

Life and cult of Cnut the Holy

The first royal saint of Denmark

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Researching relics: new interdisciplinary approaches to the study of historic and religious objects

By Georges Kazan and Tom Higham

What is a relic? While the concept is largely subjective, it is primarily associated in Western thought with religious relics, mainly comprised of sacralised human remains. Meanwhile, the word ‘relic’ has also become synonymous with the remains of past cultures, especially with those of a material nature. In this article the authors will discuss the nature of relics and research in this field, including the methods and analyses employed, identifying areas for development and exploring the current outlook for future research.

In 1978, Patrick Geary could write that “relics themselves, physical remains of saints, are essentially passive and neutral, and hence not of primary importance to historians” (Geary 1978: 3). Developments in the fields of both archaeological theory and archaeological science have made it clear that the above statement is no longer correct, not only for relics but with regards to material remains in general. Having previously been largely inspired by those of the natural sciences (Johnsen and Olsen 1992: 419, 432), the logic and objectives of archaeology are increasingly drawing on philosophies of mind. As such, material objects, including relics, are considered to possess an active agency of their own, inviting responses from the audiences that encounter them (Johnson 2019: 141). Meanwhile, the value of material objects from the past as documents of factual, historical data is becoming increasingly clear as a result of accelerating advances in methods of scientific analysis.¹ Accessing this data presents not only new answers but also new questions, and demands a structured interdisciplinary approach. Geary and a small number of historians have not only taken heed of these advances, but have also entered into collaborations with geneticists and other scientific researchers (Veeramah *et al.* 2011), urging colleagues to engage with such new technologies in their study of the human past (Nature Editorial, May 2016: 437–438). While historians and

archaeologists are increasingly incorporating scientific analyses into the study of objects, this article proposes that given their importance in evaluating objects, attention should be given to the scientific study of audiences also. Advances in areas such as cognitive neuroscience, for example, are shedding new light on the processes used by the human brain to perceive and conceive people and things (Raichle 2015; Binder & Desai 2011; Kosslyn *et al.* 2006).

Relics: objects at the nexus of the material and the immaterial

Since 2010, the authors have been exploring Christian relics and the remains of medieval royalty using a range of scientific analyses, within the context of the historical and material evidence. Religious relics provide extremely interesting evidence: they can be approached either as material religion, as cultural heritage, (in certain cases) as human remains, or, more generally, as material objects. As such, the study of relics presents an important opportunity for scholars in a range of disciplines, but also challenges current concepts, theory and practices. As research in the field of relics becomes increasingly common, careful consideration and consensus is required in a number of areas. A fundamental question concerns the definition of a relic: does the subject solely concern religious material, or can it extend to other objects?

Relics as material objects from the past

Relics play a vital role in our perception of the past and of the present. The English word ‘relics’ stems from the Latin ‘reliquiae’, which in the Latin literature of late antique and medieval European Christianity is predominantly connected with religious relics, a translation of the Ancient Greek word ‘λείψανα’. Both words literally mean ‘things left behind’ (i.e.

remains) and are also used in late antique and medieval sources to refer to Christian relics.

In the Western tradition, anything that survives from the past, be it a museum object or a personal keepsake, can thus in theory be considered a ‘relic’. The word has indeed been commonly applied to material remains of the past, especially among English-language scholars, for whom the word’s religious sense has been loosened since the Reformation (Lutz 2015: 21). Archaeology itself has thus been described as “the subject par excellence which is concerned with relics or remains” (Giddens 1987: 357), a view echoed by the archaeologist and philosopher of history R.G. Collingwood, who conceived relics as “artifacts serving human purposes” (Collingwood 1947: 212) and sets them alongside documents as the prime evidence for historical thought (Collingwood 1946: 282). In this sense, the understanding of relics is fundamental to the philosophy of archaeology.

Until the 1970s, archaeologists commonly considered material objects, monuments and landscapes within a logical-empiricist framework aspiring to that of the natural sciences. Since then, they have increasingly adopted philosophical approaches already in use by sociologists, historians and anthropologists to question and largely reject positivistic conceptions of causality within their fields (Johnsen and Olsen 1992: 432). One result has been a recognition of the intersection between the objectives and aims of archaeology and those of hermeneutics, with regard to the limits of presence in the interpretation of meaning (Giddens 1987: 357). The influence of hermeneutics can be seen in post processual archaeology, which, rather than seeing objects as a product or fossil of a past society, considers objects as mediators of social relationships and activities, as well as of the evolution of identities. Since the 1990s, the cluster of theoretical ideas evolved from postprocessual archaeology known as the Material Turn has attributed to objects an active agency, in the manner of human beings (Johnson 2019: 134-145). Objects, places and monuments, like individuals, have thus been described as having biographies of changing character (cf. MacGregor 2010). The biographies of such objects, moving through changing environments, have been termed itineraries in more recent scholarship (Joyce & Gillespie 2015). The Material Turn has led to a number of theoretical positions such as Symmetrical Archaeology (Olsen & Whitmore 2015) and the New Materialism (Dolphijn & Van der Tuin 2012), which continue to evolve. As tangible representations of intangible subjects, relics now provide

valuable opportunities to explore conceptions of the material and the immaterial, a field of increasing relevance in today’s digital age (Buchli 2016).

