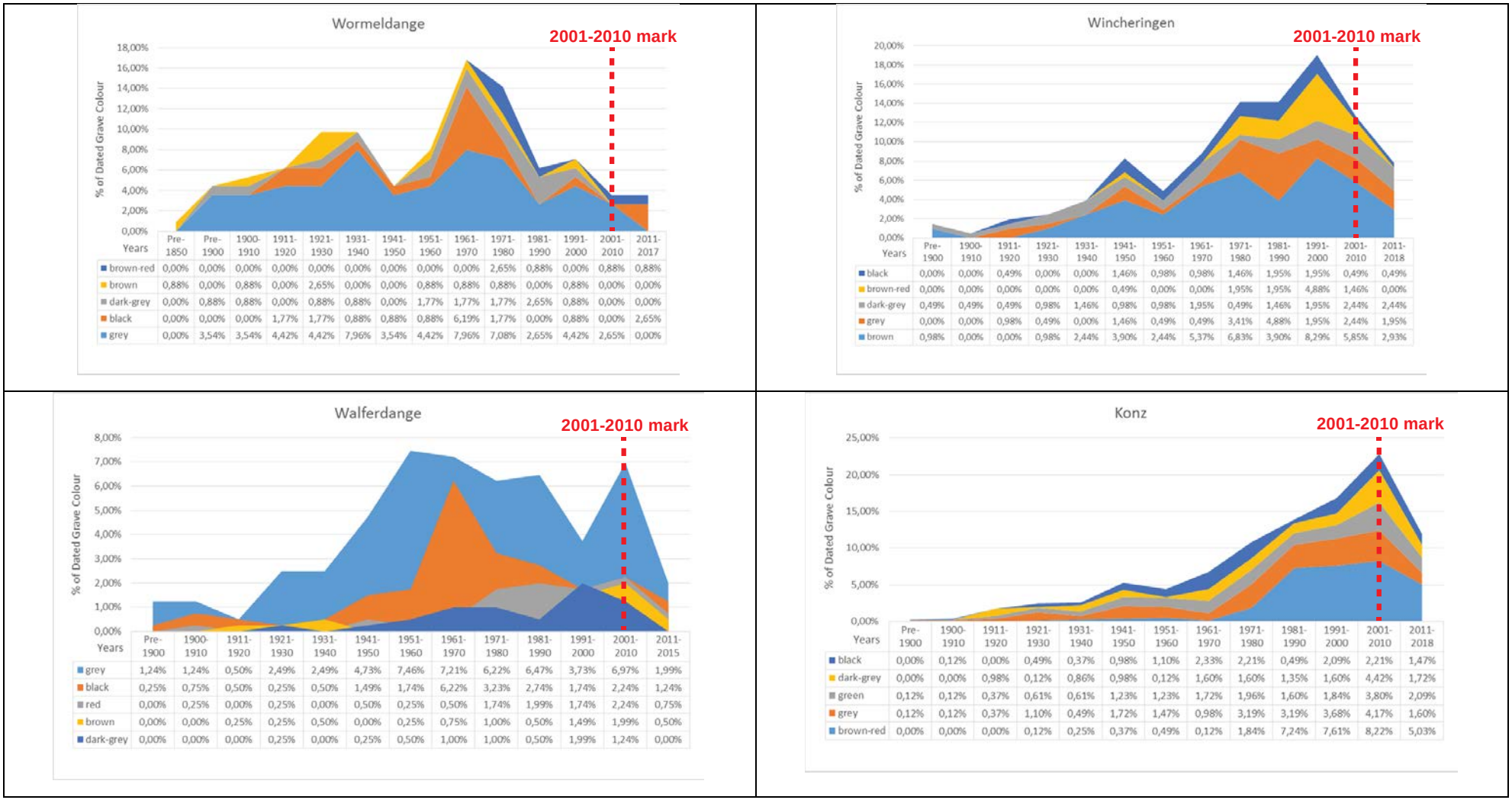


Figure 116. Percentage of datable grave colour according to decade.

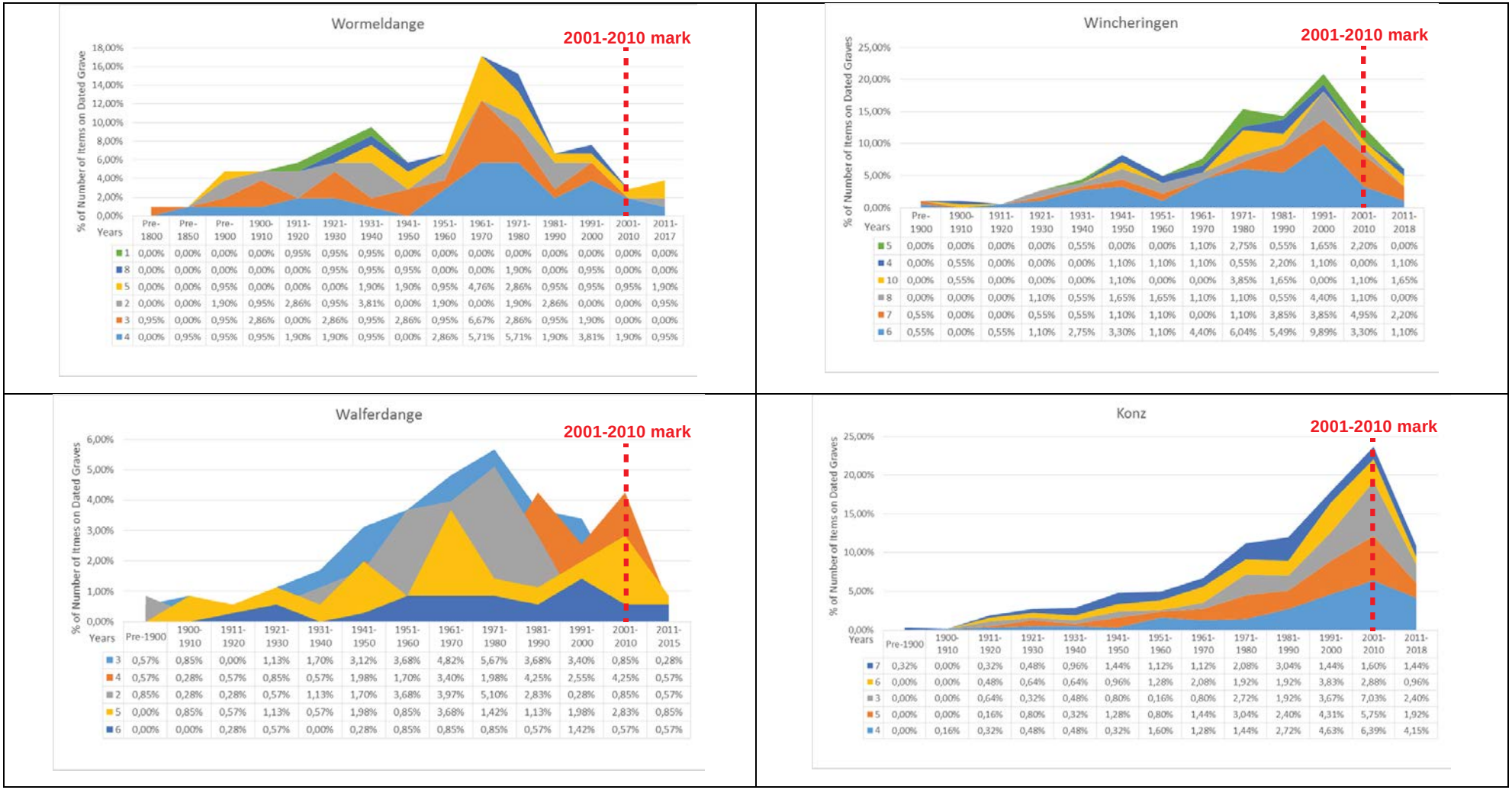


Figure 117. Percentage of number of items according to decade.

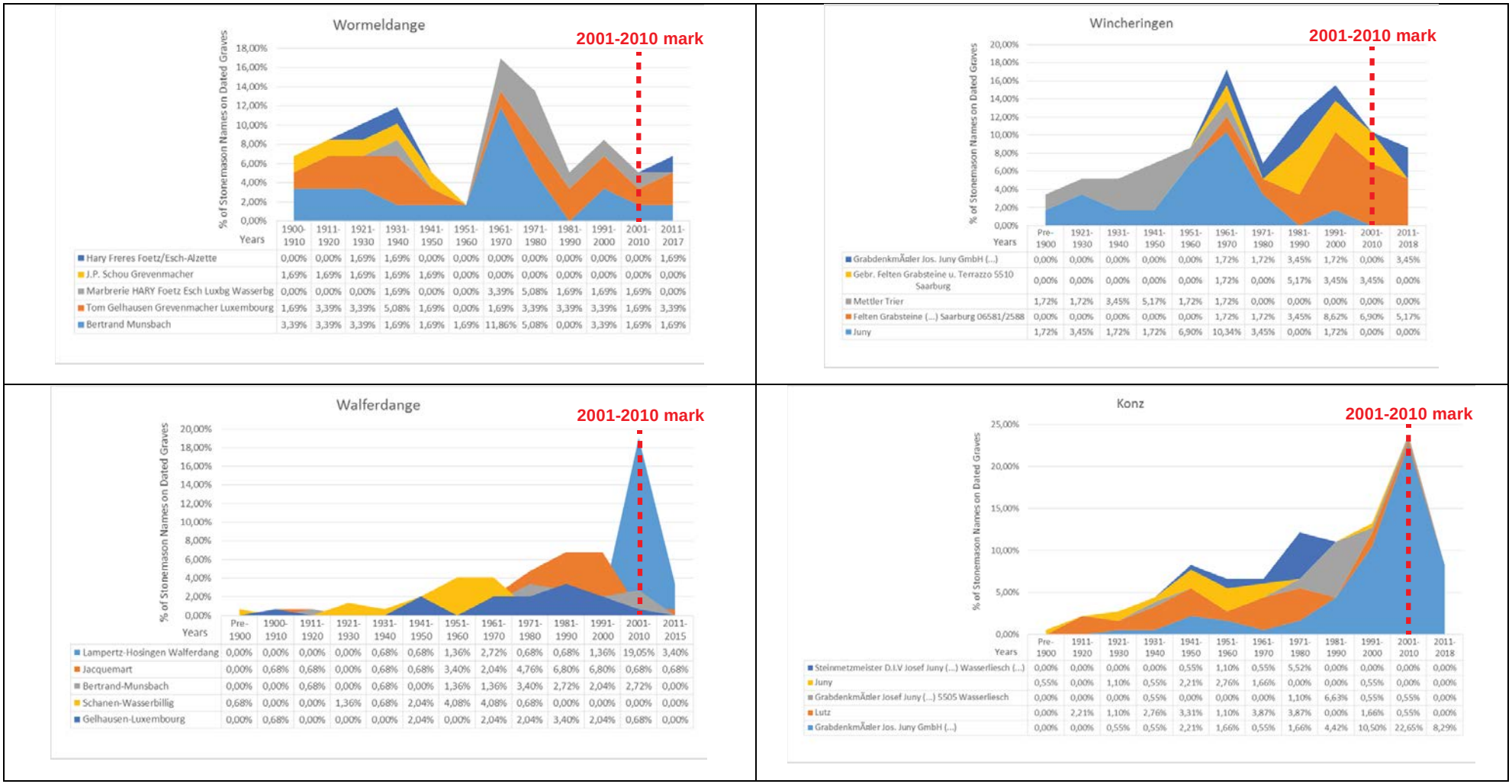


Figure 118. Percentage of stonemason names according to decade.

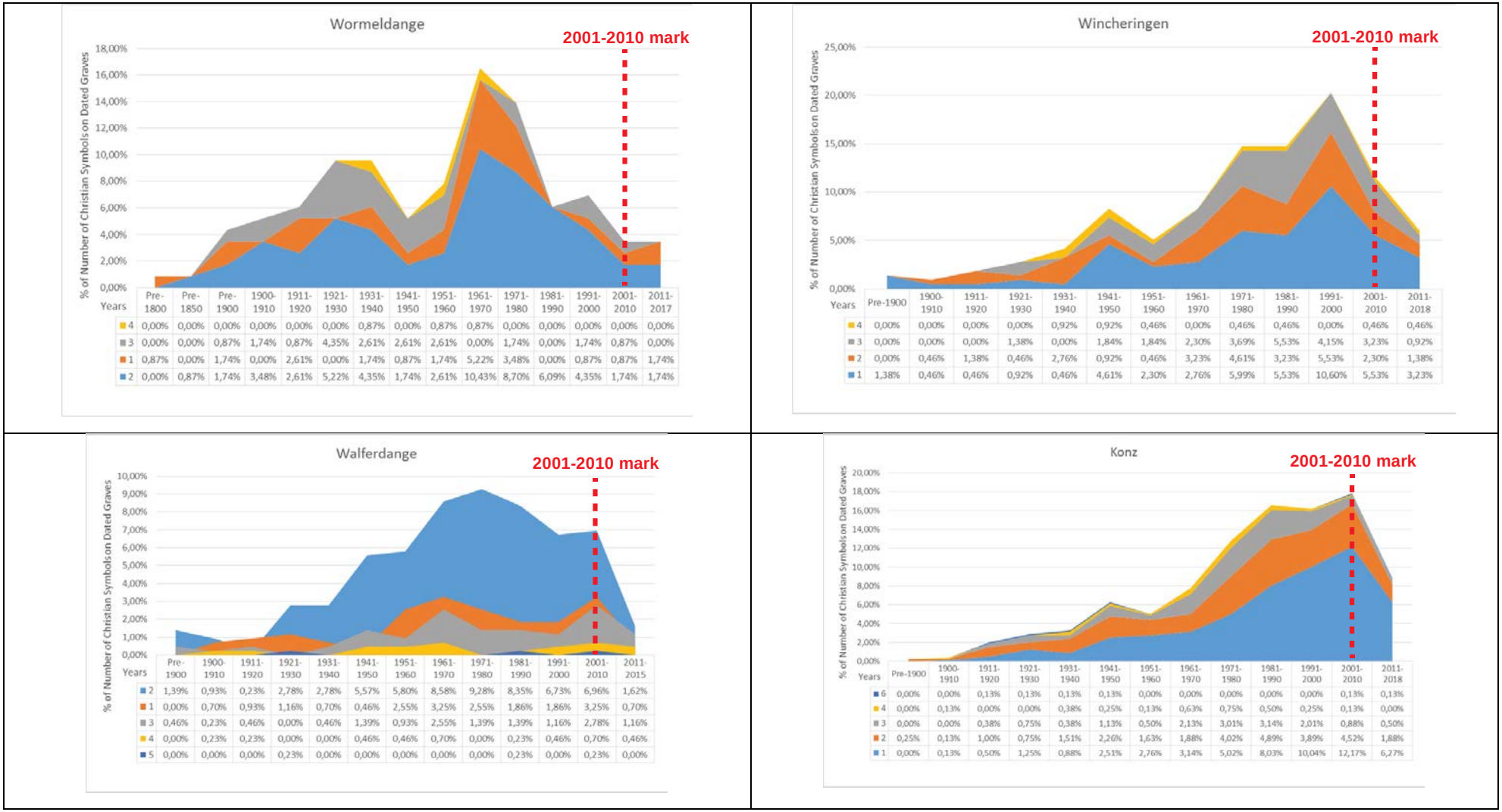


Figure 119. Percentage of number of Christian symbols according to decade.

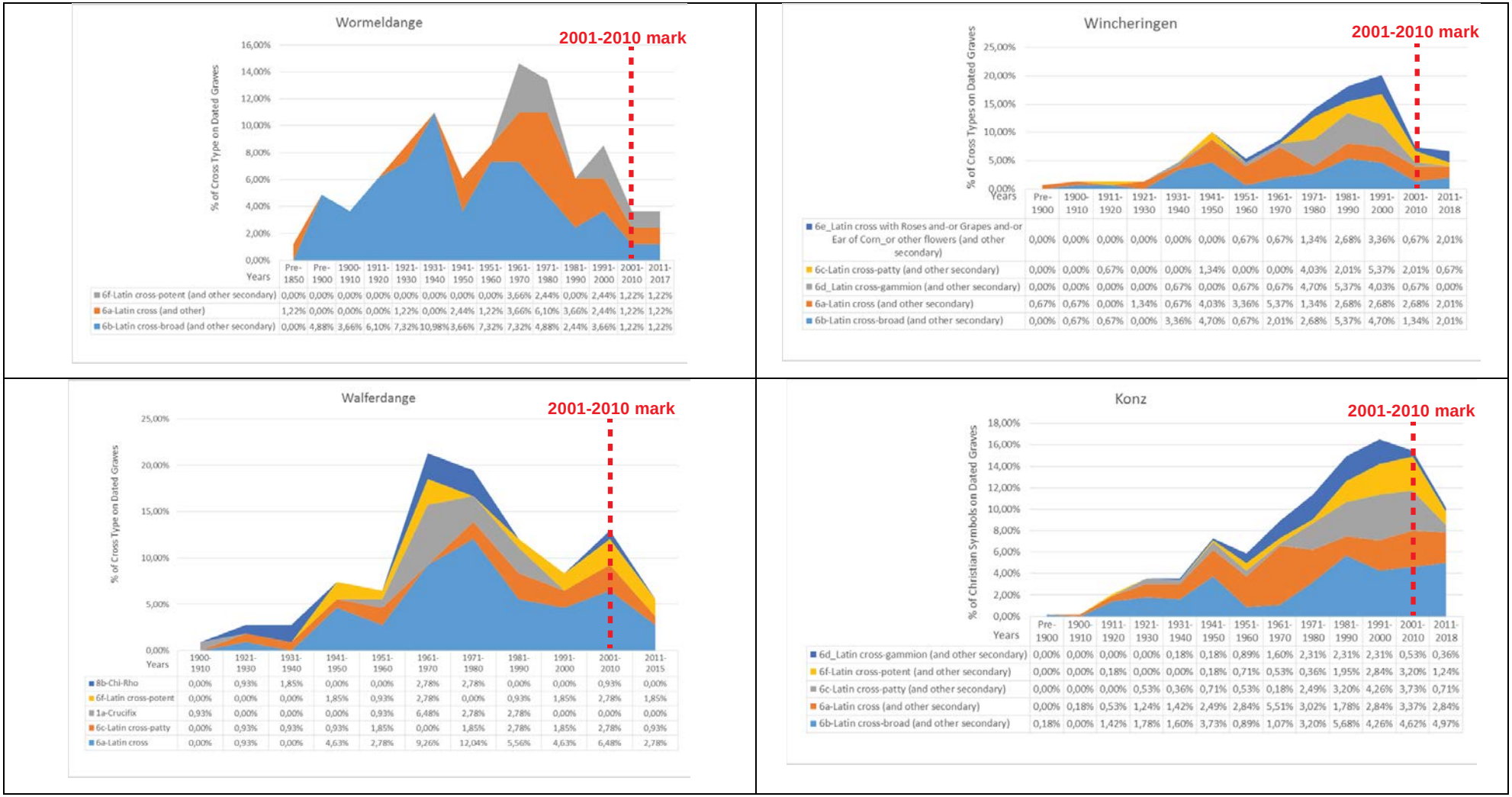


Figure 120. Percentage of cross types according to decade.

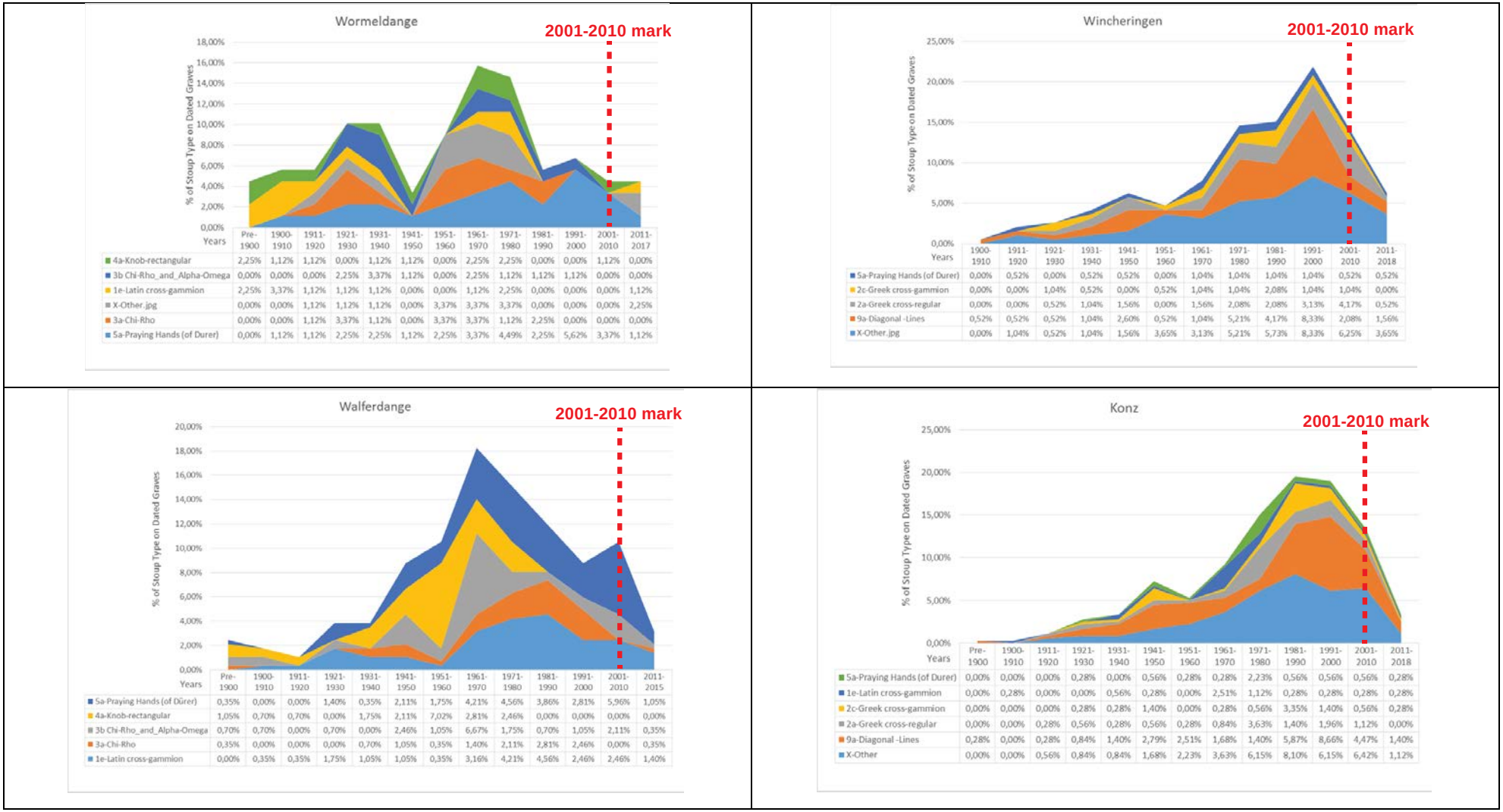


Figure 121. Percentage of stoup types according to decades.

7.1.1 Wormeldange

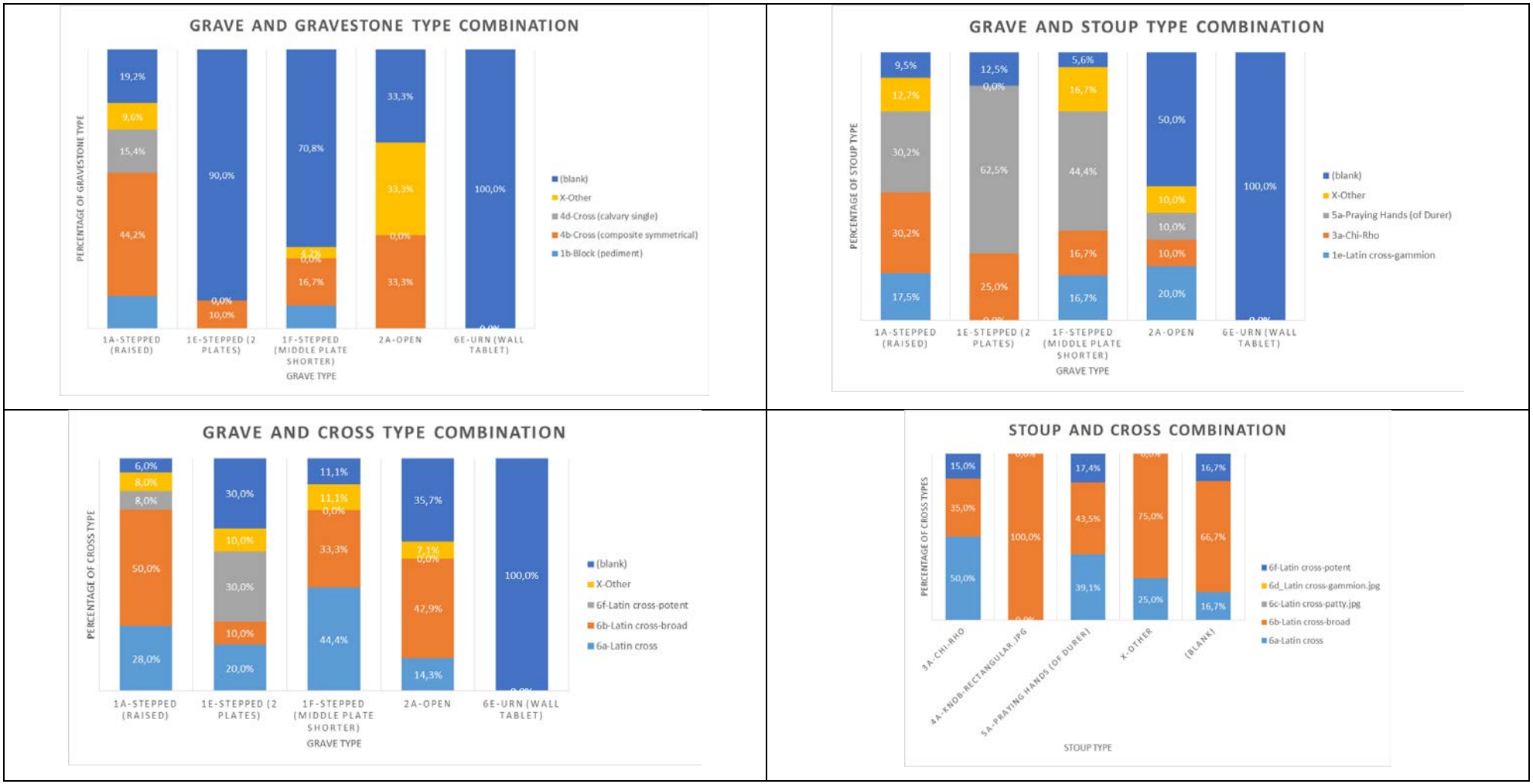


Figure 122. Wormeldange combinations.

7.1.2 Wincheringen

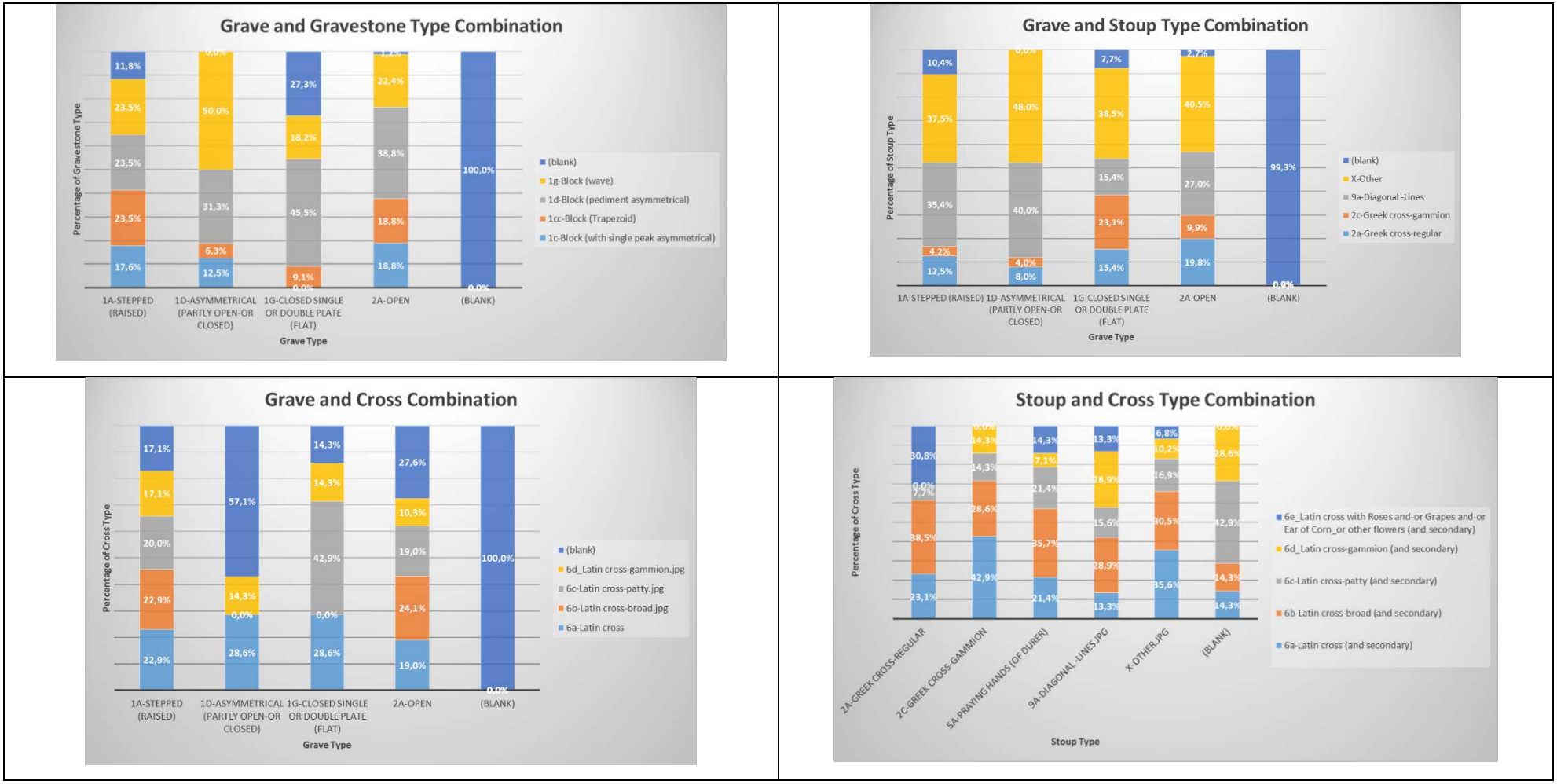


Figure 123. Wincheringen combinations.

7.1.3 Walferdange

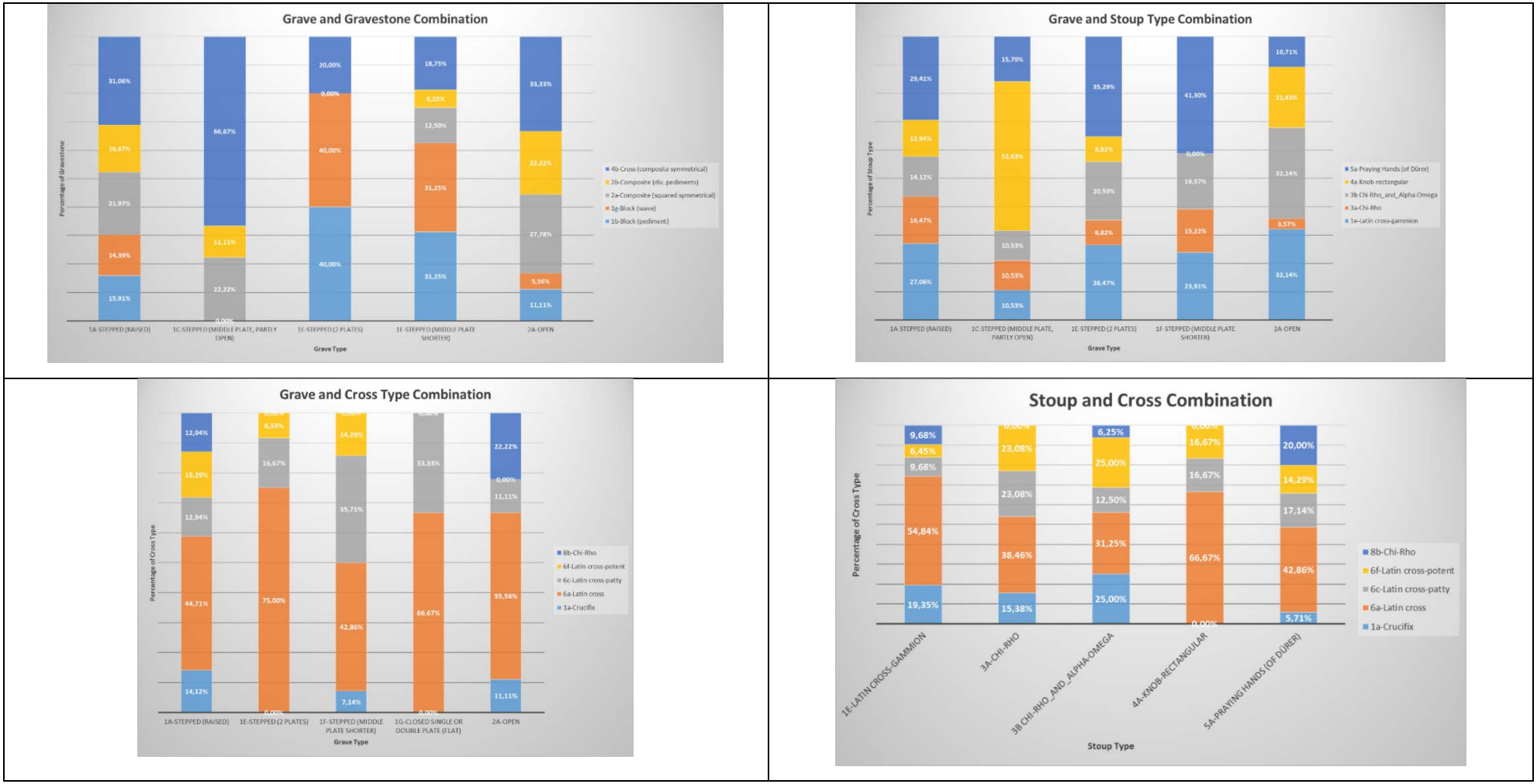


Figure 124. Walferdange combinations.

7.1.4 Konz

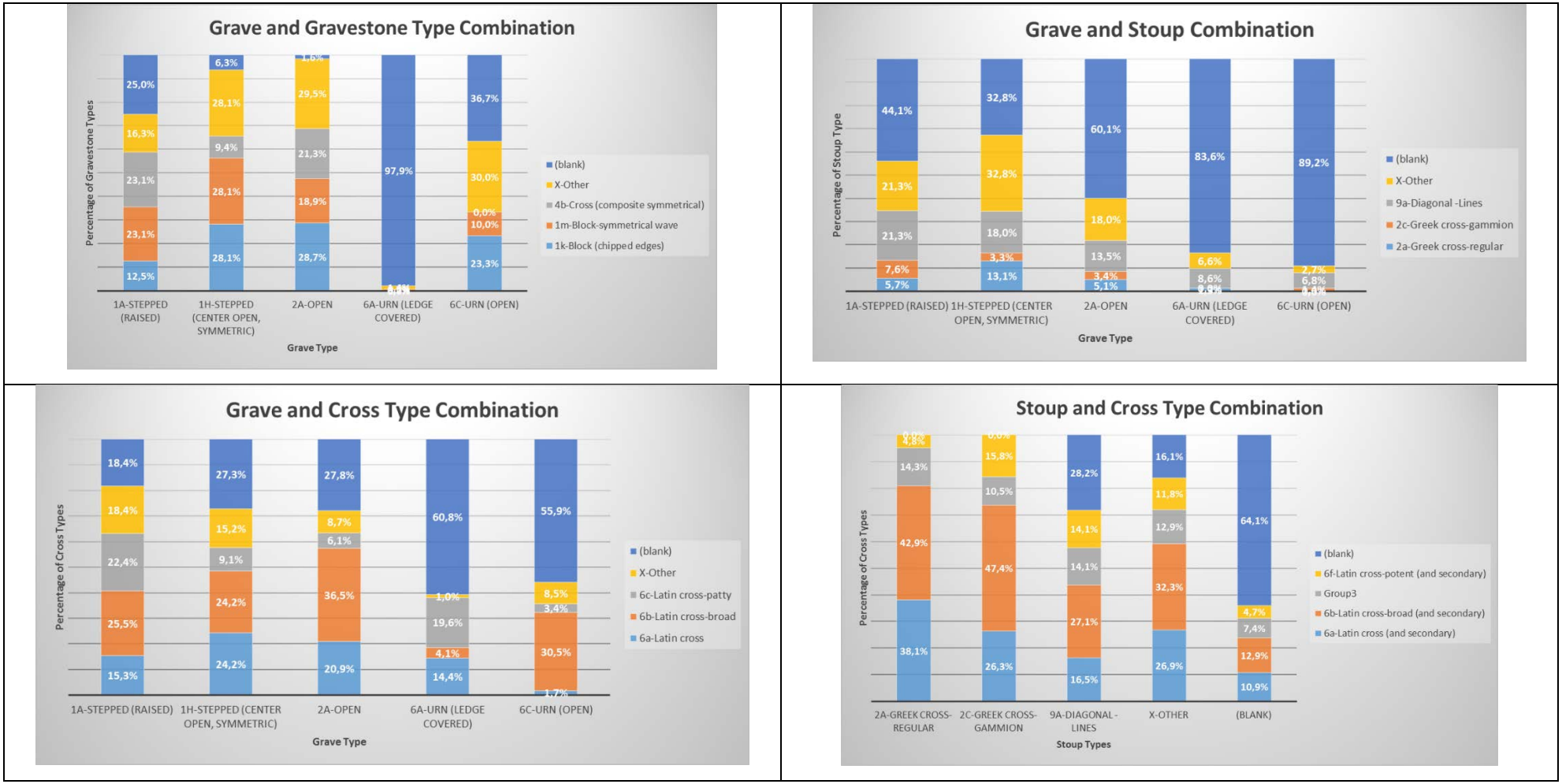


Figure 125. Konz combinations.

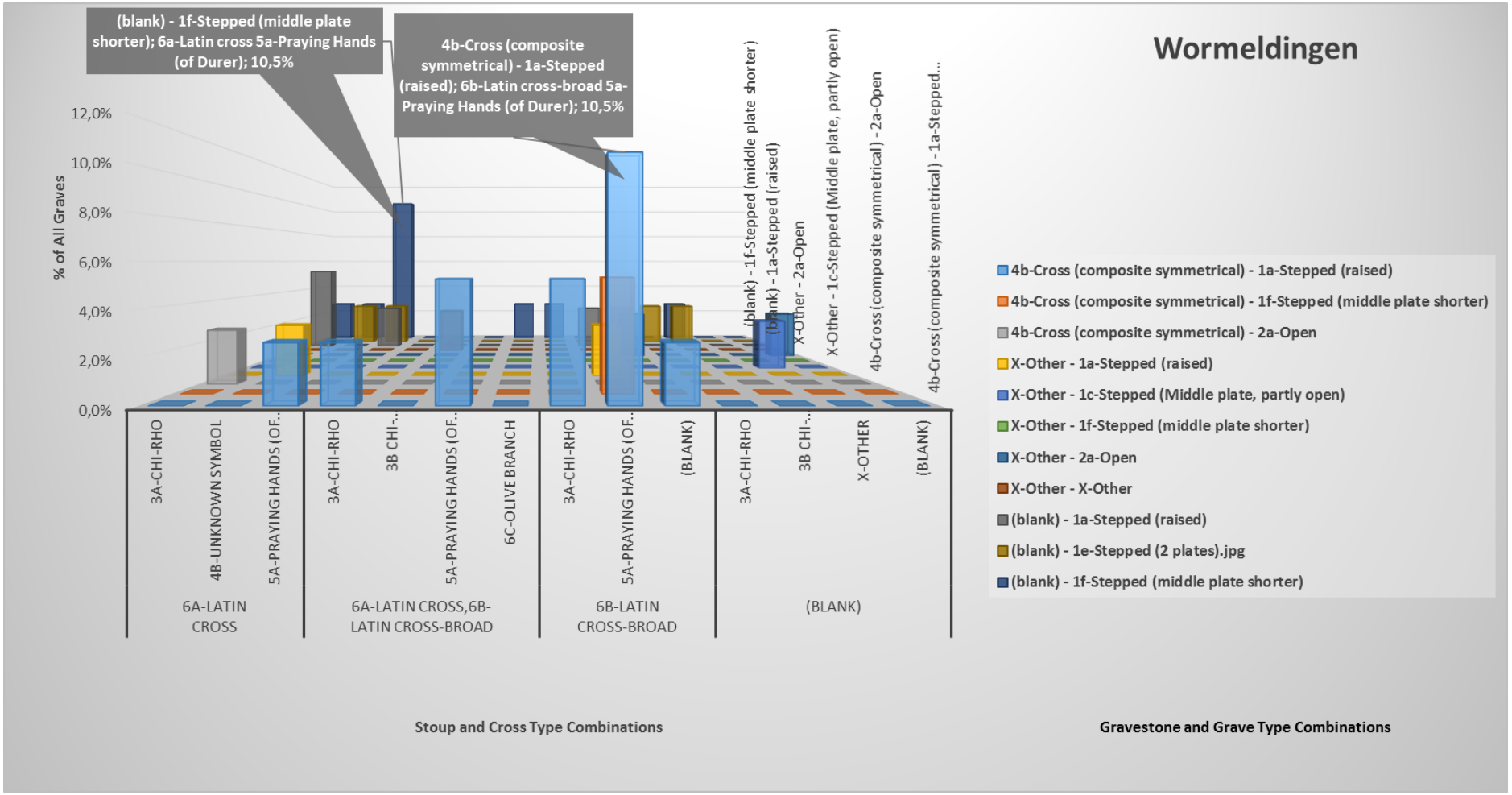


Figure 126. Wormeldange detailed combinations.

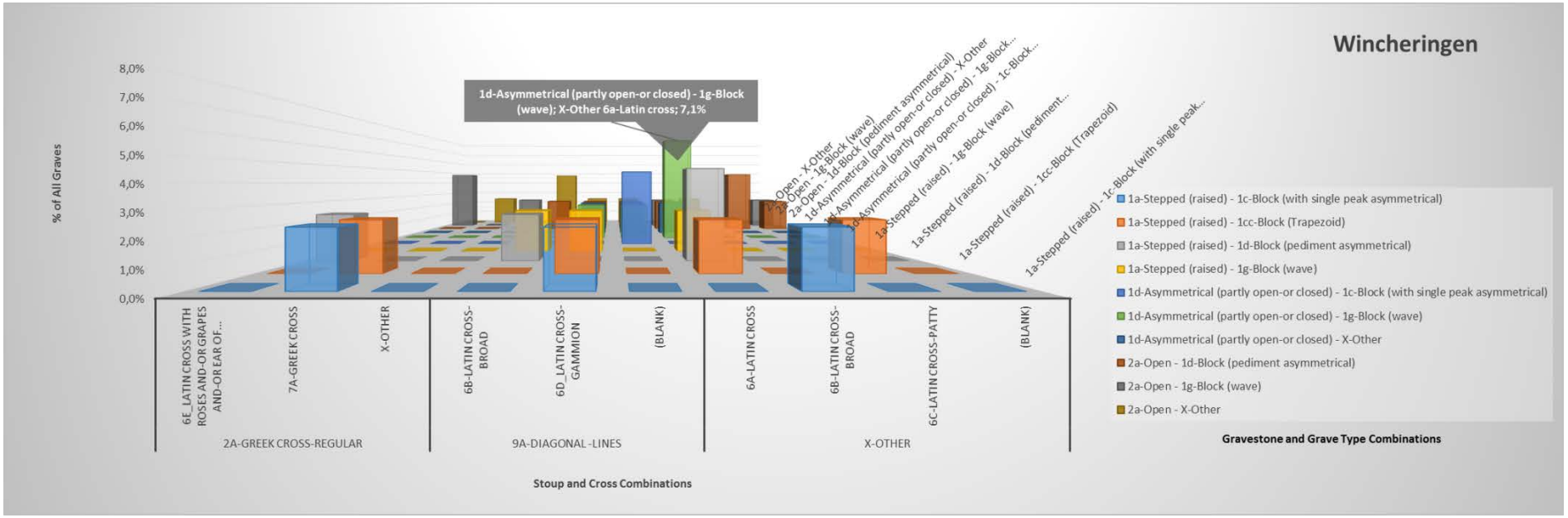


Figure 127. Wincheringen detailed combinations.

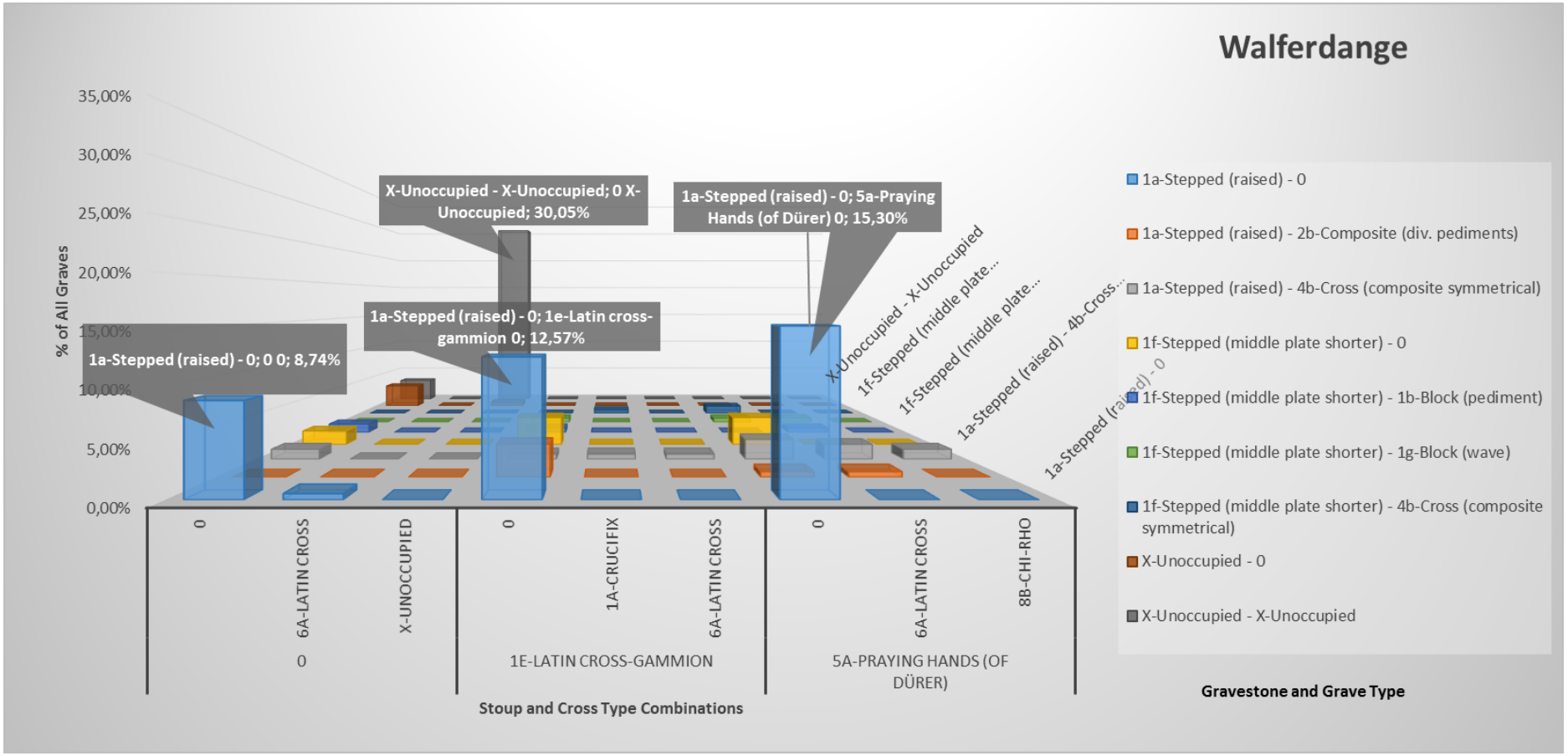


Figure 128. Walferdange detailed combinations.

