RESEARCH ARTICLE

The role of women in the shaping of civic identity in Edwardian Leicester: Edith Gittins and the Anglo-Saxon past of Æthelflæd’s fountain. Historical reconstruction and 3D visualization

Rosa Smurra1* and Marco Orlandi2†

1Alma Mater Studiorum – Università di Bologna, via Filippo Re 6, 40126 Bologna, Italy
2Università di Padova, via Del Vescovado 30, 35122 Padova, Italy
*Corresponding author. Email: rosa.smurra@unibo.it

Abstract
This article analyses a case of female patronage in Edwardian Leicester, a drinking fountain surmounted by a statuette dedicated to a female Anglo-Saxon ruler. The bequest, by Edith Gittins (1845–1910), is contextualized within the nineteenth-century perspectives on the past that identified the roots of the English people in the Anglo-Saxon period. The article explores the cultural, social and gender implications of Gittins’ intentions behind the bequest both for women’s rights and for the use of the past in the construction of civic identity. These have not hitherto received sufficient attention. In order to address these questions the article exploits the potential of a 3D visualization of the urban setting where the fountain was intended to be erected to help frame the historical inquiry.

Introduction
On 3 August 1922, the citizens of Leicester crowded into Victoria Park for the unveiling of the ‘Ethelfloeda Fountain’, a drinking fountain surmounted by a statuette dedicated to the Anglo-Saxon Lady of the Mercians who had ruled a thousand years earlier. This fountain, a bequest from Miss Edith Gittins to Leicester, however, was not erected in High Street where she had originally intended, a location that would have enabled it to perform a more complex and political role than in Victoria Park. This case of female patronage, providing for the statuette and fountain to be erected in a central space (High Street) has implications both for women’s

*The first section of the article (Introduction; Edith Gittins and Æthelflæd’s fountain; The Gittins family: social and political engagement, education, art and philanthropy; Donation of the monumental fountain to the County Borough of Leicester; Æthelflæd in the historical records and historiography: the construction of an Anglo-Saxon tradition; Use of an urban space: a strategic site for the formation of a collective memory and identity) is by Rosa Smurra; the second section (Note on the methodology of the historical reconstruction) is by Marco Orlandi.

© The Author(s), 2021. Published by Cambridge University Press. This is an Open Access article, distributed under the terms of the Creative Commons Attribution licence (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted re-use, distribution, and reproduction in any medium, provided the original work is properly cited.
rights\(^1\) and for the use of the past for the construction of civic identity.\(^2\) The urban setting that was intended to be the site of the monument was Leicester, where Edith Gittins, artist and drawing teacher, had been born and spent her entire life. However, connections can be made with other cities in the United Kingdom, not just because numerous instances are to be found of charitable works promoted by women philanthropists in the late Victorian and Edwardian era,\(^3\) but also because the bequest for a public fountain in Leicester was one of a series of initiatives at national level taken by philanthropic movements spanning half a century for the construction of public drinking fountains, especially for the less privileged members of society.\(^4\)

The purpose of the Leicester fountain was not solely to provide an indispensable resource. The statuette\(^5\) that surmounted it was intended also to celebrate the historic roots of Leicester, and in particular the period of Anglo-Saxon rule. The choice of Edith Gittins, firmly placed in the contemporary cultural tradition that identified the roots of the English people in the Anglo-Saxon period, brought together a number of needs that were increasingly important in the Victorian era with the rise of industrialization\(^6\) and the demand for recognition of the role of women in the public sphere,\(^7\) which radical Unitarians, such as Edith, had been advocating for some time.\(^8\) Her bequest to Leicester and the civic engagement that it embodies reflected the cultural and philanthropic climate\(^9\) that framed her existence, also characterized by her appreciation of the role of art in society. As noted by Amy Woodson-Boulton, \'in the middle of the nineteenth century,
through a variety of factors...art became connected to morality and even to Protestant religiosity. As a result of art’s new moral status, reformers began to advocate art as a potentially active and democratic force for making nature, beauty, and the morality of expressive labor available in the industrial city.\(^{10}\)

Edith Gittins’ commitment to the cause of women’s suffrage, her activity in both women’s and mixed associations, as well as the bequest of a substantial sum for the erection of a public drinking fountain dedicated to Æthelflæd, have attracted considerable interest in recent years,\(^{11}\) although the cultural, social and gender implications of the bequest have not hitherto received sufficient attention. This study is intended to fill this gap and to contextualize the bequest and to address a number of questions. Why did a middle-class woman in the Edwardian age bequeath a substantial share of her estate to a monument commemorating an Anglo-Saxon female ruler? Why did she choose High Street as the site for the monument? Would the monument have played a more effective role in promoting the memory of the Anglo-Saxon past had it been erected in the place for which it was intended? Would the statuette of the Lady of the Mercians have given rise to reflection on the role of women in public life and civic identity had its location been the intended one?

To address these questions, it is necessary to understand the historical figure represented by the statuette, as well as the factors that prompted Edith Gittins to make such a bequest. It is also important to consider the role of Æthelflæd’s fountain along with the built environment surrounding it. With regard to this question, it is helpful to make use of the 3D visualization of the urban setting where the fountain was intended to be erected.\(^{12}\) The 3D reconstruction is essential for testing hypotheses and to contextualize artifacts, buildings, places, the flow of pedestrians and above all casting light on relations between the various elements of the cityscape. It is an effective method for the investigation of historical facts and circumstances, and in this specific case it was fundamental for establishing the reasons, not explicitly stated in Edith’s will, leading her to choose High Street as the site for Æthelflæd’s fountain. With the construction of a monument to Æthelflæd, the High Street – East Gates visual axis would have undergone a dramatic transformation: the four statues of male historical figures embellishing the Clock Tower at East Gates, and each representing a different period of the history of Leicester, would have been aligned with Æthelflæd’s fountain at the other end of the axis, the junction of Silver Street and High Street. The traffic congestion cited as the official reason for choosing a location in Victoria Park is shown by the 3D visualization to have been unfounded: the modest dimensions of the fountain or monument, reconstructed on the basis of its exact measurements (geometrical fidelity), would not in any way have obstructed the road traffic or the circulation of pedestrians. However, Æthelflæd’s fountain would have played an important role, contributing to collective memory, bringing

\(^{10}\)A. Woodson-Boulton, “‘Industry without art is brutality’: aesthetic ideology and social practice in Victorian art museums’, *Journal of British Studies*, 46 (2007), 47–71, at 47.


to mind the exploits of a woman who had acted in the defence of Leicester, at the same time allowing for the emergence of a female civic identity, and recognizing female agency in the creation of the urban landscape.

**Edith Gittins and Æthelflæd’s fountain**

Edith Gittins (1845–1910), an artist and drawing teacher from Leicester, was active in the promotion of women’s rights and social reform. Her participation in the movement for the emancipation of women was closely related to her decision to erect a drinking fountain to Æthelflæd. By means of the realization of a fountain dedicated to Æthelflæd, the tenth-century Anglo-Saxon Lady of the Mercians and ‘liberator of Leicester’, she identified the key to the civic identity of Leicester, while recognizing the value of the role of women in her part in the campaign for women’s suffrage.