Relics and cultural heritage: from memory to consciousness

Since the rise of the Christian cult of relics in the fourth century, it has been acknowledged that “a relic has no intrinsic meaning or existence. If detached from its worshipping community, it is void of power or significance” (Frank 2000: 176).² Within the context of the Christian tradition, defining a relic is therefore an aesthetic process, in which the audience is as important as the object. Outside the context of Christianity, this complex and audience-specific process of encountering and defining is also found in the conception of ‘heritage’ (Johnson 2019: 253-254). Heritage objects have been described as “a material structure for the “accumulation of affect”” that produces and sustains the memory and identity of a person or culture (Ireland & Lydon 2016: 1, 6). This definition can also be applied to religious and “secular relics” (Lutz 2015: 4). These have been described as objects such as keepsakes and mementoes, which materialise a memory or experience that has changed or defined the identity of their audience. Relics also have the particular characteristic of materialising memories of persons, objects or events (Lutz 2015: 5, 56). Since these aspects can also be found in some but not all forms of heritage, one might therefore describe relics as a particular category of heritage. As such, it can also be argued that an object can be defined and cherished as a relic by a group or by a single individual (Lutz 2015: 4).

The interaction between objects and their audience is key to what can, or can no longer, be considered a memory (Davie 2000: 156). Like objects, audiences change and evolve over time (with the added aspect of variations in their emotional states). This concept of memory has been explored by Davie with reference to religious memory. Distinctions can be drawn between degrees of engagement, ranging from fully active (direct engagement) to indirect engagement and non-engagement (an audience for whom something is not, or is no longer a memory). Within this range, Davie describes different categories, such as vicarious memory (where a smaller group preserves it for a larger community, precarious memory (where the guardians of memory are at risk), mediated memory (in which the medium can become the message), symbolic memory (where the memory is formally acknowledged but not actively participated

in), alternative memory (e.g. between different parts of a community), conflicting memory (e.g. between rival communities in a region), extinguished, ruptured and/or rediscovered, and mutating memories (e.g. the ongoing evolution of a memory) (Davie 2000: 36-37, 177-192). These concepts provide a useful means of understanding the changing identities of relics among different, changing audiences.

In contrast to memory, which can vary and change over time, objects can permit the past to maintain a physical foothold in the present. In so doing, they may be perceived as ‘materialising’ memory for certain audiences, by stimulating perceptions of a common history and shared identity, assisting in the development of consensus positions (cf. Bockmuehl 2012: 27; Freeman 2011, p. xiv). Furthermore, as well as serving as mnemonics, evoking specific memories, objects can also be said to elicit a spatiality of memory, acting as anchors for a landscape of further, associated memories.³ At the same time, objects can also “trigger an interest in ‘unarchived’ histories and give glimpses of alternative narratives beyond the familiar ones” (Rigney 2015: 14). Finally, while the biographies and itineraries of objects from the past can mark or change their appearance, in many cases their seemingly unchanging nature can highlight to the beholder the changes that have taken place within their own environment.⁴

It appears, then, that the identification of an object as a religious or secular relic, as material heritage, or as something else, takes place during encounters - where the itineraries of an audience and object intersect - and depends on the conditions of each. As we shall observe later, one such condition is an audience’s ability to interpret the relic as an image that is removed from a perceived original, by learning a semantic association and being able to recall it (Sadowski 2009: 105). Such objects can therefore represent physical and metaphysical aspects of a culture, both its body and its soul, and as such, one might argue, are inherently religious objects (Tillich 1959: 42).

Relics as material religion

In addition to their perceived identity as material heritage or ordinary objects, relics can also function as expressions of material religion (cf. Hutchings & McKenzie 2017: 5). This aspect, along with their specific role as a medium for the perception of the past, mentioned above, and the fact that they regularly comprise human remains, seems to distinguish them from most other forms of heritage. The term