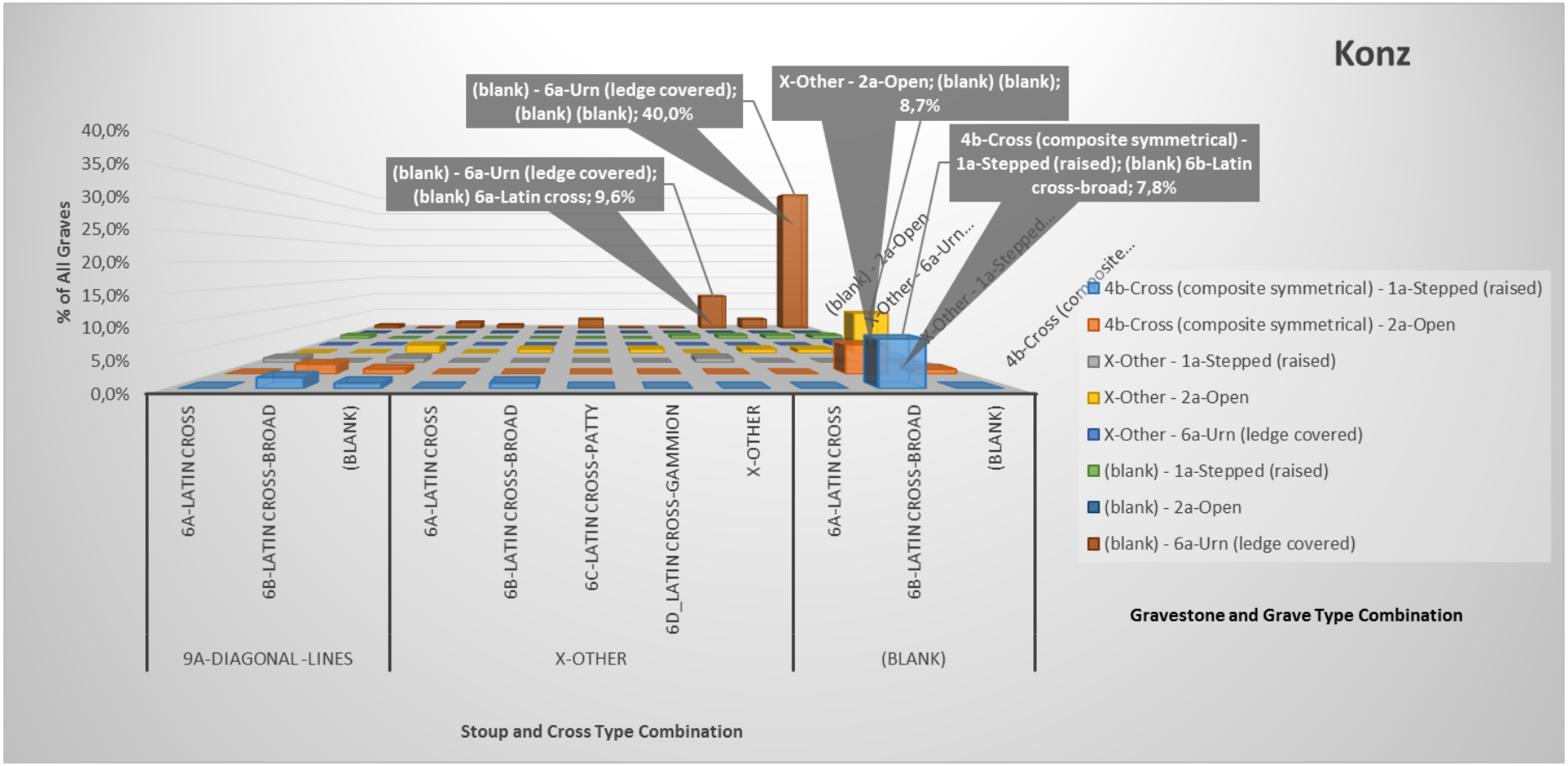


Figure 129. Konz detailed combinations.

7.2 Spatial Analysis Findings

The spatial analysis for the cemeteries under scrutiny only focuses on the highest ranked variable/features regarding grave, grave marker, stoup, cross and stonemason as well as such graves that actually show a combination of that particular grave, grave marker, stoup and cross types. The following tables also include the results of a neighbouring analysis.

The Nearest Neighbour Analysis basically tries to identify whether certain types of variables are randomly distributed, clustered or spread. In order to do so, QGIS calculates an expected medium distance based on a random distribution and the observed actual distance between the phenomena under scrutiny. If the observed medium distance is lower than the expected medium distance, the distribution is considered to be clustered.

In ArcGIS, the underlying calculations are as follows (Figure 130); unfortunately, it is not clear whether QGIS works similarly:

The Average Nearest Neighbor ratio is given as:

$$ANN = \frac{\bar{D}_O}{\bar{D}_E} \quad (1)$$

where $\bar{D}_O$ is the observed mean distance between each feature and its nearest neighbor:

$$\bar{D}_O = \frac{\sum_{i=1}^{n} d_i}{n} \quad (2)$$

and $\bar{D}_E$ is the expected mean distance for the features given in a random pattern:

$$\bar{D}_E = \frac{0.5}{\sqrt{n/A}} \quad (3)$$

In the above equations, d_i equals the distance between feature i and it's nearest neighboring feature, n corresponds to the total number of features, and A is the area of a minimum enclosing rectangle around all features, or it's a user-specified Area value.

The average nearest neighbor z-score for the statistic is calculated as:

$$z = \frac{\bar{D}_O - \bar{D}_E}{SE} \quad (4)$$

where:

$$SE = \frac{0.26136}{\sqrt{n^2/A}} \quad (5)$$

Figure 130. Nearest Neighbour Analysis according to ArcGIS.

(Source: https://pro.arcgis.com/de/pro-app/tool-reference/spatial-statistics/h-how-average-nearest-neighbor-distance-spatial-st.htm).

7.2.1 Wormeldange

1a-Stepped Grave Type n = 88 'EXPECTED_MD': 4.525638185404425, 'OBSERVED_MD': 4.149378017005575, 'Z_SCORE': -1.4920405774189014	4b-Cross Gravestone Type n = 33 'EXPECTED_MD': 7.178721822111488, 'OBSERVED_MD': 6.372603897829308, 'Z_SCORE': -1.234068611364621
5a-Praying Hands Stoup Type n = 35 'EXPECTED_MD': 6.003643549013289, 'OBSERVED_MD': 4.942095751834898, 'Z_SCORE': -2.001195691937806	6b-Latin Cross Type n = 70 'EXPECTED_MD': 4.96267856245864, 'OBSERVED_MD': 4.493371254548428, 'Z_SCORE': -1.5136346932411162
Bertrand Munsbach Stonemason n = 30 'EXPECTED_MD': 5.8669039883130605, 'OBSERVED_MD': 5.757133168466291, 'Z_SCORE': -0.19605116935375727	Combination n = 7 'EXPECTED_MD': 10.098065582683956, 'OBSERVED_MD': 16.79040882812311, 'Z_SCORE': 3.354439191232856

Figure 131. Relevant selection for Wormeldange.

Figure 131 shows the relevant selection for Wormeldange in the form of a heatmap as described in the methodology section. The selected graves are generally low in numbers, which is not surprising considering the overall size of this particular cemetery. Certain concentrations can, nonetheless, be observed. The 1a-stepped grave type is spread throughout the cemetery;

however, there are places of higher concentration in the south-western sections E and D that lie below the church level and especially in the northern section C right behind the choir of the church building. The 4b-Cross grave markers type is scarcer and shows stronger concentrations only in sections C and E. The dominating stoup type is, like the cross type, so scattered that distinct concentrations are not clearly visible. When it comes to the stonemason's name, there appears to be a concentration in section C. Graves that show the before-mentioned combination of variables are extremely rare and no clear concentrations can be deduced.

Based on these visualisations, is it feasible to consider a neighbouring effect, i.e. an actual clustering of types? With QGIS it is possible to process an algorithm that calculates whether the expected distance of certain variables is within the expected range or differs from it. As can be seen in Figure 131, all observed medium distances are slightly lower than expected, except in the case of the combined selection. Consequently, the Z-Score is negative in most cases, thus indicating clustering. How sure one can be whether such clustering is due to coincidence or not, depends in statistics on the applied levels of confidence. With the exception of the 5a-Praying hands stoup type where a 95% certainty threshold is exceeded, for most other types less than a 90% certainty must be assumed, based on the expected normal distribution. However, the high positive Z-Score for the combined selection indicates, with more than 99% certainty, that no clustering is visible.

Consequently, clustering of the selected variables is visible in certain cases; however, when using this specific type of algorithm in QGIS, the Z-Scores support this hypothesis only depending on which confidence threshold is actually selected, i.e. how sure one wants to be that visible clusters are supported by statistics.

7.2.2 Wincheringen

In Wincheringen, the spatial visualisation of selected variables (Figure 132) show a common 2a-Open grave type with certain concentrations in section C. The 1d-Block grave marker type is somewhat rare in sections A and B with a high concentration in section C. The 9a-Diagonal stoup type is similarly spread and concentrated. The 6a-Latin Cross type, however, is not present in section A and otherwise appears to be more or less evenly distributed. The most common stonemason's name, “Juny”, is likewise not present in section A, rare in section B and appears to have only a few concentrations in section C. For the combination of the common variables, only three cases exist in section B and D. Again, concentrations appear to be visually present. However, the calculated Z-Scores indicated values around 0 or so low that randomness of spatial distribution can be assumed, the exception being the selected combinations, which, with a very high Z-Score, are clearly dispersed throughout the cemetery.

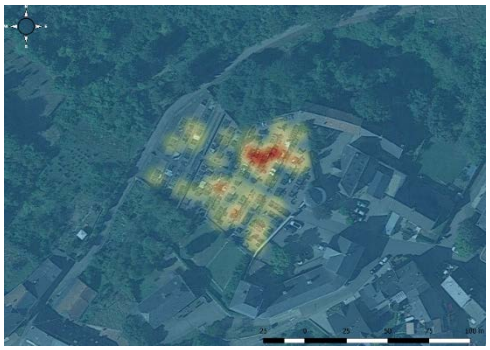
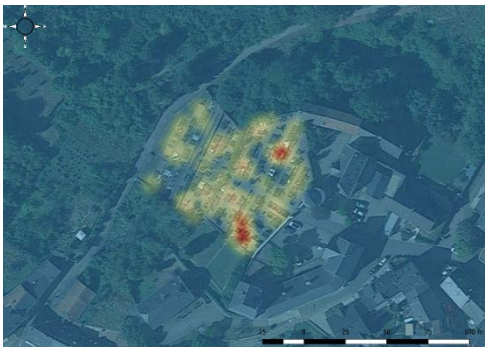
2a-Open Grave Type n = 142 'EXPECTED_MD': 3.678021030585673, 'OBSERVED_MD': 3.7005404049880184, 'Z_SCORE': 0.13957806340696008	1d-Block Gravestone Type n = 52  'EXPECTED_MD': 5.500427344890103, 'OBSERVED_MD': 5.566597438566065, 'Z_SCORE': 0.16595787744719948
9a-Diagonal Stoup Type n = 59  'EXPECTED_MD': 5.594038650238804, 'OBSERVED_MD': 6.025312848433185, 'Z_SCORE': 1.1328825894345662	6a-Latin Cross Type n= 26 'EXPECTED_MD': 6.769244865007197, 'OBSERVED_MD': 7.053437415697071, 'Z_SCORE': 0.4095340559745148
Juny Stonemason n = 18 'EXPECTED_MD': 6.966738300142254, 'OBSERVED_MD': 7.819216408257053, 'Z_SCORE': 0.9931637817092827	Combination n = 3 'EXPECTED_MD': 5.083189323633151, 'OBSERVED_MD': 13.212697641134227, 'Z_SCORE': 5.299312183484092

Figure 132. Relevant selection for Wincheringen.

It appears as if although the visualisation via a heatmap looks like it shows concentrations of variables, spatial statistics do not necessarily support this, as the slightly positive Z-values would indicate dispersion of types or at least a random distribution. A possible explanation for this could be the relatively lower number of cases as compared to Wormeldange where clustering was supported at certain levels of statistical confidence.

7.2.3 Walferdange

The number of graves and, thus, the number of selected cases per variable/feature is much higher in Walferdange than in Wormeldange or Wincheringen. This should enable a clearer visualisation of spatial patterns and more accurate statistical values. As can be seen in Figure 133,

1a-Stepped Grave Type n = 382 'EXPECTED_MD': 2.937057138442309, 'OBSERVED_MD': 3.0547221539990304, 'Z_SCORE': 1.4979507176639066	4b-Cross Gravestone Type n = 61 'EXPECTED_MD': 6.835732468978176, 'OBSERVED_MD': 6.030075850001848, 'Z_SCORE': -1.7610055410374632
5a-Praying Hands Stoup Type n = 129 'EXPECTED_MD': 4.892931768128186, 'OBSERVED_MD': 4.290525945491048, 'Z_SCORE': -2.6751352212825315	6a-Latin Cross Type n = 68 'EXPECTED_MD': 6.887546435430067, 'OBSERVED_MD': 6.33518202699947, 'Z_SCORE': -1.2651630117999728
Lampertz-Hosingen Stonemason n = 56 'EXPECTED_MD': 7.199192280640807, 'OBSERVED_MD': 5.239255187390635, 'Z_SCORE': -3.8974742590826064	Combination n = 30 'EXPECTED_MD': 9.922851687098664, 'OBSERVED_MD': 9.128624999263833, 'Z_SCORE': -0.8386861792418365

Figure 133. Relevant selection for Walferdange.

the 1a Stepped grave type is very common and spread throughout the cemetery with a few higher concentrations in sections C and G. The 4b-cross type is mostly present in the northern and central sections but almost not at all in sections C and G. The 5a-Praying hands stoup appears more evenly spread with certain concentrations in the northern sections. However, as with the 6a-Latin Cross type, there appears to be a few concentrations visible. The stonemason's name, “Lampertz-Hosingen”, is mostly concentrated in section F, while the selected combinations have pockets of weak concentrations all over the cemetery, except for section B.

The Z-Scores, except for the case of the stoup types and stonemason names, indicate levels of confidence below the 95% threshold. This means that the 1a-Stepped grave type is more likely randomly spread, while there is less than 90% confidence that there are non-random concentrations of the 4b-Cross grave marker type and less than 80% confidence for the cross type. However, the indications for a concentration of variables is clearer for the stoup type and stonemasons – well beyond 99%. While there might be concentrations of the combined selections in terms of what is visible, – as in others cases at other cemeteries before, – the statistical value, again, cannot support a strong argument for this.

7.2.4 Konz

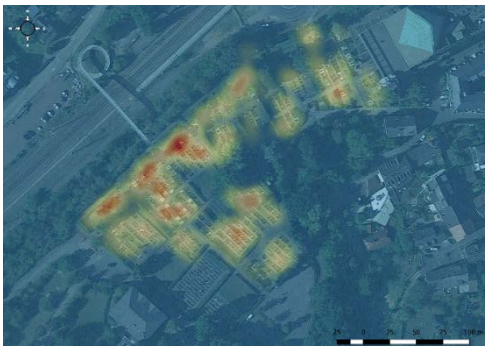
1a-Stepped Grave Type n = 254  'EXPECTED_MD': 7.813000559002469, 'OBSERVED_MD': 5.191851139889053, 'Z_SCORE': -10.22872880983878	1k-Block Gravestone Type n = 80 'EXPECTED_MD': 13.547847902967455, 'OBSERVED_MD': 8.506959159803944, 'Z_SCORE': -6.366674931792614
9a-Diagonal Stoup Type n = 116 'EXPECTED_MD': 12.302177329071997, 'OBSERVED_MD': 7.360225518270362, 'Z_SCORE': -8.277065670072153	6b-Latin Cross Type n = 110 'EXPECTED_MD': 12.663251873533806, 'OBSERVED_MD': 7.542158851554213, 'Z_SCORE': -8.114180137531934
Grabdenkmäler Juny Stonemason n = 98 'EXPECTED_MD': 12.462358227938461, 'OBSERVED_MD': 6.615795391311924, 'Z_SCORE': -8.884731577558941	Combination n = 22 'EXPECTED_MD': 20.503708159402564, 'OBSERVED_MD': 18.03698814619182, 'Z_SCORE': -1.079517455127471

Figure 134. Relevant selection for Konz.

Similar to Walferdange, the size of the cemetery, as well as the number of cases, is rather high in Konz. What is interesting and quite different from cemeteries presented thus far, besides the combined selected variables, is that all Z-Scores are negative and extremely high. This would indicate a definite proximity of neighbours or clustering of the observed cases, well beyond even

a 99% confidence threshold. Based on this, it would be permissible to make statements like there are definite concentrations of grave, grave marker, stoup and cross types, as well as stonemasons' names, across the cemetery, even under the most conservative statistical assumptions regarding confidence thresholds. This is easily noticeable from the visual concentration of the stonemasons' names in section B (see Figure 134); however, otherwise relying on the visual impression only, one might assume more dispersion.

7.2.5 Critical Assessment of Spatial Analysis Findings

As shown in the previous chapter, in many instances the visualisation via heat maps enables visually identifying places where variables or types concentrate or cluster. At Wormeldange, for example, it appears that all types can be found all over the cemetery, but clearly there are places of higher concentrations, i.e. spaces with an above average concentration of certain types. Only the combinations, – points in space where this particular phenomenon emerges, – appear spread. The calculation of Z-values with the nearest neighbour analysis and the calculation of the difference between the expected and the observed medium distance in Quantum Geographic Information System (QGIS) at first appear to support this visual impression, as negative values indicate clustering.

However, such a conclusion in statistics always depends on which confidence threshold is assumed or intended, as statistics never allow absolute certainty. Figure 135 provides an exemplary figure of the normal curve and its equivalents, i.e. certain values that correlate with it, including the Z-scores or Z-values.

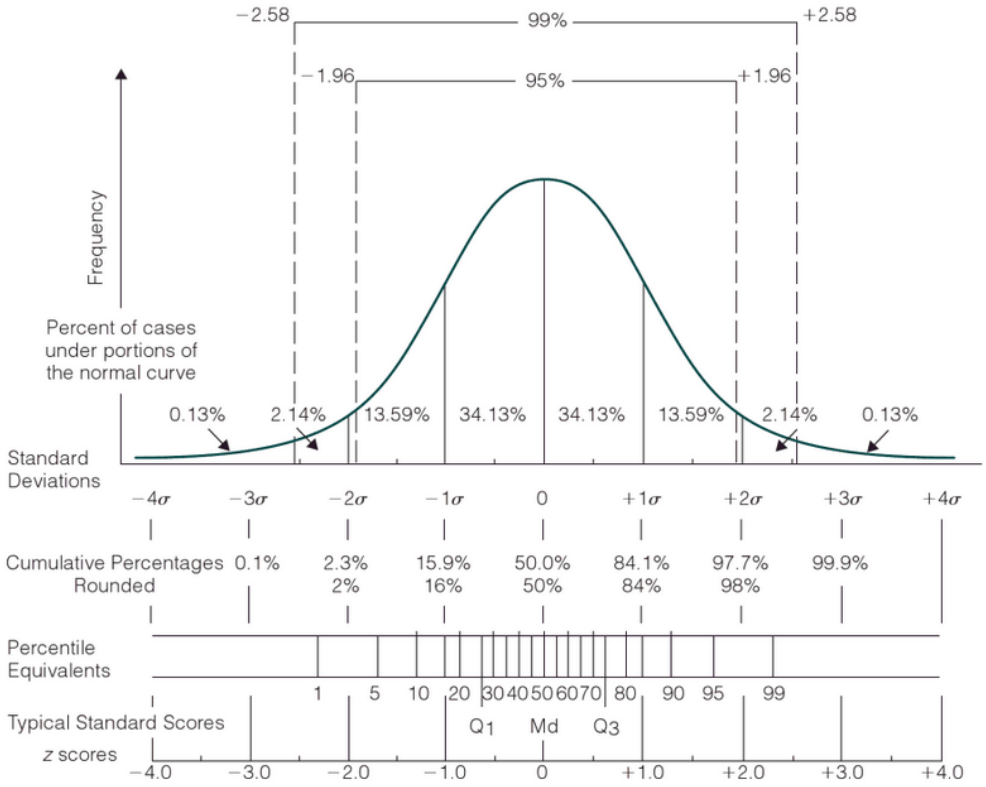


Figure 135: Normal curve and equivalents.

(Adapted from Ary et al. (2009: 125))

What this figure shows in more detail is that confidence intervals of 99%, 95% and 90% correspond to Z-values of 2.576, 1.96 and 1.645. This means that if one wants to be sure about a certain percentage, – i.e. that the observed phenomena are not due to coincidence, – one needs to compare the calculated Z-values accordingly. In the case of Wormeldange, for example, this means, – as stated before, – that the negative values appear to support the visual impression of clustering; however, most of the time the negative values do not cross a 90% confidence threshold for all types and if they sometimes cross such a threshold, it is by only a small margin. Only the stoup type crosses the 95% threshold. The combination of types crosses the 99% threshold by far, which, however, strongly indicates a random spread. This means that in all other cases the likelihood that the observed concentrations are indeed clusters is below 90%. In order to reiterate a point made earlier, it needs to be emphasized again that the number of cases observed, i.e. “n”, might be too small for a strong statistical measure.

Similarly, although with opposite indications, the Z-values in Wincheringen are low positive, – well under the 90% threshold, – thus indicating dispersion or randomisation with a relatively low confidence. Although based on a visual impression, spaces of concentrations appear to be visible. As stated, the intention is not to say that the visual impression is contradicted by the statistics or vice versa. The observed values might be the result of the relatively small “n”. However, one must realise that, in this instance, the levels of confidence are relatively lower than what is

conventionally assumed in statistical analysis, – aside from the combinations, – to clearly show a spread. However, with an "n" equalling three, the value of this statement should be challenged.

For Walferdange, the "n" is relatively larger: However, a spread of types appears to be visible with only a few areas of clustering. The Z-values indicate a confidence of more than 90% for the gravestone type but more than 99% for the stoup type, thus supporting clustering. An even stronger clustering is indicated for stonemason names, while other negative Z -values are below the 90% threshold again. With a confidence level that is also less than 99%, the grave types appear not to be clustered.

The "n" is also larger for Konz. Remarkably, besides the combined selected variables, – again with the relatively lowest "n", – all Z-values are negative, i.e. indicating clustering, with values well beyond the 99% threshold. Arguably these very clear indications of clustering could also be the result of the larger "n" numbers.

Does this, however, mean that in certain instances the visual impressions are misleading and that one can blindly follow the statistical values? Does following the statistical values mean that only when the Z-values are beyond 90%, 95% or even 99% one can clearly deduce clustering or reject it? Unfortunately, there is no conclusive answer to this problem. Caldas de Castro and Singer (2006) considered the issue of confidence intervals or thresholds in the context of spatial analysis. They caution against adhering to strict cut-off thresholds and blindly following such data and ignoring the larger spatial context. As this widely quoted article states:

"Historically, a standard criterion for significance when multiple tests are carried out is the demand that the probability of any single false positive among all tests carried out is at most 0.05. This strict criterion has been used primarily in studies where only a few comparisons are expected to yield meaningful differences, and the Bonferroni adjustment is a simple and trustworthy procedure for assuring simultaneously that the probability of any single Type I error is no greater than α. In the context of spatial analyses in geography, where hundreds, or even thousands, of comparisons are to be carried out, using a procedure that guards against any single false positive occurring is often going to be much too strict and will lead to many missed meaningful findings" (Caldas de Castro and Singer, 2006: 181).

This means that while a 95% confidence threshold is historically acceptable in the field of geospatial analysis, it might actually not be suitable in all cases. Moreover, and maybe more relevant with regards to the study at hand, usually thousands of comparisons are assumed. This is clearly not so with regards to the relatively small number of cases found at the average cemetery within the context of this regional research. However, it needs to be emphasized that a confidence threshold of 95% is a convention, not a definite rule. Consequently, in this thesis,

three different confidence intervals are discussed such that the reader can judge the presented data more objectively.

If, however, a confidence level of at least 95%, – i.e. a Z-value of beyond 1.96, – would be strictly applied, then in Wormeldange only the stoup types are clustered, while all other types do not cross the threshold or are clearly spread. In Wincheringen, there would be no clusters at all, while in Walferdange only the stoup type and the stonemason names would be clustered. In complete contradiction to this, in Konz almost all types would be clustered owing to confidence thresholds well beyond 95% or even beyond 99%, with the exceptions of the combinations.

Therefore, when assuming 95% confidence, clustering is, statistically, only weakly indicated at the sampled cemeteries, despite Konz. The values of “n” might be partly responsible for this but since Konz is not that much larger than Walferdange, the "n" values might not be enough to explain this difference. Generally, it might be questionable whether the visually indicated clusters can be confirmed by statistics if such strict confidence intervals are chosen.

Shaus et al. (2017) make a strong plea for introducing more advanced statistics into the field of archaeological research. They do so especially by considering qualitative research methods and the need to quantify the validity of related conclusions even if basic statistical methods are applied. However, such extreme dependence on the explanatory power of statistics, including conventional thresholds of confidence, is questioned by the before-mentioned authors Caldas de Castro and Singer (2006), emphasizing caution in carelessly applying statistics.

However, the statistical data caution against assuming that the heat maps and the concentrations of certain types that are visible on the heat maps are enough to deduce clustering. These heat maps indicate any concentration of types by simply colouring the areas that might consequently be interpreted as clusters, even though, as for the overall sample, the medium distance observed might only indicate clustering with a relatively low level of confidence, – one that might not be acceptable for the conventional standards of statistical analysis. For example, two of the same type close together might look like a concentration on a heat map; however, in relation to the overall space and proximities the distances might even out or might even result in a positive Z-value. This potential problem is exactly what the calculation of the Z-value with regards to the nearest neighbour analysis tries to address. Consequently, these results should be taken seriously, as, from a conventional statistics perspective, they allow strong support for clustering in a few cases but not at all cemeteries. Considering the above presented visualisation as well as the statistical analysis, the observed phenomena must be carefully discussed and in the context of more information.

7.3 Excursus: Inscription Data

This thesis focuses on the material dimension of data and its embedment in space. One could discuss to what degree inscriptions are part of this materiality or whether they form a specific dimension that requires separate consideration and treatment for analysis. It is an interesting discussion subject to elaborate as to whether something engraved or attached to a grave or grave marker, such as letters and writing, is material or transcends this materiality by its further meaning, i.e. the message transported by it. It would go well beyond the scope of this thesis, however, to address such issues.

In the following, in order to ensure all collected types of data are addressed, the same analytical process as illustrated above will be applied to the data collected on inscriptions found on the graves and/or the grave markers. After the researchers began to apply the CSA in the data collection process, the family name or the main family name, the maiden names if mentioned, other names than the main family name, the number of inscriptions, the type of inscription – for example, inscriptions that are family related or related to a profession, – the acronym R.I.P. if mentioned and the actual inscription text were collected. This was done by standardised data entry in the CSA (see Chapter 5 for details). The related standardised data output applies for Wincheringen, Wormeldange and Konz. For Walferdange, this data entry method did not exist during the pilot project phase; consequently, the data were entered in a non-standardised manner as explained before. This means that also the data output needs to be presented slightly differently as will be shown below.

What can be achieved with the collected data is to identify with descriptive statistics how many times the words *famille* or *familles* (in French) and *familie* or *familien* (in German) are mentioned, whether the maiden names are mentioned, how many inscriptions are present, what kind of inscriptions they are, whether the acronym R.I.P. is mentioned and what the actual inscription says. For all of these charts, only graves that could be dated are considered, as the collected data are organised chronologically. To the extent that the graves actually show any of the relevant data at all and depending on the content, either simple columns or stacked columns are applied in order to improve readability.

As for a spatial analysis, this is more complicated. A neighbouring effect – indicating potential emulation from one grave monument to another – can only occure if an artefact and/or phenomenon is not unique to a certain monument and did not, during data collection and/or for the sake of data analysis, become aggregated too much, resulting in too broad categories of analysis. Moreover, as will be shown, the headcount of personal information, especially the mentioning of actual names, is very low and applies only to certain decades. Pointing out single or even a few counts of certain names at a cemetery would not produce a spatial analysis of any

value and would become statistically irrelevant. Consequently, only the general presence of maiden names and other names will be spatially analysed, since their presence is more common in the linguistic part. Summing up, the analysis of linguistic elements on grave monuments in the sample at hand is not a focus of this thesis; thus, this chapter can only be read as an excursus. Moreover, the linguistic data collected might be too aggregated, while at the same time being too distinct from case to case to allow any stastical analysis.

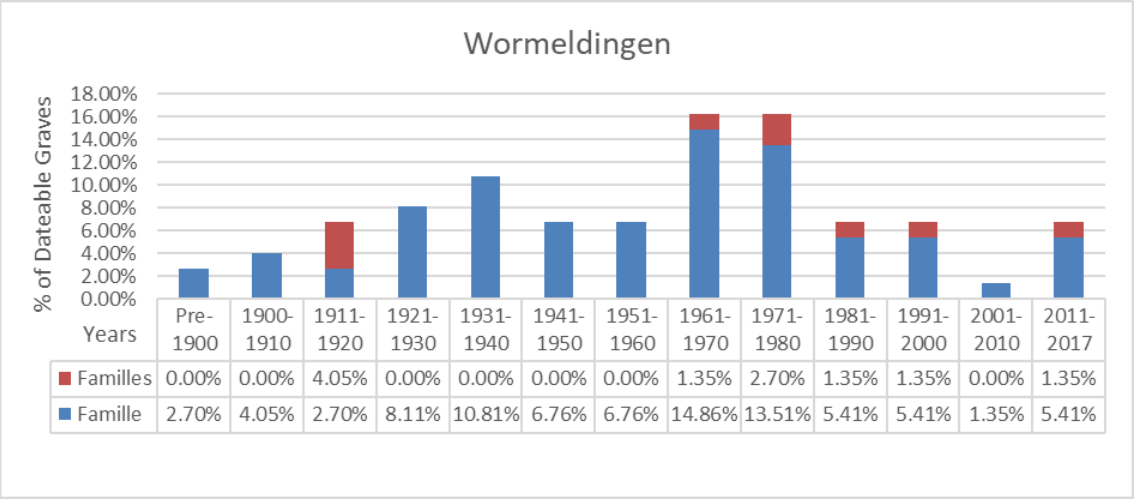


Figure 136: Percentage of graves/grave markers inscribed with the word *Famille* or *Familles*.

Figure 136 shows that the mentioning of the term *famille* or *familles* at Wormeldange rises and declines, climaxing most significantly during the 1960s and 1970s. The plural version, *familles*, i.e. the mentioning of more than one family for one grave, is relatively rare, while one needs to consider that values are generally relatively low. Apart from the 1910s, it appears to be a post-1960s phenomenon. This might indicate that family graves dating from that period host more people, which is only natural in certain parts, as a family grave is used for an extended period of time in Luxembourg. It would be speculation to assume that the practice of more than one family sharing a grave might also be a necessity in order to save costs.

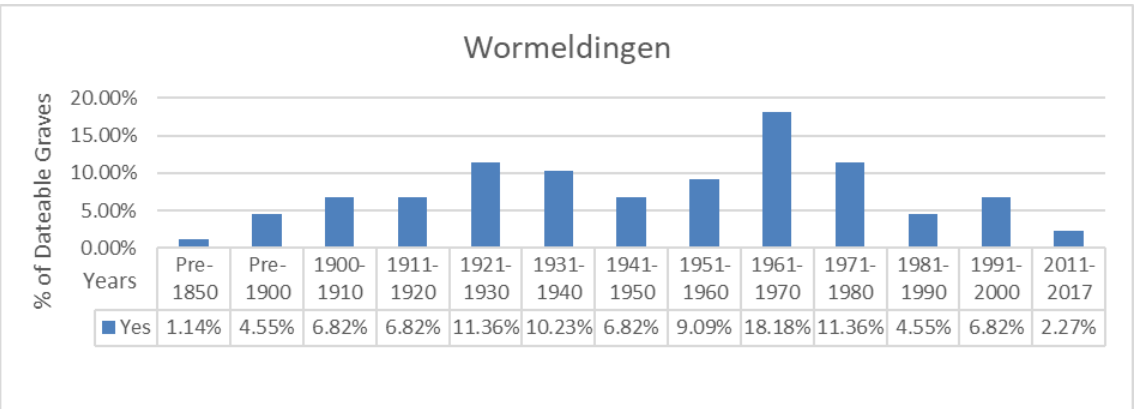


Figure 137: Percentage of graves/grave markers inscribed with a maiden name.

Figure 138 shows the mentioning of maiden names. There appears to be two peaks, i.e. during the 1920s and during the 1960s, while the mentioning of maiden names otherwise remain on a relatively low level of occurrence. The phenomenon is, however, still present until today, although on a relatively low level.

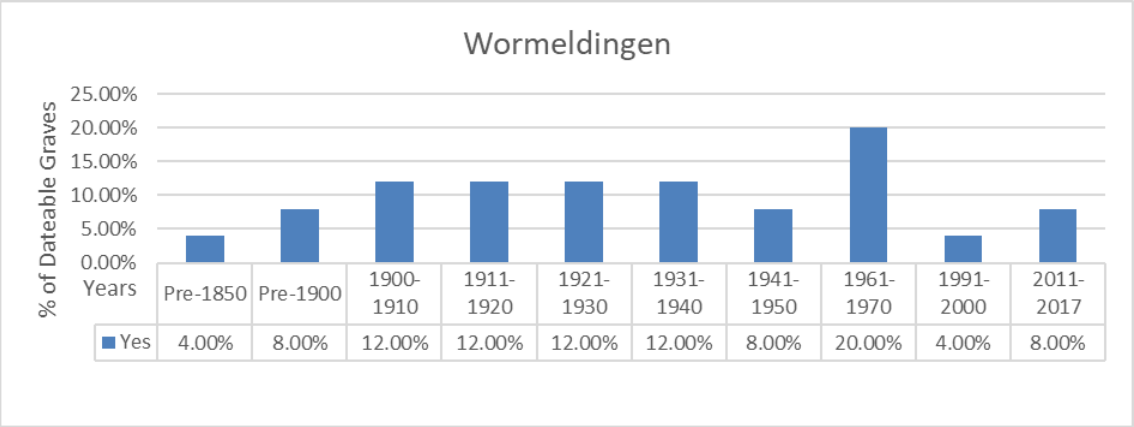


Figure 138: Percentage of graves/grave markers inscribed with other names.

Figure 138 shows the mentioning of other names/family names on a grave or grave marker. The peak during the 1960s might be coincidental, as the overall phenomenon is more or less stable over time at approximately 10%. Yet again, one needs to consider the actual number of graves per decade, which is not very high, and put the observable relative numbers in this instance in the appropriate context.

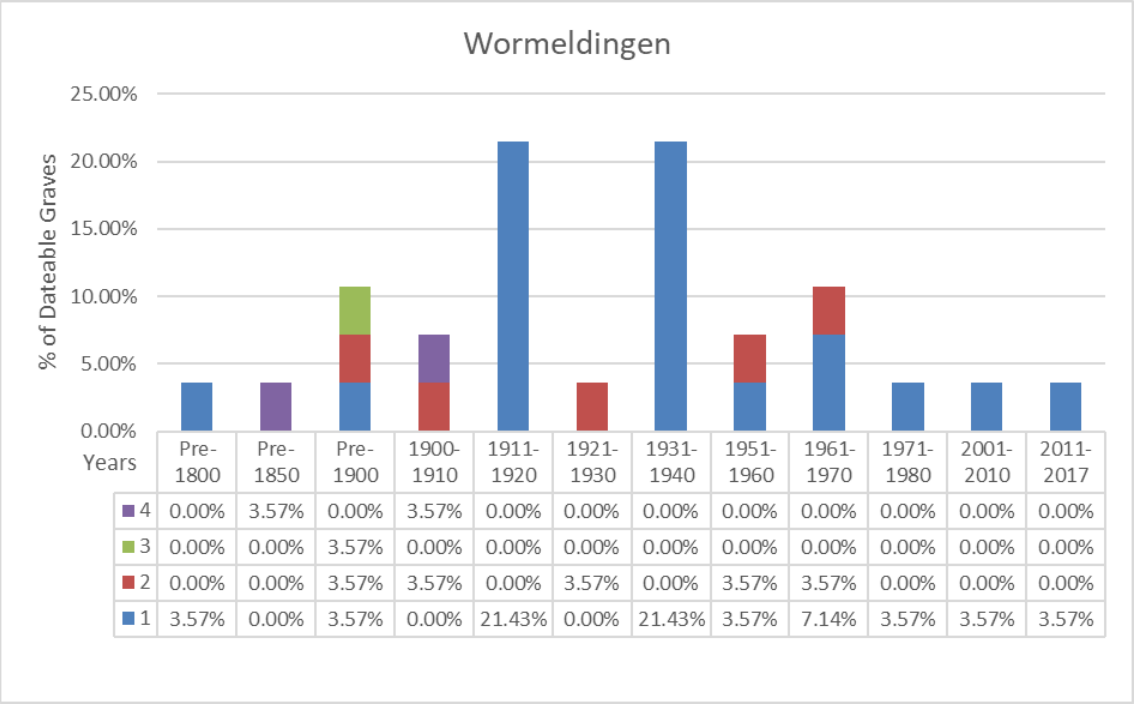
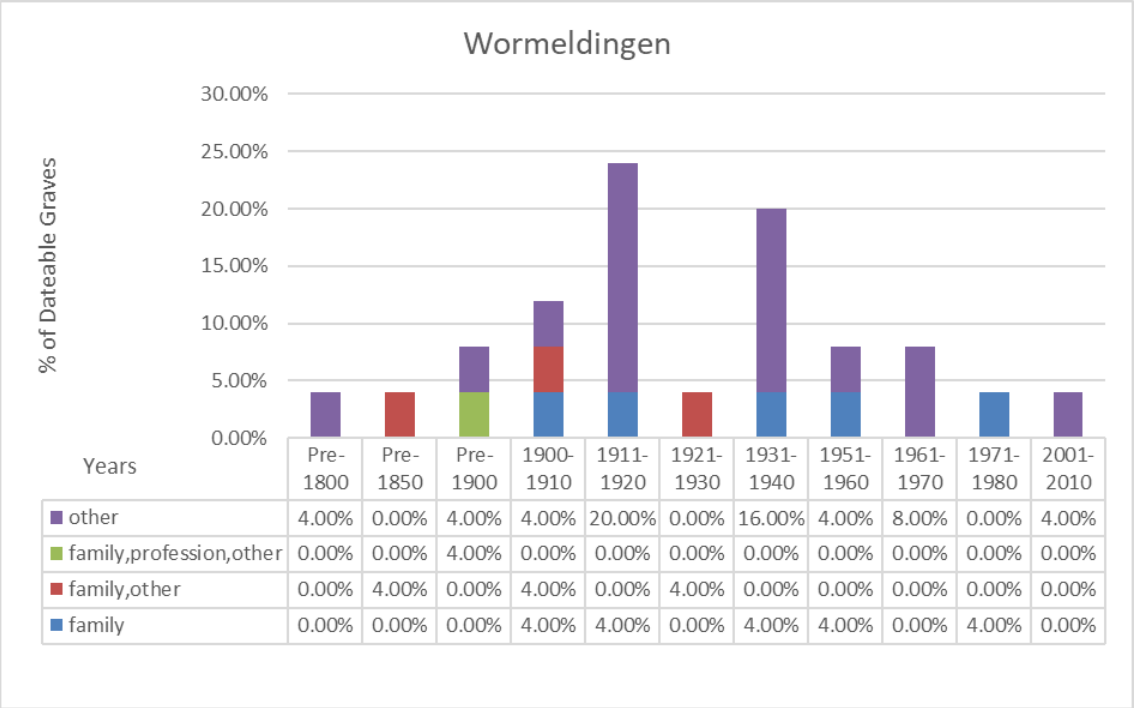


Figure 139: Percentage of graves/grave markers showing a certain number of inscriptions.

As indicated in Figure 139, in most cases if there is an inscription, it is only one – and rarely more than that. An exception appears to be older graves or grave markers where more than one inscription, – up to three or four, – might occur. However, the relatively low number of instances needs to be considered. During the 1910s and 1930s, inscriptions generally stand out with more than 21% of the datable graves falling within the relevant decades.



Years	Pre-1800	Pre-1850	Pre-1900	1900-1910	1911-1920	1921-1930	1931-1940	1951-1960	1961-1970	1971-1980	2001-2010
other	4.00%	0.00%	4.00%	4.00%	20.00%	0.00%	16.00%	4.00%	8.00%	0.00%	4.00%
family,profession,other	0.00%	0.00%	4.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
family,other	0.00%	4.00%	0.00%	4.00%	0.00%	4.00%	0.00%	0.00%	0.00%	0.00%	0.00%
family	0.00%	0.00%	0.00%	4.00%	4.00%	0.00%	4.00%	4.00%	0.00%	4.00%	0.00%

Figure 140: Percentage of graves/grave markers showing a certain type of inscription.

When it comes to the type of inscriptions, all inscriptions that can be summarised under the category "other", i.e. not family or profession related, dominate over the decades. This usually refers to religious inscriptions or inscriptions expressing loss and emotion (see Figure 140). This particular figure also shows the mentioning of this typology in context to each other, for example, where the family category shows up together with other categories or the family category together with the profession and other category. Here one can also observe a peak during the 1910s and 1930s.

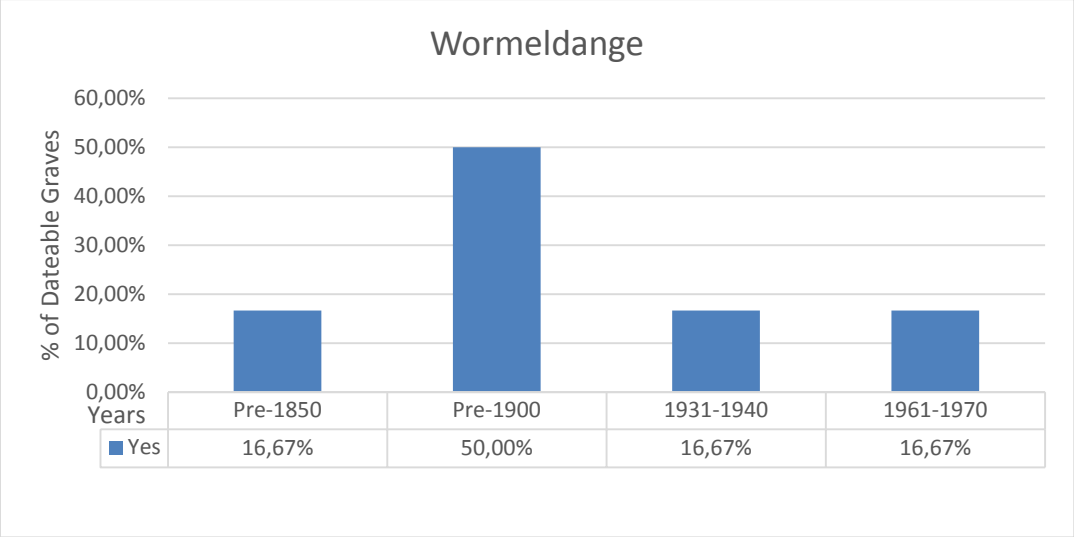


Figure 141: Percentage of graves/grave markers inscribed with R.I.P.

The acronym R.I.P. appears rarely, which is why, in Figure 141, two thirds of all R.I.P. inscriptions are found on the few pre-1900 and pre-1850 graves and the remainder on the few graves dating from the 1930s and 1960s. Again, considering the actual sample size for each decade here, the value of such data is questionable.

Table 11: Inscriptions at Wormeldange cemetery.

Pre-1800	**Pre-1850**
Hier ruht der hochwürdige Herr...von Wormeldingen ... (?)	Hier ruhen, geboren zu Altwies...gestorben zu Wormeldingen...im Alter von..., Ehemann v.
Pre-1900	**1900-1910**
Hier ruhen in Frieden die christlichen Eheleute ..., In Memoriam, Hic Recuiescant in pace Dr. Theol. et. phil., Canonicus Cathedralis Luxbg, Parcchus (?) Decanus in Remich, Parochus in Stolzenburg et Brouch	Gatte von... Gattin von... Ehegatte in 2ter Ehe von... Morte pour la patrie...tombe en Russie
Hier ruhen...	Gattin von...Gatte von, INRI
Ici Repose	INRI
1911-1920	**1921-1930**
Gattin von...	INRI, Gattin in 2ter Ehe von
Ici Reposent	
INRI	
Souvenir	
1931-1940	**1941-1950**
Epouse en 1ere noce de	none
Geb. ... Gest. ...	
INRI	
illegible, most likely a verse from bible	
Wenn Liebe könnte Wunder tun und Tränen Tote wecken Dann würde dich heut nicht die kühle Erde bedecken.	
1951-1960	**1971-1980**

Gatte von...	A notre Beau-Frère le temps qui efface tout n'efface pas le souvenir
INRI, A La Memoire de...	
1961-1970	
Gott rief zur Ruhe, im Alter von …	
INRI	
1981-1990	**1991-2000**
none	none
2001-2010	**2011-2017**
Firstname Name 1920-2006	none
none	

Table 11 shows the noted inscriptions and then indicates the dominant usage of standardised phrases in general, disregarding the pre-1900 graves. Only the older graves appear to provide a more extensive inscription, referring to the deceased's personal background.

In order to protect the anonymity of the collected data, no full name list of the cemetery can be published. What can be said, however, is that the collected names appear to mirror the expected social demographics of the village, i.e. a number of what might be described as local names that continuously reoccur, but also with a French and German influence. To the author's best knowledge, no names appear to be exceptional from what could be expected at this particular location as a village right at the Luxembourgish-German border. Moreover, stereotyping about names and places of origin should be avoided. Consequently, it cannot be judged whether any of the present names are not Luxembourgish but indicate any other nationality or heritage.

Figure 142 shows the heatmap of concentrations for maiden names, while Figure 143 does the same for the other names.

Figure 142: Heatmap of maiden names at Wormeldange.

Figure 143: Heatmap of other names at Wormeldange.

Certain concentrations appear to be visible in these figures. For the maiden names, the nearest neighbour analysis in QGIS reveals an expected medium distance (MD) of 4.61769239832688 and an observed medium distance (MD) of 4.46281501361687, thus a Z-score of -0.6019150825142691, which statistically indicates a clustering that is, however, well below a 90%

confidence level. The heatmap for other names shows an expected MD of 6.389164489188796 and an observed MD of 6.463548202794092, thus a Z-score of 0.11136139810284729, which does not support clustering.