Edith’s artistic work was widely appreciated, and she became a member of the Leicester Society of Artists, exhibiting her work at the New Water-Colour Society and the Royal Academy in London between 1868 and 1879. Her artistic career was closely linked to civic engagement, as exemplified by her membership of the Kyrle Society, of which she co-founded the Leicester branch in 1880. The Society, a forerunner of the National Trust, founded in 1876 by Miranda Hill, the older sister of Octavia, was ‘set on foot with the view of bringing the refining and cheering influences of natural and artistic beauty into the homes and neighbourhoods of the poor in our large towns’.

**The Gittins family: social and political engagement, education, art and philanthropy**

As members of the middle class, the Gittins family, who were Unitarians, were characterized by a propensity to take on public duties, particularly in the case of...
the father, Edward, and his sons. They were active in the community, playing a political role in the administration of the city (that until 1919 had the status of a borough), promoting and supporting economic and cultural initiatives. The women in the Gittins family also gradually moved into civic life: their Unitarian background had a bearing on the roles that they were able to perform. From the 1880s onwards, like many middle-class women in Britain, they took part in movements and associations that were attempting to deal with a number of problems and questions that had come to the fore during the Victorian era, as a result of rapid urban development, determined by the rise of industrialization.

The three Gittins sisters, Mary Catherine, Elisabeth Ann and Edith, were all drawing teachers. Elisabeth Ann emigrated from the United Kingdom to America, where she died from complications arising from the birth of her third child, whereas the lives of Mary Catherine and Edith were intertwined in many respects, although Mary Catherine lived and worked away from Leicester for almost 40 years: in Liverpool (1865–78) and Birmingham (1861–64, 1879–98).

In the 1871 Census, Mary Catherine was registered as a boarder in the home of a highly regarded Liverpool medical practitioner, Alfred Higginson, and his wife Ellen Martineau (1811–89), sister of the well-known writer, philosopher and social reformer Harriet Martineau (1802–76). This proximity to the sister of Harriet

19J. Storey, Historical Sketch of Some of the Principal Works and Undertakings of the Council of the Borough of Leicester since the Passing of the Municipal Corporations Reform Act...with a Complete List of Mayors, Magistrates, Aldermen, Councillors, and Head Officials, down to the Present Date (Leicester, 1895).
20Edward Gittins was a member of the governing body of the Leicester Permanent Library (Leicester Journal, 16 Feb. 1866, 8).
22Many middle-class women, by means of their participation in social reform movements, philanthropic associations and local government, contributed to the development of a middle-class civic identity. For a study of the involvement of Scottish women in public life, see M. Smitley, The Feminine Public Sphere: Middle-Class Women and Civic Life in Scotland, c. 1870–1914 (Manchester, 2009).
24From the late Victorian period on, Birmingham was considered to have a progressive and radical local government based on the doctrine of the civic gospel according to which ‘religious beliefs (the gospel) should underpin everyday (civic) life’; see P. Bartley, ‘Moral regeneration: women and the civic gospel in Birmingham, 1870–1914’, Midland History, 25 (2000), 143–61, focusing on women’s contribution to the civic gospel; see also R. Hartnell, ‘Art and civic culture in Birmingham in the late nineteenth century’, Urban History, 22 (1995), 229–37.
25Census Returns of England and Wales, 1871, Kew, Surrey, England: The National Archives of the UK (TNA): Public Record Office (PRO), 1871. Shirley Aucott (Women of Courage, Vision and Talent, 107–8) states that Mary Catherine Gittins was employed as a governess by the Higginson family, but in actual fact the only daughter of Alfred Higginson, who was more or less the same age as Mary Catherine, was a Latin and mathematics teacher at the time.
Martineau undoubtedly had a strong influence on Mary Catherine – and hence also on Edith – in terms of the development of her thinking about women’s rights.28 Resonating with the experience of Mary Catherine, who had the opportunity to live in cities that, along with Manchester, were the largest outside of London, Edith’s artistic work was never separated from her interest in and passion for women’s rights and the disadvantaged conditions of the less privileged social classes.29

Edith Gittins and her sister were well aware of the squalor and insanitary conditions associated with life in urban centres that were transformed and at times dehumanized by the industrial revolution. Like other late nineteenth-century social reformers (both men and women) who aimed to bring beauty to the poor,30 they considered the decorative arts as a means to improve the living conditions of the working classes, and took part in many voluntary activities.31 In so doing, like other middle-class women, they extended their range of action beyond the confines of domestic life,32 contributing to the development of a middle-class identity and its expression in public culture.33 They approached these issues relating to the social and cultural life of the city primarily through charity organizations.34 Charitable activities were run by the churches and chapels, with initiatives such as Sunday Schools.35 As highlighted by Anne Summers, the involvement of middle-class women in nineteenth-century philanthropy, such as visiting poor families, was seen as a kind of work, making a valuable contribution to the development of...

---

30As Geoffrey C.A. Ginn observes, the late Victorian cultural philanthropists ‘called out great number of energetic, capable, intelligent men and women who willingly put their shoulders to the wheel’. These middle- and upper-class social workers supplied hundreds of art exhibitions, concerts of fine music, evening lectures, clubs and socials, debates and excursions to urban poor. G.A.C. Ginn, Culture, Philanthropy and the Poor in Late-Victorian London (London, 2017), 2.
31On middle- and upper-class ‘missionary aesthetes’ who, aiming to bring art to masses and improving working-class conditions, considered aestheticism as a kind of philanthropy, see D. Maltz, British Aestheticism and the Urban Working Classes, 1870–1900: Beauty for the People (Basingstoke, 2005). On decorative arts as ‘embellishment’ of lives, see J. Price, ‘Octavia Hill’s Red Cross Hall and its murals to heroic self-sacrifice’, in Baigent and Cowell (eds.), ’Nobler Imaginings and Mightier Struggles’, 65–89. See also Woodson-Boulton, “Industry without art is brutality”.
33For an analysis of this topic, above all with regard to Leeds, see S. Morgan, Victorian Woman’s Place: Public Culture in the Nineteenth Century (London, 2007). On the female presence in a range of public realms, such as political, social, cultural and economic, in the West End of Glasgow between 1840 and the early twentieth century, see E. Gordon and G. Nair, Public Lives: Women, Family and Society in Victorian Britain (London, 2003).
35D. Nash, D. Reeder et al., Leicester in the Twentieth Century (Dover, NH, 1993), 160–4.
women’s agency in civic life.36 In addition, secular associations were set up with a view to promoting an awareness of the origins and the historical and architectural heritage of Leicester, to promote urban decorum and beauty in the urban landscape. Among the achievements of this cultural movement, mention should be made of the role played from 1835 onwards by the Literary and Philosophical Society that contributed to set up the Town Museum (1849) and, at a much later date, the University (1921).37 However, it took over 50 years for women to be admitted as full members of the Leicester Literary and Philosophical Society (1886). It was rather the domestic setting of the Ladies’ Reading Society, set up in Leicester in 1869 by a group of Unitarian middle-class women, that provided them with the opportunity for self-education and improvement by attending and giving lectures, and chairing discussions. Though not necessarily feminist in nature, the Ladies’ Reading Society, of which Edith Gittins served as president four times, also contributed to reinforcing a sense of a middle-class female identity in Leicester.38 Edith left the Ladies’ Reading Society in 1886, when she became one of the few women admitted to the Leicester Literary and Philosophical Society. The president of the Society in that year was the radical Unitarian minister, the Reverend John Page Hopps, an advocate of the women’s rights movement. It is significant that in the same year the Literary and Philosophical Society39 invited Millicent Fawcett (1847–1929) – also known as Mrs Henry Fawcett – who at the time was the leading light in the movement for women’s suffrage,40 to give a lecture on ‘The Social Position of Women: its progress during the last hundred years’.41 As in many other British towns and cities, in Leicester the civic role of middle-class women was emerging and they were making a substantial contribution to institutions and associations favouring the development of middle-class identity in the local context.42