‘relic’ is commonly applied to the sanctified physical remains of persons and objects revered in Christianity and Buddhism, although the worship or veneration of relics can be found in a number of other religions (Murray 2015). To the faithful, religious relics represent a point of convergence between Heaven and Earth; a medium for contact with the Divine (Gregory the Great, Dialogues I.10, IV.5-6; George 2013: 28; Freeman 2011: 14). In the Buddhist tradition, relics have for centuries been a focus of worship (Stargardt & Willis 2018), although the theological basis for this has been debated (Werner 2013). In Roman Catholic Christianity, relics are venerated (not worshipped) as objects that are perceived to carry the *virtus* (or contagious holy power) of Christ or of a saint, and are traditionally distinguished as ‘first-class’ or ‘primary’ (bodily remains); ‘secondary’ (objects used or touched by a holy person); and ‘tertiary’ (objects that have been in physical contact with one of the former) (Hahn 2012: 8-9). In the case of ‘primary’ relics, a further distinction is made by Canon Law between significant (*insignes*) relics, non-significant (*non insignes*) (Vacant, Mangenot & Amann 2005: “relique”, cf. Angelo Card. Amato 2017; Immonen & Taavitsainen 2014: 152). Significant relics are said to consist of a saint’s entire body or a major portion of this, such as the head, forearm, heart, tongue, hand or leg, or the part of the body by which the saint was martyred if this is complete and not small. Orthodox Christians do not apply such hierarchies in their veneration of relics (Carroll 2017: 120). Like Roman Catholics, however, they believe that the grace of God’s Holy Spirit remains active in the relics of saints after death, and “that God uses these relics as a channel of divine power and an instrument of healing” (Ware 1993: 234).

A religious relic can therefore be perceived as an extension of the personality or consciousness of a deceased or otherwise absent being. It may be useful to note that in Buddhism, relics comprising of humans remains are known as *dhātu*, a word that refers to a person’s essence (Strong 2004: xvi; Chidester 2018: 81). The ‘co-presence’ of individuals within relics, it has been argued, enables such objects to be considered instead as subjects (Carroll 2017: 131). However, even within Christian material religion, this phenomenon is not restricted to relics, but can be extended to other objects that are ascribed a dual nature, namely the Eucharist and religious icons (Frank 2000: 174), as well as to religious texts, as material vessels for a greater, spiritual whole (Schadee 2016, 684).

The role of religious relics in the process of pre-sencing of an absent sacred, through what has been described as “the Eye of Faith” (Frank 2000: 133), has been attested in Christian literature since the rise of the cult of relics in the fourth century.⁵ This aesthetic experience, through which events or persons from a sacred past are perceived as a present reality, takes place through the sensorium: a spiritual journey which been termed a “haptic visual connection” (Buchli 2016: 49, cf. Marks 2002: 2), or as a tactile visibility (Frank 103-104), by which the meanings and values assigned to a sight by a culture are triggered through sight and grounded in a sense of touch, which is located as the source of vision’s power and authenticity (Frank 2000: 133).⁶ This has been likened to the practice of *enargeia* in classical oratory, by which a speaker made their description of a person or event as detailed as possible, inviting the audience to engage their emotions and imagination to create missing details and give them a sense of participating in the past directly (Frank 2000: 18-19). The ability to provoke certain audiences to engage emotion, as well as memory, has also been described as a further property of heritage materials (Ireland & Lydon 2016: 3-5), and incidentally recalls Hegel’s description of religion or “genuine religious action” as the “binding together of feeling’s emotion and memory’s reflection in thought” (Hegel 1986: 370).

This process can be ascribed to both religious and secular relics, which can be effectively sacralised by successfully evoking an absent prototype for which an audience has a sufficient emotional attachment (Lutz 2015: 108; cf. Davie 2000: 96). This would extend the concept of material religion beyond its traditional sense towards a broader, more personalised form, and depend upon relics acting as triggers for an audience’s semantic memory (connecting an object with an absent original), with emotion, memory and imagination combining to produce a vivid, virtual encounter. Such a connection, or the awareness that it can be made, would thus invest an image or medium with a special, immaterial value, leading to its identification as a relic.

This living, sensory experiencing of relics by their audiences, which transcends traditional boundaries such as that of subject-object, evokes the aesthetic approach applied in the consideration of artworks (Babich 2002: 272). In the manner of works of art, relics serve as intermediaries between the audience and prototype represented, a sacred portrait that the viewer looks through rather than at (Barber 2002: 29). This can be seen in the Byzantine concept of sacred

images, which is clearly expressed in the sixth-century *Life of St Symeon the Younger*, who exclaims to a devotee “when you look at the imprint of our image, it is us that you will see” (Van den Ven 1962: 205–206 [231]). As representative objects worthy of veneration, relics would therefore also share the properties of icons as sacred images (cf. Chidester 2018: 82-83).

Relics and authenticity

As expressions of an independent prototype, relics, like images, constitute both original and copy (cf. Buchli 2016: 57). Whereas images alone represent their subjects visually, relics can do so materially, often through synecdoche, through which the essence of the whole can be physically encountered in its smallest part, or metonymy, by which one thing evokes another thing to which it is perceived as being closely connected. The process of perceiving an object from its parts also recalls the hermeneutic method of interpretation.⁷

This conception of relics in terms of art leads to the consideration of aesthetics and authenticity. In the case of relics, as with artworks and heritage objects, ‘authenticity’ is often a problematic question, critical to the aesthetic assessment of their value. The question of authenticity in the case of art, cultural heritage and even commodities has been widely discussed, with constructivist approaches prevailing (Hicks & Beaudry 2010). In the absence of an independent reality, modern scholars would therefore conceive authenticity as a highly contextual, time-bound social construct, with authenticities, or degrees of authenticities, being determined on a daily basis by changing and diverse audiences, which means that “even the explicitly inauthentic can be reconceptualised into something authentic” (Geurds 2013: 2-4).