In Wincheringen, the plural case of *familie* (*famille* in French and accordingly indicated in the relevant Figure 144) is not present. The singular term, though, peaks in the 1930s and is relatively strong during the 1970s and 1980s as well. Generally, the numbers fluctuate by about 10%, not dissimilar to what could be observed in Wormeldange, although with a different increase, peak and decline pattern.

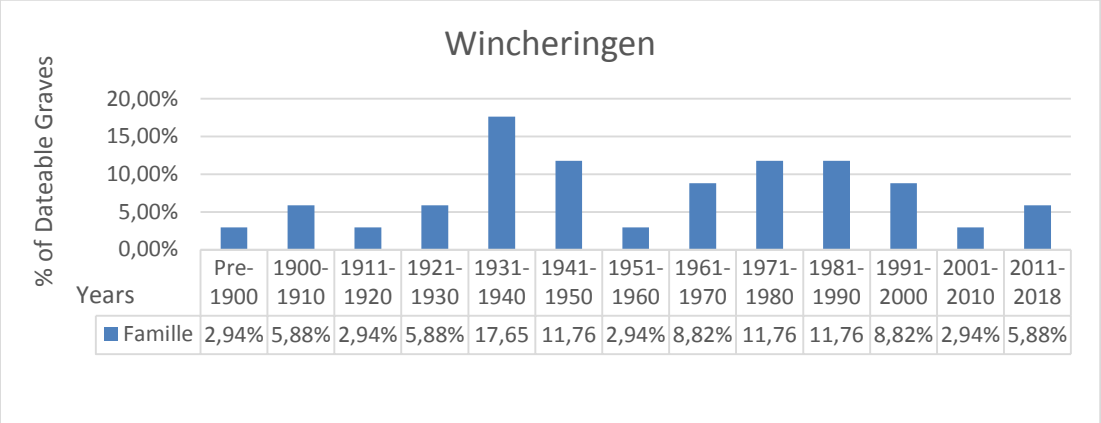


Figure 144: Percentage of graves/grave markers inscribed with the word *Famille/Familie at Wincheringen.*

Regarding the mentioning of a maiden name on the grave or grave marker, Figure 145 shows that this practice peaked in the 1940s and 1960s, with around a fifth of all grave markers from those particular decades mentioning a maiden name.

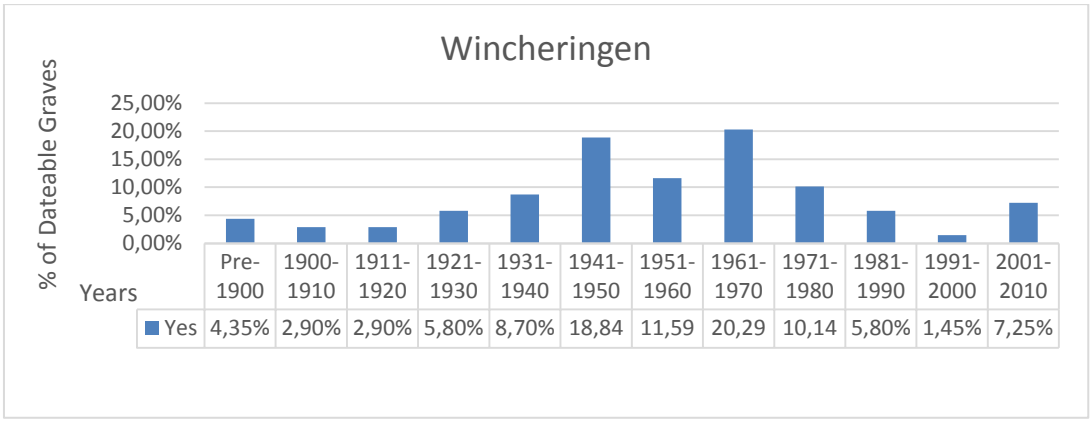


Figure 145: Percentage of graves/grave markers inscribed with a maiden name at Wincheringen.

Other names appear mostly during the 1940s and are stable from the 1960s to the beginning of the 1990s (see Figure 147).

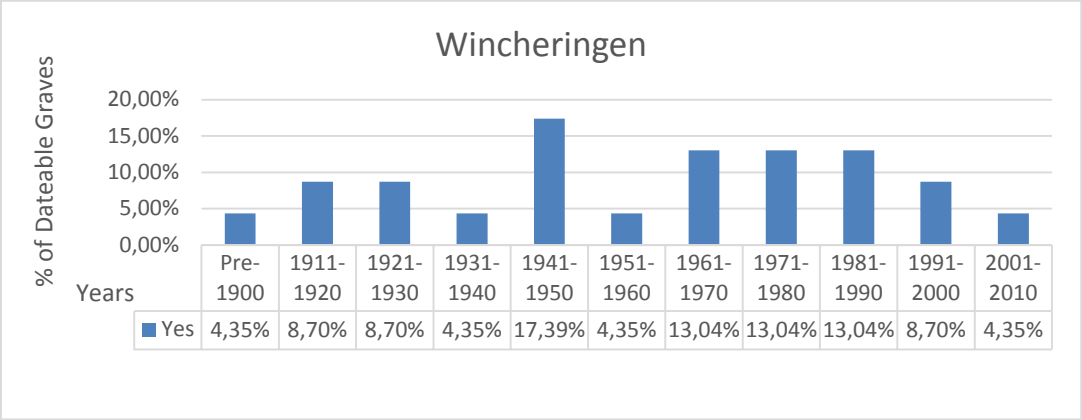


Figure 146: Percentage of graves/grave markers inscribed with other names at Wincheringen.

The number of inscriptions in Wincheringen (see Figure 147) is dominated by single inscriptions, with the exception of the relatively older graves or the most recent ones. Six inscriptions are certainly the exception and form an outlier. The relatively higher number of inscriptions on more recent graves might be due to the need to express emotions more explicitly in the time following death. On older graves, a few inscriptions might have already disappeared with time or as the mourning process in concluded.

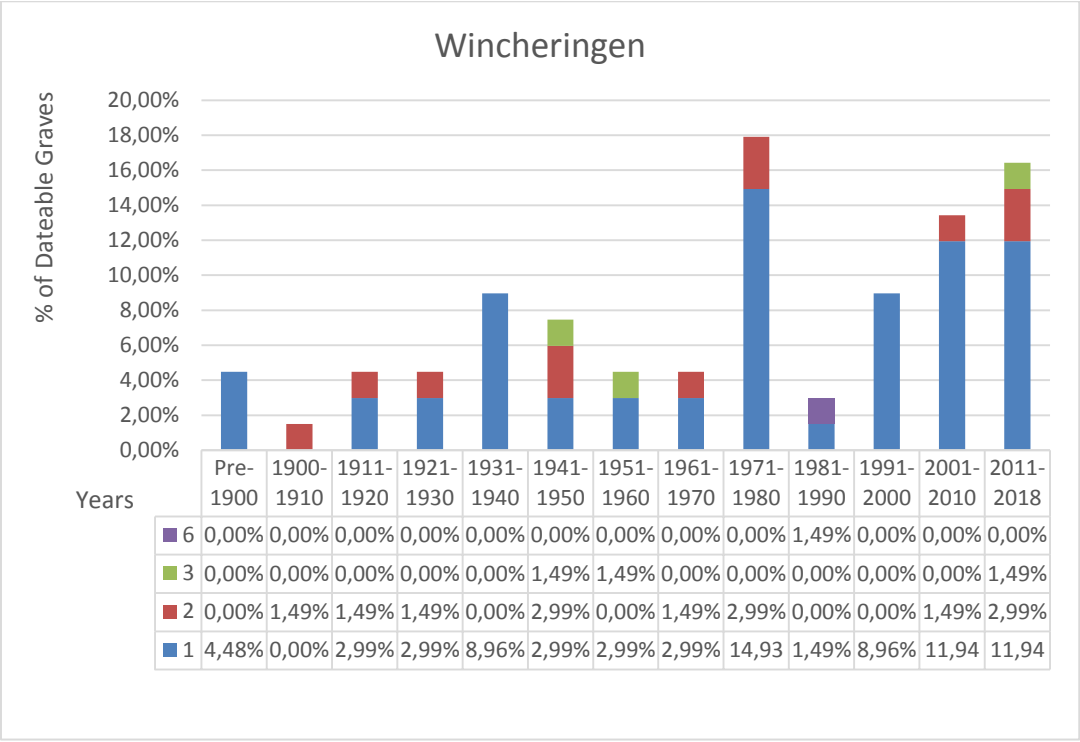
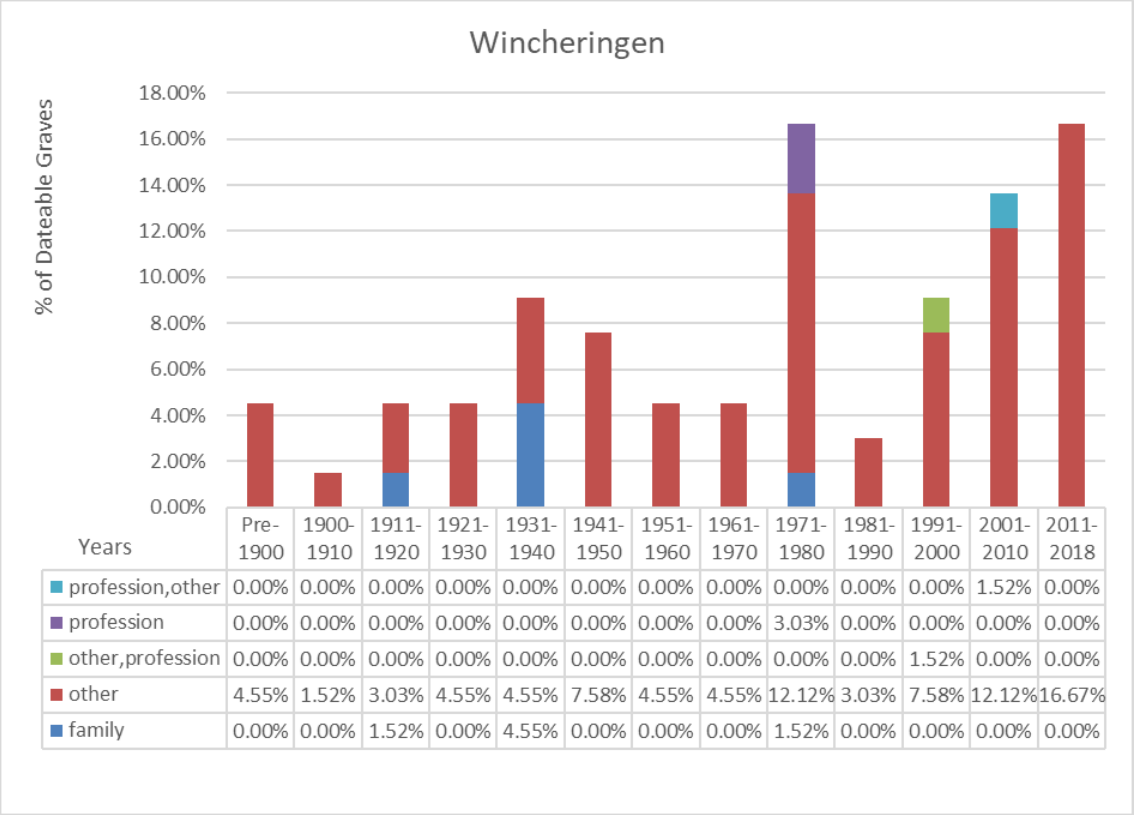


Figure 147: Percentage of graves/grave markers showing a certain number of inscriptions at Wincheringen.

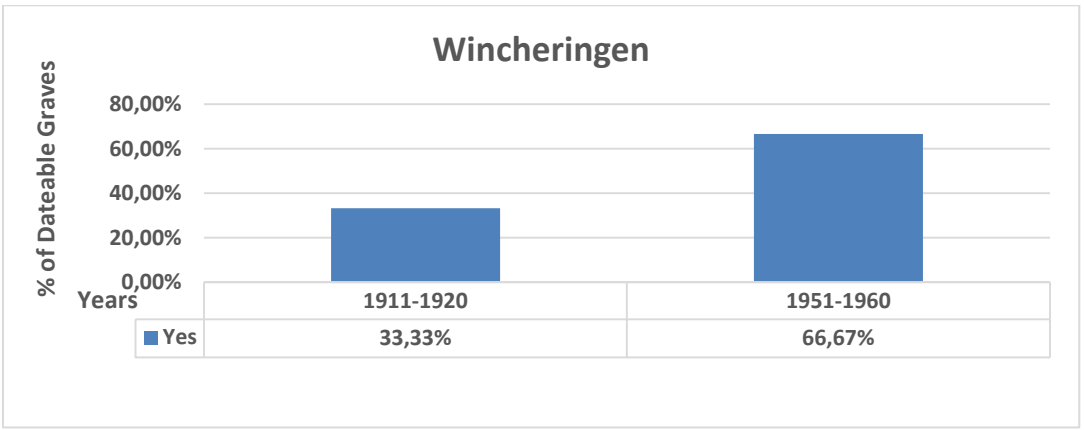


Years	Pre-1900	1900-1910	1911-1920	1921-1930	1931-1940	1941-1950	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2010	2011-2018
profession,other	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.52%	0.00%
profession	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.03%	0.00%	0.00%	0.00%	0.00%
other,profession	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.52%	0.00%	0.00%
other	4.55%	1.52%	3.03%	4.55%	4.55%	7.58%	4.55%	4.55%	12.12%	3.03%	7.58%	12.12%	16.67%
family	0.00%	0.00%	1.52%	0.00%	4.55%	0.00%	0.00%	0.00%	1.52%	0.00%	0.00%	0.00%	0.00%

Figure 148: Percentage of graves/grave markers showing certain types of inscriptions at Wincheringen.

Regarding certain types of inscriptions (see Figure 148), as with Wormeldange, the category "other" dominates, certainly for the most recent graves with regards to inscriptions expressing grief and loss. The category "family" shows up during the 1930s, while the category "profession", including profession in combination with other types of inscriptions, is present in the 1970s, 1990s and 2000s.

The acronym R.I.P. is only present on a small percentage of the few graves during the 1910s and 1950s, making this hardly statistically relevant and conclusive (see Figure 149).



Years	1911-1920	1951-1960
Yes	33,33%	66,67%

Figure 149: Percentage of graves/grave markers inscribed with R.I.P. at Wincheringen.

Table 12 provides an overview of the actual inscriptions. Interesting is the number of inscriptions marking the status of a few deceased as missing in action in Russia during Second World War and a number of more recent graves having inscriptions that express emotions, at times in a less elaborated manner and/or of a profane nature, potentially indicating a more standardised set of inscriptions, most likely found on commercially mass produced paraphernalia.

Table 12: Inscriptions at Wincheringen cemetery.

Pre-1900	**1900-1910**
Hier ruhen in Gott	Zum Gedenken an..., INRI
Ruhestätte	
verm. ... in Russl.	
1911-1920	**1921-1930**
Hier ruhen in Gott	Ruhestätte der ..., verm.
Hier ruht in Gott mein lieber Gatte unser lieber Vater...im Alzter v. ... u. unsere liebe Mutter...im Alter v.	verm. i. Russland
INRI	verm....gef.
1931-1940	**1941-1950**
Hier ruht in Gott mein lieber Gatte unser Guter Vater ...	Die Eltern mein empfehl ich Dir, Zum Andenken an...
Hier ruht in Gott mein lieber Gatte unser lieber Vater...	illegible
Hier ruht in Gott...	INRI
Ineligable	Ruhestätte, 2x Hier ruht in Gott...
Ruhestätte der...	verm. ... gef. ....
und verstorbene Kinder	
1951-1960	**1961-1970**
Hier ruht in Gott	Es bleibt die Erinnerung, Wir vergessen Dich nie
Zum Gedenken, INRI	Hier ruhen in Gott
	In liebvoller Erinnerung
1971-1980	
A Hon Cousin	Ich vermisse Dich, Hier ruht in Frieden
Dr.	Im stillen Gedenken
Hier ruhen in Gott	In liebevoller Erinnerung
Hier ruht in Gott	Requiem
Ich bin der Weinstock Ihr seid die Reben	Wenn die Zeit endet, beginnt die Ewigkeit, Du lebst in unserem Herzen
1981-1990	
Die Seele ist nie ohne Geleit der Engel	Im stillen Gedenken, Dem Auge fern, dem Herzen nah, In Liebe, Wo immer die Sonne untergeht..., Wir vermissen Dich, Wenn die Liebe einen Weg zum Himmel fände ...
1991-2000	
Der letzte Sonnenstrahl macht erst bewusst wie kostbar der Tag war	Ich bin die Auferstehung und das Leben
Geliebt und unvergessen	Im stillen Gedenken
Gott rief zur Waidmannsruh	Unvergessen
2001-2010	
Geliebt und unvergessen, Erinnerungen sind kleine Sterne...	Marie

Hier ruht in Gott ... Pastor in Wincheringen von ...	Menschen die wir lieben bleiben für immer in unserem Herzen
Hier ruht in Gott...	MGV Mosella Wincheringen 1904 e.V.
Ihr fehlt uns	Wir vermissen Dich
Leg alles still in Gottes Hände. (...)	
2011-2018	
2x Im stillen Gedenken	Gehe hin in Frieden, Im stillen Gedenken
2x: Im stillen Gedenken	Hier ruht in Frieden...
Der Glaube gibt uns Kraft	Hier ruht in Gott
Die Seele ist nie ohne Geleit der Engel, Das Leben ist vergänglich (...), Du fehlst uns	Ruhe in Frieden
Eine Stimme die uns vertraut war schweigt, ein Mensch der uns lieb war ging von uns. (...)	Wir haben irgendwann wieder jede Menge Zeit

With regards to the actual names that appear on the monuments, a number of these appear to be of French and/or Luxembourgish origin. However, the author of this thesis cannot possibly be sure of such a finding without making himself guilty of stereotyping, which must be avoided. None of the names appear to be particularly foreign, i.e. outside the expected spectrum within the Luxembourg-German border region, if such judgement is permitted. Generally, these names appear to be the kind of names one would expect at such a cemetery in a border region. Certain names appear to show up more often than other, albeit at times with different spelling, which could indicate towards families that have been residing at this particular location for a longer period of time and, thus, are more represented than others over a longer period of time. However, as mentioned before, it is impossible to be sure of such an interpretation without studying the civil registers. Morever, the incidents are too rare to permit statistical and/or spatial analysis.

Figure 150 shows the heatmap for the maiden names in Wincheringen; Figure 151 shows the heatmap for other names.

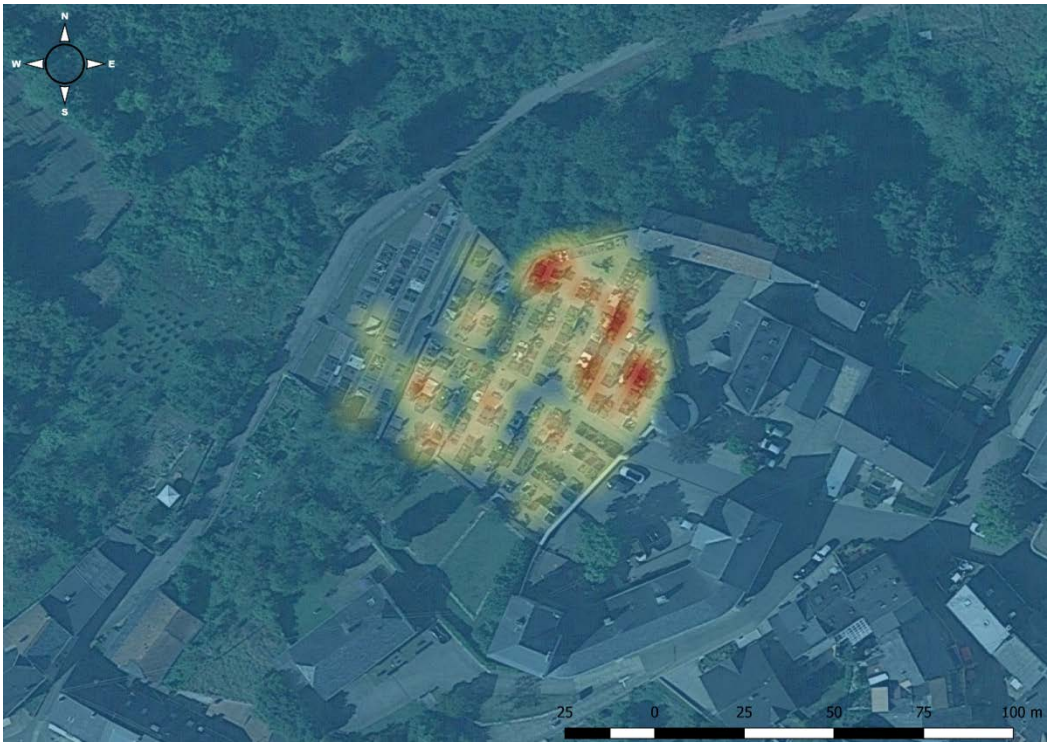


Figure 150: Heatmap of maiden names at Wincheringen.

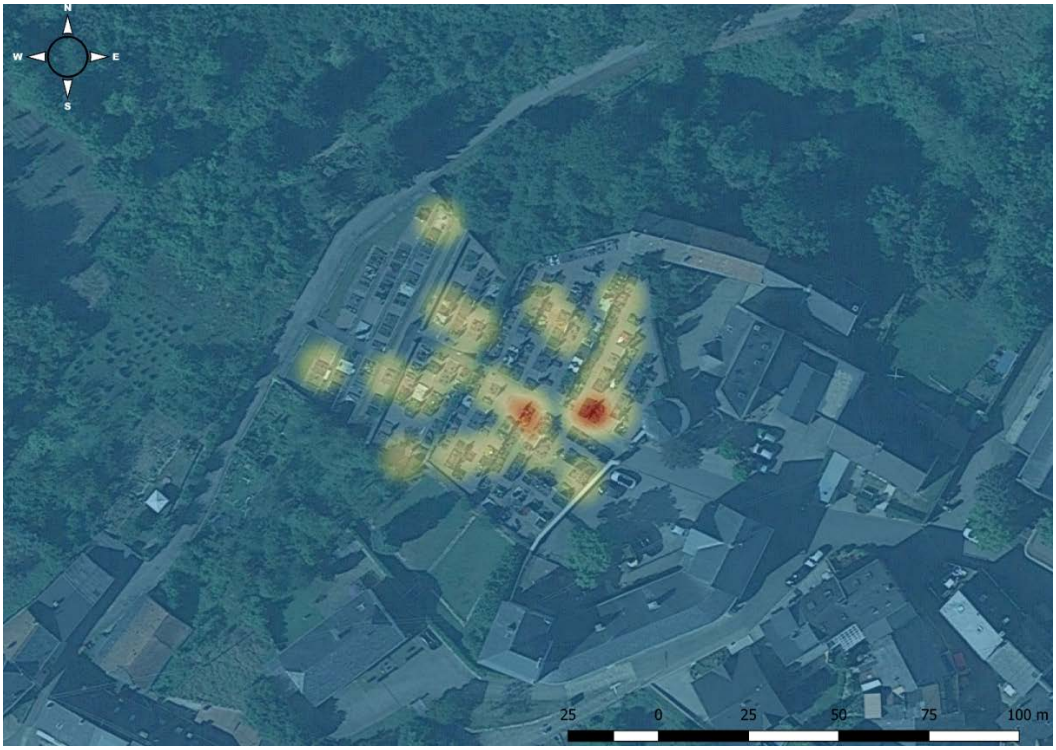


Figure 151: Heatmap of other names at Wincheringen.

Again, a concentration appears to be visible. For the maiden names, the nearest neighbour analysis shows an expected MD of 4.67940378027748 and an observed MD of 4.981338120671082, thus a Z-score of 1.025362468445001. For the other names, the expected MD is 8.003569138395143 and the observed MD is 10.178968848439668, resulting in Z-score of

2.4937342279285684. In both cases this would indicate no clustering; it would actually indicate quite the opposite.

For Konz, like in Wincheringen, no plural form of family is mentioned (Figure 152). It appears as if this would be uncommon for the German sample. However, the mentioning of family appears to peak during the 1940s and then slowly declines until the present. Yet again, the relative numbers of each decade are low.

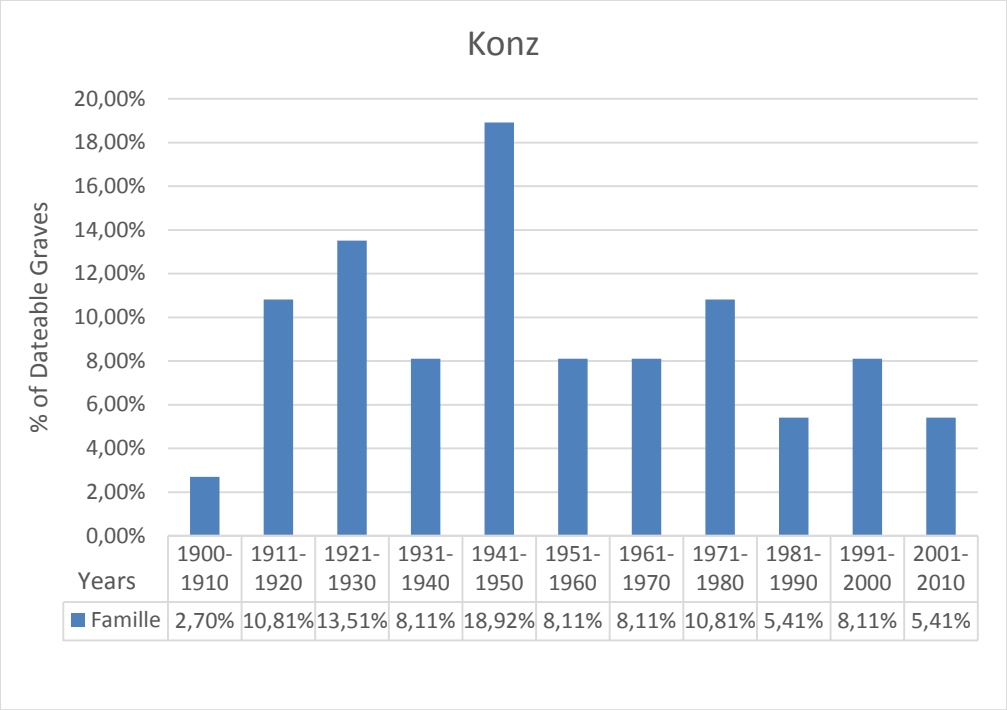


Figure 152: Percentage of graves/grave markers inscribed with family names at Konz.

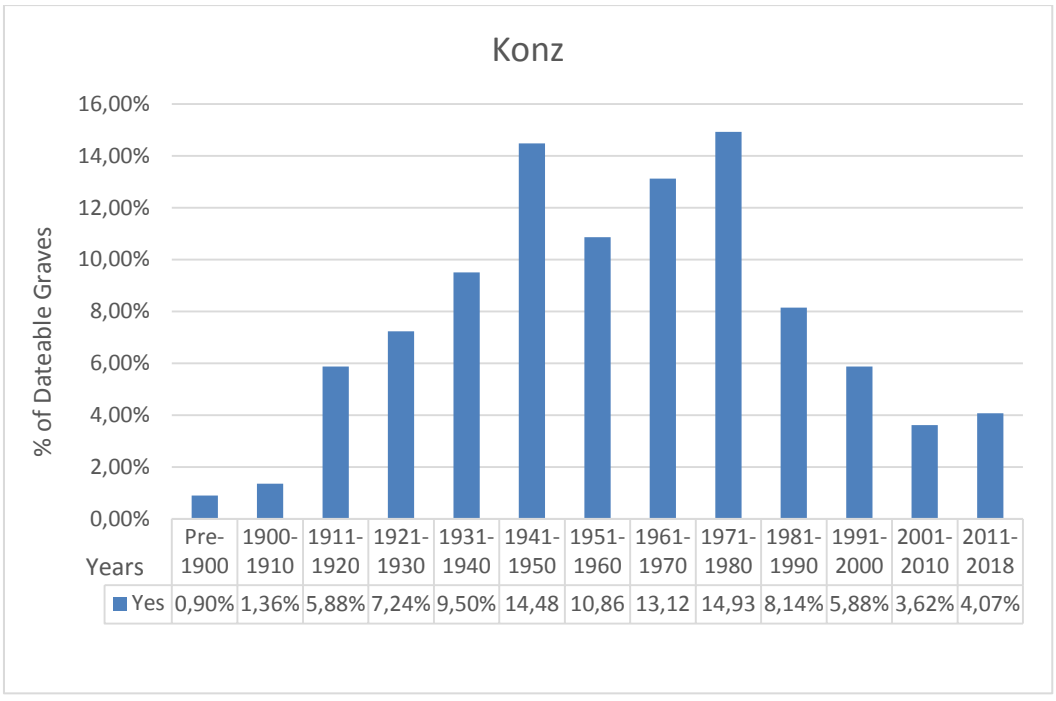


Figure 153: Percentage of graves/grave markers inscribed with a maiden name at Konz.

Similarly, the mentioning of a maiden name on the grave or grave marker peaked between the 1940s and 1970s, only to decline from there onwards to a very low level (see Figure 153).

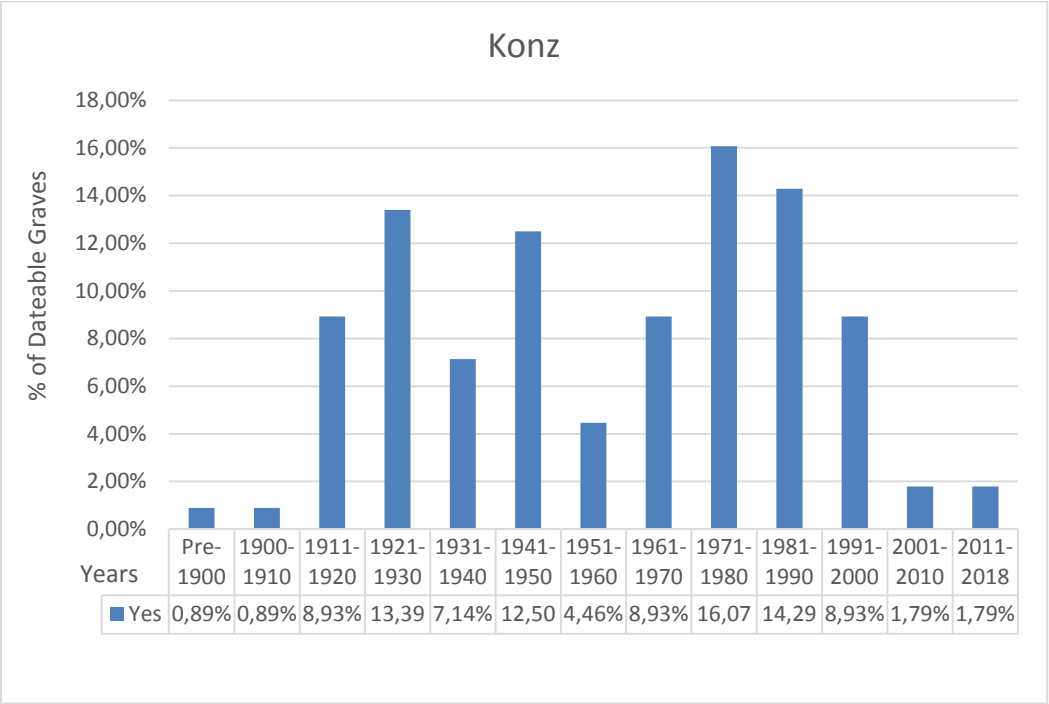
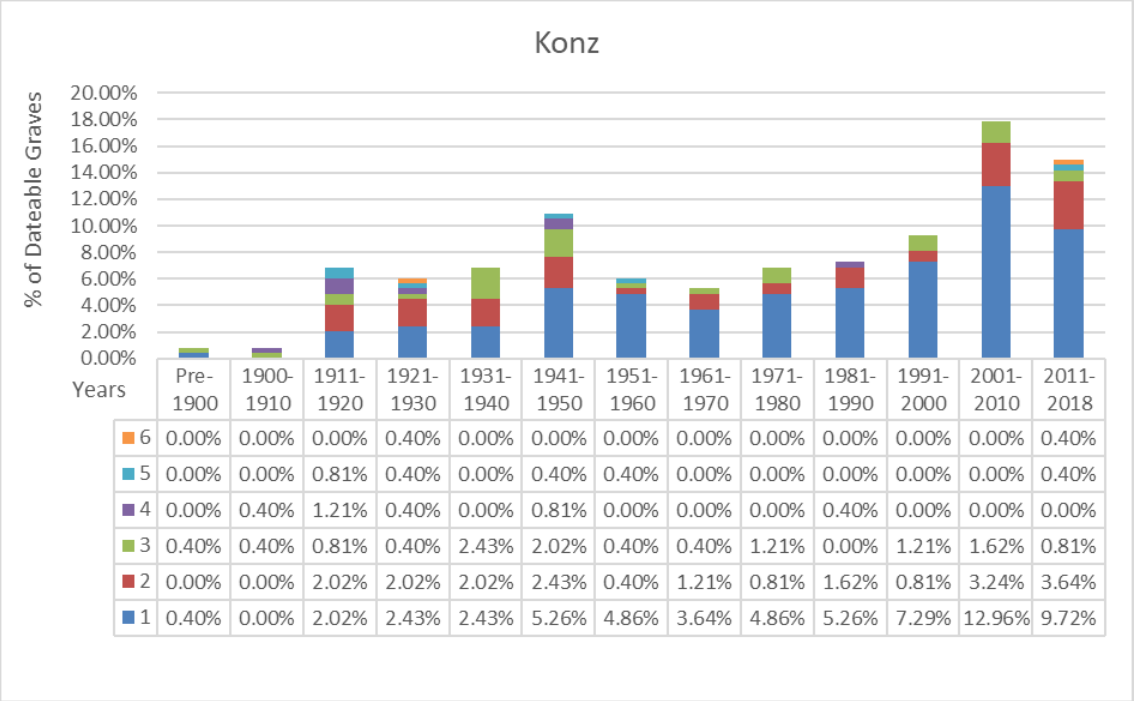


Figure 154: Percentage of graves/grave markers inscribed with other names inscription at Konz.

It is more difficult to identify a peak or a steady increase or a decline for the mentioning of other names on the grave or grave marker (Figure 154). No clear trend can be determined for the entire 20th century grave sample. It appears to alternate significantly from decade to decade with percentages at relatively low levels.

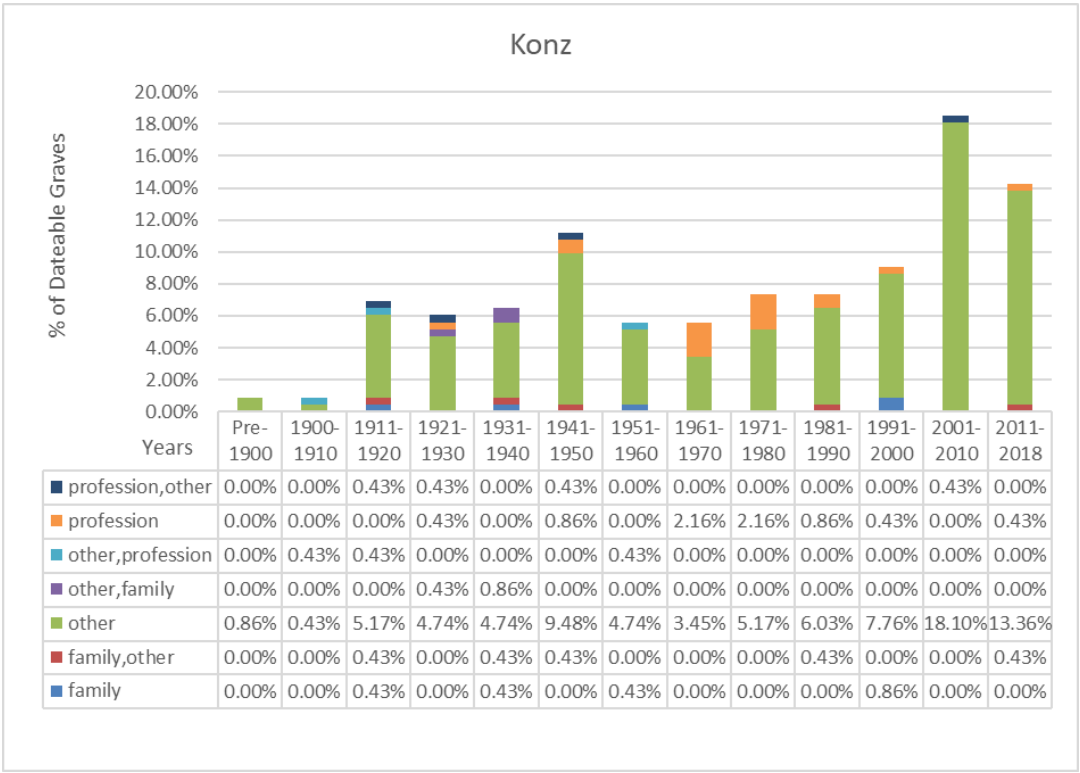
Regarding the number of inscriptions, provided that there are inscriptions (Figure 155), there appears to be a slight trend towards a total increase over the decades, while graves/grave markers with several inscriptions appear to be higher on older graves. Possibly, inscriptions were more common during the early 20th century. However, with more recent graves there appears to be a need again to express certain issues that are beyond standard information.



Years	Pre-1900	1900-1910	1911-1920	1921-1930	1931-1940	1941-1950	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2010	2011-2018
6	0.00%	0.00%	0.00%	0.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.40%
5	0.00%	0.00%	0.81%	0.40%	0.00%	0.40%	0.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.40%
4	0.00%	0.40%	1.21%	0.40%	0.00%	0.81%	0.00%	0.00%	0.00%	0.40%	0.00%	0.00%	0.00%
3	0.40%	0.40%	0.81%	0.40%	2.43%	2.02%	0.40%	0.40%	1.21%	0.00%	1.21%	1.62%	0.81%
2	0.00%	0.00%	2.02%	2.02%	2.02%	2.43%	0.40%	1.21%	0.81%	1.62%	0.81%	3.24%	3.64%
1	0.40%	0.00%	2.02%	2.43%	2.43%	5.26%	4.86%	3.64%	4.86%	5.26%	7.29%	12.96%	9.72%

Figure 155: Percentage of graves/grave markers showing a specific number of inscriptions at Konz.

When it comes to which topics are inscribed, Figure 156 shows that the category of other topics, which, due to the data collection procedures, includes profane, emotional or even religious issues, appears to become more dominant on more recent graves, while the category profession and/or family was more relevant during the beginning and the middle of the 20th century.



Years	Pre-1900	1900-1910	1911-1920	1921-1930	1931-1940	1941-1950	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2010	2011-2018
profession,other	0.00%	0.00%	0.43%	0.43%	0.00%	0.43%	0.00%	0.00%	0.00%	0.00%	0.00%	0.43%	0.00%
profession	0.00%	0.00%	0.00%	0.43%	0.00%	0.86%	0.00%	2.16%	2.16%	0.86%	0.43%	0.00%	0.43%
other,profession	0.00%	0.43%	0.43%	0.00%	0.00%	0.00%	0.43%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
other,family	0.00%	0.00%	0.00%	0.43%	0.86%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
other	0.86%	0.43%	5.17%	4.74%	4.74%	9.48%	4.74%	3.45%	5.17%	6.03%	7.76%	18.10%	13.36%
family,other	0.00%	0.00%	0.43%	0.00%	0.43%	0.43%	0.00%	0.00%	0.00%	0.43%	0.00%	0.00%	0.43%
family	0.00%	0.00%	0.43%	0.00%	0.43%	0.00%	0.43%	0.00%	0.00%	0.00%	0.86%	0.00%	0.00%

Figure 156: Percentage of graves/grave markers showing a certain typology of inscriptions at Konz.

One needs to note again that a number of categories are aggregated, i.e. a category contains several different items of, for example, professions. For researchers more interested in analysing grave marker inscriptions, a more detailed data collection is advisable in future studies, something that the Cemetery Surveyor Application (CSA) could be adapted for.

The chronological distribution of the acronym R.I.P. is shown in Figure 157. Interestingly, while this increased during the early 20th century and peaked during the 1930s, in the most recent sample of the last decade almost a quarter of all graves dateable in that particular decade shows R.I.P. in a certain form.

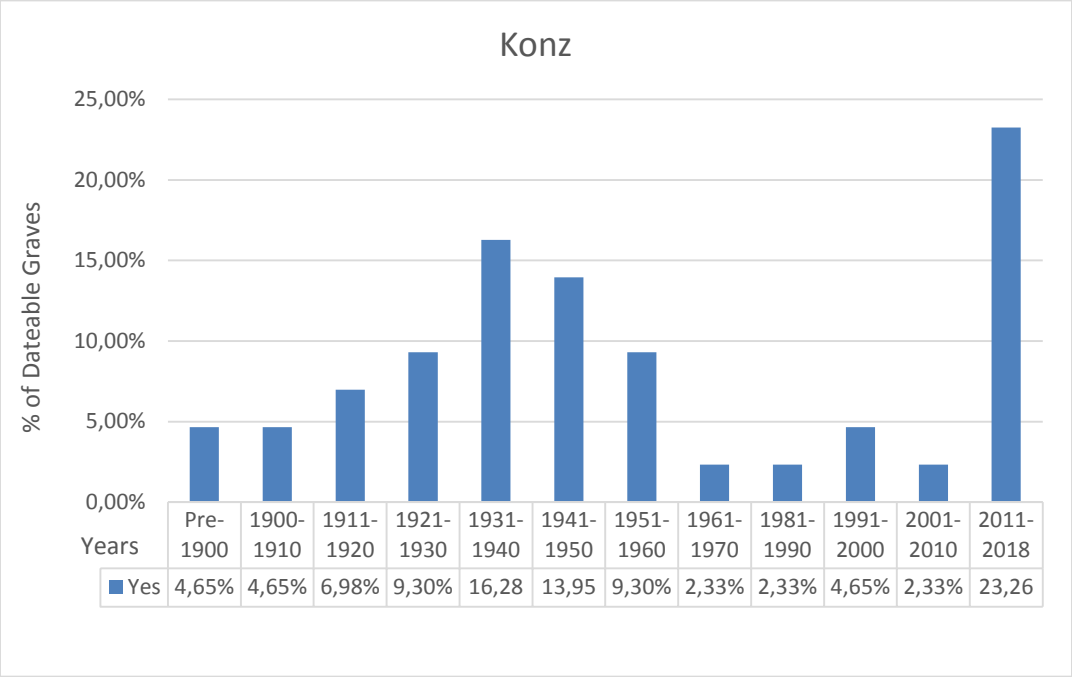


Figure 157: Percentage of graves/grave markers inscribed with R.I.P. at Konz.

The actual inscriptions summarised in Table 13 allow for the notion that not only the mentioning of active military duty but also religious connotations were more common until the second half of the 20th century, while more recent graves show more emotional and profane inscriptions. However, these types of inscriptions are equally repetitive, potentially indicating a large number of mass-produced items on the graves that bear standardised phrases. Noteable is a French, a Hebrew, a Latin, a Chinese and an Arab inscription. While this is distinct from the cemeteries discussed before and might indicate a much more diverse population here, it needs to be stressed that these are still single cases and that no pattern is visible.

Table 13: Inscriptions at Konz cemetery.