Furthermore, as noted above, the numerous interests cultivated by the Gittins sisters included one that was closely connected with the improvement of the moral and material environment of the poor: ‘Bringing beauty through art’, one of the stated aims of the Kyrle Society, provided an opportunity for them to use their artistic skills, to fulfil their social duty and to be involved in civic life. Albeit in two different cities,43 the sisters promoted the setting up of local branches

37Morris, ‘Clubs, societies and associations’, 395–444; in Leicester, the opening of the museum was supported by the city council; see F.B. Lott, The Centenary Book of the Leicester Literary and Philosophical Society (Leicester, 1935). For public museums across Britain as an important factor for constructing the identity and authority of certain groups, see K. Hill, Culture and Class in English Public Museums, 1850–1914 (Aldershot, 2005).
42Morgan, Victorian Woman’s Place.
43Mary Catherine Gittins was general secretary of the Kyrle Society in Birmingham. On local Kyrle Societies, see Ginn, Culture, Philanthropy and the Poor in Late-Victorian London, 42.
of the Kyrle Society. During the ceremony establishing the local branch of the Kyrle Society, held in the Mayor’s Parlour at the Old Town Hall in Leicester on 25 November 1880, after remarks by the highly regarded speaker Charles E. Maurice (1843–1927) – who was the son of the Christian socialist Frederik D. Maurice and brother-in-law of Octavia and Miranda Hill, founders of the London Kyrle Society 44 – Edith Gittins took centre stage and made a brief speech to underline the need to set up a local branch in Leicester. 45 She served on the governing committee of the Society and became the first female president in 1898. Edith seems to have been the driving force of the Kyrle Society in Leicester, reflecting the close attention she paid throughout her life to the history of the city. This role was evident on one occasion in particular: the celebrations for the Centenary of the Great Meeting Sunday Schools in Leicester, 46 where she served on a voluntary basis for 40 years. 47 During these celebrations, held in 1883, Gittins gave the commemorative speech, in which her knowledge of the history of Leicester came to the fore. 48

Donation of the monumental fountain to the County Borough of Leicester

Further insight into Edith Gittins’ ideals and aspirations is to be gained from the provisions of her last will and testament, with particular regard to her bequest for the construction of a monumental fountain. 49 The fountain was indeed constructed, as noted below, but only a small part of it remains, including a statuette, at present to be found in the courtyard of the Guildhall of Leicester. In her will, drawn up on 14 December 1909, Edith made the following bequest:

I bequeath the sum of five hundred pounds to the treasurer for the time being of the County Borough of Leicester to be expended in the erection and maintenance of a public drinking fountain to be called ‘Ethelfloeda’s Fountain’ to be beautiful in material, colour, design and workmanship and always supplied with pure water. And should the Town Council for the said Borough accept this bequest I desire them to entrust the execution of the work to Mr B. J. Fletcher and Mr Crosland McClure of the Municipal School of Art if they will accept this charge in a spirit of friendship in conjunction with the Birmingham Guild Limited of 45 Great Charles Street Birmingham or any development of the said company with which my nephew the said Edward

44Anderson and Darling, ‘The Hill sisters: cultural philanthropy and the embellishment of lives in late nineteenth-century England’, 33–50, at 44–7. On the eclipse of the Kyrle Society, see Whelan, “‘The poor, as well as the rich, need something more than meat and drink’: the vision and work of the Kyrle Society’, at 111–15.
45LLRO, Kyrle Society, minute book, 1880.
47Ellis, Records of Nineteenth Century Leicester, 147–9.
49Will of Edith Gittins, dated 14 Dec. 1909; died 7 Aug. 1910; proved and registered in the District Probate Registry of His Majesty’s High Court of Justice at Leicester, 12 Oct. 1910.
Russell Gittins shall be then associated and I suggest the angle formed by the junction of High Street and Silver Street as suitable site for such fountain which when erected I pray the public of Leicester to keep free from all untidiness and defilement.50

In her will, Edith refers to three main features of her bequest: it was to be a drinking fountain for public use, it was to be surmounted with a statue of Æthelflæd and it was to be placed in a specific position in the town centre. In addition, she made provision for the fountain to be erected by Leicester Council only after the death of her sister Mary Catherine, her heir. In actual fact, Mary Catherine initiated the procedure for the realization of the monument in 1920 while she was still alive (she was to pass away in 1930). All the steps for the realization of the fountain, from August 1920 until its inauguration on 3 August 1922, were pursued with great determination by Mary Catherine Gittins, who on several occasions had to fight hard to ensure that her sister Edith’s bequest was brought to fruition.

The council agreed to the rescheduling of the bequest and thanked Mary Catherine for bringing forward the realization of the drinking fountain, and determined that the Sanitary Committee and the Highways Committee would deal with the matter.51 The discussion prior to the adoption of the resolution was reported in the local press the next day.52 The mayor stated that in order to erect the fountain in such a prominent position, the sum of £500 would not be sufficient, and argued that in order to erect a monument worthy of the site, further funding would be required, in addition to the Gittins bequest, and proposed submitting the matter to the Finance Committee. The Leicester Daily Post also reported on the discussion at the council meeting.53 First of all, mention was made of the good works of the Gittins sisters. With regard to the fountain, it was underlined that the benefactor intended a beautiful monument to be created for the city, as shown by the names of the artists she had suggested. With regard to the site where the fountain was intended to be placed, the Daily Post stated that the opinion expressed by the testator was not binding, pointing out that the traffic conditions at the junction were quite different from when the will was drawn up (1909). Moreover, the newspaper criticized the mayor for stating that the amount of the bequest was insufficient, whereas it would have been more appropriate to express gratitude to an individual who had bequeathed £500 (a ‘very magnanimous sum’)54 even though she was by no means a millionaire.55

On 4 January the following year, a few months after the council had adopted the resolution accepting the bequest, the Sanitary Committee, along with the Highways and Sewerage Committee, at the suggestions of the Corporation’s Victoria Park Sub-Committee, after consulting Mary Catherine Gittins,56 proposed erecting the

50Ibid.
52Leicester Daily Post, 29 Sep. 1920, 5.
53Ibid., 2.
54According to the Bank of England Inflation Calculator, the equivalent sum today would be £59,338.
55Edith Gittins left effects of £6,874 9s 5d according to probate records.
56T. Cavanagh, with an introduction by A. Yarrington, Public Sculpture of Leicestershire and Rutland (Liverpool, 2000), 325.
fountain in Victoria Park, near Regent Road, a site considered to be appropriate for a public drinking fountain.57

During the preparations for the installation of the fountain, Mary Catherine Gittins expressed her concerns about the siting of the fountain as she feared it would be too close to another monument, known at the time as the War Trophies.58 On 5 April 1922, the Parks Committee, to which Miss Gittins had submitted the plans for the fountain realized by B.J. Fletcher, agreed to her request to erect the fountain on the west side of the entrance to the Park facing Regent Road.59 Mary Catherine’s concerns were not unfounded due to the fact that the memorial to the fallen servicemen in the Great War was likely to be the focus of public attention.60