One result of scholarly discussion in this area has been the distinction between “nominal authenticity”, authenticated by empirical facts, and “expressive authenticity”, described as any original, personal expression of an artist (Dutton 2003: 259; Kivy 1995: 123). Dutton describes the important role of the audience in determining what he calls ‘expressive authenticity’, in contrast to a ‘nominal authenticity’, an approach appears more logical (relying on reason), than aesthetic (relying on the senses), with ‘truth’ established with reference to authority, expertise, accuracy. He also problematizes the loss of the living critical tradition that is supplied to an art form by an audience indigenous to its creational context. “Establishing nominal authenticity [...] enables

us to understand the practice and history of art as an intelligible history of the expression of values, beliefs, and ideas, both for artists and their audiences — and herein lies its link to expressive authenticity” (Dutton 2003: 270). In the understanding of art, heritage, or relics, then, it would seem that an understanding of the earliest examples and their audiences provides an important starting point.

One might therefore propose that the definition of a relic is based on notions of audience participation and authenticity, elements which regularly figure in discussions of art and cultural heritage. An example of this can be noted in the behaviour of different audiences towards objects in religious buildings and museums: each can elicit behaviour associated with the other, depending on the audience and the objects displayed.⁸ The discussion of the authenticity of relics within the context of art and aesthetics leads to questions of value. One measure of value might be a relic’s perceived authenticity and the strength of an audience’s emotional response to the object that the relic represents. As such, the value would be relative to the audience, be it a single individual or an entire population. Alternatively, if one perceives value as the sum total of emotion that a relic triggers, then this would depend upon the size of the audience. In such cases, one might speculate that the awareness that others are taking part in the same experience might further validate the authenticity of a relic for each individual, elevating the emotional energy (Riis & Woodhead 2010: 153). Riis and Woodhead therefore propose that “the capacity of symbolic objects to evoke powerful emotions seems to increase with the size of the group for which the symbol is moving. The most powerful of all are those that symbolise and help constitute an entire society; they can be animate (an animal, a charismatic leader), inanimate (a national flag, a crucifix) or intermediate (a relic of a saint, a memorialized leader)” (Riis & Woodhead 2010: 38, with reference to Durkheim 1912/2001 and Collins 2005). In the case of relics, this raises the question of global cultures: with 2.2 billion Christians in the world out of a total population of 7.5 billion, it can be argued that religious relics have a wide audience at varying degrees of engagement, and are thus the most widely understood and valued examples of relics.

Relics – a social medium?

Like art, places and material cultural heritage, relics are pliable, evoking ideas, emotions and memories, inviting the formation of images and identities, and

acting as nodes in evolving networks between people and places (cf. Geurds 2013: 2). Whereas the images created by individuals in their encounters with a relic may vary, relics act as media to connect members of culture or group connected by shared or similar values and memories, not only with a remote ‘original’ but also with each other, through the shared experience of participating in the same process. This seeming resolution of differing individual realities into a perceived common sense of reality and meaning can be conceived as a religious experience, given Tillich’s conception of religion as engagement with an ultimate reality that exists independently of observation by an audience (Tillich 1959: 59-61).

The role of relics as a medium for communication is being increasingly recognised by scholars (Sadowski 2009: 34-35, 96; George 2013; Leone 2014). Sadowski, for example, uses relics as examples in his application of Peircian semiotics to media in communications theory. He distinguishes between direct and indirect forms of communication as follows:

Direct Communication	Indirect Communication
contiguous (in the same spatio-temporal context)	indexical (original perceived through its secondary marks or traces)
spatially contiguous (in the same spatial context)	iconic (image created by the audience to evoke a real or imagined original)
simultaneous (in the same temporal context)	symbolic (through signs (e.g. a name) with no direct equivalency but able to trigger an image of original)

As with direct forms of communication, distinctions are drawn within these indirect forms of communication between contiguous, spatially-contiguous and simultaneous forms, with the added classification of displaced forms (neither spatially nor temporally contiguous). Furthermore, Sadowski distinguishes metonymic cues (fur, hair, teeth) from indices, since these are not secondary traces created unintentionally. Within forensic evidence, he distinguishes material such as photographs and fingerprints (indexical) from blood and DNA (metonymic cues). He adds that religious relics, such as saint’s bones, being originally a part of the saints’ bodies should probably be classified “as contiguous metonymic signs (not as cues or signals), because they are not invested with symbolic, that is, metainformational meaning. The most famous displaced indexical sign of Christiani-

ty, he proposes, is probably the Turin Shroud, a piece of cloth allegedly containing an imprint of Christ's body taken from the cross. He remarks that "the excitement would probably be much greater if for example something like Christ's bone or lock of hair were ever to be found. The difference in emotive response would be due to the fact that a contiguous metonymic sign (a bone) would be an integral physical part of, and therefore closer to the "real thing"." (Sadowski 2009: 96).⁹ With regard to relics as media, this would suggest the existence of a hierarchy of closeness to the original, with physical remains ranking among the highest forms, a phenomenon that one can indeed observe in the classification of relics within Roman Catholic Christianity (as mentioned above).