Pre-1900	1900-1910
Hier ruhen in Gott, Hier ruhen in Frieden	Hier ruhen in Gott, Ruhe Sanft!
RIP	Lehrerin, gef. in Russland

1911-1920	1921-1930
Beigesetzt in Rom, Zum Andenken an...Er starb den Heldentod am ... und ruht in Frankreichs Erde, Priester	2x Hier ruhen in Gott
Ego eram quid tu es, tu eris quid ego sum, Du bist in unserem Herzen	Erbauer der...
Hier ruhen in Gott	gest. in Frankreich
Hier ruhen in Gott, A mon Beau Frere, A notre Oncle	Hier harren der Auferstehung
Hier ruhen in Gott, RIP	Hier ruhen in Gott
Hier ruhen in Gott, Zum frommen Andenken an, In Mühlhausen im Elsass	Hier ruhen in Gott und harren der Auferstehung, meine liebe Gattin, unsere liebe Mutter, unser lieber Vater, Zum Andenken an unseren lb. Sohn u. Bruder, INRI
Hier ruht, Zum steten Gedenken, Geb. in Conz, Dep 1942, Gefallen	Hier ruhen in Gott, Gef. ... i. Russl.
INRI, Hier ruhen in Gott	Hier ruhen in Gott, INRI
INRI, Hier ruht in Gott, Kan.Fuu.-Art.Regt. 9 ... gestorben in Folge Kriegsverletzung..., Barmherzig	Hier ruht unsere innigst geliebte Mutter und Grossmutter, Ruhe in Frieden, Zum Frommen Gedenken an..., gestorben, gefallen, Auschwitz, Hebrew inscription
INRI, Kinder	INRI
INRI, Ruhestätte	Ruhestätte, Rb.Ob. Kass. Vorst. a.D., INRI
RIP, INRI	Zur Erinnerung an
Ruhestätte	
Ruhestätte, Zum Andenken an unseren lb. Bruder, Lehrer	
1931-1940	
2x Hier ruhen in Gott	Hier ruht unsere liebe Mutter Frau Witwe, im Alter von 84 Jahren, Hebrew
Hier ruhen in Gott	INRI
Hier ruht in Gott mein lieber Gatte, Hier ruht in Gott unsere liebe Tante	INRI, Ruhe in Frieden
Hier ruht in Gott meine liebe Gattin, unsere gute treusorgende Mutter, Ruhe in Frieden	Ruhestätte, 2x Hier ruhen in Gott
Hier ruht mein guter Mann, unser lieber Vater, Er ruhe in Frieden, Hebrew	Zum Gedenken an
Hier ruht unser geliebter Vater, Ruhe in Frieden, Hebrew	
1941-1950	
2x Hier ruht in Gott	Hier ruht in Gott
2x Hier ruht in Gott, Zum Andenken an	illegible
2x RIP, Zum Andenken an, Hier ruht in Gott	Im Frieden Gottes harren der Auferstehung, In Erinnerung, Pastor, Trier St. Valerius
A notre cher papa, A mon oncle..., A notre oncle..., A notre cher Louise, A notre belle soeur	INRI
Du lebst in unserem Herzen	INRI, Hier ruhen in Gott
Etwas von dem, was Du...	INRI, Hier ruhen in Gott, Diakon
Euch ist der Unheilig der Teil an der ersten Auferstehung	Ogfr., Uffz.
Frieder	Ruhestätte
Hier ruhen in Frieden	Ruhestätte, Zum Gedenken, Gef.
Hier ruhen in Gott	verm.
Hier ruhen in Gott, verm.	verw.
1951-1960	**1961-1970**

Gott rief zur Ruhe	Dipl. Ing.
Hier ruhen in Gott	Friede
Hier ruht in Gott 2x, Lokf. i. R., INRI	Gott sprach das Grosse Amen
Hier ruht in Gott mein geliebter Mann unser herzensguter Vater, Hier ruht in Frieden unsere geliebte Mama und Oma	Hier ruhen in Gott
In Gottes Frieden	Hier ruhen in Gott, Oberregierungsrat A.D.
Otto verm. in Russland	Hier ruht in Gott
RIP	In Gedenken
Ruhe Sanft!	In Liebe
Ruhestätte, Ehrenbürger der Stadt Konz	Lehrer i.R.
	Oma …, Susi, Isidor
	Regierungsinspektor
	Zahnarzt (2x)
	Zum Gedenken
1971-1980	**1981-1990**
2x Hier ruht in Gott, Ruhestätte	A notre Ami Souvenir, Sc Amis ca Brenon Souvenir
Chinese inscription	Die Erinnerung ist ein Fenster...
Die Liebe weint der Glaube sieht empor...	Dr.
Dr.	Dr.med.Dr.med.dent.
Dr. Med. 3x	Ein Engel schütze Dich, verw., In stillem Gedenken, In stiller Trauer
Dr.Agr.	Gott rief zur Ruhe
Dr.med.	Hier ruht in Frieden
Du bist in unserem Herzen, Geliebt und Unvergessen, Ich vermisse Dich	Hier ruht in Gott
Du fehlst uns	illegible
Gott rief zur Ruhe	illegible
Hier ruhen in Gott	In ewiger Liebe
In stillem Gedenken	In lieber Erinnerung, Unvergessen
In stiller Erinnerung	In liebevoller Erinnerung
Pfarrer	INRI
Unvergessen	INRI, Hier ruhen in Gott
Was ihr seid das waren wir was wir sind das werdet ihr, Unvergessen	Ruhestätte
Wenn der gebundene Körper zerfällt...	
1991-2000	
A Notre Mere, A notre Grandmere, H.D.	Ida u. Wilhelm …
Arab. inscription	illegible
Cous ne vous oullierons jemais	In stillem Gedenken
Das Leben ist vergänglich! Aber Du bleibst in unserem Herzen!	INRI
Du bringst mein Herz zum Lächeln	INRI, Ruhestätte, Hier ruht in Gott
Ein Engel schütze Dich, Du bleibst für immer in unserem Herzen	Lehrerin i.R.
Für Dich	Ruhe in Frieden
Geschwister	Wenn die Zeit endet, beginnt die Ewigkeit
Hier ruht in Frieden	Wir vermissen Dich
Hier ruht in Gott	
Ich denk an Dich	
2001-2010	

A ma maman A notre grand mere	In stillem Gedenken
Auf Wiedersehen im Himmel	IXOYS, Dr.med.
Das Leben ist vergänglich! Aber Du bleibst in unserem Herzen	Johann u. Josefine …
Dem Auge fern, dem Herzen immer nah	Liebe braucht keine Worte, Du fehlst so sehr, Geliebt und unvergessen
Der Tod ist...	Liebe ist die Brücke zur Ewigkeit, In stillem Gedenken
Die Sonne sank bevor es Abend wurde	Menschen die wir lieben bleiben für immer denn sie hinterlassen Spuren in unserem Herzen
Du bist in unserem Herzen	Menschen die wir lieben bleiben für immer in unserem Herzen
Ehrenbürger der Stadt Konz	Psalm 23
Ein bisschen mehr..., Wir vermissen Dich, In stillem Gedenken	Rene B. … 36 J
Engel sehen nicht die äussere Gestalt sondern das Wesen der Dinge	Ruhe in Frieden
Franz u. Klara …	Ruhe in Frieden, Wir vermissen Dich
Geliebt und Unvergessen	Ruhe sanft
Hier ruhen in Gott	Ruhe Sanft, In stillem Gedenken
Hier ruht	Souvenier de Lourdes
Hier ruht in Frieden, In ewiger Erinnerung	Unser täglich Brot
Hier ruht in Gott	Unvergessen
Ich denk an Dich	Unvergessen, In stillem Gedenken
Im Gedenken Georg u. Josefine …	Wir vermissen Dich, Der Glaube gibt uns Kraft, In Liebe geboren In Liebe Gelebt In Liebe gestorben
In ewiger Liebe	Wir werden Dich nie vergessen, In liebevoller Erinnerung
In Liebe	
In Liebe, Geliebt...	
2011-2018	
2x Ich vermisse Dich, Weltbester Opa	Hier ruht in Gott
born, died	Hier ruht in Gott (2x)
Das Leben endet, die Liebe nicht	Hier ruht in Gott, In stillem Gedenken
Das Leben ist vergänglich Aber Du bleibst in unserem Herzen	illegible
Das Leben ist vergänglich! Aber Du bleibst für immer in unserem Herzen	Im Gedenken
Das Leben ist vergänglich! Aber Du bleibst in unserem Herzen.	Im stillen Gedenken, Dem Auge fern dem Herzen nah
Dr.	In Liebe, Holger, Jutta, Alina, Sandra, Du bist nicht mehr da wo du warst aber du bist überall wo wir sind
Du bist nicht mehr dort wo du warst aber du bist überall wo wir sind	In lieber Erinnerung
Du lebst in unserem Herzen	In liebevoller Erinnerung, In stillem Gedenken
Du lebst in unserem Herzen, Semper Vivum	In stillem Gedenken
Es bleibt die Erinnerung	Mama & Papa Menschen die wir lieben bleiben für immer denn sie hinterlassen ihre Spuren in unserem Herzen
Es wehr der Wind (...) In Erinnerung an unseren Geliebten ..., In Liebe Papa und Mama, Unsere Gedanken begleiten Dich, Hainer und Petra	Nicht mehr bei uns aber für immer in unserem Herzen
Geliebt, beweint und unvergessen	Stärker als der Tod ist die Liebe
Hier ruht in Frieden	Wenn die Zeit endet beginnt die Ewigkeit

Hier ruht in Frieden, Wir vermissen Dich	Wenn die Zeit endet, beginnt die Ewigkeit, Dans mon coeur a jamais tu demeures
Ich vermisse Dich, Stärker als der Tod ist die Liebe	Wir werden Dich nie vergessen

Concerning the actual names to be found at the cemetery, it is, yet again, very difficult and inaccurate to make definite statements as to the origin of these names. Many sound German and a few appear to have a bit of French influence but that does not mean these people were not German. Remarkable, though, is the number of Thai or Vietnamese-sounding names. At least five such examples exist. It would require an analysis of further data to establish whether this indicates a significant Thai and/or Vietnamese population in Konz or whether this is a coincidence. Moreover, without contacting the families directly, the actual heritage cannot be clarified. However, this would require another methodological, ethical research approach, which is not covered by the thesis at hand. Last but not least, the cases are too rare to permit a stastical and/or spatial analysis.

Figure 158 and Figure 159 show the heatmaps for the maiden names and other names in Konz.

Figure 158: Heatmap of maiden names at Konz.

Figure 159: Heatmap of other names at Konz.

In this instance, concentrations also appear to be present. For the maiden names, the expected MD is 9.126151098254505, the observed MD is 5.726383086042544 and therefore the Z-score is -10.666366950884207, thus indicating a certain clustering. For the other names, the expected MD is 12.637991276877418, the observed MD 8.200435717085108, thus again indicating a strong clustering with a Z-score of -7.140618930966818. As a consequence, one could argue that certain areas of the cemetery show a certain concentration of linguistic characteristics.

The data for Walferdange, as explained before, were entered manually and exploratively, i.e. without the usage of the CSA. Consequently, the data for Walferdange differ somewhat from the data for the other three cemeteries. For example, the words *famille* and *familles* are mentioned separately and, consequently, the manner in which these words are presented here is the manner in which the data were collected.

Concerning the use of the words *famille* and *familles*, Figure 160 and Figure 161 show that in both instances the use of these words peak during the 1960s and 1970s and then decline again.

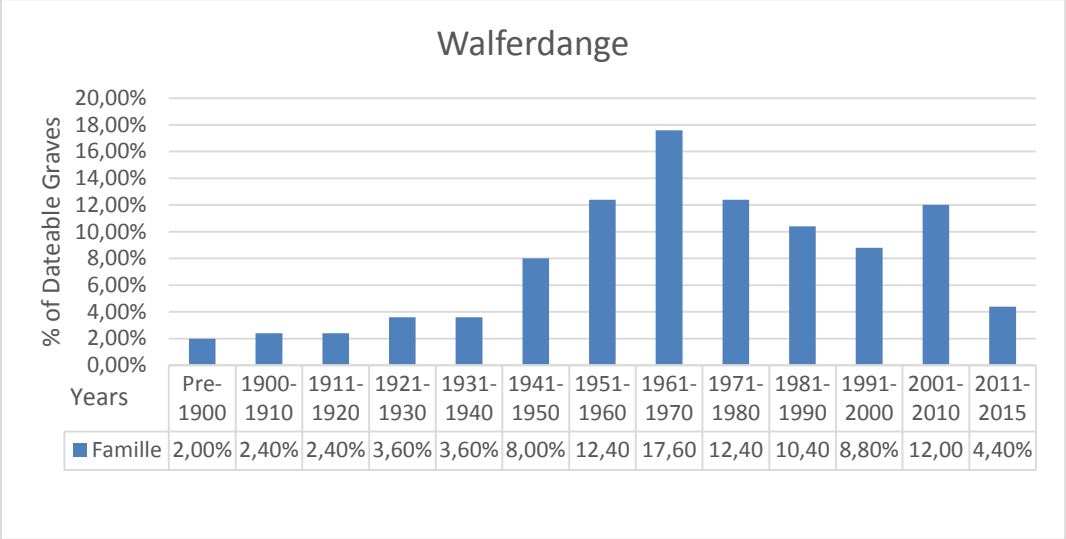


Figure 160: Percentage of graves/grave markers inscribed with the word *famille at Walferdange.*

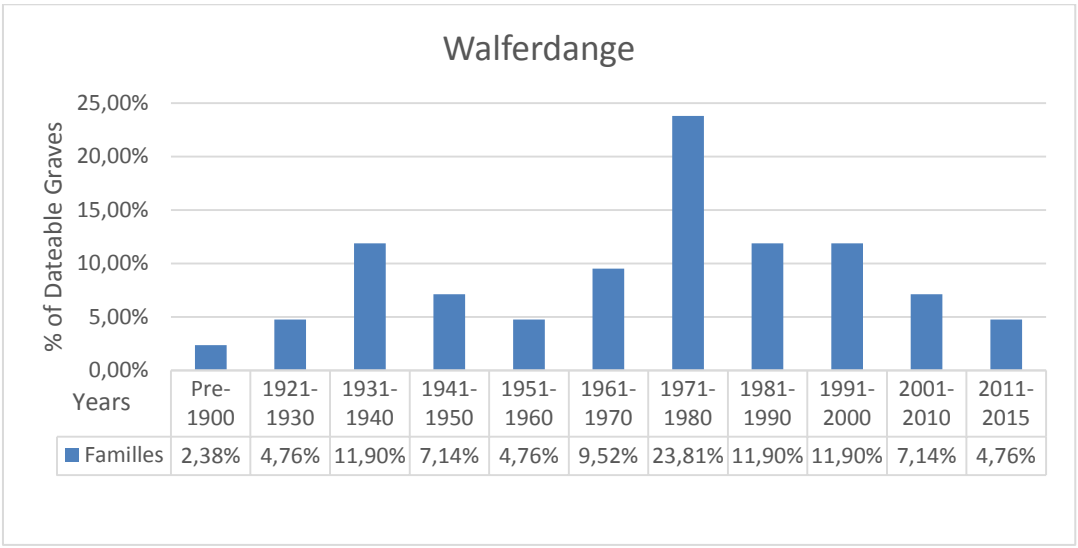
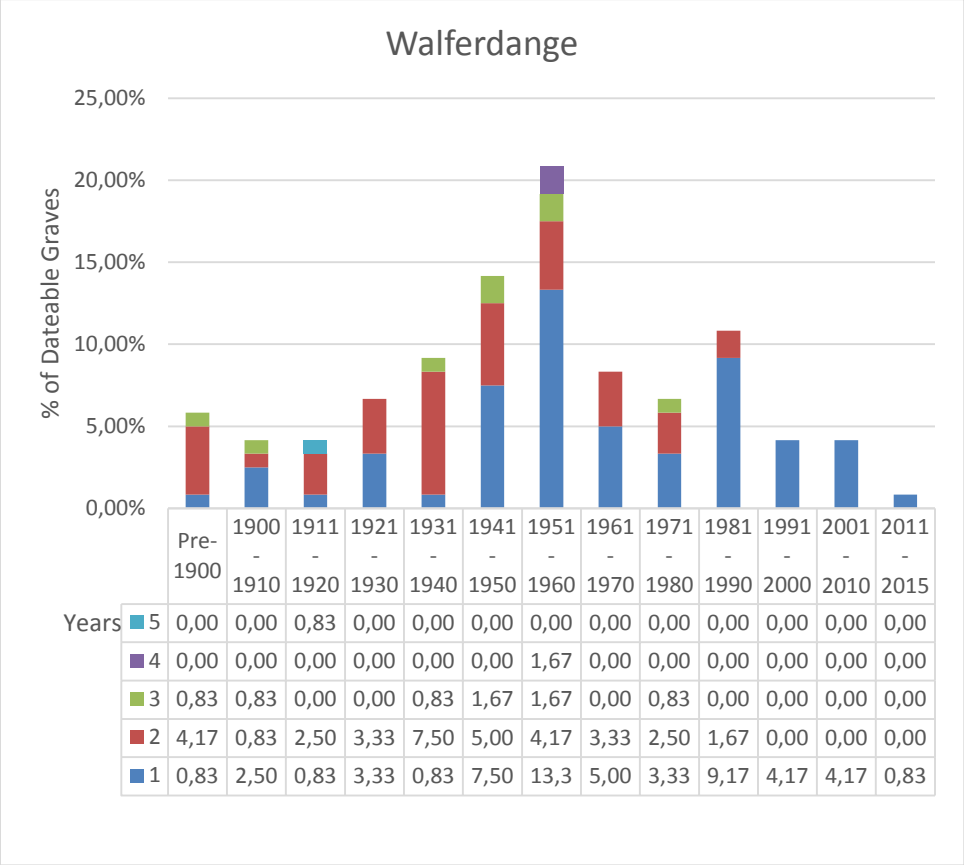


Figure 161: Percentage of graves/grave markers inscribed with the word *familles at Walferdange.*

In each of the decades presented in Figure 160 and Figure 161, the number of graves inscribed with either *famille* or *familles* can even be higher than a third. Compared to the other cemeteries, this is remarkable.

Figure 162 shows how many times maiden names are used, i.e. the figure not only shows whether maiden names are inscribed but also how often on each grave and/or grave marker.



Years	Pre-1900	1900 - 1910	1911 - 1920	1921 - 1930	1931 - 1940	1941 - 1950	1951 - 1960	1961 - 1970	1971 - 1980	1981 - 1990	1991 - 2000	2001 - 2010	2011 - 2015
5	0,00	0,00	0,83	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4	0,00	0,00	0,00	0,00	0,00	0,00	1,67	0,00	0,00	0,00	0,00	0,00	0,00
3	0,83	0,83	0,00	0,00	0,83	1,67	1,67	0,00	0,83	0,00	0,00	0,00	0,00
2	4,17	0,83	2,50	3,33	7,50	5,00	4,17	3,33	2,50	1,67	0,00	0,00	0,00
1	0,83	2,50	0,83	3,33	0,83	7,50	13,3	5,00	3,33	9,17	4,17	4,17	0,83

Figure 162: Percentage of graves/grave markers inscribed with a specific number of maiden names at Walferdange.

While a single use of a maiden name is most common, especially graves that date from the first half of the 20th century or even from the 1960s show an even more regular use of more than one or even up to five maiden names. However, this practice appears to decline from the 1960s onwards.

Names other than the main family name or the deceased's name that can be found, are indicated in Figure 163. It appears as if this custom is also in this instance more popular amongst graves that date from the first half of the 20th century or from the 1960s with up to four additional names, a practice that is not present at the most recent graves. The reason for this could again be that many graves in Walferdange are family graves in which several generations can be buried, also with changing family names.

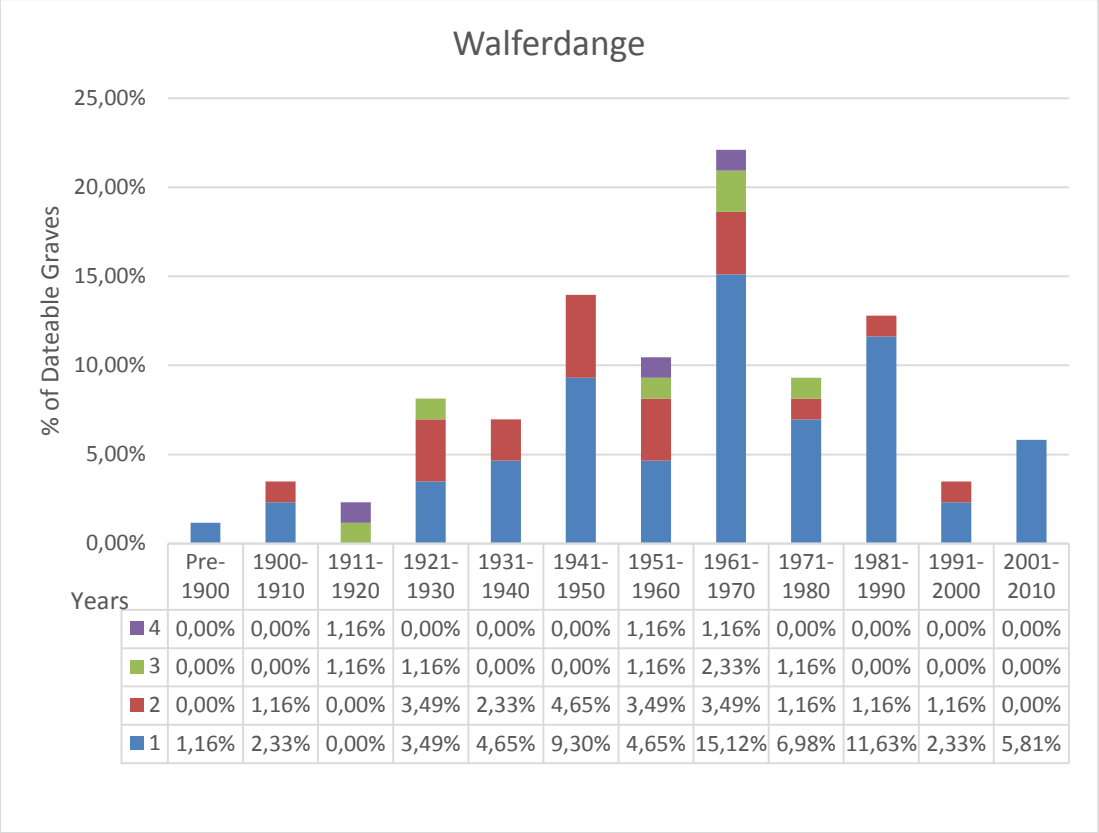


Figure 163: Percentage of graves/grave markers inscribed with other names at Walferdange.

The number of inscriptions can be seen in Figure 164. Interestingly, while relatively older graves show several inscriptions, – and there is a peak during the 1940s, – the 2000s peak with regards to the total number and the largest number of inscriptions in general. A possible explanation for this is that older graves historically show more inscriptions, while for the more recent graves emotions, such as loss and grief, tend to be articulated more, simply because the occasion is closer to the bereaved.

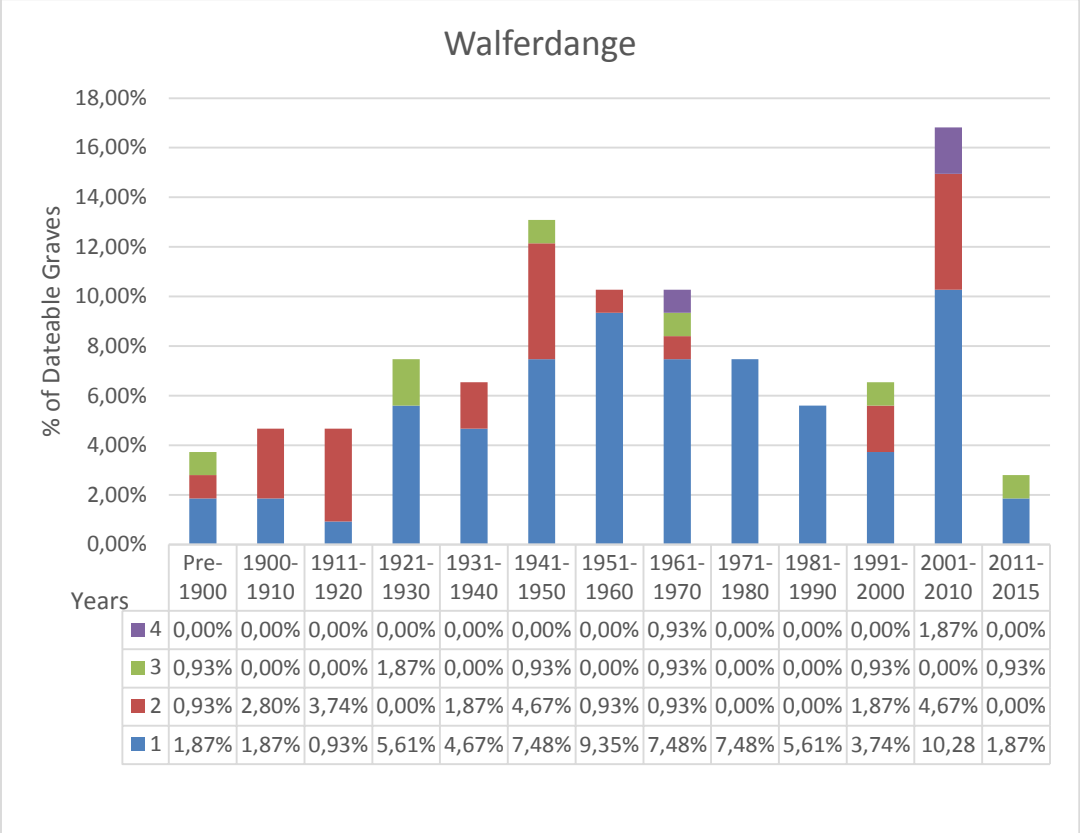


Figure 164: Percentage of graves/grave markers with a certain number of inscriptions at Walferdange.

Figure 165 to Figure 166 show the types of inscriptions, i.e. whether they are family or profession related or whether they fall into any other category, such as emotion, religion, etc. For all these types of inscriptions, it is not only shown that such a phenomenon was recorded but also how often it was recorded and in one instance even the actual text was noted. The record of the actual text was kept in this chart to also indicate the explorative approach of the Walferdange pilot study. Unfortunately, the value of the data for inscriptions related to family and profession is very weak. For the category profession, the examples are so few that the relative values for the relevant decades of occurrence are extremely high. Similarly, actual absolute numbers are very low and even relative numbers show very low values for inscriptions that are family and profession related. This is different for the category other, as can be seen in Figure 167. While several inscriptions are not so common, there is a peak in total inscriptions and single inscriptions during the 1940s and 2000s.

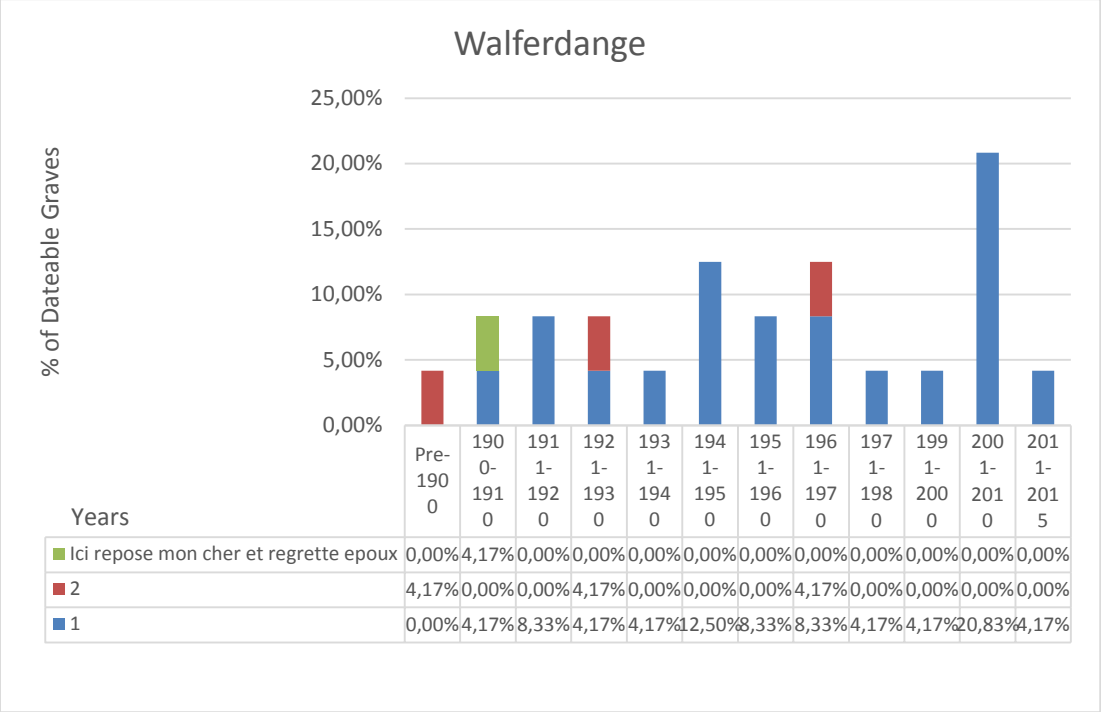


Figure 165: Percentage of graves/grave markers with family-related inscriptions at Walferdange.

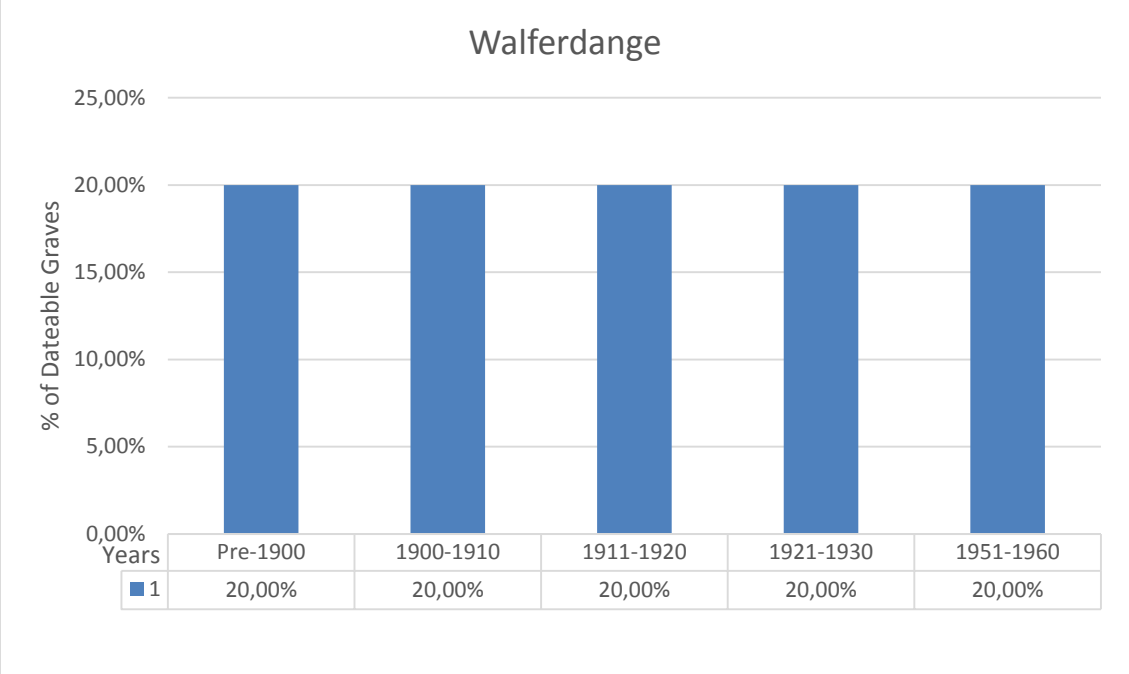


Figure 166: Percentage of graves/grave markers with profession-related inscriptions at Walferdange.

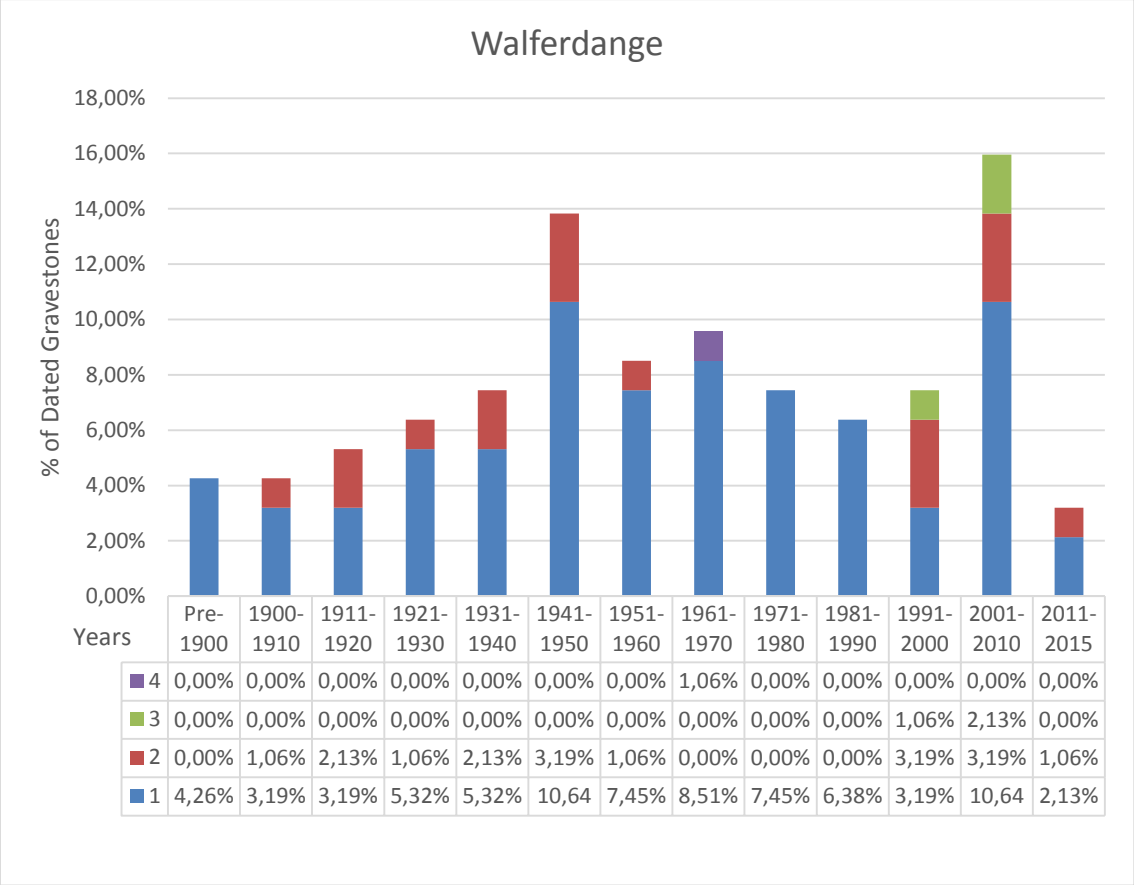


Figure 167: Percentage of graves/grave markers with other inscriptions at Walferdange.

The acronym R.I.P. in Figure 168 is coded as 10a-RIP in the pilot project Walferdange and shows a more or less stable occurrence throughout the decades, peaking during the 1930s and disappearing since the 1980s.

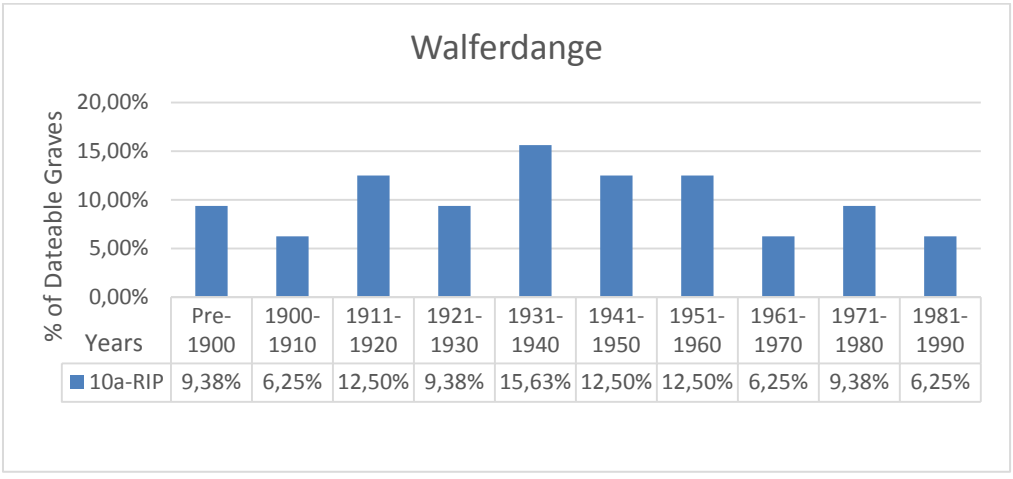


Figure 168: Percentage of graves/grave markers inscribed with R.I.P. at Walferdange.

The inscriptions summarised in Table 14 are noteworthy, as they are an interesting mix of French and German, with a French dominance especially during the second half of the 20th century in this sample. Three Chinese inscriptions on one of the more recent grave markers are also noteworthy.

Table 14: Inscriptions at Walferdange cemetery.

Pre-1900	1921-1930
Selig sind die Toden, die im Herrn sterben/Denn der Geist spricht sie ruhen von ihrer Arbeit / Apoc.XIV.13. (Offenbarung 14, 13: Und ich hörte eine Stimme vom Himmel zu mir sagen: Schreibe: Selig sind die Toten, die in dem HERRN sterben von nun an. Ja, der Geist spricht, daß sie ruhen von ihrer Arbeit; denn ihre Werke folgen ihnen nach.	epouse en sec. Noces
	age de huit jours
	Ici reposent
	R.I.P.
	Déc. à Lourdes
	A la mémoire de
A notre Tante - Bien Aimée	
Hier ruhen im Frieden/Die sterblichen Ueberreste des im Herrn entschlafenen Ehemann P. …-A. … von Walferdingen	
1941-1950	**1991-2000**
Ruhe in Frieden	Concession à perpétuité
In unseren Herzen lebst Du weiter	R.I.P.
epouse en seconde noces	A la mémoire des Familles
1961-1970	De Khorramshar a Paris, de Tananarive a Adua, d'Ifrane a Taourirt, de Casablanca a Walferdange il a soigne les coprs et les ames
Concession à perpétuité	De l'Iran a l'Ethiopie, du Maroc au Luxembourg elle a servi l'humanite
Matadi-Congo Belge	Ô fils de l'homme! Tu es mon bien, et mon bien ne périt pas ; pourquoi donc crains-tu de périr ? Tu es ma lumière, et ma lumière ne s'éteindra jamais ; pourquoi crains-tu l'extinction ? Tu es ma gloire, et ma gloire ne se ternit pas ; tu es ma robe, et ma robe jamais ne s'usera. Reste donc ferme en ton amour pour moi, afin que tu puisses me trouver au royaume de gloire. Baha Ullah
Colmar-Berg	
Im stillem Gedenken	
Im Gedenken	
In Liebe	
2001-2010	**2011-2015**
Le temps passe le souvenir reste	Chinese
A mon Epoux Anotre Papa; Que Ton repose soit doux comme bon com cour fut bon	Chinese
Reposit au Pax	Chinese
Partiste semte despedir deixaste-nos na solidao deus te tenha no ceu como nos no coracao	
In unseren Herzen lebst Du weiter	
Un Ange au ciel	

With regards to the actual names that are mentioned on the monuments, these do not differ from the author's expectations with regards to a Luxembourgish sample, i.e. a German and French speaking influence, with a few names that that appear to be unusual. At first glance, these names might have an Italian, Portuguese, Iranian and Chinese origin. However, the author cannot be sure of such interpretation without further study of the specific family background. Nonetheless, the number of such names might indicate a strong immigration influence that is already visible in this particular cemetery, particularly from Southern European countries.

Figure 169 and Figure 170 show the heatmaps for the maiden names and other names for which one occurence is indicated.

Figure 169: Heatmap of maiden names at Walferdange.

Figure 170: Heatmap of other names at Walferdange.

The nearest neighbour analysis reveals that, for the maiden names, there is an expected MD of 6.341866155423172 and an observed MD of 4.784998513433, thus a Z-score of -4.01260983450675, indicating clustering well beyond the 99% threshold. For the other names, the expected MD is 7.002715223777404, the observed MD 5.846749180269035, resulting in a Z-score of 2.4461614601865733, slightly less than the 99% threshold. This points towards clustering in that instance. It is not clear though, why in the above stated samples of Konz and Walferdange, spatial analysis indicates clustering, while in the other cases it does not. The most likely explanation is the larger number of observed cases at the two larger cemeteries.

It needs to be emphasized, though, that analysing text and/or inscriptions via the analytical approach displayed in this thesis, is extremely difficult and most likely not constructive. As can be seen on many examples of modern, Anglo-American and Western European grave monuments, inscriptions become more and more standardized and brief. Gaining any distinct information from such text is almost impossible. Notable exemptions from such a trend represent single cases and are thus not comparable. Elaborated inscriptions, if they appear, would need to be analysed individually on a case basis, an approach that goes well beyond the scope of this thesis. Thus, the author would recommend such subject to further research.

As is evident from above, while the statistical results are certainly interesting and extensive, the spatial analysis did not produce a very clear picture. Certain items appear to be clustered, while others are certainly not. Depending on which confidentially interval is chosen, the results, as well as their explanatory power and confidence, varies. These results might appear somewhat

disappointing, as they do not support definite clustering and neighbouring effects over the larger part of the collected sample. However, the results need to be understood in the context of statistical analysis and also in the context of the very specific space a cemetery provides, with a relatively limited population present in each case. In order to shed light on the visible spatial concentrations of phenomena at the cemetery, as well as the rise, climax and decline curves that could be identified, – not unlikethose in the case of seminal literature, – it might be necessary to apply a different set of literature as will be attempted in the following chapter.

8. Extended Theoretical Discussion

The previous chapters presented and summarised the findings from the statistical and spatial data analysis. While these chapters focus on stating the findings without too detailed interpretations, they also contain a limited discussion and a few hypotheses about what these findings mean. However, the initial research questions of this thesis – as well as the more general objective to gain knowledge about how the observed graves' and grave markers' materiality and spatiality came into being and what, consequently, their relevance in explaining past socio-economic and socio-cultural transformations might be – remains and the findings need to be discussed in the context of more relevant literature in order to provide a more in-depth explanation and potential basis for further research. After all, the socio-cultural and socio-economic context within the region under scrutiny, as discussed before, has been remarkably similar, as the region shares a common history that extends over centuries. Moreover, the discussed guidelines stated in past and current cemetery regulations are not enough to account for the observed material and spatial assemblages. Hence, factors explaining the present material assemblage might need to be sought where so far neglected.

Firstly, it is important to acknowledge that the general method of chronological seriation of typologies, such as grave and grave marker types, could be, on a universal level, successfully applied in the context of this particular geographic region and historic time frame. In studying Luxembourgish and German cemeteries, it is possible to apply methods similar to the battleship-shaped diagrams in Mallios and Caterino (2011) or the graphs in Streb (2017) and to visualize the data. The observable chronological horizon might be less extended, compared to samples from other countries, but renovations of graves and monuments do, apparently, occur rarely enough, so the statics still produce valid results. Secondly, when considering the observed materiality over time, each cemetery depicts its unique combination of a certain material typology that makes it not only unique and identifiable, but also comparable. It is important to note that simply ranking specific types of graves, grave markers, crosses, stoups, etc., at a single cemetery over time is futile, unless one considers how similar or different a few cemeteries are, based on each cemetery's particular location. This leads to the third important finding, i.e. researchers can generally observe that the cemeteries on the same side of the border show more similarities to each other than to cemeteries that are located relatively closer across a national border. Scholars can deduce hypotheses based on the exact ranking, as well as the chronological appearance, rise and decline of the specific typology such that one can judge a cemetery's approximate location with a relatively high degree of certainty. At least – and this is the fourth interesting finding – the author can state that the German sample collected for this thesis shows more diversity between each other than the Luxembourgish sample, i.e. the Luxembourgish sample appears to be more homogenous than the German sample. In contrast, the Luxembourg sample contains types that

are more volatile than those in Germany, with several peaks of the top five types during the decades. An explanation for this could be the relatively larger number of family graves in Luxembourg, maintained over a longer period of time and renovated as well as redesigned according to current standards and fashion from time to time. This is much less common in Germany where most graves tend to be abandoned after their useful life after which they are eventually dismantled and reused. Hence, a type's clear first appearance, rise, peak and eventual decline cannot be clearly identified. The same types appear to be present throughout the observed time frame, especially in Luxembourg. However, as discussed before, despite this phenomenon, the relatively small number of cases this applies still permits the general application of the research approach, as long as certain precautions are executed by the research, as will be introduced before. Generally, researchers might explain this phenomena based on a chronological material analysis according to conventions, trends, fashions and subsequent emulation and spreading over time, which themselves might be related to socio-cultural and socio-economic transformations. The discussion below will extend these hypotheses.

Returning to the starting point of this study: As described in the introductory chapter, this thesis set out to attempt answering the following research questions:

- Does the research approach demonstrated in Anglo-America literature also apply to the sample in the border region between Luxembourg and Germany?
- Does the analysis of materiality within its spatial context provide indications for a neighbouring effect, i.e. do material characteristics appear in spatial clusters?
- With regards to the materiality that can be observed in the selected cemeteries, how can one explain the specific appearance of, especially, graves and grave markers? Put differently, what factors might have had an influence on physical appearance? For example, could it be cemetery regulations and/or stonemasons?

A major difference from what is often described in Anglo-American literature, concerns the sampling. The sampling of a complete cemetery assemblage as it is conducted during the data collection for this thesis stands in contrast to the collection of either only a statistically relevant sample as a subset of the overall population or the selective collecting of data from such graves and grave markers that fit a predetermined time horizon with the exclusion of datable graves and grave markers that do not fit the temporal research focus. Obviously, the main reasons to collect a full population of graves and grave markers from the four selected cemeteries are explained with the second research question, aiming at identifying potential neighbouring effects and clustering for which maximum complete coverage of materiality and space is necessary.

However, before addressing this particular research question, can the same research approach as it is usually applied in Anglo-American studies be applied here? A simple answer to this is not possible. While the general approach still produces interesting results, the different funeral culture in Luxembourg and Germany, specifically the reuse and possible renovation of grave monuments, require a different awareness and a higher level of caution by the researcher. As explained in much detail in Chapter 4 and Chapter 6, the basic approach to collecting material and spatial data of graves and grave markers is comparable, although the basic approach is enhanced by the level of detail in this thesis. The before mentioned challenges prevent the unreflected and uncritical application of the exact same methodology as applied in many Anglo-American cases to the sample at hand: For example, in most studies of the Anglo-American research context reviewed for this thesis, the available sample at cemeteries is often considered more or less static. A static sample does not change over time, as a once existing grave usually remains unaltered and in situ until the overall cemetery is abandoned or material evidence vanishes. By contrast, in the region under scrutiny in this thesis, it is common that there is a limited lease period for a grave. The lease can be extended, for example, in the case of family graves and/or new interments, but the lease periods mentioned in the cemetery regulations are usually around 25-30 years. If a lease is not extended, the survival of a grave and grave marker is up to circumstance. As a consequence, the available sample of a cemetery in the Luxembourg-German border region is not representative across the overall time horizon that the relevant cemetery covers with regards to its time of existence, simply because grave monuments tend to be demolished after the expiry of their lease period. As is evident from the descriptive statistics of Chapter 4 and Chapter 7, the available sample hardly reaches far into the 19th century. Older memorials are scarce, if they survived at all. Moreover, it might happen in a few rare cases that older grave monuments are renovated and/or altered at a later point in time, for example, regularly used family graves, still bearing the previous occupants' dates of death. Clearly, this means that a limited number of graves might actually bear dates that are not correct, potentially resulting in wrong chronological categorisation. Last but not least, the data collection of a full cemetery population with potentially thousands of graves in furtherance of subsequent statistical and spatial analyses, is a major task if conducted with the paper and pen methods often described and often still applied in other studies and also mentioned in detail in this thesis.

A number of the above mentioned issues have been addressed in this thesis by adapting and extending the existing methodology when needed. This means, first of all, that the Cemetery Surveyor Application (CSA) has been developed and tested in the course of this research in order to facilitate data collection and provide standardised data output permitting subsequent data processing and analysis. While the basic underlying principles of this tool are identical to the seminal research methodology as explained in the literature, it permits another level of detail and

data processing. The issues of an available chronological sample, as well as incorrectly dated grave monuments, remain, though, and present a major limitation to the straightforward application of the known methodology to the sample of this particular region. In the case of Wormeldange, it was possible researching how many graves actually have been altered during recent years and clarifying with cemetery administration how often this is the case. In consultation with a team member of the research project RIP, a professor at the University of Luxembourg with a strong background in statistics, as well as in urban analysis and modelling, it was decided that the resulting small percentage of graves that might fall into this category does not statistically challenge the explanatory power of the data and can be ignored. However, it is not known in any of the searched cases what assemblage actually existed in each decade. Furthermore, archival records do not permit any answers to that. Consequently, the unreflected and straightforward application of the same methodology and procedures then applied in the Anglo-American context needs to be rejected, as it is conditional.

The researcher studying areas of non-static cemetery assemblages, i.e. with grave leases that are limited and graves being demolished after active use, has to be aware of these issues and limitations and should check for related issues upon commencing research. Ideally, such alterations can be identified and evaluated by means of relevant archival data. Unfortunately, except for Wormeldange, such data were not available during this study and if so, then only for the most recent years as described above.

In summary, while the general research paradigm and method is still true, the simple and almost naive application of the same methodology of chronological seriation over time is not possible, as it does not permit an accurate representation of past grave monuments' assemblage. The researcher needs to be much more careful in the evaluation of the available data and alternative approaches need to be developed. For example, obvious outliers in chronological descriptive statics, should either be removed from the sample, or, if possible, their real date of erection be corrected, with the help of archival data. Needless to say, this would require access to such archival data and/or, foremost, an a priori awareness of a chronological typology by the researcher. This might not always be the case, as typologies might still need to be developed. These limitations are an important key finding of this study.

This thesis successfully added another important dimension to the research of the materiality of graves and grave markers, i.e. space. By collecting the full cemetery population and depicting a relatively high level of detail concerning its actual position within this clearly defined space, the question could be asked whether the observable assemblage is also the result of neighbouring effects. Put differently, the question is whether the present materiality appears concentrated in clusters, potentially indicating that similar materiality finds its way in relative proximity to each

other. It is often assumed that the reason for concentrated or clustered materiality could be that the bereaved and the stonemasons visit the site when it is time to choose a grave monument and become influenced in the choices they make based on what they see around the relevant grave. While it goes well beyond the scope of this thesis to analyse such processes in the past and present, it was important to first of all answer the question whether such a neighbouring effect or clustering actually could be identified. While the descriptive statistics showed what can be interpreted as developments of trends and fashion in grave monument designs that are subject to related trends and fashion at a certain point of time (keeping in mind the before mentioned limitations regarding dating), unfortunately the results of the spatial analysis were not conclusive and in many cases even strongly reject the hypothesis of neighbouring effects. Consequently, the findings presented in Chapter 7 do not support a neighbouring effect, as the findings do not permit any indications as to why, in certain instances, clustering is supported, while in many cases it is not. This must acknowledge, though, that visual impressions of clustering are present for both the on-viewer at the cemeteries and for the visual impression depicted in the above described heat maps.