Edith Gittins’ bequest, aimed not only at the construction of an ornamental fountain, but also at the provision of drinking water, reflected developments that had been taking place for several decades in British society. An important role was undoubtedly played by the influence exerted by her sister Mary Catherine, who was employed for a long time as a teacher and governess in Liverpool with the family of George Melly MP,61 the brother of Charles Melly who in the 1850s had promoted the installation of public drinking fountains.62 Due to the recurrent epidemics of cholera (1831–32, 1848–49, 1853–54 and 1866), of which contaminated drinking water was the dominant medium of transmission, increasing attention was turned to the question of drinking water and above all medical research, starting from the fundamental work of John Snow (1813–58).63 With regard to Leicester, Charles Melly reported that: ‘E. S. Ellis, Esq. has placed two marble Drinking Fountains in the Leicester Railway Station, which have been found so useful to the travelling public, that at their next meeting the Directors of the Midland Railway Company resolved to erect Drinking Fountains at all the principal stations on their line.’64

It is well known that the movement for the construction of public drinking fountains led to the establishment of the Metropolitan Free Drinking Fountain Association (1859) by Samuel Gurney MP (1816–82), the nephew of the Quaker philanthropist, Elizabeth Fry. The aim of the Association, supported by Prince

58 The ‘War Trophies’ to which Mary Catherine referred consisted of a tank moved to Victoria Park in March 1920, where it was flanked by two captured guns (Leicester Daily Post, 30 Mar. 1920).
59 Cavanagh, Public Sculpture of Leicestershire and Rutland, 325.
60 Designed by the architect Sir Edwin Landseer Lutyens, after World War II an inscription was added commemorating those who lost their lives in that war.
61 Census Returns of England and Wales, 1871, TNA: PRO, 1871. S. Aucott claims that Mary Catherine Gittins was employed as a governess by the Higginson family, but in fact at the time the only daughter of Alfred Higginson, who was almost the same age as Mary Catherine, was a Latin and mathematics teacher: Aucott, Women of Courage, Vision and Talent, 107–8.
62 C.P. Melly, A Paper on Drinking Fountains. Read in the Health Department of the National Association for the Promotion of Social Science, Liverpool Meeting, October, 1858 (Liverpool, 1858), 9.
64 Melly, A Paper on Drinking Fountains, 8. The philanthropist Edward Shipley Ellis (1817–79), chairman of the Midland Railway Company, had played a leading role in the city institutions and was chairman of the Temperance Society, which campaigned against the consumption of alcohol, which the supply of free drinking water was intended to limit.
Albert, was to encourage the erection of public fountains to supply pure drinking water free of charge to all social classes, but especially the lower social classes.65

Æthelflæd in the historical records and historiography: the construction of an Anglo-Saxon tradition

In order to appreciate the reasons for Edith’s bequest to erect a fountain surmounted by a statue of Æthelflæd, it is necessary to provide an overview of the political characteristics of this sovereign, and how she was perceived in the 10 centuries that separated the lives of the two women. What was known in the second half of the nineteenth century about Æthelflæd, the Lady of the Mercians? The Anglo-Saxon kingdom of Mercia, situated in the Midlands between Wales, Wessex, Northumbria, Essex and East Anglia, saw its period of greatest expansion under Æthelflæd’s father, Alfred the Great (849–99), king of Wessex, with which Mercia was closely allied. During the reign of Alfred the Great, repeated incursions by the Vikings took place on the east coast of the British Isles. Alfred managed to contain these incursions, defeating the invader and drawing up a treaty of co-existence between the kingdom of Mercia and the regions occupied by the Vikings (the Danelaw). On the death of Alfred, his children had to deal with the difficulties of governing the territory. Æthelflæd, his eldest daughter – who was married to Æthelred (Lord of the Mercians), who died in 911 – became Lady of the Mercians,66 as reported in the Annals of Æthelflæd, a queen to all intents and purposes. The other child, Edward the Elder, became king of Wessex.

The events concerning the kingdom of Mercia governed by Æthelflæd are narrated in the Anglo-Saxon Chronicle, which contains a series of historical accounts concerning Mercia, with a specific focus on Æthelflæd, known as the Mercian Register, but also as the Annals of Æthelflæd.67 Thanks to these records, we have an account of the military exploits aimed at defending her territory from the Viking incursions. In 918, she managed to gain control of Leicester68 and York, shortly before her death in Tamworth, on 12 June 918,69 ‘in the eighth year in
which with lawful authority she was holding dominion over the Mercians. And her body is buried in Gloucester in the east chapel of St. Peter’s church.70

References to Æthelflæd are to be found also in later records relating episodes from the Anglo-Saxon and Anglo-Norman period but based on information to be found in the chronicles of the tenth century. From these records and the work of scholars from the sixteenth century onwards, it is known to us that Æthelflæd managed to wield power in a world dominated by men, not as regent on behalf of her sons or grandchildren, or her late husband, but in her own right as Lady of the Mercians. She had carried out her role as governor, fighting the Viking oppressors, fortifying the territory and, on a par with other governors and monarchs, she had promoted a policy of conquest also by means of the construction of churches and the veneration of holy relics. Unlike her brother who ‘showed a remarkable lack of interest in using saints’ cults for political purposes’, although he had shared many other political strategies with his sister for extending the territorial authority of their family,71 Æthelflæd was clearly an ‘avid patron of conversion-era royal saints’.72

The second half of the nineteenth century was a fertile period for the development of Anglo-Saxon studies with an increasing attention, as noted by Rosemary Sweet, to ‘their role in the development of the nation and the shaping of English national character’.73 Edith Gittins thus had access to a series of studies of a general nature aimed at reconstructing the principal phases of the history of Britain and specific regional areas, similar in structure to the studies which nineteenth-century historiography produced all over Europe, focusing on the sequence of events, while pursuing the objective of highlighting the historical roots of the formation of the nation. The historical representation of women played an important role in the rise of British nationhood:74 in her History of Woman in England (1843) focusing on women’s education, the writer Hannah Lawrance, drawing on several sources, provided a detailed narrative of Æthelflæd’s political achievements.75 As Rosemary Mitchell has pointed out, ‘A formal recognition of women’s presence

*Chronicle*, manuscript D (Whitelock, Douglas and Tucker (eds. and trans.), The Anglo-Saxon Chronicle, 67 fn. 3).

70Whitelock, Douglas and Tucker (eds. and trans.), The Anglo-Saxon Chronicle, 67. The chapel mentioned was to become the priory of St Oswald, where her husband was also buried; see C. Heighway, ‘Gloucester and the new minster of St Oswald’, in N.J. Higham and D.H. Hill (eds.), Edward the Elder 899–924 (London, 2001), 102–11, in particular, 103. C. Heighway also attributes the construction of the priory of St Oswald to Æthelflæd between the mid-80s and the end of the ninth century. See also J. Ni Ghrádaigh, ‘The occluded role of royal women and lost works of pre-Norman English and Irish art (tenth to twelfth centuries)’, Journal of Medieval History, 42 (2016), 51–75, at 56–71.