Conceptualising the function of religious relics outside the context of Christianity in this way lends support to the concept of secular relics. Sadowski therefore remarks that "spatially contiguous connection with objects removed in time is also the basis of such widespread cultural phenomena as the cult of relics, fetishism, or sympathetic magic, in which an object is invested with special emotional significance deriving from its earlier physical contact with another object or person: a saint's bone, a lover's lock of hair, water from a holy well, a phial supposedly containing the blood of Christ, an alleged splinter from the Cross, Elvis Presley's handkerchief, Marilyn Monroe's dress, Eric Clapton's guitar and so on. Spatially contiguous communication underlies human fascination and almost "magical" obsession, found today in collectors of memorabilia for example, with material objects that have been either a part of or in physical contact with culturally significant persons or objects. Consequently, this type of indirect interaction illustrates what can be called displaced indexical communication." (Sadowski 2009: 34).

Another scholar, Leone, has also applied Peircean semiotics to the subject of relics, although he prefers to class relics simply within the category of "indexes", and similarly identifies their presence within "nonreligious" contexts, giving the example of Elvis Presley's guitars (Leone 2014: S54-S55). He concentrates on the wrapping of relics (e.g. by reliquaries), by which they are defined (Leone 2014: S70-S72), and attempts to provide a typology of reliquaries, both in religious and secular contexts (e.g. the use of pristine packaging of an iPhone for sale on eBay). Leone uses his discussion of the wrapping of relics to reach a valuable conclusion: "The icons wrap the index, and together they wrap the intangible object of transcendence" (Leone 2014: S78).

One might therefore argue that in cases where an object performs this role extremely effectively, nominal authenticity becomes less critical, and a relic's ability to express, incarnate or "wrap" the values, beliefs or memories of an audience provides them with a powerful expressive authenticity, which, as we shall note later, has the potential to outweigh nominal authenticity.

Object and audience: a scientific approach

Relics therefore possess intriguingly liminal qualities, straddling conceptual boundaries (e.g. between the past and the present), or bridging realms between which tensions can exist (e.g. history and memory, or the temporal and the eternal in Christian cosmology).¹⁰ As a subject that transcends disciplinary as well as conceptual boundaries, and engages with different conceptions of reality, the study of relics offers a valuable opportunity for interdisciplinary research. The critical, participatory role of audience in defining an object's meaning highlights the need to open up research agendas to establish interdisciplinary connections. As Geurds points out (with reference to ethnographic museum objects), this is required within academia specifically and more widely at local and global levels, "in order to compare ways in which different disciplinary discourses have invited their audiences to consider authenticity and inauthenticity, and to see the tenuousness of such bipolar hierarchy" (Geurds 2013: 5). As such, the results of scientific analyses offer a range of new opportunities not only to better understand the history and nature of relics, but also to explore theoretical discourse in this field.

To date, we have concentrated on the application of scientific analyses to relics as objects. However, by acknowledging that the audience plays a critical part of a relic's identity, we propose that the scientific study of the mind of the audience, for example using experimental psychology and cognitive neuroscience (including the use of functional magnetic resonance imaging (fMRI) of brain activity), offers new approaches to the use of relics in mediated memory (cf. Van Dijck 2007: 27-52). An initial survey of work in this field has suggested that such studies may support the above reasoning with regard to the nature and meaning of relics. For example, recent work on semantic memory describes the recall of memories, including emotion, not only for purposes

such as the recognition of objects, but also to imagine and develop conceptual knowledge in an abstract, symbolic form. “All of human culture, including science, literature, social institutions, religion, and art, is constructed from conceptual knowledge. We do not reason, plan the future or remember the past without conceptual content – all of these activities depend on activation of concepts stored in semantic memory.” (Binder & Desai 2011). Objects, emotions and memories would therefore play an important role in conceiving the immaterial, with material objects also easier to imagine given that our mental representations are said to be largely analogical. This would underline the importance of relics in the recall and re-conception of the past, and in the imagination of immaterial concepts, such as the Divine. In triggering memories semantically, objects (e.g. relics) are also observed to be more effective than images (Snow *et al.* 2014).