What might explain the materiality that can be found in the special space called a cemetery? As has been detailed in Chapter 2, the Luxembourg-German border region shares a common history and culture, despite being separated for most of the last 200 years by a (national) border. Funeral customs are similar, although they might vary significantly within regions as well. What could also be disclosed is that while historically the church's role in all aspects of funeral culture had been decisive and almost monopolistic, the custom of marking a grave with a monument predates this. Moreover, and most importantly, the church's influence has been slowly restricted further and further, especially since the French Revolution, despite the region being historically dominantly Catholic and under the rule of the Trier dioceses. Especially since the end of the 19th century, the influence of the church has been pushed back as also shown in the discussion regarding cremation and the constant struggle between state and church around that time but even more so by what has been detailed in Chapter 2 regarding the cemetery regulations. While the church, until a few decades ago, maintained control over the main issues concerning the funeral culture, especially the processes, customs and rites in cemetery regulations, no explicit Christian, Catholic or any other religion’s or denomination’s influence is present anymore in the sample at hand. In fact, the guidelines and rules regarding the grave and grave marker in cemetery regulations as direct medium of the cemetery administration has become, over time, quite liberal. As long as a certain deference is ensured, and the monument is within the regulations regarding dimensions, there is a lot of flexibility to accommodate the bereaved. Most of the grave markers present today in the cemeteries under scrutiny were already subject to a secular society in which the immediate

influence of the church was limited, and with a cemetery regulation that permitted almost any kind of grave marker as long as it adhered to certain dimensions and was pious.

While in a Western society with a clearly Christian heritage the church's long-term influence cannot be denied and might certainly impact on conventions and traditions, a direct influence by the church on grave and grave marker design cannot be proven, as there are no direct rules present – there are no rules prescribing the application of a cross or any other Christian symbology or non-negotiable conventions as to how a grave and grave marker should look like, except for regulations regarding dimensions and the distance between the graves. This leaves the bereaved, the stonemasons, the relevant stonemason companies and the related agents as potential influencing factors. As also shown in Chapter 2 with regards to stonemasons' catalogues and their role in the customer's decision-making process, it is remarkable how much the samples in such catalogues or relevant specialist journals resemble the assemblage at the cemeteries within a certain time frame and also depending on which side of the national border the cemetery is located. As detailed in Chapter 2, it appears as if Luxembourg had been influenced much more by French grave monument design than by German grave monument design. Furthermore, it also appears as if especially the German reform movement has largely been irrelevant in Luxembourg, while within the German samples such influence is at least marginally present in the ideal of open, i.e. planted, graves as well as conventional headstones and steles.

While a number of the works discussed in Chapter 2 addresses issues of consumer choice and decision-making, it is the opinion of the author of this thesis that the relevant literature needs to apply the insights gained in this thesis in order to revisit these issues and to conduct further research, also relying on literature, studies and related findings from disciplines that consider issues of consumption much more their territory, such as business studies. If there is an indication that materiality and spatiality in cemeteries might be explained, at least in part, by business-related processes of choice and decision-making, for example, but not limited to the stonemason and the bereaved, continuing research in this direction could be a fruitful endeavour.

8.1 Continuative Literature Discussion

Unfortunately, up till now scholars have still not examined the before mentioned issues in the related field of historical archaeological research in depth. When scanning the existing research literature for recently published periodicals, i.e. published within the last five years, assuming that these periodicals will publish the relevant research quickly, it is revealed that very few articles deal with the stonemason’s product, i.e. the grave marker, in terms of its genesis or the interaction between the customer and the stonemason. The number of peer-reviewed and high-quality publications in the field of cemetery and funeral culture studies is indeed increasing, as the *Essential Cemeteries Bibliography* published by the Cemetery Research Group (2019) at the

University of York proves. However, research is still mainly concerned with socio-cultural issues that researchers can study with the help of cemeteries and/or grave monuments, very much like the very first related historical archaeological works by James Deetz and Edwin Dethlefson in the 1960s. Surprisingly, scholars draw these assumptions, hypotheses and conclusions without, in the least, critically assessing the related material culture's actual explanatory power.

The author has already described and discussed Mallios and Caterino's (2011) research, which not only addresses socio-cultural but also socio-economic issues. The author of this thesis has also worked on research proposing the rise of a class society during the 19th century in a specific region based on the transformation of specific grave marker traits over time (Streb, 2017). Other examples base on similar assumptions. Although not for human grave monuments but for inscriptions on US pet grave markers, Brandes (2009) identifies that during the last century, pet owners have not only given human names to animals and considered them as actual kin but, clearly transgressing reality, have also bestowed a religious and ethnic identity on the pet animals. According to Brandes (2009), demographic change, i.e. dispersed traditional family ties and a reduced number of actual offspring, is mostly responsible for this pet owner behaviour. Falk Gesink (2010) puts a similar emphasis on the inscription when describing the usefulness of cemetery studies for undergraduate research at universities and their subsequent engagement into the documentation, preservation and historical relevance of those artefacts for the local communities. Interestingly, for the two above-mentioned authors, all other material aspects of grave markers are of less relevance, if relevant at all, and what they observe on a gravestone they apply as factual data, which is a means to an end in order to make a statement about socio-cultural transformations. Very similarly, although via a much more sophisticated statistical analysis, Streiter and Goudin (2013) analysed the use and spread of a specific Chinese character inscribed on Taiwanese grave markers and by putting this into its historical context they identify nationalist ideologies. In another methodologically sophisticated study, the same authors (Streiter and Goudin, 2014) use the inscriptions to follow transformations in a family line and use this to trace family histories in Taiwan.

As a brief side note and for the sake of completeness, the author emphasizes that related studies rarely consider material artefacts as a sole data source. With regards to cemetery and/or funeral culture studies, there generally appears to be a quantitatively higher consideration of the broad issues surrounding the issues of death and funeral customs, illuminating particular aspects of that field by often focusing on a limited regional scope. Frisby's (2015) research is an almost typical example of such work. Frisby applied archival ethno-historical data to study lower middle-class experiences of death and the related customs in the later nineteenth and early twentieth-century England. She continues to deduce specific findings for as she calls it the "… ritualised social exchange between the living: in the short and medium term, for the provision of comfort and

practical support in a crisis; and also for the construction, expression and through that expression the long-term reinforcement of social and emotional ties" (Frisby, 2015: 121), again becoming an example of the explanatory power in understanding socio-cultural transformations that is specifically ascribed to funeral cultural artefacts. Toplean (2015) discusses the practice of placing family photographs on Transylvanian gravestones not only from a specific social science perspective but also in terms of method and deductions that are very similar to historical archaeological research. According to Toplean, the above-mentioned practice is a means to affirm or mitigate social death, especially concerning couples, and acknowledge the role this practice plays in the specific community with regard to social identity and collective memory. Thereby, Toplean (2015) interprets this data in a specific manner and ascribes it a certain explanatory power but without questioning the genesis of this particular custom and artefacts. Such a case would have been particularly suitable for analysing that custom's background in more detail to assess the actual information value. Scholars can find another extreme in terms of the interpretive value of cemetery studies and the related funeral culture and artefacts in the research of Huerta (2016) who generally argues strongly for considering cemeteries as places of historic memory and art education, or even in the work of Abel (2009) who analyses inscriptions to prove post-mortem gender discrimination, thus revealing a string of personal agendas in related research. Similarly, De Spiegeleer and Tyssens (2017) discuss the secularisation of cemeteries in major Belgian cities, putting this into a context of political and religious controversies during the 19th century.

Considering the increasing number of such and similar publications in social science generally and in historical archaeology specifically, it would be a futile attempt to provide an exhaustive discussion of this literature. The value of these and many other similar publications is beyond question. However, the above-mentioned examples should prove that the explanatory power of the studied artefacts is usually taken for granted, even in the most recent published work, thus supporting the initial research question of this thesis.

There are exceptions, however. A few works address further related issues more or less explicitly. Tony Walter (2005) considered the private businesses', the municipality's and the church's influence on the modernisation of funeral practices in Western countries and ascribed the related differences between them to the different roles these agents played during the modernisation in the nineteenth and twentieth centuries. Depending on which influence was stronger, and on the cultural environment and its development towards more individuality, this resulted in national solutions to the problem of disposing of a growing society's deceased persons. Obviously, the differences also had a large impact on the differences in each environment's material culture. Such a consideration might not only help explain the observed differences between Luxembourg and Germany, but also shed light on the underlying complexity of agency via the different

stakeholders of the funeral process, including its materiality and spatiality. Thus, Walter (2005) opens an area of conflict – in funeral practices and the related agency – between the individual and his / her changing needs, the government, private business and the church, all of which struggle to influence and which, depending on how powerful these influences are, result in different funeral cultures. Thus, the materially and spatiality of death becomes more than only a historically grown fact: It is the result of agents (the term being used in its basic definition as someone who acts to achive an effect). As Walter (2005: 176) puts it: "Everywhere, we find two linked innovations. One is increasing use of technical, especially medical, rationality. The other is the rise of new specialists: registrars, pathologists, funeral directors, cemetery entrepreneurs and managers". And indeed, the author of this thesis would like to add that scholars cannot underestimate the role of business, i.e. the increasing role of a rational, quantitative organisation of work and labour with the economic goal of profit maximisation during the 19th and 20th century. Considering the findings of this thesis, it should be clear that what one can observe at a cemetery is always the result of an interplay between different agents, embedded in their personal historical cultural and economic background. More directly, these agents meet and negotiate their interests in a sales process, manifested by the eventual grave monument. In the case of the 19th century Church of Scotland, Smith (2009) confirms Walter's (2005) area of conflict between the church, state and industry, but unfortunately Smith limits his focus to the church's role and the provision of the actual funeral's ritual details, thereby largely omitting the related materiality.

Julie Rugg's (2013) research is amongst the few seminal works to explicitly highlight the role of agency in the materialisation and spatialisation of a cemetery. Referring to conflicts of agency in the Diocese of York during the 1950s, she clarifies the related process, which, in that case, was a form of either inhibited or dominating agency. Most importantly, she explicitly mentions not only the choices the bereaved have but also the related constraints, resulting from other involved agents, in this case the church and its idiosyncrasies regarding the grave monuments' style, material and size (Rugg, 2013: 215). In that sense, she places much more emphasis on the bereaved's personal agency in the general funeral process and the potential conflict with the owner of the burial place's agency than Walter (2005), nonetheless supporting the notion that the materiality one can find at a cemetery is always the result of agency between several different stakeholders and the mitigation of their personal interests and possibilities. The headway of Rugg's (2013: 223) paper is evident from her also considering the stonemasons and the catalogues they use during the sales process. This thesis confirms Rugg's approach, the importance and relevance of which can hardly be underestimated. Moreover, Rugg (2013: 231) actually uses her findings to challenge the explanatory power of grave monuments when she indicates that the results today's researchers observe at cemeteries might be largely due to the demands of powerful agents and less due to the bereaved's manifold possible expressions of loss,

grief and love. In this sense, this thesis definitely responds to Rugg's (2013) plea for more research, especially considering her 2018 published work in which she challenges the often cited notion of social emulation at cemeteries when she writes that the visible materiality instead "… reflects a more essentialist search for consolation that is undermined by the threat to individuation by industrial-level scales of operation and professionalisation. Within this framework, consumption is posited as a facilitator and the bereaved make active choices – depending on their unequal resources – amongst a range of products and services to secure consolation" (Rugg, 2018: 61).

While this work by Rugg remains relatively theoretical in scope, the thesis at hand appears to not only support but also extend her theory in depth. If the above described agency exists – and the author of this thesis is convinced that it does – how does the actual genesis of the grave monument, and its specific context, express this agency from the research literature's perspective? Unfortunately, there are extremely limited results stated in the literature.

Although agency is not explicitly an issue, Heinrich (2014) directly challenges the hypotheses concerning the transformation of religious socio-cultural convictions in colonial North America, proposed most prominently by James Deetz in the 1960s and expressed by the cherub as a heavenly being. In his challenge, Heinrich claimed that this cherub was actually a putto and, consequently, does not present specific religious beliefs per se but follows a contemporary Rococo artistic trend. As such, the cherub is an allegorical element, driven by consumer choice to always present the latest fashion, irrespective of any religious symbology. The consequences of a work such as Heinrich's are twofold: Firstly, it proves the importance of actually understanding the origins and reasons behind grave monument design when attempting to deduce a socio-cultural and/or socio-economic hypothesis in a historical archaeological context. Otherwise, researchers are prone to over-interpret their findings, usually with respect to their personal ideological convictions or their specific research aims. As shown in this thesis, the symbolical interpretations of the grave monument design features do not only change between observers but can also become transformed for the customer within the actual design and manufacturing process. Without a deeper understanding of these processes it is impossible to make strong statements about how to interpret the visible transformations of dominant design features over time. Secondly, artefact genesis is subject to a multitude of agents' influences. Amongst these influences, the trends, fashions and their underlying motivations determine consumer choice much stronger than conventionally assumed. Petersson and Wingren (2011: 57ff.) would describe these motivations as an attempt of the bereaved not only to receive comfort but mainly to express the deceased's personality, individuality and their personal continuous care for the deceased. From the before described findings of this thesis, this description sounds familiar, as it is the study participant's goal to commemorate and honour the deceased by giving a résumé of

the deceased's life, often with the study participant's personal aesthetic ideals dominating the design process. However, while this is surely a strong point in Petersson and Wingren's (2011) study, the article falls short of attempting to critically understand the underlying processes and questioning the sources of the actual design choices, since the study puts too much emphasis on the attempt to locate and materialise feelings of grief and loss and to bridge the gap towards the afterlife (Petersson and Wingren, 2011: 65). Although they address agency in their study, it is lost for discussion by putting too much emphasis on the emotional motivations. It would be interesting to learn more about the actual process, for example, from the stonemason's perspective. However, contrary to general studies about, for example, pre-industrial grave marker manufacturing (e.g., Nijssen and Nyssen, 2011) and the factors influencing their distribution over larger distances, the literature is, yet again, extremely scarce.

Graham and McCormick (2004) presented a study of James Connelly, a stonemason in Ireland during the 19th century, in which they analysed his work and its distribution via a specified typology. This shows that James Connelly, the stonemason, was influenced not only by the available material, but also by the available technology and skillset in order to process material (Graham and McCormick, 2004:164). Moreover, the fashion and trends of his time also influenced Connelly (Graham and McCormick, 2004:165). Based on the presented typology, it becomes clear that Connelly had a certain repertoire of scenes, designs and ornaments that became varied but which he repeated (Graham and McCormick, 2004:165f.). Eventually, Connelly succumbed to the industrially manufactured competition but not without benefitting from their standardisation and him having already processed stone material first. The parallels, especially to the case studies presented in this thesis, are obvious, as this mirrors the importance of a stonemason's personal aesthetic convictions and available repertoire, which is the result of study and work experience and which might be impossible to explicate. While Graham and McCormick (2004: 167) held back on any interpretation and actually highlighted that a certain symbology might have been chosen for practical and fashion reasons instead, they unfortunately failed to provide more information about the sales process, such as the relevance of catalogues, for example. This might have been due to a lack of particular data, as it is not possible to follow real-time and ex-post sales and production processes in detail. Colman (2004), however, at least had data from order books and further archival data to try and construct these process with the benefit of hindsight, thus illuminating transportation issues and many interesting business aspects of the craft thereby emphasizing that a stonemason is, after all, primarily a business, oriented towards revenue and profit. Therefore, even though it might not be obvious, especially with the handcrafting stonemasons and artists, ultimately the processes have to be kept lean and efficient in order to be profitable, while maintaining a price that allows a broad market coverage. Finally, this will always lead to stonemasons following trends and fashion, as well as a streamlined, at times

standardised, sales procedure. The challenge to understand these processes ex-post and with the historic distance between today's researchers and people in the 19th century can hardly be underestimated. Very much like Colman (2004), Baugher and Veit (2013) provided valuable insights into the work, especially the business side, of stonemasons in the 18th and 19th centuries via the example of John Zuricher in New York. This example shows how far standardisation had already progressed and, again, what role fashion and trends can play for the related stakeholders (Baugher and Veit, 2013: 236). From these works it appears that it is not so much the church and/or municipality that shape the grave marker and these cemeteries but the stonemasons with the customer-oriented product range, bounded by efficiency and larger scale production, as well as customer demands and expectations, regardless of how these came into being. Fashion and trends are also more important than actual symbology. From the customers' perspective, Baugher and Veit (2013: 241) state that "…gravestones reflect the agency of individuals and families in making those choices. The choice also reflects economics (cost of the stone and price for choosing a particular carver), availability, and marketing […]". On the stonemasons' side, it is known from this thesis that also the stonemasons' choice is based on their personal ideals, skills, technology, available material and, of course, economic considerations. The grave marker is the result of the interaction between mainly those two stakeholders, i.e. the customer and the stonemason, embedded in a larger socio-cultural context. Based on the above discussed literature, it would be useful to gain a deeper understanding of consumer behaviour, in order to deduce further hypotheses, linked to literature also discussed in Chapter 1.2.

8.2 Consumer Behaviour, Choice and Fashion

There is, of course, literature emphasizing the potential relevance of consumer behaviour and/or choice from a theoretical perspective, which the author has already discussed elsewhere in this thesis. First and foremost, is the work of Susan Buckham (2000) and Julie Rugg (2013, 2018). As early as 1987, Spencer-Wood published an edited book, addressing the related issues of consumer choice from a historical archaeological perspective. However, the main theme of this work still evolved around artefact assemblages of consumption and possible deductions of socio-economic status and classes, thus offering no answer in regard to the actual underlying processes and deeper reasons remaining on a superficial level of analysis. An interesting example of such research is Pendery's (1992) work, which discusses consumer behaviour in colonial North America, based on household material culture. Even today, it is safe to say that an actual and explicit study about consumer behaviour and/or choice and the related agency during the process of grave and/or grave marker design and production, as well as the subsequent impact on the appearance of cemeteries, is lacking. Before discussing certain published work in the context of historical archaeology, though, it is important to emphasize that most of this literature also lacks an exact definition of and distinction between consumer behaviour and consumer choice from a

strict economics or business perspective. Although it is beyond the scope of this thesis to offer such a precise definition, it needs to be emphasized that while consumer choice is usually concerned with the microeconomic modelling of the consumers' choice between two goods and their budget constraints, based on largely unrealistic assumptions for economic modelling purposes and completely eliminating irrational decision elements from the equitation, consumer behaviour is at the other end of this scale, much more addressing the black box of decision-making, i.e. the consumers' emotional and mental idiosyncrasies during the related processes. While the former might serve economists well in understanding and expressing larger economic phenomena, the latter at least attempts to model that which one can hardly fully understand when it comes to real life processes. Hence, the following discussion will combine the two concepts in an attempt to offer a consumer behaviour understanding of what one can learn from the before discussed data. This includes the limitation that the perspective of the producer, i.e. the stonemason or artist, becomes one of the factors involved in the consumer's decision-making, ignoring the producer's personal reasons for specific behaviour.

Models of consumer behaviour in the business literature are so manifold, while at the same time so overlapping, that an attempt to describe them exhaustively is futile and at the same time unnecessary. For this discussion, it will suffice to first present two general models, – widely spread and taught in business education, – in order to explain the core elements of consumer behaviour. Loudon and Della Bitta (1993) presented a model that draws largely on learning theory concepts, thus acknowledging the dynamics of the process itself as well as changing customer idiosyncrasies (see Figure 171). The overall model is divided into exogenous variables as well as perceptual and learning constructs that mediate inputs towards output via a learning process. The core concepts are, in short, as follows (Bray, 2008: 12):

- "Motive – described as either general or specific goals impelling action.
- Evoked Set – the consumers' assessment of the ability of the consumption choices that are under active consideration to satisfy his or her goals.
- Decision mediators – the buyer's mental rules or heuristics for assessing purchase alternatives.
- Predispositions – a preference toward brands in the evoked set expressed as an attitude toward them.
- Inhibitors – environmental forces such as limited resources (e.g. time or financial) which restrain the consumption choice.
- Satisfaction – represents a feedback mechanism from post-purchase reflection used to inform subsequent decisions".

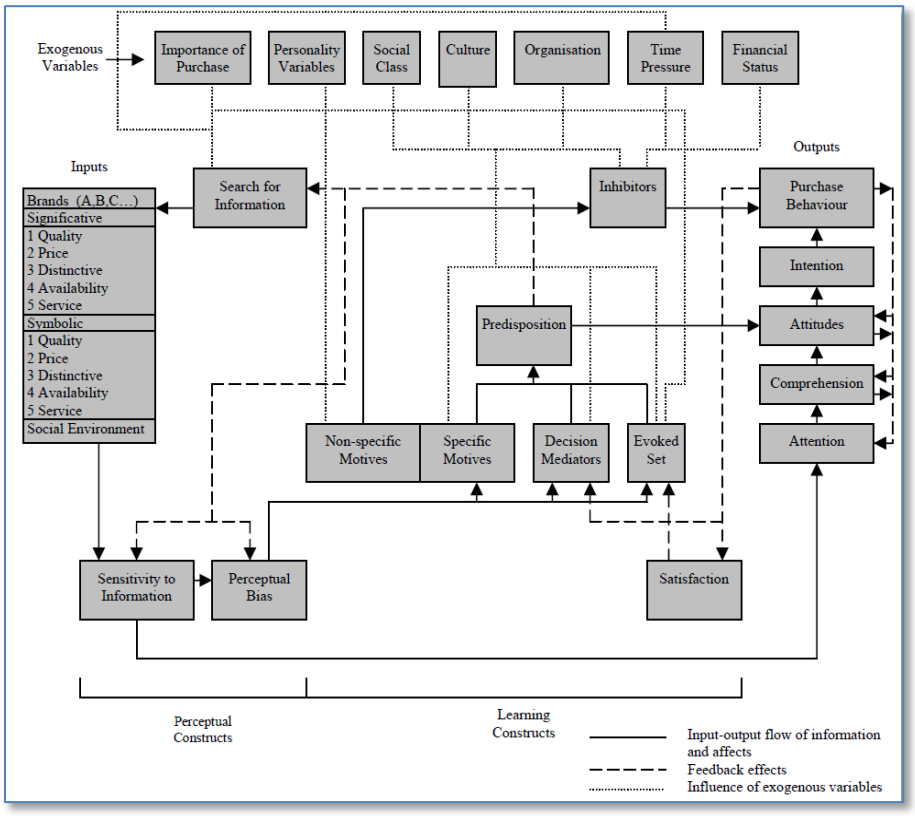


Figure 171: Consumer Behaviour according to Loudon and Della Bitta (1993).

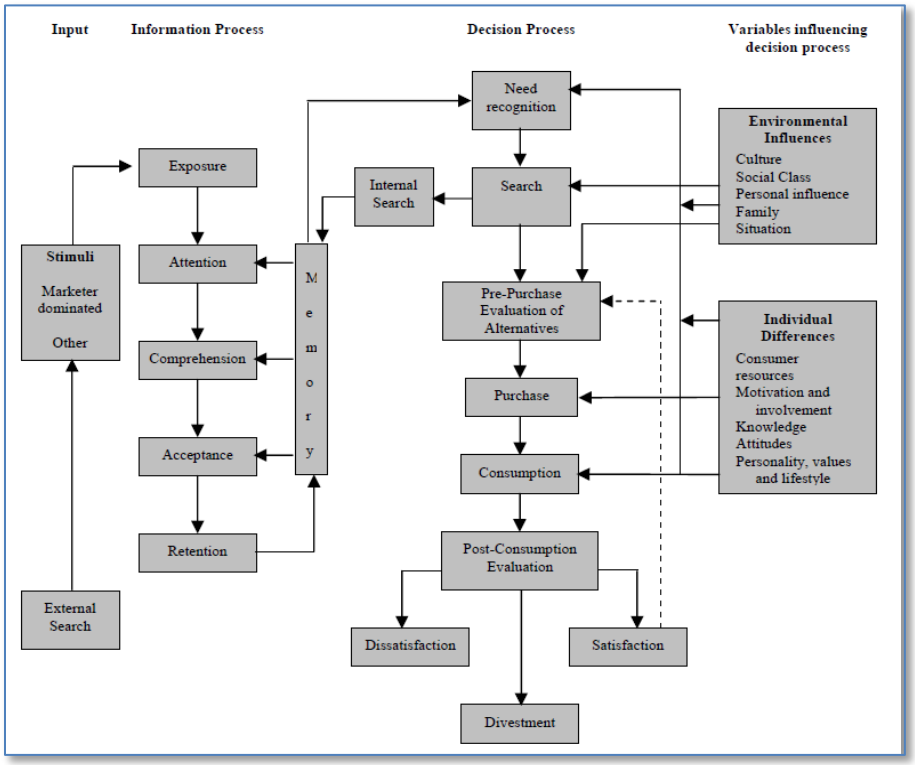


Figure 172: Consumer Behaviour according to Blackwell, Miniard and Engel (2001).

Blackwell, Miniard and Engel (2001) suggested a model that is much more focused on the consumer's actual decision-making process (see Figure 172). This process is mediated by an

information-seeking process, which is influenced by internal and external stimuli, as well as variables, such as the larger environment and/or personal attributes and characteristics. As these models and the interrelatedness of the mentioned variables and factors are complex, the author will abstain from a more detailed analysis or criticism. Again, it is clear that such models require constant revision and adaption based on subsequent research. The criticism of these models are extensive, as they often lack an empirical basis, assume the consumers' rational behaviour and generally oversimplify a complex phenomenon that is still in dire need of extensive research. However, these models provide an established access to a current basic understanding of consumer behaviour. Consequently, they can be applied in order to deduce certain prepositions about consumer behaviour in grave and grave marker sales, based on the above described findings.

While the two models are a useful basis for attempting such deductions, the author of this thesis prefers Loudon and Della Bitta's (1993) model, as it emphasizes the complexity and interrelatedness of existing variables without oversimplifying the actual decision-making. It is clear that deciding and buying a grave marker is a very specific and complex endeavour, as it is not a very common event and only occasionally follows a fully rational decision-making process. Moreover, Blackwell et al.'s (2001) emphasis on stimuli via marketing while simplifying individual and environmental factors do not give justice to the role of family, society and the very specific circumstances that buying a grave marker usually involves. Following Loudon and Della Bitta (1993), it is clear that exogenous variables play an important role. Although this might not necessarily always be the case, the related emotional stress can mediate the overall process, while personality, social class, culture, organisation, time pressure and financial status certainly mediate the overall process. Similarly, the input regarding brand, price, quality, etc., are not necessarily transparent for this specific product. With regards to environmental influences and individual differences, there are, consequently, significant similarities to Blackwell et al.'s (2001) model, which also has the advantage of a strong marketer role potentially accounted for, for the industry at hand, this would be the stonemason or artist, – impacting on the information process. Hence, one could assume variables, such as the importance or motivation and involvement of and concerning the consumer's purchase, personality, values, lifestyle, social class, culture and the role of family, as well as the stonemason's or artist's agency in a) the information process and b) the learning constructs of the consumer who, during the process, evolves in his/her preconceptions and predispositions regarding the topic and the product. This, in turn, influences the output via the consumer's attitudes towards the process and the product, his/her intentions or pre-purchase evaluation of alternatives and his/her general purchase behaviour. Obviously, there is a strong interrelatedness of these variables and factors, as they keep evolving over time. One also needs to consider that the stonemason or artist is also embedded in a similar system of

variables and factors that influence his/her sales behaviour based on motivation, involvement, personality and values with regard to the field, topic and/or industry, the craft and/or job, lifestyle and workstyle, culture, as well as the specific education, job training, skills, available technology and suppliers. While these variables and factors influence the stonemason's or artist's attitudes towards the process and the product, the intentions or pre-sales evaluation of alternatives and general purchase behaviour, as well as the role of available suppliers and technology, can be crucial as is, in the specific context of this thesis, the role the supplied grave marker catalogues play.

While such models might provide a few theories or at least a basic understanding of why consumers choose what they do and how, such decisions are additionally moderated by the consumer's constrained choice according to the microeconomic consumer maximisation, which is a trade-off between the choice of different products and budget restrictions (e.g. Perloff, 2017: 60ff.) and the adoption and diffusion of new products over time (Foxall, 2016) as can be seen in Figure 173.

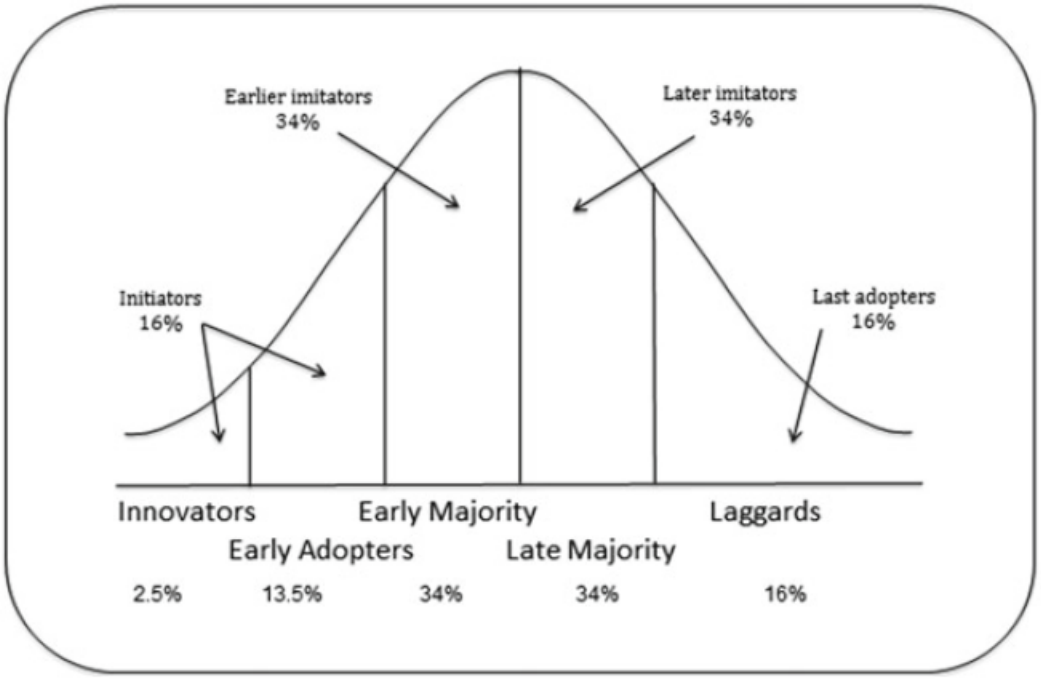


Figure 173: The adoption and diffusion of new products, according to Foxall (2016: 75).

Such economic models are usually, again, based on the ideal of the rational market participant, the homo economicus, possessing complete market knowledge, while products are completely substitutable with each other. Nonetheless, the consideration of such a macro-economic environment in which the stonemason or artist meets the customer and engages in a sales and production process, might shed light on the research gap addressed in this thesis.

Last but not least, when considering the macroeconomic embeddedness of consumer behaviour as well as product lifecycles one would need to add issues of fashion and conventions to a specific model as the before described analysis of the rise, peak and decline of typologies as well as the motivation to design and purchase unique and distinct grave and grave marker designs clearly indicates issues of fashion and conventions for the sample at hand. From the spatial data analysis, one can hypothesise the existence of trends and fashion. The often to be observed homogeneity at the cemetery with regards to materiality proposes the existence of conventions, trends and fashion. Unfortunately, these concepts, even though they might offer a few interesting explanations for the observed phenomena, are themselves complex and difficult to understand. For example, Bikhchandani, Hirshleifer and Welch (1992: 992) tried to explain what they call localised conformity by describing it as informational cascades that occur "… when it is optimal for an individual, having observed the actions of those ahead of him, to follow the behaviour of the preceding individual without regard to his own information". They conclude that such equilibria can appear spontaneously and allow for deviations; however, since these equilibria are fragile, they also permit the spread of new behaviours, i.e. new trends and fashion, until another state of conformity is achieved (Bikhchandani, Hirshleifer and Welch, 1992: 1016). While such models are intriguing when trying to understand the start, rise and decline of fashion and trends, they are, again, based on rational economic models that only work under laboratory conditions. Similarly, Shoham and Tennenholtz (1997) suggested stochastic games as another microeconomic approach for understanding the emergence of social conventions facing similar limitations, and offering the concept of the highest cumulative rewards as a strategic selection rule leading towards such states. Young (1993) applied a similar stochastic approach in considering choice as an n-person game played repeatedly with sampled information about the actions of previous players. What one can observe, is an almost natural trend towards an equilibrium, i.e. a convention of how the game is played. If mistakes by players are permitted, i.e. deviations from the convention take place, an existing equilibrium can be destroyed and a new one achieved. Obviously, only certain equilibria have a chance to become stable, based on the resistance they face. For the topic at hand, this could mean that social conventions of grave and grave marker choice appear almost natural, based on the available samples at a cemetery or the stonemason's showroom and catalogues, while, at times, deviations from a norm can lead to new socially permitted conventions if resistance is limited, i.e. if new designs are to the consumer's liking. Following product life cycles as illustrated in Figure 173, the emulation, spread and design of new designs might follow a development similar to other products, although the author needs to emphasize that product life cycles can also be extended and revived, as currently appears to be the case at the sampled cemeteries.

But how does the consumer make a choice? Although dated, McGuire (1976) suggested eight successive consumer choice steps based on internal psychological factors, i.e. exposure to information, perception of the information presented, comprehension of what is perceived, agreement with what is comprehended, retention of what is accepted, retrieval and further information search, decision-making amongst the available options and action based on the decision. Even though the details might differ and research has continued since then, it is obvious that one can find similar steps in the before-mentioned consumer behaviour models, as McGuire (1976) sub-summarises a number of psychological concepts under each of these eight steps. Bettman, Luce and Payne (1998) critically reviewed the before-mentioned limitation of presupposing a rational decision maker with a rational choice preference; instead, they suggest that consumer choice is fundamentally constructive, thus acknowledging decision-making with incomplete information. They suggest a framework of various strategies a consumer applies alternatively in order to make decisions, not necessarily differing from the already discussed model but emphasizing constructive choice. Since incompleteness of information and non-rational decision-making certainly are at the heart of the grave marker design and purchase process, this understanding is quite useful. In that context, one can also view the rise of conventions, their chronological development, and consumer behaviour in general from a fashion perspective. This overlaps significantly with what the author has said before and also with what he has described in the findings section. Most appealing, however, is the complete rejection of rationality and acknowledging the underlying complexity of the grave and grave marker appearance phenomenon. As Sellenberger (2002: 5411ff.) describes it, fashion eludes any rational explanation. One cannot explain or understand fashion, he states, nor can anybody really control it. As he puts it, fashion starts and spreads by itself. If anything, only stimuli can be used in order to attempt any influence. Esposito (2011) confirmed this notion of fashion by stating that fashion and reason are not only opposed but profoundly incompatible. In a society consisting of idiosyncratic individuals who try to express their individuality via original and unique choices aiming for self-realisation (Esposito, 2011: 608), she understands fashion as the neutralisation of paradoxes between the stability of transition (as things always keep on changing) and the confirmation of deviance:

"… we imitate those who imitate nobody, and those who are unique and original. […] We imitate the refusal of imitation, and in doing so we are conforming and deviant at the same time: conforming because we do like the others and enjoy the corresponding social support, but deviant because we refer to the refusal to be like the others. […] everyone wants to be unique and original, without imitating anybody – but in this desire I am like everyone else" (Esposito, 2011: 609).

It is simultaneously enticing and illuminating to read this quote and compare this notion about fashion with what one can observe at the sampled cemeteries. If one considers the variables and

factors of consumer behaviour discussed earlier, takes the theories of conventions and the "trivial mystery" (Esposito, 2011: 610) into serious consideration and emphasizes the role the stonemason or artists plays, the understanding of grave and grave marker design and, thus, the appearance of modern cemetery assemblage takes shape. At the centre is the consumer, in this case the bereaved, who has to take care of the arrangements related to the funeral. Information is often lacking, while personality traits, attitudes and social context differ, and, at least for the sample at hand, finances and time appeared to be less of a concern. The stonemason or artist has his/her own personality, as well as a personal and work-related set of values. He/she has a unique skillset, technology and supply chain at hand, and takes, based on that, a certain level of agency, as the consumer relies on him or her, owing to a certain principal agent problematic, which one can also witness here. Embedded in a, depending on time and place, specific socio-cultural and socio-economic context of product life cycles, conventions, trends and fashion, a relative homogenous result or equilibrium is achieved, which is, however, renegotiated constantly.

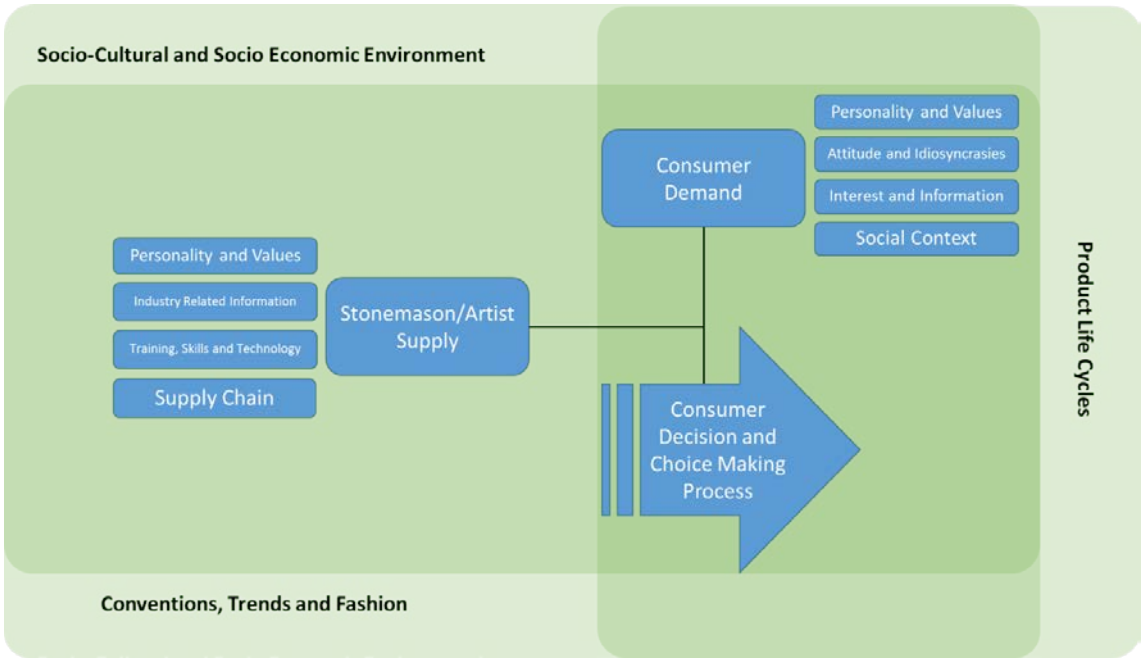


Figure 174: Proposed preliminary model of grave and grave marker genesis.

The result of this process is the observed materiality transformations and spatiality constitution at cemeteries, which change over time and allow for deducing chronology. Figure 174 is a rough draft of a model summarising the elements that one can consider relevant on a most general level and that could as discussed earlier serve as a first proposal to be detailed by existing, more recent literature, and hypotheses development.

In discussing the previously summarised findings of this thesis within the context of further literature, especially regarding consumer behaviour, decision-making and choice, it becomes apparent that there is strong indication that similar processes and issues might be at work in the

case of grave marker assemblage, at least for the sample at hand. The details of such processes remain as in other fields of study unspecified and hypothetical, which might be in its nature. However, the above should make a case for studying grave markers, their materiality and spatiality in the context of consumer behaviour, decision and choice making. This should be done with the purpose of researching similarities and differences of such process compared to other fields of study, as well as improving our understanding of the genesis of materially and spatiality in this specific context, to shed light on the explanatory power of related artefacts.

9. Conclusion

In this chapter the attempt will be made to summarise the stated and discussed findings of this thesis and to provide a more coherent conclusion. It appears as if the initial research questions have only been partially answered, as more questions have been created, but that, nonetheless, certain potentially fruitful new research paths could be identified. It appears as if the same approach as applied in the Anglo-American realm cannot be applied straightforwardly to other socio-cultural contexts, as graves and grave markers can be subject to relative short-term leases and subsequent demolition after the lease period, or even renovation. Many grave leases are extended if used for family graves, and every interment leads to an extension of the lease time. However, an assemblage extending significantly beyond 100 years is scarce and a more or less complete population of materiality at a cemetery over an extended time frame does not exist in the region under scrutiny. However, as renovations of grave monuments are relatively rare and do not confuse the overall sample quality, the use of similar methodology might still be possible, if certain precautions are executed by the researcher. In order to facilitate data collection and improve the preparation of data for further analysis, the Cemetery Surveyor Application (CSA) tool provides a new addition to the researchers' overall tool set. The neighbouring effect, as researched in this thesis, appears not to have a solid statistical basis, and it appears that cemetery regulations no longer have a strong impact on grave marker design, apart from dimensions. It is hypothesized that actual design is subject to what can be found in stonemason catalogues, particularly industrial ones. Thus, it appears worthwhile to study consumer behaviour, decision and choice making in this context, for example, via in-depth studies of past and current grave marker purchasing and design processes.

Blanke (2007) wrote an essay about how, with regard to history, one might challenge concepts of consumer choice and agency for their neglect of important issues concerning the larger capitalist consumer economy and macroeconomic consideration in that these concepts simply relied too much on agency as an explanation for observed phenomena. The author of this thesis believes that by emphasizing numerous, at times contradicting, business concepts, but which also include agency, the complexity of grave and grave marker design and purchase has become obvious. Moreover, it is clear that, with this thesis, it was only possible to shed light to a certain degree on the potentially important and relevant issues when trying to understand grave and grave marker choice. It might never be possible to conclusively answer how the related phenomena, certainly those related to conventions and fashion, came into being. What is interesting and novel, is the context of business considerations related to grave marker design, including trends and product life cycles, which, thus far, appear to have been neglected by research, but which a few researchers have proposed in the past. Moreover, one needs to stress the potential influence and agency by the stonemason and/or industrial masonry companies – including the source of related

catalogues – on the consumer's decision and choice-making process. In hindsight, the connection appears obvious and academics should research it in depth in the future. As banal and profane as it might sound, ultimately, grave and grave marker design and purchasing is a business transaction. By approaching past processes from the same perspective, one can gain new insights.

Besides broad research questions, this thesis intends to shed light to a certain extent on how the materiality and spatiality of graves and grave markers came into being, i.e. why the assemblage of artefacts at cemeteries has a specific physical appearance. To do so, the author collected data from four selected cemeteries in the Luxembourg-German border region and analysed the data in terms of their spatiality and chronology. Unfortunately, it appears as if it is not possible to simply apply the same approach as demonstrated in seminal literature, although the broad procedures and the paradigm might still be true. Due to the objective to include also spatial data, it became necessary to supplement this methodology by an application facilitating the data collection process and providing data that can conveniently be processed. Moreover, the dynamics on cemeteries of this particular region under scrutiny, based on limited lease times, prohibits straightforward deductions based on chronological stratification. One might still treat the above stated findings as interesting insights for hypotheses building.

Moreover, it was not possible to support the hypothesis that there is a clear neighbouring effect or clustering of materiality, at least not in all cases. As it could be shown that potential immediate influences by the church or cemetery administrations and regulations are limited and, if at all, indirect, it was necessary to focus on the immediate relationship between the supplier and the customer of the material artefacts at the cemetery in order to hypothesise further about what causes the observable material assemblages at the researched cemeteries. By referring to seminal literature and by putting the findings into context with a different set of literature from business studies, an attempt was made to indicate a potentially fruitful new research path.

This is by no means an indication that the author suggests leaving the realms of social science and humanities. On the contrary, this thesis stands firm on the ground of related paradigms. However, thus far, the consideration of business related aspects in the field of historical archaeology should be extended by more recent research results from this discipline, as the above stated findings provide support for studying the production, sales and usage of a grave monument from a business perspective. After all, also business studies belong to the social sciences. It is not a matter of a different discipline but of addressing the same issues from a different perspective, adding another set of literature.

Adding this novel perspective would also permit to integrate in much more detail the socio-cultural and economic transformations that took place in this region over the last 200 years as detailed in Chapter 2, but the impact of which could, again, not be related to the sample collected

for this thesis. This might be because this study's time horizon with regards to the sampled materiality does not accurately reflect 200 years of related artefacts for the already above stated reasons and existing limitations in this specific research context. Any major changes in terms of available material choices or forms and shapes, for example, because of industrialisation, new technology or globalised trade supply chains are already mirrored in the majority of the sample, as such processes have begun well into the 19th century. By focusing more on the actual consumer behaviour, choice and decision-making processes, insights about what leads to a certain choice from a predefined sample could be gained – insights that might allow a deduction about another level of meaning of the interaction of materiality, space and human actors in funeral culture.

It is absolutely possible that illuminating the complete process in depth is beyond the scope and capability of research. However, despite all of its complexity, designing and purchasing a grave and/or grave marker is, ultimately, still a business transaction, embedded in the larger socio-cultural environment and dependent on conventions and fashion but, most importantly, on the consumer's and the offering party's black box of personal idiosyncrasies, previous information, interest, etc. This, however, is deeply influenced by the socio-cultural and economic context, such as a Christian heritage and, in this particular field of study, a specific funeral culture. Nonetheless, judging from what has been stated above, the conventionally presupposed relevance of the church or cemetery regulations appears hardly present, although it is certainly relevant on a more implicit level. Stonemasons, of course, follow cemetery regulations and Christian symbols are still omnipresent. While even in older cemetery regulations Christian symbology is not explicitly mentioned, the question is: Why does one find Christian symbology in all stonemason catalogues and journals? One needs to understand the related sales processes in order to distinguish the underlying social factors. It is not questioned whether there is an influence of the Western Christian context and the genesis of modern cemetery regulations; it is simply proposed that one should consider these issues from a business perspective, as especially in more recent times where conventions and traditions are in flux, still materiality at cemeteries resembles what is promoted by the stonemason industry. Such considerations should come with a cautionary note, though: The author of this thesis does not propose a simple, causal relationship between business related activities, to state it broadly, and resulting materiality and assemblages of materiality at cemeteries. It needs to be kept in mind that a recursive nature of the relationships between business, regulations, wider influences, etc. is much more likely, i.e. that, again, as discussed in the introductory chapters, one studies a complex, intervened phenomenon.

Ultimately, this thesis is simply a reminder to treat data and its context with care and criticism, to state deductions carefully and to take limitations into account. The chronology and spatiality of material culture at cemeteries says something about socio-cultural and socio-economic transformations, as the former is a result of the latter. However, the material culture's genesis is

much more complex, always depending on a number of factors, variables and agents, with a few of them impossible to quantify, measure and decipher such that that one should limit strong statements about their explanatory power. Relying on observations with regard to only a single factor, variable or stakeholder, such as the bereaved, religion, economy, etc., means excluding the big picture. While the inherent complexity of such processes makes this exclusion necessary and although this exclusion is common in research, future studies should acknowledge this and make their limitations explicit.

For future research, academics would need to specify the hypothesised variables and interrelation based on more in-depth research from sociology, psychology and also from business studies in order to develop a strong and testable model from which to deduce precise hypotheses. Researchers would need more data with regard to the underlying real-time processes – also from other industries. An example could be the automotive industry in which, –actually very similar to the funeral industry, – a fixed set of choices exists, with a very high number of potentially very different outcomes. Yet, most cars look very similar, although there are regional differences and preferences.