71The support for the political agenda aimed at maintaining internal order and, at the same time, extending the borders of the kingdom, is highlighted in the textual and narrative analysis of the Anglo-Saxon Chronicle carried out by S.T. Smith, Land and Book: Literature and Land Tenure in Anglo-Saxon England (Toronto, 2012), 161–73.


and importance, in both the national community and the nation’s historical record, was essential before new ideas on their role could evolve, or old ones be challenged.\textsuperscript{76} Writing women’s history was seen as a means to promote the debate about women’s capacity to exercise civic and political rights.\textsuperscript{77} The Anglo-Saxon past was also significant in the women’s suffrage movement. Discussing the question of women and their place in the political life of the nation in and around 1867, Jane Rendall highlighted the fact that suffragists made frequent reference to Anglo-Saxon heroines, as in the case of Mary Smith of Carlisle (1822–89), suffragist, autobiographer, schoolmistress and nonconformist who, in the mid-1860s or early 1870s, composed a poem on ‘Ethelflaed Queen of Mercia’, portrayed as the female equivalent of King Alfred, a long-standing source of inspiration for male radicals.\textsuperscript{78}

In the course of her cultural development, Edith Gittins had acquired a keen awareness of the historical roots of her city;\textsuperscript{79} by means of the fountain dedicated to Æthelflæd, she was aiming to create a shared representation of the past contributing to the construction of a collective memory.\textsuperscript{80} The Anglo-Saxon past, in particular the role played by Æthelflæd, constituted an extremely significant phase in the history of Leicester, capable of fostering the development of a local identity. In addition, Edith took part in a cultural movement that concerned not just Britain, but the whole of Europe, where every country identified in the Middle Ages certain elements that had favoured the emergence of the nation and national identity, representing a phase of development in some ways parallel to the period in which they were living. The leading exponent of this cultural movement was Sir Walter Scott (1772–1832), who interpreted the aspiration to autonomy of the English people in his famous historical novels, such as Ivanhoe. The interest in the significance and topical importance of history and, in particular, medieval history, continued throughout the nineteenth and into the twentieth century.\textsuperscript{81}

During the early twentieth century, historical pageantry was one of the most important ways in which the general public engaged with the medieval past. Before World War I, pageants focused on the Anglo-Saxon roots both of the English nation and the English Christian tradition.\textsuperscript{82} By 1909, when Edith drew up her last will and testament, Æthelflæd had featured in tableaux of pageants

\begin{thebibliography}{9}
\bibitem{Gittins} Gittins, ‘Story of the schools’.
\bibitem{Readman} Readman, ‘The place of the past in English culture c. 1890–1914’.
\end{thebibliography}
such as the Warwick Pageant (1906), which attracted 44,000 attendees. In spite of Æthelflæd’s popularity, until the 1910s no statue had been dedicated to her. Although the cult of Alfred the Great produced a large number of portraits, paintings, engravings and miniatures from the seventeenth century onwards portraying topics from Anglo-Saxon history. However, the image of Æthelflæd had rarely been represented in art and above all she had never been commemorated with a statue until 1909, when Edith Gittins made provision for one in her last will and testament. On the one hand, her bequest was in line with tradition, as it reflected the cultural movement in Victorian England aimed at celebrating the country’s Anglo-Saxon origins, while on the other hand it was innovative, because unlike other initiatives, on a mass scale, taken to celebrate the figure of Alfred the Great, the statuette planned by Edith was intended to commemorate Æthelflæd, an Anglo-Saxon woman, who – defending Anglo-Saxon freedoms and Christianity – was to become the focal point for the construction of the collective memory of Leicester, as should be clear from an examination of the site where it was intended to be placed.

Use of an urban space: a strategic site for the formation of a collective memory and identity

‘I suggest the angle formed by the junction of High Street and Silver Street as a suitable site for such a fountain.’ With these carefully chosen words, Edith Gittins outlined what she saw as the ideal setting for the monumental fountain, without however explaining the reasons why she believed it should be placed exactly on that site. Edith was well aware of the transformations taking place in the urban landscape and she understood the meaning of certain places and their ability to evoke certain feelings. There is reason to believe that the identification of that site, undoubtedly one of the busiest in the town centre, reveals her intention to contribute to reshaping in the heart of Leicester a space for collective memory and civic identity.

In the 1860s, when the signs of economic prosperity were evident, the people of Leicester decided that the time had come to improve the appearance of the city and

84 Simon Keynes has provided an insightful overview of the evolution of the cult of King Alfred the Great in its various literary and artistic expressions, underlining the need to consider the literary manifestations of this cult in relation to those relating to sculpture, painting, engravings and book illustrations: S. Keynes, 'The cult of King Alfred the Great', Anglo-Saxon England, 28 (1999), 225–356. See also J. Parker, 'England’s Darling': The Victorian Cult of Alfred the Great (Manchester, 2007), ix.
86 Illuminated portraits of Æthelflæd appear on folio 14r of British Library MS Cotton Claudius B VI (c. 1220), and on folio 2r of British Library Royal MS 14 B V (fourth quarter of the thirteenth century).
87 The Runcorn Bridge across the Mersey, linking Widnes (Lancashire) and Runcorn (Cheshire), built during the 1860s, though the exact year is unknown, was known locally as the Ethelfleda Bridge. In fact, the Ordnance Survey maps of the Victorian era refer to it as the Runcorn Bridge.
began with East Gates, where the Clock Tower was erected in 1868. \(^{89}\) It stood a short distance to the east of the junction between High Street and Silver Street, where several decades later Edith determined the site of Æthelflæd’s fountain should be. It was in this location that work began in 1902 to construct the new tram line, resulting in the demolition of a number of buildings to widen the street to make way for the tram.

The Clock Tower was partly an expedient to regulate the flow of traffic, while commemorating, by means of the presence of life-size statues, the achievements of four male characters who were considered to be benefactors of Leicester: Simon de Montfort 1208–65, William of Wigston 1467–1536, Sir Thomas White 1492–1567 and Alderman Gabriel Newton 1683–1762. The reasons for commemorating these four individuals were widely illustrated in April 1868 in the lecture given by Dr Barclay, a member of the Literary and Philosophical Society, who highlighted in particular the role played by Simon de Montfort in Leicester, arguing that the revolt he led against the king was the origin of the English parliament. \(^{90}\) Given that the Clock Tower commemorated the achievements of men, it is plausible to think that the site chosen by Gittins for the fountain was identified in an attempt to create a space that could take its inspiration from the achievements of a woman, thus creating a sense of belonging and civic identity not necessarily alternative to but above all complementary to the monument that stood 90 metres farther on.

The fountain with the statue of Æthelflæd, liberator of Leicester, that Edith wished to be installed on the site was clearly intended to stand in contrast with the existing monument. In fact, it was to be placed in a position making it clearly visible from the Clock Tower, as if it were in a kind of ’dialogue’ with the Tower (Figure 1). On the one hand, the Clock Tower with the statues of the four male characters who had left their mark on the history of Leicester between the thirteenth and the eighteenth centuries; on the other hand, a fountain with the statue of just one individual, a woman, who had left her mark at the beginning of the tenth century. This would not have had a major impact on the cityscape, along the lines of the well-known philanthropic initiatives in other cities promoted and funded by women. \(^{91}\) Edith’s plan could be seen as an example of a womancommissioning artwork aimed at embellishing and reconfiguring the existing public space, while promoting civic memory. The presence of the monumental fountain with the statue of the Anglo-Saxon sovereign would have acted as a foil to the nearby commemorative monument with its quartet of male characters, providing an opportunity to cast light on a significant period of the history of Leicester in which a woman played a leading role.