One may compare the concept of the “Eye of Faith” to that of the “Mind’s Eye” (i.e. visual mental imaging), for which it has been shown that imagined and perceived images are processed using the same parts of the brain, with the imaging said to function “like a weak form of perception” (Pearson *et al.* 2015). Furthermore, conscious visual experiences without a corresponding retinal stimulus, termed “phantom perception”, both voluntary and involuntary, has also been documented (Pearson & Westbrook 2015). These recall the envisioning of a saint or past event by an audience upon contemplation of a relic, as described in Christian sources, compared by Franks with the classical oratorical technique of *enargeia* (see above).¹¹

This process recalls narrative Transportation Theory, a term coined by Gerrig within the context of encounters with texts (Gerrig 1993: 3), explored further by Green and Brock, who describe it as follows: “In sum, individuals reading stories may become transported into a narrative world. Transportation is a convergent mental process, a focusing of attention, that may occur in response to either fiction or nonfiction. The components of transportation include emotional reactions, mental imagery, and a loss of access to real-world information; the resulting transportation may be a mechanism for narrative-based belief change” (Green & Brock 2000: 703). “Beyond loss of access to real-world facts, transported readers may experience strong emotions and motivations, even when they know the events in the story are not real” (Green & Brock 2000: 703, with reference to Gerrig 1993: 179-191). This raises the question of the role

of relics and other triggers in the transportation of an audience into a narrative (religious or secular), and suggests that relics may have an important role in supporting belief and religious faith over empirical knowledge. Further research is required to explore the role of relics in the narrative transportation of audiences, with potential practical applications in the modern world.

The critical role of emotion in helping to bind together features of an event and preserve certain memories has also been noted (Mather 2007). This may support the role of objects in the recall of connected memories, and possibly as anchors for a wider memory landscape, suggested above. Cases where the emotions that are triggered by a religious symbol are so overwhelming to an individual that the symbol seems to be a powerful agent in its own right have also been interpreted by Riis and Woodhead as ‘ultra-subjectification’: in this category they place Christian relics: “in a religious context this may mean an object that is venerated as if it were alive, powerful, and potentially dangerous to humans. It is beyond human control, or at least beyond the control of all but an elite that is ascribed with the ability to approach, handle, and interpret the symbol” (Riis & Woodhead 2010: 133-134). This would recall the conception of the dual subject-object identity of relics, described above, and underlines the importance of relics and related ultra-subjectified objects in studies of materiality and immateriality.

The potential for the desubjectification of the audience during encounters with such objects such as relics is another avenue for further investigation. Research has been made concerning human brain activity during intense meditative contemplation of objects (Lutz *et al.* 2008), with researchers concluding that, in some states of mindful meditation, the mind achieves positive outcomes through a process of disidentification, since significant signal decreases were observed in structures associated with interoception (Ives-Deliperi *et al.* 2011). These beneficial decreases in activity during states of mental repose have more recently been identified as a function of the brain’s default mode network (Raichle 2015). To confirm this, further research is required, including experimental and behavioural studies.

Fact and Faith: the Study of Christian relics

The most prominent interest in relics has been as objects of religious devotion, most notably in Christianity, where theological debates on the relationship between humanity and the Divine have shaped per-

ceptions of sacred materiality.¹² As a search for empirical evidence to substantiate religious faith, therefore, the study of relics has a long history, with each generation of scholars attempting to apply the most reliable methods available. From Late Antiquity and throughout the Middle Ages, accounts concerning the discovery of relics cite as proofs of their authenticity the holy smell they produced, the working of miracles, and divine apparitions.¹³ Meanwhile, according to Early Christian accounts, the Wood of the True Cross could cause liquid to boil, cure sickness, and even restore the dead to life.¹⁴ At the Reformation, Protestant censure of the Roman Catholic Church targeted the cult of relics, inspiring Catholic scholars to undertake the first modern studies of relics in response.¹⁵ As we shall see, these studies focused on applying scientific methods not to religious audiences, but to the relics themselves.

Today, the Roman Catholic Church continues to integrate modern scientific analyses into its traditional methods for investigating the authenticity of relics in its possession for religious reasons, often by arranging scientific studies, the precise results of which are sometimes published (Guarducci 1995, p. 96-103; Wiel Marin & Trolese 2003), sometimes not (H.H. Benedict XVI 2009). For example, in 1995 the Roman Catholic Archdiocese of Birmingham arranged for the radiocarbon dating by Accelerator Mass Spectrometry (AMS) of five bones attributed to St Chad at the Oxford Radiocarbon Accelerator Unit (ORAU). Results indicated that at least two individuals were present, with three of the five bones dating to the era of the saint's death (Tavinor 2016: 77). The results prompted the Archbishop of Birmingham to authorise the veneration of the relics as a group.

While in such cases the Roman Catholic Church and the Orthodox Church have recourse to the spiritual authority of sources and traditions in the interpretation of scientific results, it is usually impossible for modern science alone to establish what might be termed the nominal or empirical authenticity of putative early Christian relics, due to the absence of sufficient scientific evidence. Meanwhile, by demonstrating that a relic's origins are incompatible with their traditional identification, scientific analyses can be used to refute the nominal authenticity of relics. For the faithful, however, this does not necessarily refute a relic's authenticity, in the expressive sense at least. In the case of the Turin Shroud, for example, the scientific dating to the Middle Ages of an object supposed to date to the first century (Damon *et al.* 1989) has not prevented the object from continuing

to be venerated as a relic: during its public exposures for veneration in 1978, 1998, 2000, 2010, 2013 and 2015, visitors have continued to number between one and three million, according to the Church and the Shroud's official website, www.sindone.org (see also H.H. Benedict XVI *et al.* 2010).