Moreover, further historic and archival data are necessary in order to test to what degree these hypotheses can be transferred to explain past socio-cultural phenomena. To that extent, the thesis at hand is a methodological study in order to improve the performance of historical archaeological explanatory approaches. This thesis provides a new method to collect and analyse data, it challenges the conventions of the historical archaeologic research standard and proposes further transdisciplinary directions of research.

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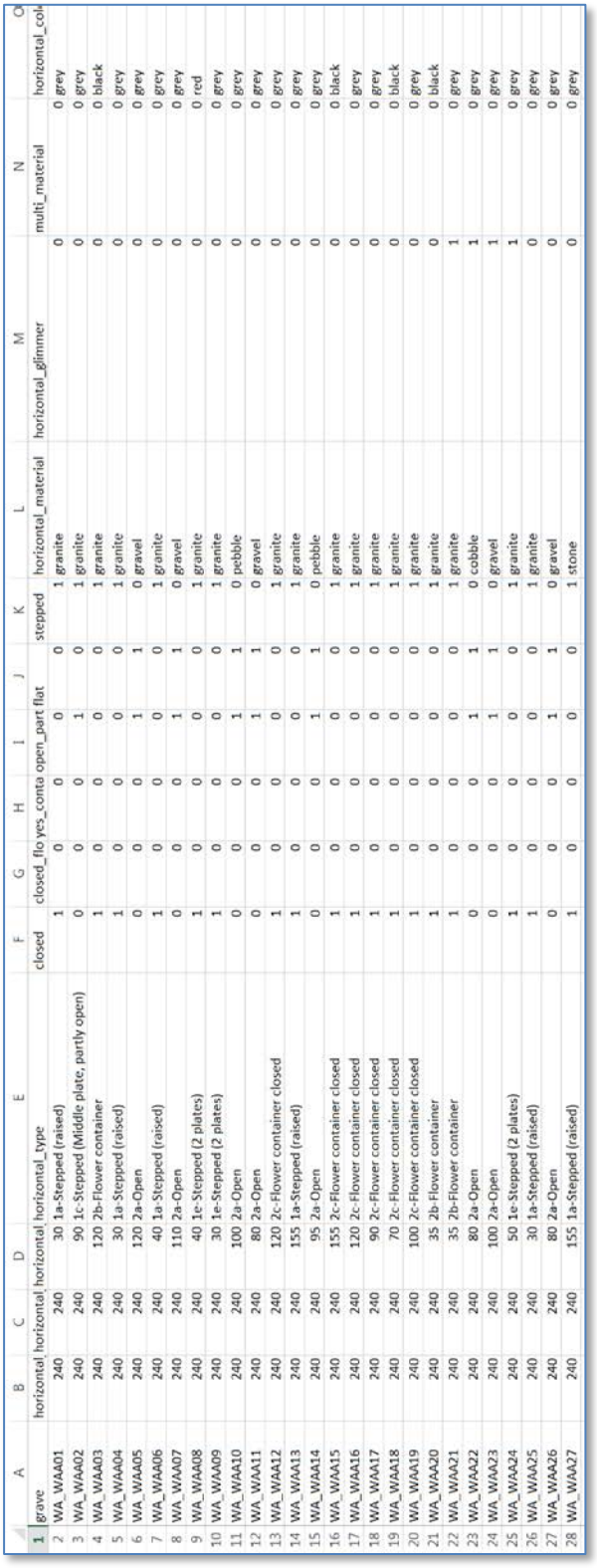
11. Annex

11.1 Screenshot of Microsoft Excel Data Sheet from Walferdange

Screenshot of Microsoft Excel Data Sheet from Walferdange cemetery in Luxembourg after finalizing data entry and revision of errors.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	grave	horizontal	horizontal	horizontal	horizontal_type	closed	closed_flo	yes_conta	open_part	flat	stepped	horizontal_material	horizontal_glimmer	multi_material	horizontal_col
2	WA_WAA01	240	240	30	1a-Stepped (raised)	1	0	0	0	0	1	granite		0	0 grey
3	WA_WAA02	240	240	90	1c-Stepped (Middle plate, partly open)	0	0	0	1	0	1	granite		0	0 grey
4	WA_WAA03	240	240	120	2b-Flower container	1	0	0	0	0	1	granite		0	0 black
5	WA_WAA04	240	240	30	1a-Stepped (raised)	1	0	0	0	0	1	granite		0	0 grey
6	WA_WAA05	240	240	120	2a-Open	0	0	0	1	1	0	gravel		0	0 grey
7	WA_WAA06	240	240	40	1a-Stepped (raised)	1	0	0	0	0	1	granite		0	0 grey
8	WA_WAA07	240	240	110	2a-Open	0	0	0	1	1	0	gravel		0	0 grey
9	WA_WAA08	240	240	40	1e-Stepped (2 plates)	1	0	0	0	0	1	granite		0	0 red
10	WA_WAA09	240	240	30	1e-Stepped (2 plates)	1	0	0	0	0	1	granite		0	0 grey
11	WA_WAA10	240	240	100	2a-Open	0	0	0	1	1	0	pebble		0	0 grey
12	WA_WAA11	240	240	80	2a-Open	0	0	0	1	1	0	gravel		0	0 grey
13	WA_WAA12	240	240	120	2c-Flower container closed	1	0	0	0	0	1	granite		0	0 grey
14	WA_WAA13	240	240	155	1a-Stepped (raised)	1	0	0	0	0	1	granite		0	0 grey
15	WA_WAA14	240	240	95	2a-Open	0	0	0	1	1	0	pebble		0	0 grey
16	WA_WAA15	240	240	155	2c-Flower container closed	1	0	0	0	0	1	granite		0	0 black
17	WA_WAA16	240	240	120	2c-Flower container closed	1	0	0	0	0	1	granite		0	0 grey
18	WA_WAA17	240	240	90	2c-Flower container closed	1	0	0	0	0	1	granite		0	0 grey
19	WA_WAA18	240	240	70	2c-Flower container closed	1	0	0	0	0	1	granite		0	0 black
20	WA_WAA19	240	240	100	2c-Flower container closed	1	0	0	0	0	1	granite		0	0 grey
21	WA_WAA20	240	240	35	2b-Flower container	1	0	0	0	0	1	granite		0	0 black
22	WA_WAA21	240	240	35	2b-Flower container	1	0	0	0	0	1	granite		1	0 grey
23	WA_WAA22	240	240	80	2a-Open	0	0	0	1	1	0	cobble		1	0 grey
24	WA_WAA23	240	240	100	2a-Open	0	0	0	1	1	0	gravel		1	0 grey
25	WA_WAA24	240	240	50	1e-Stepped (2 plates)	1	0	0	0	0	1	granite		1	0 grey
26	WA_WAA25	240	240	30	1a-Stepped (raised)	1	0	0	0	0	1	granite		0	0 grey
27	WA_WAA26	240	240	80	2a-Open	0	0	0	1	1	0	gravel		0	0 grey
28	WA_WAA27	240	240	155	1a-Stepped (raised)	1	0	0	0	0	1	stone		0	0 grey

11.2 Variables collected at Walferdange Cemetery

grave horizontal_length horizontal_width horizontal_height horizontal_type closed closed_flower_container yes_container open_partly_open flat stepped horizontal_material horizontal_glimmer multi_material horizontal_color1 horizontal_color2 horizontal_color3 horizontal_polished horizontal_coarse curb curb_color gravestone gravestone_type monumental vertical_height vertical_width vertical_depth single composite symmetrical asymmetrical cross vertical_material vertical_glimmer vertical_multi_material vertical_color1 vertical_color2 vertical_color3 vertical_polished vertical_coarse number_items fixed not_fixed persishable non_perishable mixed stonemason stonemason_label name religious_christian non_religious non_christian crosses cross_gravestone crucifix_gravestone description_material other_jesus jesus_portrait_gravestone jesus_description_material other_mary mary_portrait_gravestone mary_description_material other_gravestone_2 other_gravestone_description_material2 font font_description_material spray flowers_loose plants flower_base number_other_objects other_objects_crosses object_description1 object_material1 other_objects2 objects_description2 object_material2 other_objects3 objects_description3 other_objects_material3 other_objects4 other_objects_description4 other_objects_material4 other_objects5 other_objects_description5 other_objects_material5 other_objects6 other_objects_description6 other_objects_material6 other_objects_description7 other_objects_material7 other_objects_description8 plaque1 plaque2 plaque3 oldest_date latest_date number_occupants familiy_name famille familles maidenname other_names inscription_items family_related_inscription profession_inscription others_inscription permanent_inscription non_permanent_inscription rip text1 text2 text3 text4

11.3 Walk-Through Input to Cyrille Médard de Chardon for the Development of the Cemetery Surveyor Application

Goal: To collect materiality and spatiality data, which can be easy imported and applied in ArcGIS, about individual graves at a graveyard. Most likely, as output directly into an Access data base.

The researcher arrives at a new graveyard and first takes photographs of the overall cemetery from different angles, etc. This aims to provide an overall impression of the site. This includes relevant key features, such as chapels, walls, etc.. This should be saved into a separate folder.

Ideally, we have a map/plan of the graveyard, identifying and organising the individual graves. Such data have ideally been entered as a specific layer into ArcGIS already. In a perfect case, the graveyard is already, or can easily be, organised into clearly identifiable checker-board graveyard subsections. However, this might not always be the case. Next to the actual graveyard, identifying such sections and eventually also the individual graves with a unique ID (see Thomas's input) is key. As we move through the graves, this ID should simply be organised in a consecutive order (see attached sample Excel).

Once we start with an individual grave, all the following data should be linked via an Access database to this ID:

We start with an overall photograph of the grave. We take detailled photographs of the material (i.e. usually the stone), any paraphernalia (such as crosses, photographs, figurines, grave lanterns, flowers, plants, stonemason plaque, etc.) and eventually also of any inscriptions. The attached Excel sheet might provide an overall overview of what we are currently looking for.Currently, this is organised into “materiality”, “paraphernalia” and “linguistics”. Could it be a good idea to structure the tool accordingly (see mock-up)?

Besides pictures, we also need to enter the exact dimensions (in cm) of the horizontal grave site, as well as that of the actual grave marker (such as a headstone) separately.

It would be great if photographs could be somehow directly linked to the additional data we collect, such as material and colour of certain features/artefacts.

For example, I see a bronze cross on a grave. Therefpre, I need to enter in “paraphernalia” that there is a cross (which kind? dagger, square, etc.), where it is (on the headstone or on a tomb slab with no headstone, etc.), which material it is (mostly bronze, but can also be iron, engraved, etc.) and if it has any other unique or noteworthy features. It would be great if we could have simple buttons we can use for data entry! Except, of course, if there is new, unexpected data for which we have no predefined categorisation yet.

For example, I see that a grave has a vertical headstone. I need to note that because certain graves only have tomb slabs or nothing at all. Then I need to note its dimensions (length, height and width), its material (e.g. granite, gneiss, gneiss migmatite, marble, limestone, slate, basalt, concrete or others), its type (headstone, obelisk, tree-shape, etc.) and also any associated features, such as crosses, Jesus portraits, photographs, engravings and inscriptions.

You can understand that it is complex and sometimes features have multiple relations to each other!! A headstone can have more than one material, several features, all of which relate to the overall grave. Regarding the photographs we take, obviously they can also relate to several features that we seek.

It might be very important for us to be able to enter new categories for features on-site, i.e. when they appear for the first time at the graveyard. For example, for the first time we find a chest tomb. Then we would to simply enter this new category.

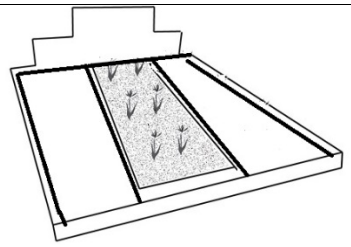
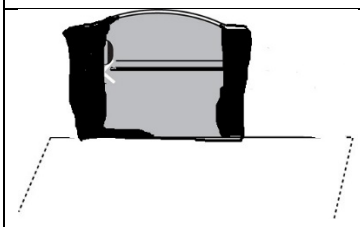
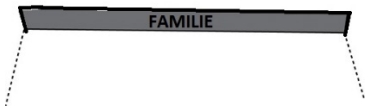
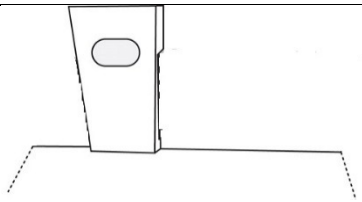
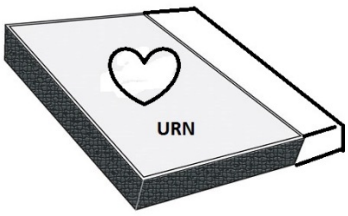
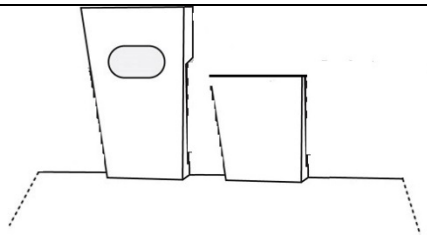
At the end, it would be great if we could simply have an Access database that can easily be exported from our data collection device into ArcGIS for further processing and analysis.

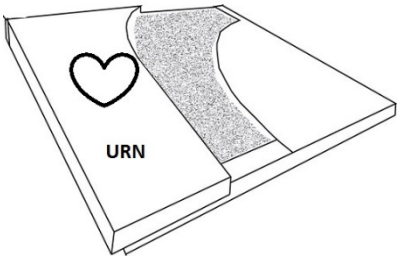
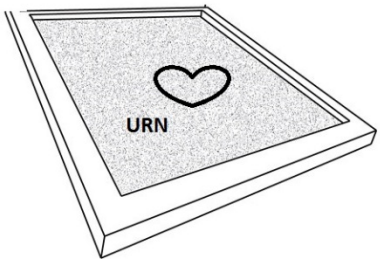
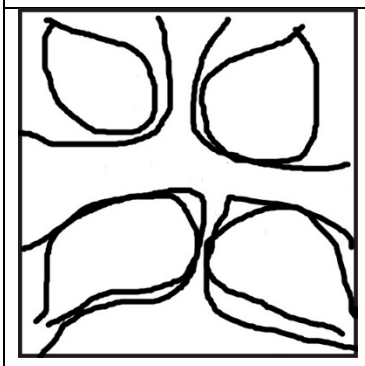
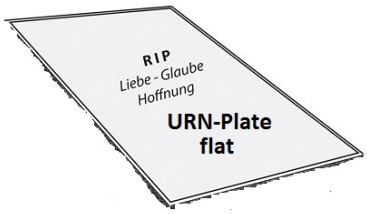
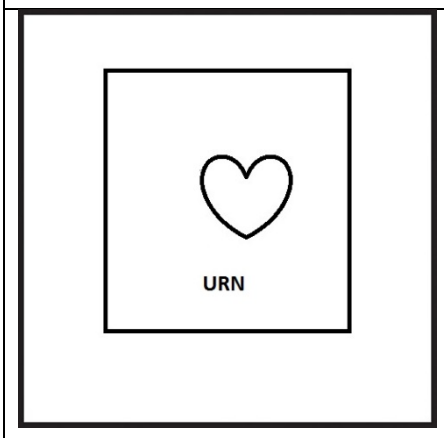
I think a quick check of our currently Excel list might be helpful in order to understand what we have collected thus far.

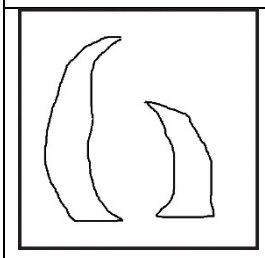
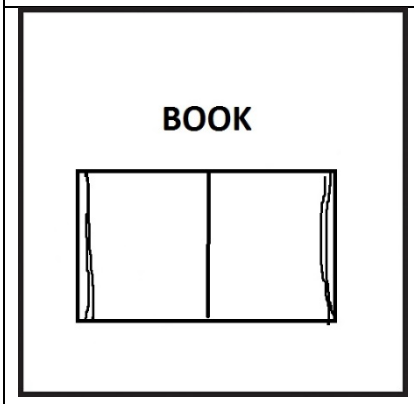
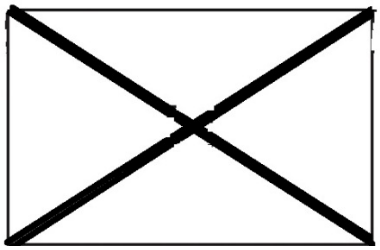
However, do not be limited by this categories and features! As long as we can collect such data on a database we can then analyse, I do not care what happens in the background!

By the way, we are in the process of further standardising certain features, (such as grave marker types, material, colours, etc. We will be able to provide further input as soon as possible.

11.4 Additional Typology

	**Name: 1h-Stepped** Horizontal grave type with symmetric centre open and two symmetric ledges on both sides.
	**Name: 1m-Block** Gravestone type in classic headstone shape with clearly defined symmetric wave
	**Name: 1n-Block** Gravestone type extremely low and rectangular shaped, covering the full length of the grave with a slight angled face
	Name: 1o-Block Gravestone type with a distinct left, asymmetrically placed, sharply corned tip
	Name: 6a-Single Stele Gravestone type presenting a single stele, often cubic
	**Name: 6a-Urn** Horizontal grave type covering an urn grave with a single, simple ledge
	**Name: 6b-Double Stele** Gravestone type presenting a double stele, often cubic and in different heights

	**Name: 6b-Urn** Horizontal grave type covering an urn grave with a ledge that is open in various shapes
	**Name: 6c-Urn** Horizontal grave type of an urn grave without any (ledge) cover
	**Name: 6d-Leaves-Cross** Stoup type depicting either four leaves and/or an organic cross shape
	**Name: 6d-Urn** Horizontal grave type covering an urn grave with an extremely flat, single and simple ledge
	**Name: 6e-Urn** Horizontal grave type covering an urn grave with a ledge or plate of some kind, embedded in a wall and/or wall monument

	Name: 6h-Latin cross Cross type with a distinct, rounded left tip
	**Name: 7a-Sickle Shape** Gravestone type with a distinct sickle shape, formed by two, usually separate, parts of the overall grave marker
	**Name: 8a-Book_Scroll Shape** Gravestone type depicting a scroll or book shape
	**Name: 9a-Diagonal –Lines** Stoup type depicting clearly identifiable diagonal lines of some kind

11.5 Selected Variables Checked for Frequency

(has_gravestone, gravestone_type, gravestone_material, gravestone_color, grave_is, horizontal_grave_type, horizontal_material, horizontal_color, items_total, has_stonemason_label, stonemason_name, has_christian_symbol, cross_type, has_jesus, has_mary, has_stoup, number_occupants, famille_familles) of the cemeteries Wormeldange, Wincheringen and Konz.

For Walferdange cemetery other attribute names apply, due to its pilot project character: horizontal_type, horizontal_material, horizontal_color1, mary_portrait_gravestone, other_jesus, familles, famille, number occupants, font description material, gravestone, other_mary, jesus_portrait_gravestone, crosses, gravestone_type, religious_christian, vertical_material, name, number_items, vertical_color1

11.6 Unedited SPSS Output Descriptive Stastical Analysis

11.6.1 Wormeldange

Anmerkungen

Ausgabe erstellt		12-DEC-2018 18:26:49
Kommentare		
Eingabe	Aktiver Datensatz	DataSet1
	Filter	<keine>
	Gewichtung	<keine>
	Aufgeteilte Datei	<keine>
	Anzahl der Zeilen in der Arbeitsdatei	184
Behandlung fehlender Werte	Definition von fehlenden Werten	Benutzerdefinierte fehlende Werte werden als fehlend behandelt.
	Verwendete Fälle	Statistik basiert auf allen Fällen mit gültigen Daten.
Syntax		FREQUENCIES VARIABLES=has_gravestone gravestone_type gravestone_material gravestone_color grave_is horizontal_grave_type horizontal_material horizontal_color items_total has_stonemason_label stonemason_name has_christian_symbol cross_type has_jesus has_mary has_stoup number_occupants famille_familles /BARCHART PERCENT /FORMAT=AFREQ /ORDER=ANALYSIS.
Ressourcen	Prozessorzeit	00:00:02,98
	Verstrichene Zeit	00:00:01,79

Statistiken

		has_gravestone	gravestone_type	gravestone_material	gravestone_color	grave_is
N	Gültig	184	184	184	184	184
	Fehlend	0	0	0	0	0

Statistiken

		horizontal_grave_type	horizontal_material	horizontal_color	items_total	has_stonemason_label
N	Gültig	184	184	184	171	184
	Fehlend	0	0	0	13	0

Statistiken

		stonemason_name	has_christian_symbol	cross_type	has_jesus	has_mary
N	Gültig	184	184	184	184	184
	Fehlend	0	0	0	0	0

Statistiken

		has_stoup	number_occupants	famille_familles
N	Gültig	184	114	184
	Fehlend	0	70	0

Häufigkeitstabelle

has_gravestone

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	No	59	32,1	32,1	32,1
	Yes	125	67,9	67,9	100,0
	Gesamt	184	100,0	100,0	

gravestone_type

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	4e-Cross (Calvary with Tree Cross on Cairn).jpg	1	,5	,5	,5
	4f-Cross (Tree Cross on Cairn).jpg	1	,5	,5	1,1
	1a-Block (squared).jpg	2	1,1	1,1	2,2
	1g-Block (wave).jpg	2	1,1	1,1	3,3
	1m-Block-symmetrical wave.jpg	2	1,1	1,1	4,3
	2c-Composite (squared asymmetrical).jpg	3	1,6	1,6	6,0
	1c-Block (with single peak asymmetrical).jpg	4	2,2	2,2	8,2
	3b-Cippus (double cippus).jpg	4	2,2	2,2	10,3
	1cc-Block (Trapezoid).jpg	5	2,7	2,7	13,0
	1j-Block (combined shapes).jpg	5	2,7	2,7	15,8
	4c-Cross (composite asymmetrical).jpg	5	2,7	2,7	18,5
	5a-Tabernacle.jpg	5	2,7	2,7	21,2
	2a-Composite (squared symmetrical).jpg	6	3,3	3,3	24,5
	2b-Composite (div. pediments).jpg	6	3,3	3,3	27,7
	3a-Cippus (simple).jpg	6	3,3	3,3	31,0

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	1d-Block (pediment asymmetrical).jpg	7	3,8	3,8	34,8
	4d-Cross (calvary single).jpg	8	4,3	4,3	39,1
	1b-Block (pediment).jpg	9	4,9	4,9	44,0
	X-Other.jpg	11	6,0	6,0	50,0
	4b-Cross (composite symmetrical).jpg	33	17,9	17,9	67,9
		59	32,1	32,1	100,0
	Gesamt	184	100,0	100,0	

gravestone_material

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Unknown	1	,5	,5	,5
	Belgisch Granit,Granit,Gabbro	1	,5	,5	1,1
	Gneis	1	,5	,5	1,6
	Granit, Unknown	1	,5	,5	2,2
	Granit,Belgisch Granit,Gabbro	1	,5	,5	2,7
	Granit,Gabbro	1	,5	,5	3,3
	Granit,Belgisch Granit	2	1,1	1,1	4,3
	Sandstein	2	1,1	1,1	5,4
	Belgisch Granit,Granit	3	1,6	1,6	7,1
	Sandstein,Marmor	4	2,2	2,2	9,2
	Belgisch Granit	5	2,7	2,7	12,0
	Belgisch Granit,Marmor	5	2,7	2,7	14,7
	Migmatit	5	2,7	2,7	17,4
	Sandstein,Gabbro	5	2,7	2,7	20,1
	Belgisch Granit,Gabbro	24	13,0	13,0	33,2
		59	32,1	32,1	65,2
	Granit	64	34,8	34,8	100,0
	Gesamt	184	100,0	100,0	

gravestone_color

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	brown	1	,5	,5	,5
	white	1	,5	,5	1,1
	brown-red	6	3,3	3,3	4,3
	sandstone-brown	11	6,0	6,0	10,3
	dark-grey	14	7,6	7,6	17,9
	black	32	17,4	17,4	35,3
		59	32,1	32,1	67,4
	grey	60	32,6	32,6	100,0
	Gesamt	184	100,0	100,0	

grave_is

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Abandoned	6	3,3	3,3	3,3
	Empty	8	4,3	4,3	7,6
	Present	170	92,4	92,4	100,0
	Gesamt	184	100,0	100,0	

horizontal_grave_type

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1d-Asymmetrical (partly open-or closed).jpg	1	,5	,5	,5
	5a-Fenced (any kind).jpg	1	,5	,5	1,1
	3b-Half-sarcophagus (cover stone).jpg	2	1,1	1,1	2,2
	X-Other.jpg	4	2,2	2,2	4,3
		5	2,7	2,7	7,1
	1c-Stepped (Middle plate, partly open).jpg	5	2,7	2,7	9,8
	1g-closed single or double plate (flat).jpg	6	3,3	3,3	13,0
	6e-Urn (wall tablet).jpg	7	3,8	3,8	16,8
	1e-Stepped (2 plates).jpg	13	7,1	7,1	23,9
	2a-Open.jpg	19	10,3	10,3	34,2
	1f-Stepped (middle plate shorter).jpg	33	17,9	17,9	52,2
	1a-Stepped (raised).jpg	88	47,8	47,8	100,0
	Gesamt	184	100,0	100,0	

horizontal_material

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Unknown	1	,5	,5	,5
	Belgisch Granit,Granit,Kiesel,Plants	1	,5	,5	1,1
	Belgisch Granit,Kiesel,Plants	1	,5	,5	1,6
	Belgisch Granit,Plants,Other	1	,5	,5	2,2
	Belgisch Granit,Plants,Soil	1	,5	,5	2,7
	Belgisch Granit,Soil,Plants	1	,5	,5	3,3
	Granit,Kiesel,Belgisch Granit	1	,5	,5	3,8
	Granit,Other,Plants	1	,5	,5	4,3
	Kiesel,Belgisch Granit	1	,5	,5	4,9
	Migmatit,Plants	1	,5	,5	5,4
	Other	1	,5	,5	6,0
	Soil,Belgisch Granit,Plants	1	,5	,5	6,5
	Soil,Plants,Granit	1	,5	,5	7,1
	Soil,Sandstein,Schotter	1	,5	,5	7,6

	Soil,Plants	2	1,1	1,1	8,7
	Belgisch Granit,Schotter	3	1,6	1,6	10,3
	Gneis	3	1,6	1,6	12,0
	Granit,Soil,Plants	3	1,6	1,6	13,6
	Migmatit	4	2,2	2,2	15,8
	Belgisch Granit,Kiesel	5	2,7	2,7	18,5
	Belgisch Granit	9	4,9	4,9	23,4
		11	6,0	6,0	29,3
	Belgisch Granit,Granit	14	7,6	7,6	37,0
	Granit,Belgisch Granit	28	15,2	15,2	52,2
	Granit	88	47,8	47,8	100,0
	Gesamt	184	100,0	100,0	

horizontal_color

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	other	1	,5	,5	,5
	green	3	1,6	1,6	2,2
	brown	9	4,9	4,9	7,1
		11	6,0	6,0	13,0
	brown-red	13	7,1	7,1	20,1
	dark-grey	18	9,8	9,8	29,9
	black	26	14,1	14,1	44,0
	grey	103	56,0	56,0	100,0
	Gesamt	184	100,0	100,0	

items_total

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	9	1	,5	,6	,6
	10	1	,5	,6	1,2
	12	1	,5	,6	1,8
	14	1	,5	,6	2,3
	6	3	1,6	1,8	4,1
	7	6	3,3	3,5	7,6
	8	6	3,3	3,5	11,1
	1	7	3,8	4,1	15,2
	5	28	15,2	16,4	31,6
	2	34	18,5	19,9	51,5
	3	40	21,7	23,4	74,9
	4	43	23,4	25,1	100,0
	Gesamt	171	92,9	100,0	
Fehlend	System	13	7,1		
Gesamt		184	100,0		

has_stonemason_label

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Missing	1	,5	,5	,5
		12	6,5	6,5	7,1
	No	63	34,2	34,2	41,3
	Yes	108	58,7	58,7	100,0
	Gesamt	184	100,0	100,0	

stonemason_name

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	A. Steffes Bascharage	1	,5	,5	,5
	Eug. Robinet Petange	1	,5	,5	1,1
	Gelhausen Grevenmacher	1	,5	,5	1,6
	Hary Freres Esch-Alzette	1	,5	,5	2,2
	Marbrerie ETS H. Schanen Wasserbillig	1	,5	,5	2,7
	P. Sahllou (?)	1	,5	,5	3,3
	Schou Grevenmacher	1	,5	,5	3,8
	Th. Mergen Luxemb. Glacis	1	,5	,5	4,3
	Witry Diekirch	1	,5	,5	4,9
	Witry Marbrerie Diekirch	1	,5	,5	5,4
	Gelhausen Magonnette Grevenmacher	2	1,1	1,1	6,5
	Marbrerie ETS H. Schanen Wasserbillig Tel. 74140	2	1,1	1,1	7,6
	Marbrerie HARY Anc. Marcel Gelhausen	2	1,1	1,1	8,7
	Al. Steffes Bascharage	3	1,6	1,6	10,3

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	Jacquemart	3	1,6	1,6	12,0
	Gelhausen Luxembourg	4	2,2	2,2	14,1
	J. Gilson Mertzig	4	2,2	2,2	16,3
	Schanen Wasserbillig	4	2,2	2,2	18,5
	Hary Freres Foetz/Esch-Alzette	5	2,7	2,7	21,2
	J.P. Schou Grevenmacher	5	2,7	2,7	23,9
	Marbrerie HARY Foetz Esch Luxbg Wasserbg	10	5,4	5,4	29,3
	Tom Gelhausen Grevenmacher Luxembourg	24	13,0	13,0	42,4
	Bertrand Munsbach	30	16,3	16,3	58,7
		76	41,3	41,3	100,0
	Gesamt	184	100,0	100,0	

has_christian_symbol

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	No	4	2,2	2,2	2,2
		12	6,5	6,5	8,7
	Yes	168	91,3	91,3	100,0
	Gesamt	184	100,0	100,0	

cross_type

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	6a-Latin cross.jpg,7c-Greek cross-gammion.jpg	1	,5	,5	,5
	6b-Latin cross-broad.jpg,6a-Latin cross.jpg	1	,5	,5	1,1
	6b-Latin cross-broad.jpg,6a-Latin cross.jpg,6d_Latin cross-gammion.jpg	1	,5	,5	1,6
	6b-Latin cross-broad.jpg,6f-Latin cross-potent.jpg,6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg	1	,5	,5	2,2
	6b-Latin cross-broad.jpg,7b-Greek cross-broad.jpg	1	,5	,5	2,7
	6b-Latin cross-broad.jpg,8b-Chi-Rho.jpg	1	,5	,5	3,3
	6c-Latin cross-patty.jpg	1	,5	,5	3,8

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6d_Latin cross-gammion.jpg,6b-Latin cross-broad.jpg	1	,5	,5	4,3
	6d_Latin cross-gammion.jpg,X-Other.jpg	1	,5	,5	4,9
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,6d_Latin cross-gammion.jpg	1	,5	,5	5,4
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,7b-Greek cross-broad.jpg	1	,5	,5	6,0
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,8b-Chi-Rho.jpg	1	,5	,5	6,5
	6f-Latin cross-potent.jpg,6a-Latin cross.jpg,X-Other.jpg	1	,5	,5	7,1
	6f-Latin cross-potent.jpg,6b-Latin cross-broad.jpg	1	,5	,5	7,6
	6f-Latin cross-potent.jpg,6c-Latin cross-patty.jpg	1	,5	,5	8,2
	6f-Latin cross-potent.jpg,8b-Chi-Rho.jpg	1	,5	,5	8,7
	7a-Greek cross.jpg,6b-Latin cross-broad.jpg	1	,5	,5	9,2
	7b-Greek cross-broad.jpg,6b-Latin cross-broad.jpg	1	,5	,5	9,8
	7c-Greek cross-gammion.jpg,X-Other.jpg	1	,5	,5	10,3
	8a-Breitkreuz_Cross with long cross beam.jpg	1	,5	,5	10,9
	8a-Breitkreuz_Cross with long cross beam.jpg,8b-Chi-Rho.jpg	1	,5	,5	11,4
	8a-Breitkreuz_Cross with long cross beam.jpg,X-Other.jpg	1	,5	,5	12,0
	X-Other.jpg,6d_Latin cross-gammion.jpg	1	,5	,5	12,5
	X-Other.jpg,6d_Latin cross-gammion.jpg,7b-Greek cross-broad.jpg	1	,5	,5	13,0

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6a-Latin cross.jpg,6f-Latin cross-potent.jpg	2	1,1	1,1	14,1
	6b-Latin cross-broad.jpg,6c-Latin cross-patty.jpg	2	1,1	1,1	15,2
	6b-Latin cross-broad.jpg,6f-Latin cross-potent.jpg	2	1,1	1,1	16,3
	7a-Greek cross.jpg	2	1,1	1,1	17,4
	8b-Chi-Rho.jpg	2	1,1	1,1	18,5
	6a-Latin cross.jpg,X-Other.jpg	3	1,6	1,6	20,1
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg	3	1,6	1,6	21,7
	6a-Latin cross.jpg,6d_Latin cross-gammion.jpg	4	2,2	2,2	23,9
	7b-Greek cross-broad.jpg	4	2,2	2,2	26,1
	6a-Latin cross.jpg,6b-Latin cross-broad.jpg	5	2,7	2,7	28,8
	6b-Latin cross-broad.jpg,6d_Latin cross-gammion.jpg	5	2,7	2,7	31,5
	6d_Latin cross-gammion.jpg	5	2,7	2,7	34,2
	6b-Latin cross-broad.jpg,X-Other.jpg	6	3,3	3,3	37,5
	X-Other.jpg	8	4,3	4,3	41,8
	6f-Latin cross-potent.jpg	9	4,9	4,9	46,7
		28	15,2	15,2	62,0
	6a-Latin cross.jpg	29	15,8	15,8	77,7
	6b-Latin cross-broad.jpg	41	22,3	22,3	100,0
	Gesamt	184	100,0	100,0	

has_jesus

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig		12	6,5	6,5	6,5
	Yes	71	38,6	38,6	45,1
	No	101	54,9	54,9	100,0
	Gesamt	184	100,0	100,0	

has_mary

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Yes	8	4,3	4,3	4,3
		12	6,5	6,5	10,9
	No	164	89,1	89,1	100,0
	Gesamt	184	100,0	100,0	

has_stoup

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1f-Latin cross_1.jpg	1	,5	,5	,5
	1g-Latin cross with rays.jpg	1	,5	,5	1,1
	9a-Diagonal -Lines.jpg	1	,5	,5	1,6
	6a-Roses and-or Ear of Corn or Flowers.jpg	2	1,1	1,1	2,7
	1c-Latin cross-patty-irregular.jpg	3	1,6	1,6	4,3
	2a-Greek cross-regular.jpg	3	1,6	1,6	6,0
	2d-Greek cross-irregular.jpg	3	1,6	1,6	7,6
	4b-Unknown symbol.jpg	5	2,7	2,7	10,3
	6c-Olive branch.jpg	6	3,3	3,3	13,6
	1b-Latin cross-potent-regular.jpg	9	4,9	4,9	18,5
	4a-Knob-rectangular.jpg	13	7,1	7,1	25,5
	3b Chi-Rho_and_Alpha-Omega.jpg	15	8,2	8,2	33,7
	X-Other.jpg	16	8,7	8,7	42,4
	1e-Latin cross-gammion.jpg	18	9,8	9,8	52,2
		26	14,1	14,1	66,3
	3a-Chi-Rho.jpg	27	14,7	14,7	81,0
	5a-Praying Hands (of Durer).jpg	35	19,0	19,0	100,0
	Gesamt	184	100,0	100,0	

number_occupants

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	10	1	,5	,9	,9
	12	1	,5	,9	1,8
	13	1	,5	,9	2,6
	17	1	,5	,9	3,5
	8	3	1,6	2,6	6,1
	7	4	2,2	3,5	9,6
	9	4	2,2	3,5	13,2
	6	6	3,3	5,3	18,4
	5	10	5,4	8,8	27,2
	1	20	10,9	17,5	44,7
	4	20	10,9	17,5	62,3
	3	21	11,4	18,4	80,7
	2	22	12,0	19,3	100,0
	Gesamt	114	62,0	100,0	
Fehlend	System	70	38,0		
Gesamt		184	100,0		

famille_familles

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Familles	23	12,5	12,5	12,5
		61	33,2	33,2	45,7
	Famille	100	54,3	54,3	100,0
	Gesamt	184	100,0	100,0	

11.6.2 Wincheringen

Anmerkungen

Ausgabe erstellt		12-DEC-2018 18:53:32
Kommentare		
Eingabe	Daten	C:\Users\christoph.streb\Desktop\PhDProject\Friedhof Spatial Data\Wincheringen\CSA Spatial Daten korrigiert\Wincheringen Spatial Data Sheet 12.12.2018.csv
	Aktiver Datensatz	DataSet1
	Filter	<keine>
	Gewichtung	<keine>
	Aufgeteilte Datei	<keine>
	Anzahl der Zeilen in der Arbeitsdatei	388
Behandlung fehlender Werte	Definition von fehlenden Werten	Benutzerdefinierte fehlende Werte werden als fehlend behandelt.
	Verwendete Fälle	Statistik basiert auf allen Fällen mit gültigen Daten.
Syntax		FREQUENCIES VARIABLES=has_gravestone gravestone_type gravestone_material gravestone_color grave_is horizontal_grave_type horizontal_material horizontal_color items_total has_stonemason_label stonemason_name has_christian_symbol cross_type has_jesus has_mary has_stoup number_occupants famille_familles /BARCHART PERCENT /FORMAT=AFREQ /ORDER=ANALYSIS.
Ressourcen	Prozessorzeit	00:00:03,96
	Verstrichene Zeit	00:00:02,54

Statistiken

		has_gravestone	gravestone_type	gravestone_material	gravestone_color	grave_is
N	Gültig	388	388	388	388	388
	Fehlend	0	0	0	0	0

Statistiken

		horizontal_grave_type	horizontal_material	horizontal_color	items_total	has_stonemason_label
N	Gültig	388	388	388	253	388
	Fehlend	0	0	0	135	0

Statistiken

		stonemason_name	has_christian_symbol	cross_type	has_jesus	has_mary
N	Gültig	388	388	388	388	388
	Fehlend	0	0	0	0	0

Statistiken

		has_stoup	number_occupants	famille_familles
N	Gültig	388	228	388
	Fehlend	0	160	0

Häufigkeitstabelle

has_gravestone

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	No	142	36,6	36,6	36,6
	Yes	246	63,4	63,4	100,0
	Gesamt	388	100,0	100,0	

gravestone_type

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1h-Block (heart shaped).jpg	1	,3	,3	,3
	1l-Block (composite with full or half figurine).jpg	1	,3	,3	,5
	1o-Block (assymmetric left tip).jpg	1	,3	,3	,8
	2c-Composite (squared asymmetrical).jpg	1	,3	,3	1,0
	6b-Double Stele.jpg	1	,3	,3	1,3
	7a-Sickle Shape.jpg	1	,3	,3	1,5
	2a-Composite (squared symmetrical).jpg	2	,5	,5	2,1

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	4c-Cross (composite asymmetrical).jpg	2	,5	,5	2,6
	5a-Tabernacle.jpg	2	,5	,5	3,1
	6a-Single Stele.jpg	2	,5	,5	3,6
	1a-Block (squared).jpg	4	1,0	1,0	4,6
	1e-Block (rounded edges).jpg	6	1,5	1,5	6,2
	2b-Composite (div. pediments).jpg	6	1,5	1,5	7,7
	4a-Cross (single).jpg	9	2,3	2,3	10,1
	4b-Cross (composite symmetrical).jpg	10	2,6	2,6	12,6
	1k-Block (chipped edges).jpg	15	3,9	3,9	16,5
	1b-Block (pediment).jpg	17	4,4	4,4	20,9
	X-Other.jpg	23	5,9	5,9	26,8
	1c-Block (with single peak asymmetrical).jpg	24	6,2	6,2	33,0
	1cc-Block (Trapezoid).jpg	26	6,7	6,7	39,7
	1g-Block (wave).jpg	39	10,1	10,1	49,7
	1d-Block (pediment asymmetrical).jpg	52	13,4	13,4	63,1
		143	36,9	36,9	100,0
	Gesamt	388	100,0	100,0	

gravestone_material

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Gneis,Granit	1	,3	,3	,3
	Marmor	1	,3	,3	,5
	Sandstein	1	,3	,3	,8
	Kalkstein	2	,5	,5	1,3
	Quarzit	2	,5	,5	1,8
	Schiefer	2	,5	,5	2,3
	Unknown	3	,8	,8	3,1
	Other	3	,8	,8	3,9
	Gneis	29	7,5	7,5	11,3
	Migmatit	71	18,3	18,3	29,6
	Granit	131	33,8	33,8	63,4
		142	36,6	36,6	100,0
	Gesamt	388	100,0	100,0	

gravestone_color

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	sandstone-brown	1	,3	,3	,3
	white	1	,3	,3	,5
	yellow	1	,3	,3	,8
	brown	4	1,0	1,0	1,8
	red	4	1,0	1,0	2,8
	light-grey	5	1,3	1,3	4,1
	grey	28	7,2	7,2	11,3
	dark-grey	48	12,4	12,4	23,7
	brown-red	63	16,2	16,2	39,9
	black	90	23,2	23,2	63,1
		143	36,9	36,9	100,0
	Gesamt	388	100,0	100,0	

grave_is

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Empty	40	10,3	10,3	10,3
	Abandoned	96	24,7	24,7	35,1
	Present	252	64,9	64,9	100,0
	Gesamt	388	100,0	100,0	

horizontal_grave_type

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1b-Stepped (sunken).jpg	1	,3	,3	,3

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	1f-Stepped (middle plate shorter).jpg	1	,3	,3	,5
	X-Other.jpg	2	,5	,5	1,0
	1c-Stepped (Middle plate, partly open).jpg	5	1,3	1,3	2,3
	1g-closed single or double plate (flat).jpg	16	4,1	4,1	6,4
	1d-Asymmetrical (partly open-or closed).jpg	28	7,2	7,2	13,7
	1a-Stepped (raised).jpg	57	14,7	14,7	28,4
		136	35,1	35,1	63,4
	2a-Open.jpg	142	36,6	36,6	100,0
	Gesamt	388	100,0	100,0	

horizontal_material

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Gneis,Schotter	1	,3	,3	,3
	Granit,Glas	1	,3	,3	,5
	Granit,Kiesel,Plants	1	,3	,3	,8
	Granit,Schotter,Other	1	,3	,3	1,0
	Granit,Schotter,Soil	1	,3	,3	1,3
	Kalkstein,Soil,Plants	1	,3	,3	1,5
	Migmatit,Other,Plants	1	,3	,3	1,8
	Migmatit,Schotter	1	,3	,3	2,1
	Migmatit,Schotter,Other	1	,3	,3	2,3
	Migmatit,Schotter,Plants	1	,3	,3	2,6
	Migmatit,Schotter,Soil,Plants	1	,3	,3	2,8
	Other,Plants,Migmatit	1	,3	,3	3,1
	Other,Schotter,Migmatit	1	,3	,3	3,4
	Other,Soil,Schotter,Plants	1	,3	,3	3,6
	Plants	1	,3	,3	3,9
	Plants,Soil	1	,3	,3	4,1

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	Plants,Soil,Gneis	1	,3	,3	4,4
	Quarzit	1	,3	,3	4,6
	Schiefer,Granit,Plants	1	,3	,3	4,9
	Schiefer,Schotter	1	,3	,3	5,2
	Schotter,Migmatit	1	,3	,3	5,4
	Schotter,Migmatit,Plants	1	,3	,3	5,7
	Schotter,Other,Plants	1	,3	,3	5,9
	Schotter,Other,Soil,Plants	1	,3	,3	6,2
	Schotter,Plants,Granit	1	,3	,3	6,4
	Schotter,Plants,Migmatit	1	,3	,3	6,7
	Soil,Plants,Schotter,Gneis	1	,3	,3	7,0
	Soil,Schiefer,Plants	1	,3	,3	7,2
	Soil,Schotter,Gneis	1	,3	,3	7,5
	Granit,Plants	2	,5	,5	8,0
	Granit,Schotter,Plants	2	,5	,5	8,5
	Schiefer,Soil,Plants	2	,5	,5	9,0
	Schotter,Plants	2	,5	,5	9,5
	Schotter,Soil,Plants,Migmatit	2	,5	,5	10,1
	Soil,Granit,Plants	2	,5	,5	10,6
	Soil,Plants,Schiefer	2	,5	,5	11,1
	Soil,Schotter,Plants	2	,5	,5	11,6
	Schotter,Other	3	,8	,8	12,4
	Schotter,Plants,Other	3	,8	,8	13,1
	Soil,Plants, Unknown	3	,8	,8	13,9
	Gneis,Soil,Plants	4	1,0	1,0	14,9
	Soil,Plants,Schotter	4	1,0	1,0	16,0
	Granit,Soil,Plants	6	1,5	1,5	17,5
	Migmatit,Soil,Plants	6	1,5	1,5	19,1
	Soil,Plants,Gneis	6	1,5	1,5	20,6
	Gneis	11	2,8	2,8	23,5
	Schotter,Soil,Plants	12	3,1	3,1	26,5
	Soil,Plants,Granit	16	4,1	4,1	30,7
	Soil,Plants,Migmatit	20	5,2	5,2	35,8
	Migmatit	22	5,7	5,7	41,5
	Granit	44	11,3	11,3	52,8
	Soil,Plants,Other	45	11,6	11,6	64,4
		138	35,6	35,6	100,0
	Gesamt	388	100,0	100,0	

horizontal_color

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	brown,green	1	,3	,3	,3
	red	1	,3	,3	,5
	light-grey	2	,5	,5	1,0
	white	2	,5	,5	1,5
	green	20	5,2	5,2	6,7

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	brown-red	23	5,9	5,9	12,6
	black	25	6,4	6,4	19,1
	dark-grey	36	9,3	9,3	28,4
	grey	45	11,6	11,6	39,9
	brown	96	24,7	24,7	64,7
		137	35,3	35,3	100,0
	Gesamt	388	100,0	100,0	

items_total

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	14	1	,3	,4	,4
	17	1	,3	,4	,8
	18	1	,3	,4	1,2
	12	3	,8	1,2	2,4
	2	4	1,0	1,6	4,0
	3	7	1,8	2,8	6,7
	11	14	3,6	5,5	12,3
	9	19	4,9	7,5	19,8
	4	20	5,2	7,9	27,7
	5	20	5,2	7,9	35,6
	10	20	5,2	7,9	43,5
	8	26	6,7	10,3	53,8
	7	39	10,1	15,4	69,2
	6	78	20,1	30,8	100,0
	Gesamt	253	65,2	100,0	
Fehlend	System	135	34,8		
Gesamt		388	100,0		

has_stonemason_label

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Missing	7	1,8	1,8	1,8
	Yes	76	19,6	19,6	21,4
		135	34,8	34,8	56,2
	No	170	43,8	43,8	100,0
	Gesamt	388	100,0	100,0	

stonemason_name

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	A.Schüller Trier	1	,3	,3	,3
	Bettendorf Olewig	1	,3	,3	,5
	Grabmalgestaltung Horst Diederich (...)	1	,3	,3	,8
	Martini Trier	1	,3	,3	1,0