The fountain was inaugurated on 3 August 1922, 12 years after the death of Edith Gittins. It was attended by a large number of citizens, including all the members of the Leicester Kyre Society, the association that had fought alongside Mary Catherine for the erection of the fountain that was finally made available to the local people, not on the site indicated by Edith but at one of the entrances to

\(^{89}\) J. Simmons, Leicester Past and Present, vol. II: Modern Leicester (Leicester, 1974), 48.

\(^{90}\) Four Benefactors of Leicester, and their Memorials, in Leicester Journal, 17 Apr. 1868, 6; 24 Apr. 1868, 6.

Victoria Park (Figure 2).92 This entrance is a considerable distance from the junction between High Street and Silver Street, the site specified by Edith in her bequest. The official reason to justify the decision to place the statue in a secondary location concerned the traffic problems affecting the junction of High Street and Silver Street at the time.93 In any case, for over 50 years, during which World War II took place, causing damage not far from the site of the monument, the fountain continued to provide drinking water for the public in Victoria Park.

The monument was also impacted by other events: in 1978, the statuette of Æthelflæd was stolen and the fountain was transferred to Dolphin Square94 with the addition of a replica of the statue of Æthelflæd, that had originally been created by Benjamin John Fletcher (1868–1951). However, even this new position was not definitive: acts of vandalism resulted in the removal of the basin of the fountain with the statuette to the Hall of the City Rooms in Hotel Street.95 Even this was only a temporary measure since at present the only surviving part of the monument

---

92 With regard to the development of Victoria Park and the adjacent streets, see H. Boynton, The History of Victoria Park, Leicester and its Surrounding Areas (Leicester, 2000). On pp. 19–20 the author provides a brief description of Ethelflo(e)da’s Fountain and on p. 23 a sketch with the layout of Victoria Park and the most important features, including Ethelflo(e)da’s Fountain; by the same author, for an overview of the evolution of Victoria Park, see H. Boynton, ‘The history of Victoria Park’, Transactions of the Leicester Literary & Philosophical Society, 96 (2002), 22–5.

93 A description of the fountain and a detailed account of the history of the monument until it was moved to the Hall of the City Rooms in 1990 are to be found in the volume by Cavanagh, Public Sculpture of Leicestershire and Rutland, 129–30, 324–5.


95 The statuette is listed in the database of the National Recording Project of the Public Monuments & Sculptures Association (PMSA), which provides information also about the inscription on the part currently placed up against the wall of the building.
is to be found in the courtyard of the Leicester Guildhall: in front of a wall in poor condition stands a small bronze statue of the sovereign, with the sceptre in solemn pose, pacific and serene. At the centre stands a basin, bearing the inscription in capital letters ETHELFOEDA. A brass plate, placed not far from the tiny monument, clarifies the reason for the presence of the statuette:


But where did Benjamin Fletcher, the sculptor named by Edith as the artist who was to create the statue, find inspiration for his representation of Æthelflæd? Certainly not from the statue of Æthelflæd wielding a sword on the monument erected to celebrate the millennium of the foundation of Tamworth. The monument, the work of Edward George Bramwell, was installed at the foot of the castle of Tamworth (Staffordshire) in 1913: Æthelflæd is represented with an unsheathed sword defending Æthelstan, the son of her brother Edward, the relative who, succeeding his father, was to deprive Æthelflæd’s daughter of the kingdom of Mercia: G. Th. Noszlopy and F. Waterhouse, Public Sculpture of Staffordshire and the Black Country: Public Monuments and Sculpture Association National Recording Project (Liverpool, 2005), 157–8. To commemorate 1,100 years since her death in Tamworth, a new Æthelflæd statue has been erected outside Tamworth Railway Station. At the beginning of the 1960s, Æthelflæd was portrayed by W.T. Carter Shapland in the West Window of Chester Cathedral.

---

96 With regard to the biography relating to Æthelflæd, see Costambeys, Æthelflæd (d. 918).
98 The monument, the work of Edward George Bramwell, was installed at the foot of the castle of Tamworth (Staffordshire) in 1913: Æthelflæd is represented with an unsheathed sword defending Æthelstan, the son of her brother Edward, the relative who, succeeding his father, was to deprive Æthelflæd’s daughter of the kingdom of Mercia: G. Th. Noszlopy and F. Waterhouse, Public Sculpture of Staffordshire and the Black Country: Public Monuments and Sculpture Association National Recording Project (Liverpool, 2005), 157–8. To commemorate 1,100 years since her death in Tamworth, a new Æthelflæd statue has been erected outside Tamworth Railway Station. At the beginning of the 1960s, Æthelflæd was portrayed by W.T. Carter Shapland in the West Window of Chester Cathedral.
Leicester Æthelflæd was intended to convey a sense of security, peace and serenity, suitable for a safe and peaceful community which, in Edith’s vision, would be supplied with drinking water, in that strategic point in the city, where there was a constant coming and going of people, at the meeting point of the historic town and the new area of urban expansion. However, the events following her death prevented her final wishes from being fully implemented.

Edith Gittins made provision for a monumental fountain that embodied an important period in the history of the city of Leicester by means of the dedication of a statue of the Anglo-Saxon sovereign Æthelflæd. With this act of generosity, she intended to create a site commemorating the history of her city. Edith was aware that, unlike other towns and cities in the United Kingdom, the Town Hall of Leicester had not drawn up any iconographic plans to celebrate the origins of the city and the important periods of its urban history. With her own resources, as a private citizen and as a woman, she made provision to fill this gap. She wanted her fellow citizens to remember, by means of a monument placed in the town centre, an important part of their heritage: she intended to promote a sense of collective identity. However, the erection of the monumental fountain at a site other than the one she had chosen, and above all in a secondary location (Victoria Park) meant at least in part ‘betraying’ Edith’s bequest and thwarting her attempt to intervene purposefully in an urban space in order to promote an awareness of civic history including the Anglo-Saxon past and a female ruler. As pointed out by Maureen Flanagan and Maryann Valiulis, ‘Across time, space, and place the city has remained a patriarchal creation that strives to keep women in public as invisible as possible.’

The question arises as to whether, in addition to providing drinking water, the fountain surmounted by the statuette of Æthelflæd could also serve as a visual stimulus for a reflection on the role played by women in the construction of an urban narrative and collective civic identity if it had been erected in the intended location. To address this question, in addition to the research illustrated so far, it is useful to make use of 3D information technology to visualize the built environment with the maximum photorealism. It is essential for 3D visualization of cultural heritage sites to be accompanied by references that illustrate the sources of the research, the degree of reliability and the interpretation procedures. The viewer

99Æthelflæd’s fountain presents two particularly significant decorative elements: the bronze ring with zig zag pattern of the statuette pedestal, and the frieze with an interface pattern around the edge of the basin. It is important to note that both of these ornamental devices correspond to objects from the Anglo-Saxon period that were well known when the fountain was created.


101Like other members of the Kyrle Society, Edith Gittins was concerned with providing open space and communal gardens for the urban poor. On the parks movement, see H.L. Malchow, ‘Public gardens and social action in late-Victorian London’, Victorian Studies, 29 (1985), 97–124.