Depending on a relic's effectiveness, or power to trigger a virtual experience of an original subject, and the depth of an audience's engagement or faith in the original, a relic may therefore continue to be valued as authentic regardless of the results of scientific analyses. In the case of relics with a reputation for working miracles, there is even at least one account of popular veneration being continued after it has been discovered that the relic was fraudulently produced (Argenti & Rose 1949: vol. I, p. 272, n. 3). However, while one would expect the aims of independent, scientific relic studies to focus on a range of issues, there has been a tendency for studies of relics that are primarily or purely science-based to address the question of 'authenticity' as a binary debate between 'authentic' and 'inauthentic', an approach which scholars are increasingly rejecting.¹⁶ Just as the analyses available for the study of relics has progressed, the opportunity to develop the objectives of such research is also growing.

Traditionally, scholarly research into relics has been a fragmented field, variously approached from such separate disciplines as history, theology, art history, patristics, or conservation, and rarely as a subject in its own right. Until recently, the main evidence considered was largely contextual, consisting of written sources, monuments, art, oral traditions, and artefacts, with the physical nature of the relics themselves remaining for the most part shrouded in mystery. In special cases, information such as the species of wood relics or osteological information was obtained as part of collaborations between the Roman Catholic Church and scientific experts (e.g. H.H. Leo XIII 1884). Independent, interdisciplinary studies of relics of a particular person or object, such as the Wood of the Cross, which integrated material evidence with written sources, were virtually non-existent (Rohault de Fleury 1870).

During the 1980s and 1990s, medievalist and conservator Philippe George (Trésor de Liège), led a number of collaborative interdisciplinary studies of relics in Belgium, opening medieval reliquary caskets, assessing and documenting their contents. This allowed George to combine his knowledge of medieval history and art with, for example, physical anthropology (e.g. Charlier & George 1982), metallurgy

(Martinot, Weber & George 1996), dendrochronology (George 2006) and radiocarbon dating (Charlier & George 1982; George 2002: 146-147). At this time, it was not possible to obtain ancient DNA (aDNA) from such remains, and the size of sample required for radiocarbon dating was so large that George and his colleagues would need to make a plaster mould of any bone that was to be dated before sampling, in order to preserve a record of its form. The radiocarbon dating of smaller bone relics which were on public display was therefore out of the question, and studies were restricted to the mostly complete skeletal remains of medieval local saints found in large reliquary caskets. Even so, George decided to suspend studies that involved the opening of medieval reliquaries until more effective analyses would become available (George 2002: 188-193 and personal communication; cf. George 2003: 22).

From the turn of the millennium, the development of such methods permitted the radiocarbon dating of Christian relics to regain momentum (Evin & Rillot 2005). The first major attempt at applying a systematic scientific methodology to a broader assemblage of evidence was led by radiocarbon scientist Mark van Strydonck in a ten-year study of more than 20 relics of Belgian and Dutch saints from shrines under restoration at the Royal Institute for Cultural Heritage (KIK-IRPA) in Brussels (Van Strydonck 2006). This project combined detailed physical anthropological observations, stable isotope measurements, and radiocarbon analysis of bones, documenting and comparing the results. While its aims included the evaluation of nominal authenticity, the study also sought to discover new evidence concerning the origin, history, and treatment of valuable parts of Belgium's religious heritage (Van Strydonck 2009).

Since 2007, the aspect of methodology and cross-disciplinary study on relics has been explored by another decade-long relic study: that of the collection discovered in Turku cathedral in the 1920s. This has been led by Taavitsainen, Arponen and Immonen, and it is the first study to apply radiocarbon dating and further isotope analysis, alongside osteology, on a systematic basis to the examination of a single, major collection (Immonen & Taavitsainen 2014; Taavitsainen 2015). It has been followed by collaborative studies of other relic collections in the Nordic region (Nilsson *et al.* 2010; Morten 2013; Arneborg *et al.* 2015, 148; Sten *et al.* 2016; Taavitsainen 2018).¹⁷ These studies have included radiocarbon dating along with other isotope analyses and, increasingly, aDNA analysis.

In addition to advances in radiocarbon dating and other isotope analyses, the emergence of molecular genetics since 2005 has opened up new opportunities for the study of human history, not only concerning early human evolution (molecular anthropology) as well as prehistoric and undocumented migrations of peoples, but also to help solve historical mysteries (Samida & Feuchter 2016). This emergent field of research has been termed 'genetic history'. As well as finding solutions, researchers in this field have encountered a range of new questions, including unexpected genetic diversity within a culturally homogenous population (Schiffels *et al.* 2016).