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	MelChisedech 54568 Gerolstein Tel. 06591/3319	1	,3	,3	1,3
	Nik. Diederich (...)	2	,5	,5	1,8
	J. Mettler Trier	4	1,0	1,0	2,8
	Steinmetzmeister D.I.V Josef Juny (...) Wasserliesch (...)	4	1,0	1,0	3,9
	Grabdenkmäler Jos. Juny GmbH (...)	7	1,8	1,8	5,7
	Gebr. Felten Grabsteine u. Terrazzo 5510 Saarburg	9	2,3	2,3	8,0
	Mettler Trier	9	2,3	2,3	10,3
	Felten Grabsteine (...) Saarburg 06581/2588	18	4,6	4,6	14,9
	Juny	18	4,6	4,6	19,6
		312	80,4	80,4	100,0
	Gesamt	388	100,0	100,0	

has_christian_symbol

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	No	12	3,1	3,1	3,1
		135	34,8	34,8	37,9
	Yes	241	62,1	62,1	100,0
	Gesamt	388	100,0	100,0	

cross_type

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	6a-Latin cross.jpg,7c-Greek cross-gammion.jpg,X-Other.jpg	1	,3	,3	,3
	6b-Latin cross-broad.jpg,6a-Latin cross.jpg	1	,3	,3	,5
	6b-Latin cross-broad.jpg,6f-Latin cross-potent.jpg	1	,3	,3	,8
	6b-Latin cross-broad.jpg,7a-Greek cross.jpg	1	,3	,3	1,0
	6b-Latin cross-broad.jpg,7a-Greek cross.jpg,6c-Latin cross-patty.jpg	1	,3	,3	1,3
	6b-Latin cross-broad.jpg,7b-Greek cross-broad.jpg	1	,3	,3	1,5

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6b-Latin cross-broad.jpg,X-Other.jpg,6c-Latin cross-patty.jpg	1	,3	,3	1,8
	6b-Latin cross-broad.jpg,X-Other.jpg,7a-Greek cross.jpg	1	,3	,3	2,1
	6c-Latin cross-patty.jpg,6b-Latin cross-broad.jpg	1	,3	,3	2,3
	6c-Latin cross-patty.jpg,7a-Greek cross.jpg	1	,3	,3	2,6
	6c-Latin cross-patty.jpg,7b-Greek cross-broad.jpg	1	,3	,3	2,8
	6c-Latin cross-patty.jpg,7c-Greek cross-gammion.jpg	1	,3	,3	3,1
	6c-Latin cross-patty.jpg,8b-Chi-Rho.jpg	1	,3	,3	3,4
	6c-Latin cross-patty.jpg,X-Other.jpg	1	,3	,3	3,6
	6d_Latin cross-gammion.jpg,6b-Latin cross-broad.jpg,7a-Greek cross.jpg	1	,3	,3	3,9
	6d_Latin cross-gammion.jpg,7b-Greek cross-broad.jpg	1	,3	,3	4,1
	6d_Latin cross-gammion.jpg,7c-Greek cross-gammion.jpg,X-Other.jpg	1	,3	,3	4,4
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,6b-Latin cross-broad.jpg	1	,3	,3	4,6
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,6b-Latin cross-broad.jpg,7a-Greek cross.jpg	1	,3	,3	4,9
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,7b-Greek cross-broad.jpg,X-Other.jpg	1	,3	,3	5,2
	6f-Latin cross-potent.jpg,6b-Latin cross-broad.jpg	1	,3	,3	5,4
	7a-Greek cross.jpg,6b-Latin cross-broad.jpg,X-Other.jpg	1	,3	,3	5,7

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	7a-Greek cross.jpg,6c-Latin cross-patty.jpg	1	,3	,3	5,9
	7a-Greek cross.jpg,7b-Greek cross-broad.jpg	1	,3	,3	6,2
	7a-Greek cross.jpg,7b-Greek cross-broad.jpg,6a-Latin cross.jpg	1	,3	,3	6,4
	7a-Greek cross.jpg,8b-Chi-Rho.jpg	1	,3	,3	6,7
	7b-Greek cross-broad.jpg,6a-Latin cross.jpg,7a-Greek cross.jpg	1	,3	,3	7,0
	7b-Greek cross-broad.jpg,7a-Greek cross.jpg	1	,3	,3	7,2
	7b-Greek cross-broad.jpg,7a-Greek cross.jpg,6c-Latin cross-patty.jpg	1	,3	,3	7,5
	7b-Greek cross-broad.jpg,8a-Breitkreuz_Cross with long cross beam.jpg	1	,3	,3	7,7
	7c-Greek cross-gammion.jpg,6b-Latin cross-broad.jpg	1	,3	,3	8,0
	7c-Greek cross-gammion.jpg,X-Other.jpg	1	,3	,3	8,2
	8a-Breitkreuz_Cross with long cross beam.jpg,6a-Latin cross.jpg	1	,3	,3	8,5
	8b-Chi-Rho.jpg,X-Other.jpg	1	,3	,3	8,8
	8c-Three Crosses (Calvary).jpg,6b-Latin cross-broad.jpg,7b-Greek cross-broad.jpg	1	,3	,3	9,0
	X-Other.jpg,6b-Latin cross-broad.jpg	1	,3	,3	9,3
	X-Other.jpg,6c-Latin cross-patty.jpg	1	,3	,3	9,5
	X-Other.jpg,7b-Greek cross-broad.jpg	1	,3	,3	9,8
	6b-Latin cross-broad.jpg,6c-Latin cross-patty.jpg	2	,5	,5	10,3
	6b-Latin cross-broad.jpg,6d_Latin cross-gammion.jpg,X-Other.jpg	2	,5	,5	10,8

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6b-Latin cross-broad.jpg,6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg	2	,5	,5	11,3
	6b-Latin cross-broad.jpg,7c-Greek cross-gammion.jpg	2	,5	,5	11,9
	6b-Latin cross-broad.jpg,7c-Greek cross-gammion.jpg,6a-Latin cross.jpg	2	,5	,5	12,4
	8b-Chi-Rho.jpg	2	,5	,5	12,9
	6a-Latin cross.jpg,6b-Latin cross-broad.jpg	3	,8	,8	13,7
	6a-Latin cross.jpg,7a-Greek cross.jpg	3	,8	,8	14,4
	6a-Latin cross.jpg,7b-Greek cross-broad.jpg	3	,8	,8	15,2
	6a-Latin cross.jpg,7c-Greek cross-gammion.jpg	3	,8	,8	16,0
	6d_Latin cross-gammion.jpg,6b-Latin cross-broad.jpg	3	,8	,8	16,8
	6d_Latin cross-gammion.jpg,X-Other.jpg	3	,8	,8	17,5
	7b-Greek cross-broad.jpg,6c-Latin cross-patty.jpg	3	,8	,8	18,3
	7c-Greek cross-gammion.jpg,6c-Latin cross-patty.jpg	3	,8	,8	19,1
	6b-Latin cross-broad.jpg,7b-Greek cross-broad.jpg,X-Other.jpg	4	1,0	1,0	20,1
	6b-Latin cross-broad.jpg,X-Other.jpg	4	1,0	1,0	21,1
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,7b-Greek cross-broad.jpg	4	1,0	1,0	22,2
	6f-Latin cross-potent.jpg	4	1,0	1,0	23,2
	7b-Greek cross-broad.jpg,X-Other.jpg	4	1,0	1,0	24,2
	7c-Greek cross-gammion.jpg	4	1,0	1,0	25,3
	6a-Latin cross.jpg,X-Other.jpg	5	1,3	1,3	26,5
	7a-Greek cross.jpg	5	1,3	1,3	27,8
	X-Other.jpg	6	1,5	1,5	29,4

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	7b-Greek cross-broad.jpg	7	1,8	1,8	31,2
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg	12	3,1	3,1	34,3
	6d_Latin cross-gammion.jpg	16	4,1	4,1	38,4
	6c-Latin cross-patty.jpg	22	5,7	5,7	44,1
	6b-Latin cross-broad.jpg	25	6,4	6,4	50,5
	6a-Latin cross.jpg	26	6,7	6,7	57,2
		166	42,8	42,8	100,0
	Gesamt	388	100,0	100,0	

has_jesus

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Yes	39	10,1	10,1	10,1
		135	34,8	34,8	44,8
	No	214	55,2	55,2	100,0
	Gesamt	388	100,0	100,0	

has_mary

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Yes	17	4,4	4,4	4,4
		135	34,8	34,8	39,2
	No	236	60,8	60,8	100,0
	Gesamt	388	100,0	100,0	

has_stoup

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1a-Latin cross-regular.jpg	1	,3	,3	,3
	1c-Latin cross-patty-irregular.jpg	1	,3	,3	,5
	1g-Latin cross with rays.jpg	1	,3	,3	,8
	2d-Greek cross-irregular.jpg	1	,3	,3	1,0
	6b-Tree of Life.jpg	1	,3	,3	1,3
	1e-Latin cross-gammion.jpg	2	,5	,5	1,8
	2e-Breitkreuz-Broad Cross.jpg	2	,5	,5	2,3
	3a-Chi-Rho.jpg	2	,5	,5	2,8
	3b Chi-Rho_and_Alpha-Omega.jpg	3	,8	,8	3,6
	2b-Greek cross-patty.jpg	4	1,0	1,0	4,6

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6d-Leaves-Cross.jpg	6	1,5	1,5	6,2
	6a-Roses and-or Ear of Corn or Flowers.jpg	10	2,6	2,6	8,8
	5a-Praying Hands (of Durer).jpg	16	4,1	4,1	12,9
	2c-Greek cross-gammion.jpg	17	4,4	4,4	17,3
	2a-Greek cross-regular.jpg	34	8,8	8,8	26,0
	9a-Diagonal -Lines.jpg	59	15,2	15,2	41,2
	X-Other.jpg	82	21,1	21,1	62,4
		146	37,6	37,6	100,0
	Gesamt	388	100,0	100,0	

number_occupants

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	11	1	,3	,4	,4
	8	2	,5	,9	1,3
	7	5	1,3	2,2	3,5
	6	8	2,1	3,5	7,0
	5	16	4,1	7,0	14,0
	4	23	5,9	10,1	24,1
	3	26	6,7	11,4	35,5
	1	64	16,5	28,1	63,6
	2	83	21,4	36,4	100,0
	Gesamt	228	58,8	100,0	
Fehlend	System	160	41,2		
Gesamt		388	100,0		

famille_familles

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Famille	47	12,1	12,1	12,1
		341	87,9	87,9	100,0
	Gesamt	388	100,0	100,0	

11.6.3 Walferdange

Anmerkungen

Ausgabe erstellt		30-DEC-2018 15:08:17
Kommentare		
Eingabe	Aktiver Datensatz	DataSet1
	Filter	<keine>
	Gewichtung	<keine>
	Aufgeteilte Datei	<keine>
	Anzahl der Zeilen in der Arbeitsdatei	739
Behandlung fehlender Werte	Definition von fehlenden Werten	Benutzerdefinierte fehlende Werte werden als fehlend behandelt.
	Verwendete Fälle	Statistik basiert auf allen Fällen mit gültigen Daten.
Syntax		FREQUENCIES VARIABLES=horizontal_type horizontal_material horizontal_color1 mary_portrait_gravestone other_jesus familles famille number_occupants font_description_material gravestone other_mary jesus_portrait_gravestone crosses gravestone_type religious_christian vertical_material name number_items vertical_color1 /FORMAT=AFREQ /ORDER=ANALYSIS.
Ressourcen	Prozessorzeit	00:00:00,06
	Verstrichene Zeit	00:00:00,06

Statistiken

		horizontal_type	horizontal_material	horizontal_color1	mary_portrait_gravestone	other_jesus
N	Gültig	739	739	739	739	739
	Fehlend	0	0	0	0	0

Statistiken

		familles	famille	number_occupants	font_description_material	gravestone
N	Gültig	739	739	739	739	739
	Fehlend	0	0	0	0	0

Statistiken

		other_mary	jesus_portrait_ gravestone	crosses	gravestone_type	religious_ christian
N	Gültig	739	739	739	739	739
	Fehlend	0	0	0	0	0

Statistiken

		vertical_material	name	number_items	vertical_color1
N	Gültig	739	739	739	739
	Fehlend	0	0	0	0

Häufigkeitstabelle

horizontal_type

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	3a-Sarcophagus	2	,3	,3	,3
	2b-Flower container	3	,4	,4	,7
	5a-Twisted (open or closed)	4	,5	,5	1,2
	1d-Asymmetrical (partly open-or closed)	5	,7	,7	1,9
	4a-Block of stone (cushion)	6	,8	,8	2,7
	2c-Flower container closed	7	,9	,9	3,7
	4b-Block (full)	10	1,4	1,4	5,0
	X-Other	11	1,5	1,5	6,5
	1b-Stepped (sunken)	13	1,8	1,8	8,3
	1g-closed single or double plate (flat)	20	2,7	2,7	11,0
	3b-Half-sarcophagus (cover stone)	21	2,8	2,8	13,8
	1c-Stepped (Middle plate, partly open)	24	3,2	3,2	17,1
	2a-Open	49	6,6	6,6	23,7
	1e-Stepped (2 plates)	54	7,3	7,3	31,0
	1f-Stepped (middle plate shorter)	61	8,3	8,3	39,2
	X-Unoccupied	69	9,3	9,3	48,6
	1a-Stepped (raised)	380	51,4	51,4	100,0
	Gesamt	739	100,0	100,0	

horizontal_material

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	cobble	1	,1	,1	,1
	earth	1	,1	,1	,3
	earth & plants	1	,1	,1	,4
	mulch	1	,1	,1	,5
	sandstone	1	,1	,1	,7

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	stone	1	,1	,1	,8
	terrazzo	1	,1	,1	,9
	wood & gravel	1	,1	,1	1,1
	earth & wood	2	,3	,3	1,4
	limestone	2	,3	,3	1,6
	marble	2	,3	,3	1,9
	plants	4	,5	,5	2,4
	quartzite	5	,7	,7	3,1
	0	6	,8	,8	3,9
	soil	7	,9	,9	4,9
	pebble	11	1,5	1,5	6,4
	gravel	16	2,2	2,2	8,5
	migmatite	17	2,3	2,3	10,8
	concrete	22	3,0	3,0	13,8
	gneiss	29	3,9	3,9	17,7
	grass	36	4,9	4,9	22,6
	blaustein	58	7,8	7,8	30,4
	granite	514	69,6	69,6	100,0
	Gesamt	739	100,0	100,0	

horizontal_color1

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	blue	1	,1	,1	,1
	light-red	2	,3	,3	,4
	dark-green	3	,4	,4	,8
	light-brown	3	,4	,4	1,2
	green	6	,8	,8	2,0
	0	10	1,4	1,4	3,4
	white	38	5,1	5,1	8,5
	green/plant	41	5,5	5,5	14,1
	brown	45	6,1	6,1	20,2
	dark-grey	47	6,4	6,4	26,5
	red	64	8,7	8,7	35,2
	black	122	16,5	16,5	51,7
	grey	357	48,3	48,3	100,0
	Gesamt	739	100,0	100,0	

mary_portrait_gravestone

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1	17	2,3	2,3	2,3
	0	722	97,7	97,7	100,0
	Gesamt	739	100,0	100,0	

other_jesus

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig		1	,1	,1	,1
	1e-Christ the Good Shepard	2	,3	,3	,4
	2d-Christ Good Shepard	2	,3	,3	,7
	1a-Crucifix	5	,7	,7	1,4
	4a-Groups (bible)	6	,8	,8	2,2
	1d-Christ falling under the Cross	7	,9	,9	3,1
	X-Other	9	1,2	1,2	4,3
	1c-Christ carrying the Cross	10	1,4	1,4	5,7
	2b-Head of Christ-no cross	17	2,3	2,3	8,0
	2a-Head of Christ with Crown of Thornes with Halo on Cross with or without Rays	24	3,2	3,2	11,2
	1b-Body-of-Christ (no cross)	42	5,7	5,7	16,9
	X-Unoccupied	44	6,0	6,0	22,9
	0	570	77,1	77,1	100,0
	Gesamt	739	100,0	100,0	

familles

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1	101	13,7	13,7	13,7
	0	638	86,3	86,3	100,0
	Gesamt	739	100,0	100,0	

famille

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	3	1	,1	,1	,1
	2	7	,9	,9	1,1
	0	344	46,5	46,5	47,6
	1	387	52,4	52,4	100,0
	Gesamt	739	100,0	100,0	

number_occupants

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	11	2	,3	,3	,3
	8	5	,7	,7	,9
	7	10	1,4	1,4	2,3
	6	23	3,1	3,1	5,4
	5	31	4,2	4,2	9,6

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	4	48	6,5	6,5	16,1
	3	68	9,2	9,2	25,3
	2	101	13,7	13,7	39,0
	1	133	18,0	18,0	57,0
	0	318	43,0	43,0	100,0
	Gesamt	739	100,0	100,0	

font_description_material

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	6b-Tree of Life	1	,1	,1	,1
	lost	1	,1	,1	,3
	1d-Latin cross-Alpha-Omega	2	,3	,3	,5
	2e-Breitkreuz-Broad Cross	2	,3	,3	,8
	2b-Greek cross-patty	3	,4	,4	1,2
	2d-Greek cross-irregular	3	,4	,4	1,6
	6a-Roses and-or Ear of Corn or Flowers	3	,4	,4	2,0
	1g-Latin cross with rays	4	,5	,5	2,6
	2c-Greek cross-gammion	4	,5	,5	3,1
	1b-Latin cross-potent-regular	5	,7	,7	3,8
	1f-Latin cross_1	5	,7	,7	4,5
	7a-Vessel of stone and lid	5	,7	,7	5,1
	8a-Basin open	6	,8	,8	6,0
	7b-Vessel of stone and lid	10	1,4	1,4	7,3
	X-Other	11	1,5	1,5	8,8
	6c-Olive branch	12	1,6	1,6	10,4
	1c-Latin cross-patty-irregular	29	3,9	3,9	14,3
	4b-Unknown symbol	36	4,9	4,9	19,2
	3a-Chi-Rho	58	7,8	7,8	27,1
	4a-Knob-rectangular	67	9,1	9,1	36,1
	3b Chi-Rho_and_Alpha-Omega	72	9,7	9,7	45,9
	1e-Latin cross-gammion	111	15,0	15,0	60,9
	5a-Praying Hands (of Dürer)	128	17,3	17,3	78,2
	0	161	21,8	21,8	100,0
	Gesamt	739	100,0	100,0	

gravestone

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	0	313	42,4	42,4	42,4
	1	426	57,6	57,6	100,0
	Gesamt	739	100,0	100,0	

other_mary

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	3d-Mary (other)	1	,1	,1	,1
	3c-Mary and Jesus full-Mondsichelmadonna	2	,3	,3	,4
	3a-Head of Mary	6	,8	,8	1,2
	3b-Mary and Jesus (bust)	8	1,1	1,1	2,3
	X-Unoccupied	44	6,0	6,0	8,3
	0	678	91,7	91,7	100,0
	Gesamt	739	100,0	100,0	

jesus_portrait_gravestone

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1	119	16,1	16,1	16,1
	0	620	83,9	83,9	100,0
	Gesamt	739	100,0	100,0	

crosses

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	5b-Palm Leaf	1	,1	,1	,1
	6g-Latin cross-gammadion6g-Latin cross-gammadion	2	,3	,3	,4
	7a-Greek cross	2	,3	,3	,7
	8c-Three Crosses (Calvary)	2	,3	,3	,9
	6d_Latin cross-gammion	3	,4	,4	1,4
	???	6	,8	,8	2,2
	6b-Latin cross-broad	7	,9	,9	3,1
	7b-Greek cross-broad	8	1,1	1,1	4,2
	1b-Body of Christ (no cross)	9	1,2	1,2	5,4
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers	9	1,2	1,2	6,6
	8a-Breitkreuz_Cross with long cross beam	9	1,2	1,2	7,8
	X-Other	14	1,9	1,9	9,7
	8b-Chi-Rho	15	2,0	2,0	11,8
	1a-Crucifix	16	2,2	2,2	13,9

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6f-Latin cross-potent	18	2,4	2,4	16,4
	6c-Latin cross-patty	26	3,5	3,5	19,9
	X-Unoccupied	56	7,6	7,6	27,5
	6a-Latin cross	68	9,2	9,2	36,7
	0	468	63,3	63,3	100,0
	Gesamt	739	100,0	100,0	

gravestone_type

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1h-Block (heart shaped)	1	,1	,1	,1
	1l-Block (composite with full or half figurine)	1	,1	,1	,3
	1cc-Block (Trapezoid)	2	,3	,3	,5
	3b-Cippus (double cippus)	2	,3	,3	,8
	4f-Cross (Tree Cross on Cairn)	2	,3	,3	1,1
	1f-Block (half circle)	3	,4	,4	1,5
	1i-Block (with heart)	3	,4	,4	1,9
	4d-Cross (calvary single)	3	,4	,4	2,3
	4e-Cross (Calvary with Tree Cross on Cairn)	3	,4	,4	2,7
	1e-Block (rounded edges)	5	,7	,7	3,4
	1j-Block (combined shapes)	7	,9	,9	4,3
	5a-Tabernacle	7	,9	,9	5,3
	1k-Block (chipped edges)	9	1,2	1,2	6,5
	3a-Cippus (simple)	12	1,6	1,6	8,1
	4a-Cross (single)	12	1,6	1,6	9,7
	2c-Composite (squared asymmetrical)	18	2,4	2,4	12,2
	2d-Composite (irregular)	18	2,4	2,4	14,6
	1d-Block (pediment asymmetrical)	21	2,8	2,8	17,5
	X-Other	23	3,1	3,1	20,6
	4c-Cross (composite asymmetrical)	24	3,2	3,2	23,8
	1a-Block (squared)	25	3,4	3,4	27,2
	1c-Block (with single peak asymmetrical)	27	3,7	3,7	30,9
	2b-Composite (div. pediments)	30	4,1	4,1	34,9
	1g-Block (wave)	32	4,3	4,3	39,2
	1b-Block (pediment)	33	4,5	4,5	43,7
	2a-Composite (squared symmetrical)	40	5,4	5,4	49,1
	4b-Cross (composite symmetrical)	61	8,3	8,3	57,4
	X-Unoccupied	62	8,4	8,4	65,8

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	0	253	34,2	34,2	100,0
	Gesamt	739	100,0	100,0	

religious_christian

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	22	1	,1	,1	,1
	6	3	,4	,4	,5
	5	5	,7	,7	1,2
	4	21	2,8	2,8	4,1
	0	83	11,2	11,2	15,3
	3	86	11,6	11,6	26,9
	1	112	15,2	15,2	42,1
	2	428	57,9	57,9	100,0
	Gesamt	739	100,0	100,0	

vertical_material

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	gabbro	1	,1	,1	,1
	plaster&concrete	1	,1	,1	,3
	stone & metal	1	,1	,1	,4
	terrazzo	1	,1	,1	,5
	limestone	3	,4	,4	,9
	sandstone	3	,4	,4	1,4
	quartzite	4	,5	,5	1,9
	migmatite	10	1,4	1,4	3,2
	gneiss	16	2,2	2,2	5,4
	blaustein	95	12,9	12,9	18,3
	granite	281	38,0	38,0	56,3
	0	323	43,7	43,7	100,0
	Gesamt	739	100,0	100,0	

name

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	A. Kratzenberg	1	,1	,1	,1
	Bantz Oudler 0032 80 32 90 37	1	,1	,1	,3
	Canesson-Metzeresche	1	,1	,1	,4
	Carti Putz	1	,1	,1	,5
	Caveaux Monuments Dellion R. Ottange (…)	1	,1	,1	,7
	Cochinaire - Arlon Tel. 063/223853	1	,1	,1	,8

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	Fischer, frères, à Grevenmacher	1	,1	,1	,9
	Gelhausen Grevenmacher Tel. 75191 (mit Kreuzsymbol)	1	,1	,1	1,1
	H. Jacquemart-Luxembourg	1	,1	,1	1,2
	J.P. Schmit - Pontpierre Tel. 542017	1	,1	,1	1,4
	J.P. Schmit - Pontpierre Tel. 542018	1	,1	,1	1,5
	J.P. Schmit - Pontpierre Tel. 542019	1	,1	,1	1,6
	Jacquemart (Conception Trixi Weis, mai 2000, Réalisation Marbrerie Jaquemart)	1	,1	,1	1,8
	Marbererie Raymond Dellion 57-Ottange-Tél.506005	1	,1	,1	1,9
	Marbrerie Boost-Niederanven	1	,1	,1	2,0
	Marbrerie Hary Anc. Marcel Gelhausen	1	,1	,1	2,2
	MD Caveaux Monuments Dellion R. S.A.R.L. 57840 Ottange Tel. 82505355	1	,1	,1	2,3
	MD Caveaux Monuments Dellion R. S.A.R.L. 57840 Ottange Tel. 82505356	1	,1	,1	2,4
	Mergen	1	,1	,1	2,6
	Staudt-Mersch	1	,1	,1	2,7
	???	2	,3	,3	3,0
	H.Burette-Bonnevoir	2	,3	,3	3,2
	Marbrerie ets. H. Schanen - Wasserbillig Tel. 74140	2	,3	,3	3,5
	Tom Gelhausen-Grevenmacher-Luxembourg	2	,3	,3	3,8
	Zavatti-Villerupt	2	,3	,3	4,1
	Eug. Robinet-Petagne	3	,4	,4	4,5
	Granito-Contern	3	,4	,4	4,9
	Jean Gilson-Mertzig	3	,4	,4	5,3
	E. Dell Tel. 21004 Arlon (with cross)	4	,5	,5	5,8
	Granite Platz & Co.	4	,5	,5	6,4
	Marbrerie Schott-Ellange.Mamer	4	,5	,5	6,9
	J.B. Hermes	5	,7	,7	7,6
	J.P. Schou-Grevenmacher	5	,7	,7	8,3

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	Witry Marberie-Diekrich	5	,7	,7	8,9
	G. Thill-Ettelbruck	10	1,4	1,4	10,3
	Th. Mergen	10	1,4	1,4	11,6
	VICI	10	1,4	1,4	13,0
	Focant-Esch./Alz.	11	1,5	1,5	14,5
	Schott-Mamer	13	1,8	1,8	16,2
	lost	15	2,0	2,0	18,3
	Hary Freres-Esch/Alzette	16	2,2	2,2	20,4
	Henricy-Mamer	16	2,2	2,2	22,6
	J. Gilson-Mertzig	16	2,2	2,2	24,8
	Marbrerie Hary-Foetz, Esch, Luxbg, Wasserbg	21	2,8	2,8	27,6
	Schanen-Wasserbillig	21	2,8	2,8	30,4
	N. Wenzel-Lux. Merl	23	3,1	3,1	33,6
	Bertrand-Munsbach	29	3,9	3,9	37,5
	Gelhausen-Luxembourg	32	4,3	4,3	41,8
	Lampertz-Troisvierges Walferdange	35	4,7	4,7	46,5
	Lampertz-Hosingen Walferdang	56	7,6	7,6	54,1
	Jacquemart	69	9,3	9,3	63,5
	0	270	36,5	36,5	100,0
	Gesamt	739	100,0	100,0	

number_items

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	15	1	,1	,1	,1
	17	1	,1	,1	,3
	18	1	,1	,1	,4
	21	1	,1	,1	,5
	10	4	,5	,5	1,1
	13	4	,5	,5	1,6
	14	5	,7	,7	2,3
	11	6	,8	,8	3,1
	12	6	,8	,8	3,9
	9	7	,9	,9	4,9
	8	16	2,2	2,2	7,0
	1	23	3,1	3,1	10,1
	7	29	3,9	3,9	14,1
	6	38	5,1	5,1	19,2
	0	82	11,1	11,1	30,3
	5	83	11,2	11,2	41,5
	4	131	17,7	17,7	59,3
	2	135	18,3	18,3	77,5
	3	166	22,5	22,5	100,0
	Gesamt	739	100,0	100,0	

vertical_color1

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	blue	1	,1	,1	,1
	light-grey	1	,1	,1	,3
	green	2	,3	,3	,5
	light-brown	2	,3	,3	,8
	light-red	2	,3	,3	1,1
	white	11	1,5	1,5	2,6
	brown	26	3,5	3,5	6,1
	red	30	4,1	4,1	10,1
	dark-grey	31	4,2	4,2	14,3
	black	92	12,4	12,4	26,8
	grey	215	29,1	29,1	55,9
	0	326	44,1	44,1	100,0
	Gesamt	739	100,0	100,0	

11.6.4 Konz

Anmerkungen

Ausgabe erstellt			12-DEC-2018 19:46:02
Kommentare			
Eingabe		Daten	C:\Users\christoph.streb\Desktop\PhDProject\Friedhof Spatial Data\Konz\CSA Spatial Daten korrigiert\Konz Spatial Data Sheet 12.12.2018.csv
		Aktiver Datensatz	DataSet1
		Filter	<keine>
		Gewichtung	<keine>
		Aufgeteilte Datei	<keine>
		Anzahl der Zeilen in der Arbeitsdatei	1310
Behandlung fehlender Werte		Definition von fehlenden Werten	Benutzerdefinierte fehlende Werte werden als fehlend behandelt.
		Verwendete Fälle	Statistik basiert auf allen Fällen mit gültigen Daten.
Syntax			FREQUENCIES VARIABLES=has_gravestone gravestone_type gravestone_material gravestone_color grave_is horizontal_grave_type horizontal_material horizontal_color items_total has_stonemason_label stonemason_name has_christian_symbol cross_type has_jesus has_mary has_stoup number_occupants famille_familles /FORMAT=AFREQ /ORDER=ANALYSIS.
Ressourcen		Prozessorzeit	00:00:00,02
		Verstrichene Zeit	00:00:00,03

Statistiken

		has_gravestone	gravestone_type	gravestone_material	gravestone_color	grave_is
N	Gültig	1310	1310	1310	1310	1310
	Fehlend	0	0	0	0	0

Statistiken

		horizontal_ grave_type	horizontal_ material	horizontal_ color	items_ total	has_stonemason_ label
N	Gültig	1310	1310	1310	998	1310
	Fehlend	0	0	0	312	0

Statistiken

		stonemason_ name	has_christian_ symbol	cross_type	has_jesus	has_ mary
N	Gültig	1310	1310	1310	1310	1310
	Fehlend	0	0	0	0	0

Statistiken

		has_stoup	number_occupants	famille_familles
N	Gültig	1310	991	0
	Fehlend	0	319	1310

Häufigkeitstabelle

has_gravestone

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	No	566	43,2	43,2	43,2
	Yes	744	56,8	56,8	100,0
	Gesamt	1310	100,0	100,0	

gravestone_type

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1f-Block (half circle).jpg	1	,1	,1	,1
	2c-Composite (squared asymmetrical).jpg	1	,1	,1	,2
	2b-Composite (div. pediments).jpg	2	,2	,2	,3
	2a-Composite (squared symmetrical).jpg	3	,2	,2	,5
	4c-Cross (composite asymmetrical).jpg	3	,2	,2	,8
	4d-Cross (calvary single).jpg	4	,3	,3	1,1
	1b-Block (pediment).jpg	5	,4	,4	1,5
	7a-Sickle Shape.jpg	5	,4	,4	1,8
	1e-Block (rounded edges).jpg	6	,5	,5	2,3
	3a-Cippus (simple).jpg	7	,5	,5	2,8
	5a-Tabernacle.jpg	7	,5	,5	3,4
	1c-Block (with single peak asymmetrical).jpg	12	,9	,9	4,3

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6b-Double Stele.jpg	12	,9	,9	5,2
	8a-Book_Scroll Shape.jpg	17	1,3	1,3	6,5
	6a-Single Stele.jpg	22	1,7	1,7	8,2
	1a-Block (squared).jpg	31	2,4	2,4	10,5
	1cc-Block (Trapezoid).jpg	37	2,8	2,8	13,4
	1n-Block (flat cubic top-angled).jpg	41	3,1	3,1	16,5
	1g-Block (wave).jpg	54	4,1	4,1	20,6
	1d-Block (pediment asymmetrical).jpg	56	4,3	4,3	24,9
	1o-Block (assymmetric left tip).jpg	56	4,3	4,3	29,2
	4a-Cross (single).jpg	56	4,3	4,3	33,4
	4b-Cross (composite symmetrical).jpg	60	4,6	4,6	38,0
	1m-Block-symmetrical wave.jpg	76	5,8	5,8	43,8
	1k-Block (chipped edges).jpg	80	6,1	6,1	49,9
	X-Other.jpg	90	6,9	6,9	56,8
		566	43,2	43,2	100,0
	Gesamt	1310	100,0	100,0	

gravestone_material

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Unknown,Bronze	1	,1	,1	,1
	Unknown,Metall	1	,1	,1	,2
	Unknown,Schiefer	1	,1	,1	,2
	Belgisch Granit	1	,1	,1	,3
	Blaustein,Belgisch Granit,Other	1	,1	,1	,4
	Blaustein,Bronze,Granit	1	,1	,1	,5
	Blaustein,Gabbro,Other	1	,1	,1	,5
	Gneis,Other	1	,1	,1	,6
	Granit,Blaustein	1	,1	,1	,7
	Granit,Blaustein,Gabbro	1	,1	,1	,8
	Granit,Blaustein,Other	1	,1	,1	,8
	Metall,Eisen,Granit	1	,1	,1	,9
	Sandstein,Metall	1	,1	,1	1,0
	Schiefer,Other	1	,1	,1	1,1
	Blaustein,Gabbro,Bronze	2	,2	,2	1,2
	Blaustein,Granit,Bronze	2	,2	,2	1,4
	Bronze	2	,2	,2	1,5
	Granit, Unknown	2	,2	,2	1,7
	Sandstein,Granit	2	,2	,2	1,8
	Gneis,Bronze	3	,2	,2	2,1
	Marmor	3	,2	,2	2,3

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	Schiefer	3	,2	,2	2,5
	Granit,Other	4	,3	,3	2,8
	mottled sandstone	4	,3	,3	3,1
	Blaustein	6	,5	,5	3,6
	Blaustein,Gabbro	7	,5	,5	4,1
	Blaustein,Granit	8	,6	,6	4,7
	Migmatit,Bronze	10	,8	,8	5,5
	Sandstein	10	,8	,8	6,3
	Unknown	11	,8	,8	7,1
	Granit,Bronze	23	1,8	1,8	8,9
	Other	39	3,0	3,0	11,8
	Gneis	60	4,6	4,6	16,4
	Migmatit	147	11,2	11,2	27,6
	Granit	382	29,2	29,2	56,8
		566	43,2	43,2	100,0
	Gesamt	1310	100,0	100,0	

gravestone_color

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	light sandstone-brown	1	,1	,1	,1
	green	2	,2	,2	,2
	other	2	,2	,2	,4
	mottled sandstone	4	,3	,3	,7
	light-grey	6	,5	,5	1,1
	white	13	1,0	1,0	2,1
	sandstone-brown	14	1,1	1,1	3,2
	red	23	1,8	1,8	5,0
	brown	34	2,6	2,6	7,6
	dark-grey	98	7,5	7,5	15,0
	brown-red	160	12,2	12,2	27,3
	grey	177	13,5	13,5	40,8
	black	207	15,8	15,8	56,6
		569	43,4	43,4	100,0
	Gesamt	1310	100,0	100,0	

grave_is

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig		3	,2	,2	,2
	Empty	10	,8	,8	1,0
	Abandoned	277	21,1	21,1	22,1
	Present	1020	77,9	77,9	100,0
	Gesamt	1310	100,0	100,0	

horizontal_grave_type

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1b-Stepped (sunken).jpg	2	,2	,2	,2
	1c-Stepped (Middle plate, partly open).jpg	16	1,2	1,2	1,4
	X-Other.jpg	19	1,5	1,5	2,8
	1f-Stepped (middle plate shorter).jpg	20	1,5	1,5	4,4
	1d-Asymmetrical (partly open-or closed).jpg	36	2,7	2,7	7,1
	6d-Urn (plate flat).jpg	37	2,8	2,8	9,9
	1g-closed single or double plate (flat).jpg	47	3,6	3,6	13,5
	6b-Urn (half open).jpg	57	4,4	4,4	17,9
	1h-Stepped (center open, symmetric).jpg	76	5,8	5,8	23,7
	6c-Urn (open).jpg	77	5,9	5,9	29,5
	6a-Urn (ledge covered).jpg	156	11,9	11,9	41,5
	2a-Open.jpg	224	17,1	17,1	58,5
	1a-Stepped (raised).jpg	254	19,4	19,4	77,9
		289	22,1	22,1	100,0
	Gesamt	1310	100,0	100,0	

horizontal_material

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Unknown,Soil,Plants	1	,1	,1	,1
	Gneis,Plants,Schotter,Soil	1	,1	,1	,2
	Gneis,Plants,Soil,Kiesel	1	,1	,1	,2
	Gneis,Schotter	1	,1	,1	,3
	Gneis,Schotter,Soil,Plants	1	,1	,1	,4
	Gneis,Soil,Plants,Kiesel	1	,1	,1	,5
	Gneis,Soil,Plants,Other	1	,1	,1	,5
	Granit, Unknown,Soil,Plants,Schotter	1	,1	,1	,6
	Granit,Kiesel,Soil,Plants	1	,1	,1	,7
	Granit,Migmatit,Soil,Plants	1	,1	,1	,8
	Granit,Plants,Schotter	1	,1	,1	,8
	Granit,Schiefer,Plants	1	,1	,1	,9
	Granit,Schotter,Soil,Plants	1	,1	,1	1,0
	Kiesel,Granit,Soil,Plants	1	,1	,1	1,1
	Kiesel,Schiefer	1	,1	,1	1,1
	Kiesel,Schotter	1	,1	,1	1,2
	Kiesel,Schotter,Plants	1	,1	,1	1,3
	Marmor	1	,1	,1	1,4
	Migmatit,Granit,Plants	1	,1	,1	1,5
	Migmatit,Kiesel,Plants	1	,1	,1	1,5
	Migmatit,Kiesel,Soil	1	,1	,1	1,6

	Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Migmatit,Other,Plants	1	,1	,1	1,7
Migmatit,Plants,Schotter	1	,1	,1	1,8
Migmatit,Soil,Plants,Schotter	1	,1	,1	1,8
mottled sandstone,Plants	1	,1	,1	1,9
mottled sandstone,Schotter,Plants	1	,1	,1	2,0
mottled sandstone,Soil,Plants	1	,1	,1	2,1
Plants,Other	1	,1	,1	2,1
Plants,Schiefer,Soil	1	,1	,1	2,2
Plants,Schotter,Soil	1	,1	,1	2,3
Plants,Soil,Blaustein	1	,1	,1	2,4
Plants,Soil,Sandstein	1	,1	,1	2,4
Plants,Soil,Schotter	1	,1	,1	2,5
Sandstein,Plants	1	,1	,1	2,6
Sandstein,Plants,Soil	1	,1	,1	2,7
Schiefer,Plants	1	,1	,1	2,7
Schiefer,Plants,Granit	1	,1	,1	2,8
Schiefer,Plants,Soil	1	,1	,1	2,9
Schotter,Plants,Gneis	1	,1	,1	3,0
Schotter,Plants,Granit	1	,1	,1	3,1
Schotter,Plants,Schiefer	1	,1	,1	3,1
Schotter,Soil,Plants,Kiesel	1	,1	,1	3,2
Schotter,Soil,Plants,Stone	1	,1	,1	3,3
Soil,Other,Plants	1	,1	,1	3,4
Soil,Plants, Unknown,Granit	1	,1	,1	3,4
Soil,Plants,Gneis	1	,1	,1	3,5
Soil,Plants,Kiesel,Other	1	,1	,1	3,6
Soil,Plants,Schotter,Migmatit	1	,1	,1	3,7
Soil,Schotter,Plants	1	,1	,1	3,7
Soil,Stone	1	,1	,1	3,8
Stone,Soil,Plants	1	,1	,1	3,9
Gneis,Soil,Plants,Schotter	2	,2	,2	4,0
Granit,Kiesel,Plants	2	,2	,2	4,2
Granit,Soil	2	,2	,2	4,4
Granit,Soil,Plants,Kiesel	2	,2	,2	4,5
Kiesel,Granit	2	,2	,2	4,7
Kiesel,Plants,Soil	2	,2	,2	4,8
Migmatit,Soil	2	,2	,2	5,0
Other	2	,2	,2	5,1
Plants,Granit	2	,2	,2	5,3
Plants,mottled sandstone	2	,2	,2	5,4
Plants,Soil,Other	2	,2	,2	5,6
Schotter,Granit	2	,2	,2	5,7
Schotter,Plants,Migmatit	2	,2	,2	5,9
Soil,Plants,Blaustein	2	,2	,2	6,0

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	Soil,Plants,Schotter	2	,2	,2	6,2
	Soil,Plants,Stone	2	,2	,2	6,3
	Gneis,Schotter,Plants	3	,2	,2	6,6
	Kiesel	3	,2	,2	6,8
	Migmatit,Kiesel	3	,2	,2	7,0
	Migmatit,Schotter	3	,2	,2	7,3
	Migmatit,Soil,Plants,Kiesel	3	,2	,2	7,5
	mottled sandstone	3	,2	,2	7,7
	Plants,Schotter	3	,2	,2	7,9
	Plants,Soil,Granit	3	,2	,2	8,2
	Plants,Soil,Migmatit	3	,2	,2	8,4
	Schotter,Plants,Soil	3	,2	,2	8,6
	Soil,Plants,Kiesel	3	,2	,2	8,9
	Soil,Plants,Schiefer	3	,2	,2	9,1
	Unknown	4	,3	,3	9,4
	Soil,Plants,Migmatit	4	,3	,3	9,7
	Granit,Kiesel	5	,4	,4	10,1
	Kiesel,Soil,Plants	5	,4	,4	10,5
	Schiefer,Soil,Plants	5	,4	,4	10,8
	Soil	5	,4	,4	11,2
	Soil,Plants,Other	5	,4	,4	11,6
	Gneis,Plants	6	,5	,5	12,1
	Kiesel,Plants	6	,5	,5	12,5
	Gneis,Plants,Soil	7	,5	,5	13,1
	Migmatit,Plants,Soil	7	,5	,5	13,6
	Migmatit,Schotter,Plants	7	,5	,5	14,1
	Granit,Schotter,Plants	8	,6	,6	14,7
	Migmatit,Plants	8	,6	,6	15,3
	Schotter,Soil,Plants	8	,6	,6	16,0
	Soil,Plants,Granit	8	,6	,6	16,6
	Granit,Schotter	9	,7	,7	17,3
	Schotter	10	,8	,8	18,0
	Gneis,Soil,Plants	13	1,0	1,0	19,0
	Granit,Plants	14	1,1	1,1	20,1
	Granit,Plants,Soil	15	1,1	1,1	21,2
	Plants	16	1,2	1,2	22,4
	Schotter,Plants	19	1,5	1,5	23,9
	Plants,Soil	27	2,1	2,1	26,0
	Migmatit,Soil,Plants	35	2,7	2,7	28,6
	Gneis	57	4,4	4,4	33,0
	Granit,Soil,Plants	65	5,0	5,0	37,9
	Soil,Plants	102	7,8	7,8	45,7
	Migmatit	184	14,0	14,0	59,8
	Granit	239	18,2	18,2	78,0
		288	22,0	22,0	100,0
	Gesamt	1310	100,0	100,0	

horizontal_color

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	black,dark-grey	1	,1	,1	,1
	black,green	1	,1	,1	,2
	brown,brown-red	1	,1	,1	,2
	green,white	1	,1	,1	,3
	grey,dark-grey,green	1	,1	,1	,4
	grey,green	1	,1	,1	,5
	grey,white	1	,1	,1	,5
	light sandstone-brown	1	,1	,1	,6
	light-grey	1	,1	,1	,7
	white,green,brown	1	,1	,1	,8
	green,grey	2	,2	,2	,9
	grey,green,brown	2	,2	,2	1,1
	other	2	,2	,2	1,2
	sandstone-brown	2	,2	,2	1,4
	white,brown	2	,2	,2	1,5
	brown,green	3	,2	,2	1,8
	grey,dark-grey	5	,4	,4	2,1
	mottled sandstone	8	,6	,6	2,7
	white	26	2,0	2,0	4,7
	green,brown	29	2,2	2,2	6,9
	red	29	2,2	2,2	9,2
	brown	49	3,7	3,7	12,9
	black	119	9,1	9,1	22,0
	dark-grey	129	9,8	9,8	31,8
	green	154	11,8	11,8	43,6
	grey	188	14,4	14,4	57,9
	brown-red	261	19,9	19,9	77,9
		290	22,1	22,1	100,0
	Gesamt	1310	100,0	100,0	

items_total

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	0	1	,1	,1	,1
	17	1	,1	,1	,2
	18	1	,1	,1	,3
	19	1	,1	,1	,4
	20	1	,1	,1	,5
	21	1	,1	,1	,6
	14	5	,4	,5	1,1
	15	6	,5	,6	1,7
	13	9	,7	,9	2,6
	12	16	1,2	1,6	4,2
	11	21	1,6	2,1	6,3
	10	26	2,0	2,6	8,9
	1	45	3,4	4,5	13,4
	9	63	4,8	6,3	19,7

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	8	69	5,3	6,9	26,7
	2	80	6,1	8,0	34,7
	7	98	7,5	9,8	44,5
	6	114	8,7	11,4	55,9
	3	139	10,6	13,9	69,8
	5	143	10,9	14,3	84,2
	4	158	12,1	15,8	100,0
	Gesamt	998	76,2	100,0	
Fehlend	System	312	23,8		
Gesamt		1310	100,0		

has_stonemason_label

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Missing	5	,4	,4	,4
		286	21,8	21,8	22,2
	Yes	291	22,2	22,2	44,4
	No	728	55,6	55,6	100,0
	Gesamt	1310	100,0	100,0	

stonemason_name

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	A. Sabese Remich	1	,1	,1	,1
	Alfred L???? Betonsteine-???? 5511 Wiltingen	1	,1	,1	,2
	FS Friedstein AG Tel. ...	1	,1	,1	,2
	Joh. Melchesedech u. Söhne Trier	1	,1	,1	,3
	Lutz Konz	1	,1	,1	,4
	MelChisedech 54568 Gerolstein Tel. 06591/3319	1	,1	,1	,5
	Mettler Martini Trier	1	,1	,1	,5
	Mettler Trier	1	,1	,1	,6
	Natursteine Schönborn	1	,1	,1	,7
	J. Mettler Trier	2	,2	,2	,8
	Juny Wliesch	2	,2	,2	1,0
	M. Lutz Conz	2	,2	,2	1,1
	Schönborn Trier	2	,2	,2	1,3
	Steinmetzmeister Josef Juny	2	,2	,2	1,5
	Grabmalgestaltung Horst Diederich (...)	3	,2	,2	1,7
	Alfred Lambertz Betonsteine-Grabdenkmäler 5511 Wiltingen	4	,3	,3	2,0