102With the outbreak of World War I, leading to the widespread loss of life and social tensions, the idea of reconstructing an Anglo-Saxon identity fell by the wayside; see John D. Niles, The Idea of Anglo-Saxon England 1066–1901: Remembering, Forgetting, Deciphering, and Renewing the Past (Malden, MA, 2015), vii.

must be assured of the methodological rigour applied. It is important to make transparent the process by which 3D renderings are conceived and produced in relation to the reconstruction of cultural heritage for educational purposes.104

Note on the methodology of the historical reconstruction

The three-dimensional historical reconstruction of the centre of Leicester is intended to generate a 3D street scene reproducing the life of Leicester at the beginning of the twentieth century, based on historical sources such as period photographs and historical maps. The 3D rendering focuses on a specific part of the city: from the crossroads between East Gates, Church Gate, Humberstone Gate, Haymarket and Gallowtree Gate towards High Street as far as the fork with Silver Street. This part of the city underwent major changes in the early decades of the twentieth century, particularly with the advent of the electric tram. For the 3D reconstruction of the area, 27 buildings were selected (Figure 3). Of these, seven buildings have been demolished and reconstructed over the past 50 years, while the remaining 20 preserve their original structure.

The methodology to obtain the 3D scene of Leicester in the early twentieth century consists of many different phases combining several techniques: the 3D modelling of each building, then the creation and application of texture and materials to characterize the different parts of each building, the introduction of fine detail to achieve greater realism and the composition of the streetscape. Various software applications were used for each step: from 3D modelling software to 3D texturing and real-time rendering applications.

3D historical modelling adopts methods and techniques taken from the digital entertainment business. The software applications used for digital historical reconstruction are the same as those used for the movies and videogame industry, even if a historical reconstruction needs to apply the principles of the historical method. It must, therefore, rely on documents and historical sources. What is shown in a rendered image, movie clip or digital application of a historical reconstruction should be the outcome of historical research, based on reliable sources. For the present study, a range of historical resources were considered: historical Ordnance Survey maps for geo-historical information, period photographs for visual information about the buildings and Kelly’s Directory of Leicestershire & Rutland to retrieve information about trade and commerce. The topographical basis for the 3D reconstruction of Leicester consists of historical Ordnance Survey maps. Three different points in time were chosen and compared to understand the urban changes occurring at the end of the nineteenth and the beginning of the twentieth centuries in the area under investigation: 1885, 1902, 1913 (Figure 4). By examining these three years, it is possible to cast light on the changes resulting from the advent of the electric tram. In 1885, there were still no tram lines on the East Gates–High Street axis and some buildings that were later demolished are still recognizable, such as the

ones on the corner of New Bond Street and East Gates. The first section of Silver Street changed progressively from 1885 to 1916, probably to facilitate the transit of the trams. Historical Ordnance Survey maps were also used to determine the exact position of each of the 27 buildings selected for the 3D reconstruction. The maps were imported into a Geographical Information System (GIS) and georeferenced over the present-day cartography to make them comparable and measurable. The next step involved the research of historical images about the area of interest dating back to the beginning of the nineteenth century. A large number of images were collected (approximately 130) from city archives, digital archives and websites including the storyofleicester.info. Some of the images came from unexpected repositories such as social media groups: Pinterest collections or Facebook pages such as ‘Leicester Past and Present – a walk down memory lane’ and ‘Born and raised in Leicester’, where members of these groups (mostly Leicester citizens) upload and share personal or family photographs. Each building was also identified by its main commercial activity for the decade between the 1910s and 1920s, either recognizable in the historical photographs or listed in Kelly’s Trade Directories. Most of the images from the internet do not specify the exact date of creation, so a ‘relative dating’ is set for most of them, considering the details recognizable in the picture pointing towards a specific historical period. Once each building is clearly identified over the georeferenced map of the area and

---

A Geographical Information System is an application that is used to process geographical data. It can visualize data such as raster and vector images, store data and information and perform analysis. Since it was mainly developed for geographical applications, every item of data in a GIS is georeferenced, meaning that every image pixel, point, line or polygon drawn in a GIS has specific spatial co-ordinates and can therefore be measured.

Figure 4. Leicester Ordnance Survey maps for the years 1885, 1902, 1913
Figure 5. Period photographs used as references for the 3D reconstruction of buildings
represented by an appropriate number of historical images, then it is possible to start with the 3D modelling phase. This phase is carried out with Blender, an open-source 3D modelling software. Although Blender can handle the entire computer graphic pipeline, from 3D modelling to materials and texture definition to the rendering of the final images, it was decided to use it just for the 3D modelling, leaving texturing and rendering to other specific software: Allegorithmic’s Substance Painter for 3D painting of fine details and Act 3D’s Lumion for the 3D scene composition and rendering. The georeferenced image was imported into Blender and used as a basis to outline the floorplan for each building. Then the approximate height of the 20 buildings still in place was determined using the 3D measuring tool provided by the professional version of Google Earth. The height of the seven buildings that today are totally changed was calculated by comparison with the buildings previously standing on the same sites. The next step required the classification and analysis of the historical photographs collected, working backwards from the present day to the late nineteenth century. The classification of all the images relating to the period 1910–20 depended on the presence or absence of elements in each photograph in relation to a specific period: modern cars, horse-drawn trams, clothing, fashion and so on. Moreover, a comparison of images depicting the same building in different periods was performed, so as to understand the changes and to identify the architectural peculiarity of all the buildings in the decade of interest to us. The 3D modelling process can be summarized in three progressive steps:

1. a rough definition of building volumes and heights;
2. creation of the main architectural elements;
3. definition of architectural details and fine elements, most of them specific to each different building.

Each building previously outlined was then extruded in Blender to obtain a rough three-dimensional volume. After determining the volume for all the 27 main buildings in the scene, it was possible to refine each model by setting different floor heights (ground floor, first floor, second floor, attic, rooftop), creating doors, windows and shop windows, and introducing shop and store signs (Figure 6).

Along with the 3D models created in Blender 3D, models from online repositories were used in the 3D scene for the most common elements such as fluted columns and capitals, street furniture and trams. The 3D models downloaded from online repositories were edited in Blender and then added to the 3D scene. Some of the buildings were easier to define three dimensionally because of the number of well-defined images, such as the former Coffee House building on the corner of Church Gate and East Gates, or the former Hoggett & Sons tailors building in Silver Street. Some of them are still in place today, although greatly changed. In these cases, it is also possible to make a comparison with today’s photographs of architectural elements such as window frames or mouldings. Other parts of the area

have undergone complete rebuilding in recent decades. For these parts, the 3D reconstruction was both challenging and useful, since the 3D visualization became an extremely important resource to recreate a period in the past leaving few visible traces or none at all. For example, the area behind the Clock Tower, between Haymarket and Humberstone Gate, is today occupied by a large shopping centre, while it is clear from the historical images and the nineteenth-century Ordnance Survey maps that it was occupied by no less than six different buildings. It is possible to reconstruct these buildings and their commercial activities by linking together the different historical references available. Kelly’s Directory of Leicestershire & Rutland, an annual list for business and tradespeople, represents one of the most useful resources for details about trades and commerce carried out in these buildings. Three different editions were considered, 1895, 1908 and 1916, enabling us to reconstruct the changes in the shops and businesses. From the details to be found in the historical images and the information from Kelly’s Trade Directories, it was also possible to understand how commercial activities changed over the years. One example is the building on the corner of East Gates and Gallowtree Gate. In an older picture (Figure 7) in spite of the blurry lettering it is possible to read the sign ‘The Grand Clothing Hall. Tailoring for All Classes’ identifying the business as a tailor’s shop. In later images, it is clearly visible that the sign had been changed to ‘Dean & Dawson Tours & Excursion’, a popular travel agency. Kelly’s Trade Directories confirm this, listing for the building at no. 1 East Gates in 1895 the Grand Clothing Hall, and for 1908 and 1916 the Great Central Railway Company Passengers’ Town Office, Dean & Dawson Limited, agents. Moreover, the Grand Clothing Hall moved between 1895 and 1908 to a new and perhaps more convenient location in High Street on the corner of New Bond Street, as shown in many historical photographs and in Kelly’s Trade Directories. The Grand Clothing Hall building in this new location is still visible.