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	Melchisedech	4	,3	,3	2,3
	Werner Bettendorf (...)	4	,3	,3	2,6
	J. Juny WLiesch	5	,4	,4	3,0
	Felten Grabsteine (...) Saarburg 06581/2588	7	,5	,5	3,5
	Grabmalgestaltung Melchisedech Trier (Tel...)	14	1,1	1,1	4,6
	Nik. Diederich (...)	15	1,1	1,1	5,7
	Steinmetzmeister D.I.V Josef Juny (...) Wasserliesch (...)	15	1,1	1,1	6,9
	Juny	17	1,3	1,3	8,2
	Grabdenkmäler Josef Juny (...) 5505 Wasserliesch	18	1,4	1,4	9,5
	illegible	31	2,4	2,4	11,9
	Lutz	37	2,8	2,8	14,7
	Grabdenkmäler Jos. Juny GmbH (...)	98	7,5	7,5	22,2
		1019	77,8	77,8	100,0
	Gesamt	1310	100,0	100,0	

has_christian_symbol

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	No	195	14,9	14,9	14,9
		286	21,8	21,8	36,7
	Yes	829	63,3	63,3	100,0
	Gesamt	1310	100,0	100,0	

cross_type

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	6a-Latin cross.jpg,6b-Latin cross-broad.jpg,7a-Greek cross.jpg	1	,1	,1	,1
	6a-Latin cross.jpg,6b-Latin cross-broad.jpg,X-Other.jpg	1	,1	,1	,2
	6a-Latin cross.jpg,6d_Latin cross-gammion.jpg,6b-Latin cross-broad.jpg	1	,1	,1	,2
	6a-Latin cross.jpg,6d_Latin cross-gammion.jpg,8b-Chi-Rho.jpg	1	,1	,1	,3
	6a-Latin cross.jpg,6d_Latin cross-gammion.jpg,X-Other.jpg	1	,1	,1	,4

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6a-Latin cross.jpg,7a-Greek cross.jpg,6b-Latin cross-broad.jpg	1	,1	,1	,5
	6a-Latin cross.jpg,7a-Greek cross.jpg,8b-Chi-Rho.jpg	1	,1	,1	,5
	6a-Latin cross.jpg,7b-Greek cross-broad.jpg,8a-Breitkreuz_Cross with long cross beam.jpg	1	,1	,1	,6
	6a-Latin cross.jpg,7b-Greek cross-broad.jpg,X-Other.jpg	1	,1	,1	,7
	6a-Latin cross.jpg,7c-Greek cross-gammion.jpg,6d_Latin cross-gammion.jpg	1	,1	,1	,8
	6a-Latin cross.jpg,7c-Greek cross-gammion.jpg,8b-Chi-Rho.jpg	1	,1	,1	,8
	6a-Latin cross.jpg,8b-Chi-Rho.jpg,6d_Latin cross-gammion.jpg	1	,1	,1	,9
	6a-Latin cross.jpg,8b-Chi-Rho.jpg,7b-Greek cross-broad.jpg	1	,1	,1	1,0
	6a-Latin cross.jpg,8b-Chi-Rho.jpg,7c-Greek cross-gammion.jpg	1	,1	,1	1,1
	6a-Latin cross.jpg,X-Other.jpg,7c-Greek cross-gammion.jpg	1	,1	,1	1,1
	6b-Latin cross-broad.jpg,6a-Latin cross.jpg,6d_Latin cross-gammion.jpg	1	,1	,1	1,2
	6b-Latin cross-broad.jpg,6a-Latin cross.jpg,X-Other.jpg	1	,1	,1	1,3
	6b-Latin cross-broad.jpg,6d_Latin cross-gammion.jpg,8b-Chi-Rho.jpg	1	,1	,1	1,4
	6b-Latin cross-broad.jpg,6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,7c-Greek cross-gammion.jpg	1	,1	,1	1,5
	6b-Latin cross-broad.jpg,6f-Latin cross-potent.jpg	1	,1	,1	1,5

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6b-Latin cross-broad.jpg,6f-Latin cross-potent.jpg,X-Other.jpg	1	,1	,1	1,6
	6b-Latin cross-broad.jpg,7a-Greek cross.jpg,8c-Three Crosses (Calvary).jpg	1	,1	,1	1,7
	6b-Latin cross-broad.jpg,7b-Greek cross-broad.jpg,7a-Greek cross.jpg	1	,1	,1	1,8
	6b-Latin cross-broad.jpg,7b-Greek cross-broad.jpg,X-Other.jpg	1	,1	,1	1,8
	6b-Latin cross-broad.jpg,7c-Greek cross-gammion.jpg,6a-Latin cross.jpg	1	,1	,1	1,9
	6b-Latin cross-broad.jpg,8b-Chi-Rho.jpg,7a-Greek cross.jpg	1	,1	,1	2,0
	6b-Latin cross-broad.jpg,8b-Chi-Rho.jpg,7b-Greek cross-broad.jpg	1	,1	,1	2,1
	6b-Latin cross-broad.jpg,8c-Three Crosses (Calvary).jpg	1	,1	,1	2,1
	6b-Latin cross-broad.jpg,X-Other.jpg,6a-Latin cross.jpg	1	,1	,1	2,2
	6b-Latin cross-broad.jpg,X-Other.jpg,7a-Greek cross.jpg	1	,1	,1	2,3
	6b-Latin cross-broad.jpg,X-Other.jpg,8b-Chi-Rho.jpg	1	,1	,1	2,4
	6c-Latin cross-patty.jpg,6b-Latin cross-broad.jpg,7b-Greek cross-broad.jpg,X-Other.jpg	1	,1	,1	2,4
	6c-Latin cross-patty.jpg,6d_Latin cross-gammion.jpg	1	,1	,1	2,5
	6c-Latin cross-patty.jpg,7b-Greek cross-broad.jpg,X-Other.jpg	1	,1	,1	2,6
	6c-Latin cross-patty.jpg,8b-Chi-Rho.jpg,7b-Greek cross-broad.jpg	1	,1	,1	2,7

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6d_Latin cross-gammion.jpg,6b-Latin cross-broad.jpg,7a-Greek cross.jpg	1	,1	,1	2,7
	6d_Latin cross-gammion.jpg,6b-Latin cross-broad.jpg,X-Other.jpg	1	,1	,1	2,8
	6d_Latin cross-gammion.jpg,7b-Greek cross-broad.jpg,6a-Latin cross.jpg	1	,1	,1	2,9
	6d_Latin cross-gammion.jpg,X-Other.jpg,8b-Chi-Rho.jpg,8c-Three Crosses (Calvary).jpg	1	,1	,1	3,0
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,7a-Greek cross.jpg	1	,1	,1	3,1
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,7a-Greek cross.jpg,7b-Greek cross-broad.jpg	1	,1	,1	3,1
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,7c-Greek cross-gammion.jpg	1	,1	,1	3,2
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,8b-Chi-Rho.jpg	1	,1	,1	3,3
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,8b-Chi-Rho.jpg,X-Other.jpg	1	,1	,1	3,4
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,X-Other.jpg,6b-Latin cross-broad.jpg	1	,1	,1	3,4
	6f-Latin cross-potent.jpg,6d_Latin cross-gammion.jpg,8b-Chi-Rho.jpg	1	,1	,1	3,5

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6f-Latin cross-potent.jpg,6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg	1	,1	,1	3,6
	6f-Latin cross-potent.jpg,7a-Greek cross.jpg	1	,1	,1	3,7
	6f-Latin cross-potent.jpg,7b-Greek cross-broad.jpg	1	,1	,1	3,7
	6f-Latin cross-potent.jpg,8b-Chi-Rho.jpg	1	,1	,1	3,8
	6g-Latin cross-gammadion.jpg,6a-Latin cross.jpg	1	,1	,1	3,9
	6g-Latin cross-gammadion.jpg,6d_Latin cross-gammion.jpg	1	,1	,1	4,0
	6g-Latin cross-gammadion.jpg,X-Other.jpg	1	,1	,1	4,0
	7a-Greek cross.jpg,6c-Latin cross-patty.jpg	1	,1	,1	4,1
	7a-Greek cross.jpg,7c-Greek cross-gammion.jpg	1	,1	,1	4,2
	7a-Greek cross.jpg,8a-Breitkreuz_Cross with long cross beam.jpg	1	,1	,1	4,3
	7b-Greek cross-broad.jpg,6a-Latin cross.jpg	1	,1	,1	4,4
	7b-Greek cross-broad.jpg,6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg	1	,1	,1	4,4
	7b-Greek cross-broad.jpg,6f-Latin cross-potent.jpg	1	,1	,1	4,5
	7b-Greek cross-broad.jpg,7a-Greek cross.jpg,7c-Greek cross-gammion.jpg	1	,1	,1	4,6
	7b-Greek cross-broad.jpg,7c-Greek cross-gammion.jpg	1	,1	,1	4,7
	7b-Greek cross-broad.jpg,8b-Chi-Rho.jpg,7a-Greek cross.jpg	1	,1	,1	4,7

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	7b-Greek cross-broad.jpg,X-Other.jpg	1	,1	,1	4,8
	7c-Greek cross-gammion.jpg,6a-Latin cross.jpg	1	,1	,1	4,9
	7c-Greek cross-gammion.jpg,6d_Latin cross-gammion.jpg,7b-Greek cross-broad.jpg	1	,1	,1	5,0
	7c-Greek cross-gammion.jpg,6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,8b-Chi-Rho.jpg	1	,1	,1	5,0
	7c-Greek cross-gammion.jpg,6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg,X-Other.jpg	1	,1	,1	5,1
	7c-Greek cross-gammion.jpg,7a-Greek cross.jpg,X-Other.jpg	1	,1	,1	5,2
	7c-Greek cross-gammion.jpg,8a-Breitkreuz_Cross with long cross beam.jpg	1	,1	,1	5,3
	7c-Greek cross-gammion.jpg,8b-Chi-Rho.jpg	1	,1	,1	5,3
	8a-Breitkreuz_Cross with long cross beam.jpg,X-Other.jpg	1	,1	,1	5,4
	8b-Chi-Rho.jpg,6a-Latin cross.jpg	1	,1	,1	5,5
	8b-Chi-Rho.jpg,6d_Latin cross-gammion.jpg,6b-Latin cross-broad.jpg	1	,1	,1	5,6
	8b-Chi-Rho.jpg,6f-Latin cross-potent.jpg	1	,1	,1	5,6
	8b-Chi-Rho.jpg,8a-Breitkreuz_Cross with long cross beam.jpg	1	,1	,1	5,7
	8b-Chi-Rho.jpg,X-Other.jpg	1	,1	,1	5,8
	X-Other.jpg,6b-Latin cross-broad.jpg,6d_Latin cross-gammion.jpg	1	,1	,1	5,9
	X-Other.jpg,6c-Latin cross-patty.jpg	1	,1	,1	6,0

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	X-Other.jpg,6f-Latin cross-potent.jpg	1	,1	,1	6,0
	X-Other.jpg,7a-Greek cross.jpg	1	,1	,1	6,1
	X-Other.jpg,7a-Greek cross.jpg,8b-Chi-Rho.jpg	1	,1	,1	6,2
	X-Other.jpg,8b-Chi-Rho.jpg	1	,1	,1	6,3
	6a-Latin cross.jpg,6b-Latin cross-broad.jpg,6d_Latin cross-gammion.jpg	2	,2	,2	6,4
	6b-Latin cross-broad.jpg,6c-Latin cross-patty.jpg	2	,2	,2	6,6
	6b-Latin cross-broad.jpg,6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg	2	,2	,2	6,7
	6b-Latin cross-broad.jpg,6g-Latin cross-gammadion.jpg	2	,2	,2	6,9
	6b-Latin cross-broad.jpg,7c-Greek cross-gammion.jpg,X-Other.jpg	2	,2	,2	7,0
	6b-Latin cross-broad.jpg,8a-Breitkreuz_Cross with long cross beam.jpg	2	,2	,2	7,2
	6d_Latin cross-gammion.jpg,6b-Latin cross-broad.jpg,6a-Latin cross.jpg	2	,2	,2	7,3
	6d_Latin cross-gammion.jpg,7a-Greek cross.jpg,X-Other.jpg	2	,2	,2	7,5
	7a-Greek cross.jpg,6b-Latin cross-broad.jpg	2	,2	,2	7,6
	7a-Greek cross.jpg,6f-Latin cross-potent.jpg	2	,2	,2	7,8
	7c-Greek cross-gammion.jpg,6b-Latin cross-broad.jpg	2	,2	,2	7,9
	7c-Greek cross-gammion.jpg,7a-Greek cross.jpg	2	,2	,2	8,1
	7c-Greek cross-gammion.jpg,7b-Greek cross-broad.jpg	2	,2	,2	8,2
	7c-Greek cross-gammion.jpg,X-Other.jpg	2	,2	,2	8,4

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	X-Other.jpg,6a-Latin cross.jpg	2	,2	,2	8,5
	X-Other.jpg,6b-Latin cross-broad.jpg	2	,2	,2	8,7
	X-Other.jpg,6d_Latin cross-gammion.jpg	2	,2	,2	8,9
	X-Other.jpg,8a-Breitkreuz_Cross with long cross beam.jpg	2	,2	,2	9,0
	6a-Latin cross.jpg,8a-Breitkreuz_Cross with long cross beam.jpg	3	,2	,2	9,2
	6a-Latin cross.jpg,8b-Chi-Rho.jpg	3	,2	,2	9,5
	6c-Latin cross-patty.jpg,7a-Greek cross.jpg	3	,2	,2	9,7
	6c-Latin cross-patty.jpg,7b-Greek cross-broad.jpg	3	,2	,2	9,9
	6f-Latin cross-potent.jpg,7c-Greek cross-gammion.jpg	3	,2	,2	10,2
	6a-Latin cross.jpg,7b-Greek cross-broad.jpg	4	,3	,3	10,5
	6b-Latin cross-broad.jpg,6d_Latin cross-gammion.jpg	4	,3	,3	10,8
	6b-Latin cross-broad.jpg,7a-Greek cross.jpg	4	,3	,3	11,1
	6d_Latin cross-gammion.jpg,6b-Latin cross-broad.jpg	4	,3	,3	11,4
	6d_Latin cross-gammion.jpg,7c-Greek cross-gammion.jpg	4	,3	,3	11,7
	6d_Latin cross-gammion.jpg,X-Other.jpg	4	,3	,3	12,0
	8a-Breitkreuz_Cross with long cross beam.jpg	4	,3	,3	12,3
	6a-Latin cross.jpg,7a-Greek cross.jpg	5	,4	,4	12,7
	6c-Latin cross-patty.jpg,6b-Latin cross-broad.jpg	5	,4	,4	13,1
	6d_Latin cross-gammion.jpg,7a-Greek cross.jpg	5	,4	,4	13,4
	6f-Latin cross-potent.jpg,6b-Latin cross-broad.jpg	5	,4	,4	13,8
	6g-Latin cross-gammadion.jpg	5	,4	,4	14,2

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	6h-Latin cross-rounded left tip.jpg	5	,4	,4	14,6
	6c-Latin cross-patty.jpg,7c-Greek cross-gammion.jpg	6	,5	,5	15,0
	7a-Greek cross.jpg,X-Other.jpg	6	,5	,5	15,5
	6a-Latin cross.jpg,7c-Greek cross-gammion.jpg	7	,5	,5	16,0
	6f-Latin cross-potent.jpg,X-Other.jpg	7	,5	,5	16,6
	6b-Latin cross-broad.jpg,6a-Latin cross.jpg	8	,6	,6	17,2
	6b-Latin cross-broad.jpg,7b-Greek cross-broad.jpg	8	,6	,6	17,8
	6c-Latin cross-patty.jpg,X-Other.jpg	8	,6	,6	18,4
	7b-Greek cross-broad.jpg	8	,6	,6	19,0
	6b-Latin cross-broad.jpg,7c-Greek cross-gammion.jpg	9	,7	,7	19,7
	6b-Latin cross-broad.jpg,8b-Chi-Rho.jpg	9	,7	,7	20,4
	8b-Chi-Rho.jpg	12	,9	,9	21,3
	7c-Greek cross-gammion.jpg	13	1,0	1,0	22,3
	6a-Latin cross.jpg,X-Other.jpg	14	1,1	1,1	23,4
	7a-Greek cross.jpg	17	1,3	1,3	24,7
	6b-Latin cross-broad.jpg,X-Other.jpg	18	1,4	1,4	26,0
	6a-Latin cross.jpg,6b-Latin cross-broad.jpg	21	1,6	1,6	27,6
	6e_Latin cross with Roses and-or Grapes and-or Ear of Corn_or other flowers.jpg	27	2,1	2,1	29,7
	6d_Latin cross-gammion.jpg	35	2,7	2,7	32,4
	6f-Latin cross-potent.jpg	45	3,4	3,4	35,8
	X-Other.jpg	50	3,8	3,8	39,6
	6c-Latin cross-patty.jpg	65	5,0	5,0	44,6
	6a-Latin cross.jpg	89	6,8	6,8	51,4
	6b-Latin cross-broad.jpg	110	8,4	8,4	59,8
		527	40,2	40,2	100,0
	Gesamt	1310	100,0	100,0	

has_jesus

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Yes	93	7,1	7,1	7,1
		288	22,0	22,0	29,1
	No	929	70,9	70,9	100,0
	Gesamt	1310	100,0	100,0	

has_mary

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	Yes	33	2,5	2,5	2,5
		288	22,0	22,0	24,5
	No	989	75,5	75,5	100,0
	Gesamt	1310	100,0	100,0	

has_stoup

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	1d-Latin cross-Alpha-Omega.jpg	1	,1	,1	,1
	1f-Latin cross_1.jpg	1	,1	,1	,2
	2d-Greek cross-irregular.jpg	1	,1	,1	,2
	7b-Vessel of stone and lid.jpg	1	,1	,1	,3
	1g-Latin cross with rays.jpg	2	,2	,2	,5
	1a-Latin cross-regular.jpg	3	,2	,2	,7
	1c-Latin cross-patty-irregular.jpg	3	,2	,2	,9
	7a-Vessel of stone and lid.jpg	3	,2	,2	1,1
	8a-Basin open (no lid, any shape).jpg	3	,2	,2	1,4
	6c-Olive branch.jpg	4	,3	,3	1,7
	4a-Knob-rectangular.jpg	5	,4	,4	2,1
	6a-Roses and-or Ear of Corn or Flowers.jpg	6	,5	,5	2,5
	2b-Greek cross-patty.jpg	8	,6	,6	3,1
	2e-Breitkreuz-Broad Cross.jpg	9	,7	,7	3,8
	3a-Chi-Rho.jpg	9	,7	,7	4,5
	3b Chi-Rho_and_Alpha-Omega.jpg	18	1,4	1,4	5,9
	6d-Leaves-Cross.jpg	19	1,5	1,5	7,3
	5a-Praying Hands (of Durer).jpg	20	1,5	1,5	8,9
	1e-Latin cross-gammion.jpg	21	1,6	1,6	10,5
	2c-Greek cross-gammion.jpg	31	2,4	2,4	12,8

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
	2a-Greek cross-regular.jpg	39	3,0	3,0	15,8
	9a-Diagonal -Lines.jpg	116	8,9	8,9	24,7
	X-Other.jpg	136	10,4	10,4	35,0
		851	65,0	65,0	100,0
	Gesamt	1310	100,0	100,0	

number_occupants

		Häufigkeit	Prozent	Gültige Prozente	Kumulierte Prozente
Gültig	10	1	,1	,1	,1
	11	1	,1	,1	,2
	12	1	,1	,1	,3
	15	2	,2	,2	,5
	8	5	,4	,5	1,0
	9	5	,4	,5	1,5
	7	12	,9	1,2	2,7
	6	16	1,2	1,6	4,3
	5	44	3,4	4,4	8,8
	4	109	8,3	11,0	19,8
	3	120	9,2	12,1	31,9
	1	321	24,5	32,4	64,3
	2	354	27,0	35,7	100,0
	Gesamt	991	75,6	100,0	
Fehlend	System	319	24,4		
Gesamt		1310	100,0		

famille_familles

		Häufigkeit	Prozent
Fehlend	System	1310	100,0

11.7 Information Sheet for Study Participants

Project Title: Material Culture and Spaces of Remembrance. A Study of Cemeteries in Luxembourg in the Context of the Greater Region

Contact: University of Luxembourg, Dr. Thomas Kolnberger,

Email: thomas.kolnberger@uni.lu,

Phone: +352-46 66 44 9423

Date: _____

We are very grateful that you are willing to give up your valuable time to participate in this research project of the University of Luxembourg. This sheet will provide you with information about the nature of the project, who we are, why we are conducting this research and why you have been chosen to participate. You will also be informed about how the collected data will be protected and your confidentiality will be ensured.

Who is involved in the project?

The project is supervised by Prof. Dr. Sonja Kmec. Dr. Thomas Kolnberger is the project leader. Dr. Christoph K. Streb is involved as a research associate.

What is the aim of the project?

The project aims to gain a deeper understanding of past and contemporary culture of death, burial and commemoration with a specific focus of the Greater Luxembourg Region. We are seeking a multitude of data sources in order to analyze material culture, socio-cultural aspects and spatiality over a 200 year range.

Why were you selected?

We believe that your unique background and/or your role within this particular field of study might permit us to gain interesting and important insights.

What is your role in the project?

We would like you to express your honest opinion about the questions asked from your own point of view such that we may use your information as data in our study.

Your rights!

Your participation in this study is entirely voluntary and you are free to withdraw at any stage during the process. If you are uncertain or uncomfortable about any aspect of your participation, please express your issues as soon as possible or contact the above-mentioned researcher to discuss your concerns or to request clarification on any aspect of the study.

Any information you will supply will be treated confidentially! The interview will be recorded with your permission only. When you permit us to do so on the Research Consent Form (attached), your comments can be used anonymously or in connection with your affiliation (if applicable). In any other case we will ensure full anonymity of your information at any research stage.

If you have any further questions about the University of Luxembourg's Policy on Ethics in Research, please do not hesitate to contact us directly or the University's Ethics Committee via http://wwwde.uni.lu/research/standards_policies.

Again, thank you very much for participating!

11.8 Research Consent Form

This interview is part of an FNR funded project at the University of Luxembourg, entitled "Material Culture and Spaces of Remembrance. A Study of Cemeteries in Luxembourg in the Context of the Greater Region" and aims to gain a better understanding of past and contemporary culture of death, burial and commemoration. The project is carried out in accordance with the University of Luxembourg's Policy on Ethics in Research, which can be viewed at http://wwwen.uni.lu/research/standards_policies

Participants may keep the information sheet about the project for their records. Material provided as part of this study will be treated as confidential and securely stored in accordance with the University of Luxembourg's Policy on Ethics in Research.

I agree to take part in this research: yes ☐ no ☐

I have read and understood the information sheet: yes ☐ no ☐

I have been given the opportunity to ask questions about the project and they were answered to my satisfaction: yes ☐ no ☐

I understand that I can withdraw from the study at any time: yes ☐ no ☐

I agree to the interview being recorded: yes ☐ no ☐

I give permission for my real name and institutional affiliation (if applicable) to be used in connection with any information I have passed on: yes ☐ no ☐

I request that my comments are presented anonymously but give permission to connect my institutional affiliation (if applicable) with my comments: yes ☐ no ☐

I request that my comments are presented anonymously with no mention of my institutional affiliation (if applicable): yes ☐ no ☐

Further Agreements/Issues:

Name:	**Signature/Date:**

11.9 Cemetery Survey Application Specifications (Adapted)

Cemetery Survey Application

Specifications

Design specifications 1

Cyrille Medard de Chardon´

December 18, 2015

1 Introduction

This document provides formalized layout designs of the interactions necessary as described in the Task specifications 1.2 document. At this stage we will provide mock-ups that maximize ease and speed of use regardless of Android application limitations. The application requires four main activity layouts:

1. The home screen layout listing the existing cemetery cases studies and allowing the creation of new case studies, browsing bookmarks and template import and data export functionality.

2. The cemetery layout providing survey categories, picture options and the listing and creation of cemetery sections.

3. The cemetery section or merely the section layout allows the same possibilities as the cemetery layout but just with the grave listing and creation.

4. The grave layout provides a large set of category options including photographs and moving to the next grave.

For each of the above activity layouts, this document lists the required tasks and describes how these will be accomplished.

1.1 Mock-ups

See the CSA layout.pdf document for mock-ups and the CSA layout annotations.pdf explaining the interaction available.

2 Home

2.1 Tasks

- List cemetery case studies.
- Create a new cemetery case study.
- Edit cemetery name.
- List, select and delete bookmarks.
- Load category and attributes template.
- Add attributes to categories and edit them.
- Export survey data to GIS ready structure.

2.2 Layout

See CSA layouts.pdf and CSA layouts annotated.pdf pages 1-6 and test completion of the tasks above.

3 Cemetery

3.1 Tasks

- Take photographs.
- See photographs.
- Record cemetery level category attributes.
- Bookmark this cemetery.
- Create a new section.
- Edit section name.

3.2 Layout

See CSA layouts.pdf and CSA layouts annotated.pdf pages 7-10 and test completion of the tasks above.

4 Section

4.1 Tasks

- Take photographs.
- See photographs.
- Record section level category attributes.
- Bookmark this section.
- List graves in the section.

- Create new grave for the section.
- Edit grave identification number.

4.2 Layout

See CSA layouts.pdf and CSA layouts annotated.pdf pages 11-15 and test completion of the tasks above.

5 Grave

5.1 Tasks

- Record grave level category attributes.
- Switch between tabs of categories.
- Take photographs associated with grave, category or attribute.
- See photographs taken of this grave (linked to grave, category or attribute).
- Bookmark this grave.
- Save, check and close grave.

5.2 Layout

See CSA layouts.pdf and CSA layouts annotated.pdf pages 16-17 and test completion of the tasks above.

6 Design testing

Testing the paper layout design serves two purposes. It allows us to check if any features are missing and whether the interface is usable. A few things to consider is whether the number of clicks can be reduced and whether the current activity is clear and you are not lost in the different activities.

I strongly suggest you print the CSA layouts.pdf file in landscape and give the paper version a real test. Let me know what your thoughts are.

7 Road map

The creation of the CSA will follow the following road map:

1. Task specification [complete];
2. layout and design [in process];
3. input and out standardisation;

4. development and testing and

5. final modifications.

11.10 Usage Manual (Adapted)

Cemetery Survey Application

Usage manual 1.0

Cyrille Medard de Chardon´

February 11, 2016

1 Introduction

Cemetery Surveyor is designed to be part of a survey workflow consisting of:

- the creation of an ontology, the designing of a survey consisting of categories and attributes defined in a JSON template,
- the designating of cemetery, cemetery sections and graves in a GIS with unique identifiers,
- the actual surveying of the cemetery using the application,
- the exporting of gathered data, and
- geospatial analysis with a GIS or statistical analysis.

The application is useless without the appropriate documentation. The documentation is currently located on GitHub with the source code: https://github.com/serialc/CemeterySurveyor. This application was funded by the University of Luxembourg (http://wwwen.uni.lu/).

1.1 Android version

Currently, the application is designed to work with the Android API 13+ (Android 3.2 Honeycomb MR2).

2 Uninstallation and updates

As the data gathered are extremely valuable due to the time it takes to gather it, please read carefully to prevent data loss.

Uninstalling CSA removes all data in the database. Data are exported using the export functionality on the main screen and pictures are stored in the device's root folder named cemetery survey application. These will not be deleted. Photographs are always placed directly in this directory when taken and need not be explicitly exported. Exported data and pictures are

stored in the export directory located at /cemetery survey application/export/. See Section 5 for File structure details.

Updates to the application may require an update to the JSON template format or clear all the data from the database if a new table structure is required. Always export all your data before performing an update.

3 Survey template

The survey template creates immense flexibility in designing a survey tailored for your needs. This flexibility can, however, cause a few problems if category names are not chosen carefully to avoid duplicates.

The template is constructed using JSON syntax. We will formalize the syntax in this chapter.

3.1 Terminology

We refer to a category as one data point or item to be surveyed. The attribute refers to the descriptor for that category item. A category for grave stone material may, therefore, have multiple attributes, such as marble, sandstone, granite.

3.2 Category types

There are different category types to suit the desired data collection need:

1. Set (set): Multiple textual items from which none, one, multiple or all may be selected.
2. Set thumbnail (set thumbnail): Same as the set but with images instead of textual descriptions.
3. Radio (radio): Only one can be selected from textual item list.
4. Binary (binary): Same as radio but only two choices are available.
5. Measurement (measurement): A number is entered. Context determines the unit.
6. Text (text): Any text can be entered.

3.3 Data type requirements

There are eight descriptors for each category type (Section 3.2). The six data types require different combinations of these descriptors:

- type: A field used by the application to determine what this is.
- data type: What type of survey category this is.

- name: The name kept in records and exported to the GIS referring to this variable. This must be unique.
- attributes: The list of items to choose from. Is not necessary for Measurement and Text data types.
- title: The title for the category to be shown to the user.
- required: A boolean value indicating whether the user should be warned if this field was not completed.
- camera: Whether the category should have an option to take a picture.
- attrib camera: Whether each attribute (in set, radio, binary types) has an option to take a photograph.

3.3.1 Descriptor requirements

The following descriptors are required for all data types:

- name

The following data types also require the attributes descriptors:

- Set
- Set thumbnails
- Radio
- Binary

The following descriptors are optional. Default values will be assigned if they are not provided explicitly:

- title: The title for the category to be shown to the user. Will use the name if title is not provided.
- required: A boolean value indicating whether the user should be warned if this field was not completed. Set to false, not required, if not provided.
- camera: Whether the category should have an option to take a picture. Set to false, not available, if not provided.
- attrib camera: Whether each attribute (in set, radio, binary types) has an option to take a picture. Set to false, not available, if not provided.

3.4 JSON file structure

The root of the JSON file must contain the three scope objects: cemetery, (cemetery) section and grave:

```
{
        "_type": "root",
        "cemetery": [],
        "section": [],
        "grave": []
}
```

Within each of these item's lists/arrays '[ ]' must exist a tab object. Note that a title for the tab can be provided. Although required for the cemetery, section and grave scopes, the tab functionality is only implemented for the graves. So having multiple tabs for the grave scope is recommended while pointless (but harmless) for the cemetery and section.

```
{
        "_type": "tab",
        "contents": [],
        "title": "Base"
},
```

Within each tab must be on or more group objects. Groups are important for categories that do not require explicit tiles such as text and measurements.

```
{
        "_type": "group",
        "contents": [],
        "title": "Stone details"
}
```

Finally within each group must be one or more category objects. In this example a set data type is shown.

```
{
        "_type": "category",
```

```
        "camera": true,
        "attrib_camera": true,
        "data_type": "set",
        "name": "surrounds_cemetery",
        "title": "Surrounds cemetery",
        "attributes": [
            "Hedge",
            "Metal fence",
            "Wood fence",
            "Stone wall",
            "Nothing"
        ]
}
```

3.5 Data type category syntax

Data types have different descriptor requirements (see Section 3.3 for descriptors). We define each data type's descriptor requirements here.

3.5.1 Set

This data type allows the selection of multiple attributes within the category. Required

- type: Must be defined as ”category”.
- data type: Must be defined as ”set”.
- name: The unique name kept in records and exported to the GIS referring to this category.
- attributes: The list of items to choose from.

11.10.1.1 Optional

- camera: Whether the category should have an option to take a picture.
- attrib camera: Whether each attribute has an option to take a picture.
- title: The title for the category to be shown to the user. name is used if this is not provided.

- required: A boolean value (true, false) indicating whether the user should be warned if this field was not completed.

3.5.2 Set thumbnail

This data type allows the selection of multiple attributes within the category but uses images rather than text as selectable attributes. See Section 3.7 for information on locating the image files on the device. Required

- type: Must be defined as ”category”.
- data type: Must be defined as ”set thumbnail”.
- name: The unique name kept in records and exported to the GIS referring to this category.
- attributes: The folder name (e.g., Cross shape) for the pictures for this category. File names in this folder will become the attribute name in exported data. Folder location is specified in Section 5.

11.10.1.2 Optional

- camera: Whether the category should have an option to take a picture.
- attrib camera: Whether each attribute has an option to take a picture.
- title: The title for the category to be shown to the user. name is used if this is not provided.
- required: A boolean value (true, false) indicating whether the user should be warned if this field was not completed.

Keep the thumbnail sizes below 400 pixels in width and height for better performance.

3.5.3 Radio

This data type only allows the selection of one attribute from a set. Required

- type: Must be defined as ”category”.
- data type: Must be defined as ”radio”.
- name: The unique name kept in records and exported to the GIS referring to this category.
- attributes: The list of items to choose from.

11.10.1.3 Optional

- camera: Whether the category should have an option to take a picture.
- attrib camera: Whether each attribute has an option to take a picture.
- title: The title for the category to be shown to the user. name is used if this is not provided.
- required: A boolean value (true, false) indicating whether the user should be warned if this field was not completed.

3.5.4 Binary

This data type only allows the indication of one true or false. Required

- type: Must be defined as ”category”.
- data type: Must be defined as ”binary”.
- name: The unique name kept in records and exported to the GIS referring to this category.

11.10.1.4 Optional

- camera: Whether the category should have an option to take a picture.
- attrib camera: Whether each attribute has an option to take a picture.
- title: The title for the category to be shown to the user. name is used if this is not provided.
- required: A boolean value (true, false) indicating whether the user should be warned if this field was not completed.

3.5.5 Measurement

This data type allows entering a number only. The name should specify the measurement unit (e.g., grave height cm, grave year). Integers only are possible. Required

- type: Must be defined as ”category”.
- data type: Must be defined as ”measurement”.
- name: The unique name kept in records and exported to the GIS referring to this category.

11.10.1.5 Optional

- camera: Whether the category should have an option to take a picture.
- title: The title for the category to be shown to the user. name is used if this is not provided.
- required: A boolean value (true, false) indicating whether the user should be warned if this field was not completed.

3.5.6 Text

This data type allows the entering of any text. This probably shouldn’t be overly used as it will require further coding work. Required

- type: Must be defined as ”category”.
- data type: Must be defined as ”text”.
- name: The unique name kept in records and exported to the GIS referring to this category.

11.10.1.6 Optional

- camera: Whether the category should have an option to take a picture.
- title: The title for the category to be shown to the user. name is used if this is not provided.
- required: A boolean value (true, false) indicating whether the user should be warned if this field was not completed.

3.6 Uploading the template

Connect you tablet with a USB cable to a computer. Using Android File Transfer (see Section 6.1) copy your template file to the cemetery survey application/template/ location. Your template file must be named survey template.json.

See Section 5 for File structure details.

3.7 Uploading thumbnails

Connect you tablet with a USB cable to a computer. Using Android File Transfer (see Section 6.1) copy your thumbnail folder file to the cemetery survey application/thumbnails/ location. The exact same thumbnail folder name must be provided for the appropriate category attibute in your survey template.json. It is highly recommended that you don't use pictures of greater dimension than 400 pixels in width or height as file size can impact loading times of the relevant survey screens displaying the thumbnails.

See Section 3.5.2 for thumbnail data type syntax. See Section 5 for File structure details.

4 Application usage

The application has four main activities:

- Main - select cemetery, bookmarks and perform administrative tasks.
- Cemetery - complete the cemetery scope survey, take pictures and select a (cemetery) section.
- Section - complete the section scope survey, take pictures and select a grave.
- Grave - complete the grave scope survey across multiple tabs and take pictures.

We also describe the survey behaviour across the three scopes in Section 4.5.

4.1 Main

From the Main activity you can:

- Select a cemetery to survey
- Edit a cemetery name

- Select a bookmark to jump to a cemetery, (cemetery) section or grave.
- Create a new cemetery
- Reload the JSON template
- Add an attribute to a radio or set data type
- Export the database data

We further describe some of these actions.

4.1.1 Edit cemetery name

While clicking on a cemetery name takes you to the cemetery activity, holding your putting down on the cemetery name reveals an edit dialogue. Change the cemetery name and click ’OK’.

4.1.2 Create a new cemetery

Click on the ’+’ symbol in the circle at the bottom-right of the screen to create a new cemetery.

4.1.3 Reload JSON template

If you have uploaded a JSON template file and wish to update the survey questions, click on the vertical ellipses in the top-right of the screen and select ’Reload JSON template’.

4.1.4 Add attribute

Click on the vertical ellipses in the top-right of the screen and select ’Add attribute’. In the new activity select the category on the left side of the screen that you wish to add an attribute to and click on the ’+’ symbol in the circle at the bottom-right of the screen to name the new attribute.

11.10.1.7 NOTE

This will backup your existing JSON template into the archive (See Section 5) and add the attribute into the JSON template. Remember to use this template in the future from which to make any changes.

4.1.5 Data export

The data export will be located as described in Section 5. It is important to note that the text files will be generated by exporting the internal application database, the pictures will be stored in this directory. This means that removing pictures from this folder will mean they are no longer visible from inside the application. The other data will always be maintained in the internal database unless the application is uninstalled in which case it would be wise to export the data beforehand.

As the relationship between categories and the number of attributes vary, a simple table is not possible. There exists one-to-one and one-to-many relationships. Exported data are therefore separated by scope (cemetery, section, grave) but also by data type (Section 3.5). Data types which are one-to-one are all included together in one table file, with one row for each grave, or other scope types in separate files, and a second file contains a table where multiple rows of attributes are associated with a grave (or other scope type).

4.2 Cemetery

From the Cemetery activity you can:

- Select a section to survey
- Edit a section name
- Create a new section
- Take a picture
- Bookmark this cemetery
- Complete the cemetery survey
- View pictures associated with this cemetery

The top-right icons allow picture taking and bookmarking the cemetery. The left-side icons displays the list of (cemetery) sections, display the survey and display the pictures associated with this cemetery and survey categories and attributes.

We further describe some of these actions.

4.2.1 Edit section name

While clicking on a (cemetery) section name takes you to the section activity, holding down your finger on the section name reveals an edit dialogue. Change the section name and click ’OK’.

4.2.2 Create a new section

Click on the ’+’ symbol in the circle at the bottom-right of the screen to create a new section.

4.3 Section

From the Section activity you can:

- Select a grave to survey
- Edit a grave name
- Create a new grave automatically or specified
- Take a picture

- Bookmark this section
- Complete the section survey
- View pictures associated with this section

The top-right icons allow picture taking and bookmarking the section. The left-side icons displays the list of graves, display the survey and display the pictures associated with this section and survey categories and attributes. We further describe some of these actions.

4.3.1 Edit section name

While clicking on a grave name takes you to the section activity, holding down your finger on the grave name reveals an edit dialogue. Change the grave name and click

'OK'.

4.3.2 Create a new grave

Click on the '+' symbol in the circle at the bottom-right of the screen to create a new grave. It will automatically create an id based on the next highest integer of grave ids. If you wish to create a new grave and specify its name simply hold the '+' symbol down and a dialogue will ask you for the grave name.

4.4 Grave

From the Grave activity you can:

- Take a picture
- Bookmark this grave
- Complete the grave survey
- View the pictures associated with this grave • Clear all the data associated with this grave

The grave activity only displays action icons at the top-right corner of the screen. These allow you to delete all the data for this grave, bookmark the grave, take a picture of the grave, display the pictures and survey.

4.4.1 Clear grave

Clicking on the garbage icon will prompt you to see if you would like to clear all the collected data for this grave.

4.4.2 Complete the survey

Unlike the other scopes, the grave offers tabs to display the larger set of categories for the survey.

When exiting the grave activity, using the back navigation, the application will check if all required fields have been completed. Pay attention to messages warning of this.

4.5 Surveys

The surveys operate similarly across the three scopes. We provide a few notes on interacting with the different data types.

Radio buttons allow the selection of one attribute. If you desire to disable all the attributes but have already selected one, simply hold your finger down on the selected attribute. This will disable it.

Binary buttons will not store any data by default (they are NULL) although they state

FALSE. If you wish to provide a FALSE value then you must first switch the state to TRUE and back to FALSE. Relying on this usage is not, however, a wise decision unless the category is defined as required, reminding the user. A better alternative is a radio button with two alternatives.

5 File structure

The structure of the files is shown below.

cemetery survey application/ template/ survey template.json archive/

thumbnails/

Cross shape/ Grave type/

.... export/ pictures/ data/

6 Problems

6.1 Android File Transfer

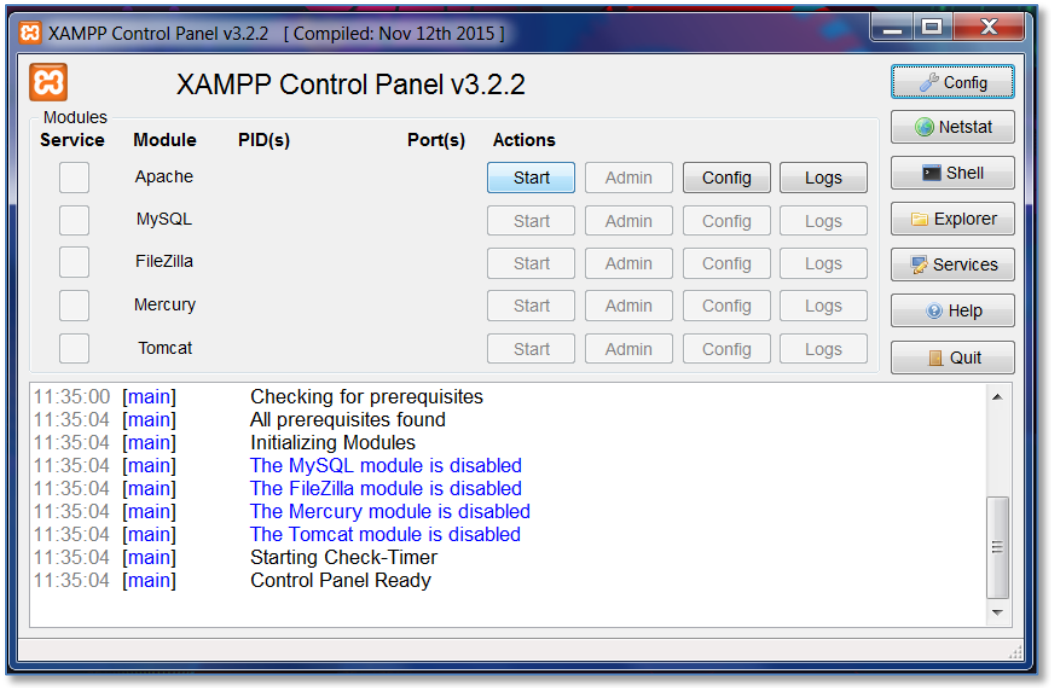
Android File Transfer (AFT) has known issues with not displaying the current status of files on the tablet. Rebooting the tablet may be required in order to see latest pictures and exported data.

11.11 How to Install the Cemetery Surveyor Application

(Desktop Version; Adapted)

1. First, you will need to install XAMPP Apache (e.g. via: https://www.apachefriends.org/de/download.html

2. Before working with the survey tool you will always need to start Apache via XAMPP:



3. Download the ZIP-Folder from: https://transmortality.uni.lu/Project-RIP/Survey-Tool

   or from the following webpage: https://github.com/serialc/WebCemeterySurveyor

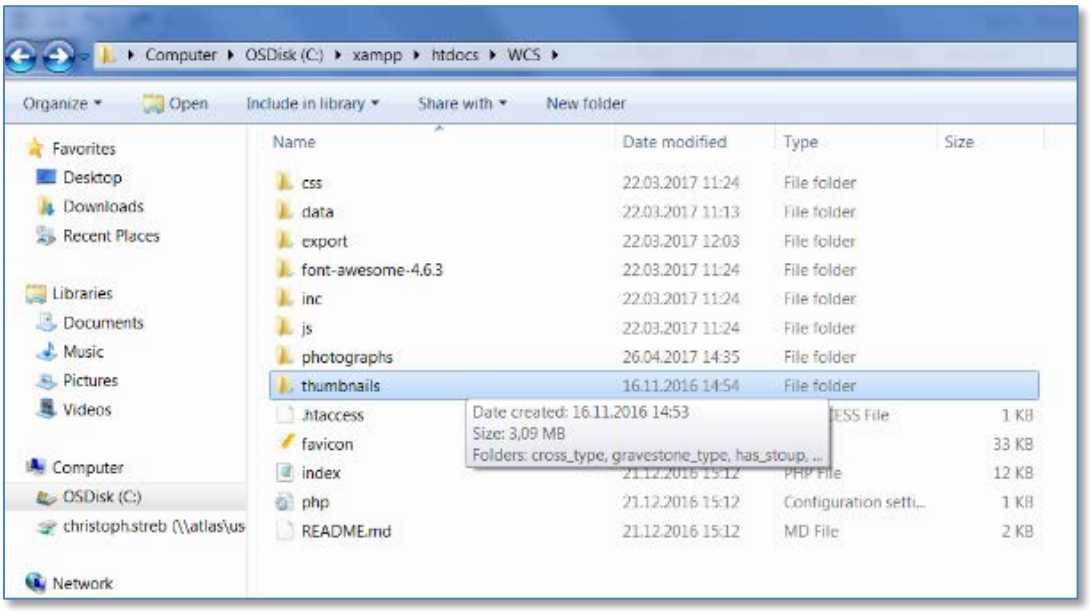
4. Extract and rename folder into “WCS”

5. Move “WCS” folder to C:\xampp\htdocs on your hard drive

6. Open http://localhost/WCS/ in your browser

7. Download thumbnails folder from https://transmortality.uni.lu/Project-RIP/Survey-Tool

8. Move the thumbnails (unzipped) from this folder into the respective folder in “WCS”:



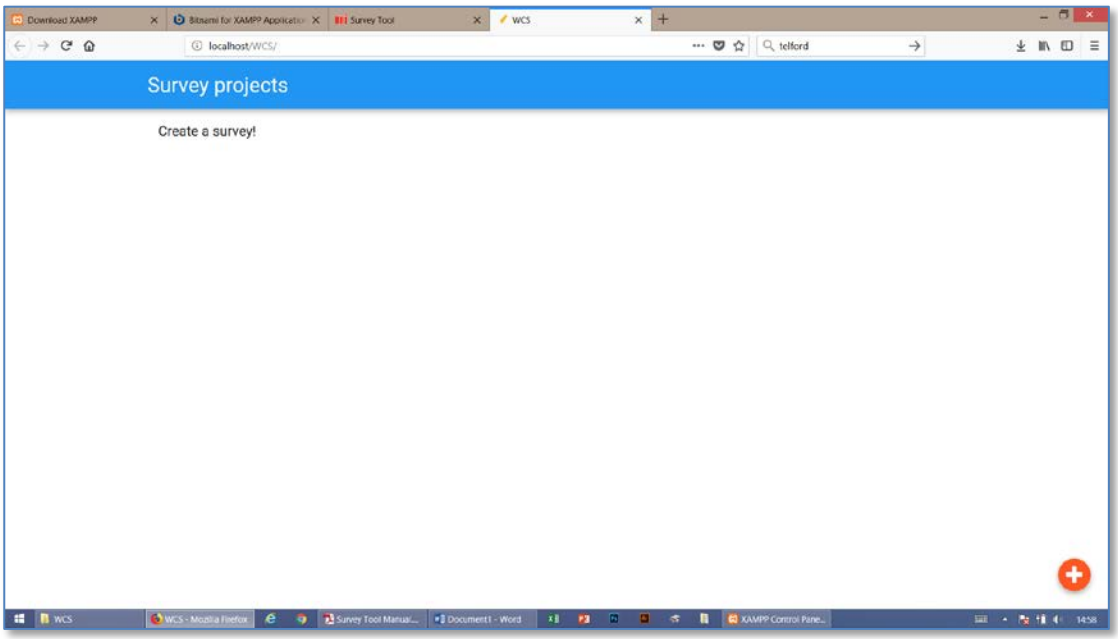
9. If necessary, create the folder “photographs”

10. Download the survey template (a JSON file) from https://transmortality.uni.lu/Project-RIP/Survey-Tool

11. Move the file “survey_template.json” file into correspondingly named folder under C:\xampp\htdocs\WCS\data

12. Move your collected pictures to folder “photographs”

13. Go to http://localhost/WCS/ again and add new project in browser



14. Go back to the folders on your hard drive and rename the json file according to project name

15. Start data within your project by adding cemeteries, sections and graves in the same way you added the project.