Figure 6. East Gates Coffee House: 3D modelling process from period photographs to virtual model

today, albeit slightly modified in shape. The final result of the 3D modelling phase is a scene with all 27 buildings modelled in detail, based on the information from the available historical sources.

The 3D scene of Leicester in the early twentieth century (Figures 8–10) consists mainly of the virtual models of the buildings, but it also includes other phases such as the creation of materials for many different surfaces (such as brick walls, wooden window frames, transparent and frosted glass for the windows, roofing tiles and so on) then incorporated into a virtual environment with natural light, artificial lighting and shadows. Moreover, a realistic virtual space needs to be populated with many other details: generic items such as street furniture, trees or plants, vehicles, people and animals. Each 3D building, item of street furniture or vehicle is then imported into the final rendering software: Lumion, which is a 3D real-time architectural visualization software designed to generate a realistic 3D scene with particular attention to light, materials and visual effects. Once the 3D scene is set up, it is possible to extract still images, movie clips or 360 degree panoramas. The 3D models are then placed in the Lumion 3D scene to recreate the urban cityscape. To preserve the individual position of each building, the Ordnance Survey
map is also imported into Lumion to check the accuracy of the building locations. One of the most useful features of Lumion is the material library that allows users to choose between many different pre-configured and realistic materials divided into different categories (internal and external materials, natural features and so on). All the materials are provided with different parameters that can be tweaked to customize the final result. Materials from the internal material library of Lumion are assigned to the different parts of each model, adjusting parameters such as basic colours, saturation, reflectivity and roughness. One of the most important features of the materials in Lumion is the ageing effect: Lumion is able to simulate dirt and

Figure 8. The 3D scene of Edwardian Leicester: rendered image

Figure 9. The 3D scene of Edwardian Leicester: rendered image
weathering effects for any material, especially along the edges, to achieve a much more realistic final effect. Lumion represents a fast and practical solution to apply materials to 3D surfaces but it is not able to paint in 3D, so an intermediate step is necessary to customize all the elements related to store signs, commercials and any more specific written features. For this purpose, a combination of Adobe Photoshop and Substance Painter is used, a software from Allegorithmic that is specially designed for 3D painting. Adobe Photoshop is mainly used to create image textures with shop and store signs and written commercials that are visible in the historical photographs. Photoshop files can then be imported into Substance Painter and used as brushes or decals to paint details such as store signs and inscriptions directly onto the 3D surface. After this step has been completed, textures edited in Substance Painter are imported into Lumion and assigned by means of the Lumion materials editor to specific customized materials. It is also necessary to add a second group of buildings to create a background for the part of the scene beyond the twenty-seven principal buildings that compose the core of the 3D reconstruction but that would still be visible in the angle of vision of a camera. This second group consists of generic buildings from the beginning of the twentieth century without any specific historical research behind them. Then the 3D scene is populated with street furniture such as lamp posts and pillar boxes, with a specific focus on electric trams that were introduced in the area in 1904 giving rise to significant changes in East Gates and High Street. For most of these objects, we used 3D models from web repositories, like Google 3D warehouse, which were further edited in Substance Painter. This methodology was used for example for the pillar boxes 3D model, which are 3D painted with the Royal Cypher of Queen Victoria and King Edward VII, and also to add details to the Æthelflæd fountain. The presence of people in a 3D environment is one of the most effective elements to obtain a more realistic and living environment. For this reason, we decided to populate the

Figure 10. The 3D scene of Edwardian Leicester: rendered image
3D urban landscape with human figures, to enhance the perception of a living scene. For the 3D reconstruction of Leicester, historical images of human figures that were geographically and chronologically close to our case-study were used, some of them taken from historical photographs of Leicester. These pictures were subsequently recoloured by means of Adobe Photoshop or websites like Colourise.sg and Algorithmia.com, which provide a free online service of automatic recolouring of period photographs based on specific algorithms. Different human figures (60 in total) populate the 3D scene of Leicester aiming for as much variation in sex, age, social class and physical appearance as possible. The same procedure was used to recreate some of the shop windows: starting from the descriptions in Kelly’s Trade Directories, historical images of shop windows were identified that could be in keeping with the early decades of the twentieth century in the United Kingdom. The images chosen were recoloured, edited in Adobe Photoshop and then imported into the 3D scene.

In addition to the East Gates–High Street axis, another 3D scene was set up and rendered in Lumion: Victoria Park, the side towards Granville Road, where the Æthelflæd fountain was originally placed in 1922 (Figure 11). The scene was populated with the 3D model of the drinking fountain with the statue of Æthelflæd, the same model as the High Street 3D scene except for the rounded plinth, replaced in the Victoria Park scene with a square one, as shown in some historical images. To complete the scene, a 3D model of the Pavilion that used to stand in Victoria Park was included, along with a 3D model of the De Montfort Hall as it appeared in the 1920s and the houses on the edge of Granville Road. Like the East Gates–High Street 3D scene, a historical Ordnance Survey map provided the geographical reference. The Victoria Park 3D scene was also integrated with vegetation: lawns with 3D grass, hedges and elm trees were positioned in the scene following the historical Ordnance Survey map location.

Figure 11. Computer-based visualization of Victoria Park in 1922 with Æthelflæd’s fountain and Pavilion.
Once the 3D scene was set up and completed, it was possible to render the final outputs. One of the main advantages of digital technologies is the possibility to deliver different outputs starting from the same product. A single 3D reconstruction can be accessed by various users in different ways, from a more passive to a more immersive experience. The 3D reconstruction is then realized by different means, with a view to reaching different categories of audiences: not only a more traditional segment, who are less familiar with the new interactive technologies and prefer to watch an image or a movie clip rather than wear a virtual reality headset, but also a more active generation of users, accustomed to interactive devices such as Oculus Rift or Samsung Gear VR. There are three main final outputs of the 3D reconstruction: still images, that can be printed or uploaded to a website; short movie clips, to accompany a tourist on a guided tour of Edwardian Leicester; and a semi-immersive experience through the creation of a Virtual Tour. A Virtual Tour is a 360 degree panorama in which a user can move around between different points of view. Virtual Tours can also allow a user to interact with the 3D objects – the buildings in this case – clicking on hotspots with hyperlinks to information and data about the history of that specific object. Virtual Tours are uploaded onto the internet and can be accessed through multiple devices: remotely on desktop pcs and laptops or directly on-site by means of mobile devices such as smartphones or tablets. As web-based applications, they can be activated in many ways, for example using simple QR Codes. Virtual Tours applications are also connected with the gyroscope in mobile devices and automatically turn the point of view of the 3D scene each time a user turns the device. This feature allows a direct and much more effective comparison between the present-day view and the digital historical reconstruction. A step further could be a total immersive application, in a videogame style, in which a user can freely explore the virtual environment, with or without a virtual reality headset, and interact with objects and people. The work done so far on the historical 3D reconstruction on this part of Leicester can be developed and extended to other periods or part of the city. The methodology used to reconstruct a 3D scene from historical sources could also be extended and applied to other case-studies in the future.