Over the course of the above-mentioned research, and particularly over the past decade, advances in scientific analyses have progressively reduced the amount of sample material required, resulting in forms of testing that are either minimally invasive or entirely non-invasive, and making available an increasing amount of information. Along with falling costs and the increasing availability of scientific testing, this has had the effect of opening up for study a wide range of precious materials that were hitherto unavailable for research, resulting in something of a boom in the scientific analysis of Christian relics and other precious heritage by means of invasive sampling. Furthermore, by digitising data from invasive and non-invasive analyses, and with the use of 3D and other forms of imaging, such as computed tomography (CT), it is now possible to document and preserve a precise, long-term record of an object's physical nature and appearance.

The increasing integration of modern science into the study of Christian relics offers the opportunity to encourage interdisciplinary research, which is particularly valuable in the study of relics, as proposed above. The value of multidisciplinary is also being increasingly recognised within the natural sciences: in the case of radiocarbon dating, supporting analyses in fields such as botany and biochemistry are of critical importance, in addition to an understanding of an object's broader historical and archaeological context (Palincaş 2017). However, it has also been noted that the mode of collaboration required is "an equal partnership, with a mutually intelligible language of communication, agreed objectives, and equal inputs" (Pollard & Bray 2007: 246). While multidisciplinary approaches are valuable, the balanced approach desired in the case of relics and other subjects should be, in practical terms, interdisciplinary (Samida & Feuchter 2016) or, perhaps more ambitiously, transdisciplinary (Nicolescu 2008), which aspires to en-

gage the unity of different realities in the interaction between audience and object.

Advances in scientific analyses and increasing interdisciplinary collaboration are therefore allowing relics and other materials from the past to be studied as complex historical and religious documents, archives not only of memory but also of faith and fact. For example, relics now represent invaluable repositories of bio-history, especially in the case of well preserved, accessible human remains, attributed to an individual with a documented life story. Such data can be compared with the textual and artistic evidence available to deepen our understanding of the history of this period. In the case of St Erik of Sweden, for example, scientific results confirmed details recorded in the saint's legend, the earliest known copy of which dates from 130 years after his death (Sten *et al.* 2016; cf. Bjerregaard in this volume).

While more than thirty years have passed since the radiocarbon dating of the Shroud of Turin, the scientific study of relics continues to be identified as an emerging field of research (George 2013: 391; Van Strydonck *et al.* 2018: 1). This is because, despite steady progress being made through increasing research, a standard methodology, along with other important features such as an established scientific community, journals, code of research ethics and a shared research database are still lacking (Fulcheri 2006; Petaros 2011: 28, 31, 45). This would appear to be a result of the fragmented nature of this field or the localised nature of current relic studies. The innovation of new methods, cross-disciplinary partnerships and tools are therefore required at national and international levels. These all have the potential to be also applied in related fields, interdisciplinary platforms through which existing practices (e.g. in history, conservation, radiocarbon dating) can be reassessed.

The Oxford Relics Cluster

The Oxford Radiocarbon Accelerator Unit (ORAU) has a longstanding tradition of archaeological research into relics. Based within the University of Oxford's Research Laboratory for Archaeology and the History of Art (RLAHA), the ORAU is one of the world's leading laboratories for AMS radiocarbon dating, especially the dating of bone. It has previously been called upon to undertake AMS radiocarbon dating on relics such as the Holy Shroud of Turin in 1988 (Damon *et al.* 1989), the remains of St Chad in Birmingham in 1995 (Boyle 1998: 35-38), and of St

Luke in Padua in 2000 (Wiel Marin & Trolese 2003). These early AMS radiocarbon studies of major relics were led by the Roman Catholic Church. The St Luke study was ground-breaking in that it brought together historians, theologians, pathologists, and experts in AMS radiocarbon and DNA analysis among others, resulting in the presentation of secular and religious studies side by side in a two-volume publication (Leonardi & Trolese 2002; Wiel Marin & Trolese 2003). Following this, in 2002, ORAU was also invited to participate in a study of the relics of St David of Wales at the Anglican cathedral of St Davids in Wales (Higham *et al.* 2007).

In 2010, the authors began a collaboration in Oxford to study historic relics, beginning with a group of human bones attributed to St John the Baptist excavated that year at a site on Bulgaria's Black Sea Coast, bones which Higham was able to demonstrate belonged to an individual who had died in the first century AD (Kostova *et al.* forthcoming). Since then, rather than simply co-operate with existing relic studies or undertake localised studies on a case by case basis, the authors have led new projects and developed new working collaborations and research methods, in order to advance a holistic approach to the study of relics.

In 2015, the authors formed the Oxford Relics Cluster, based at the Advanced Studies Centre of Keble College, University of Oxford. The Cluster was conceived to help realise the major opportunities for interdisciplinary research that relics present. It provides a platform for dialogue and collaboration between experts from across the Humanities and the Sciences through round-table meetings and at seminars on a termly basis, as well as through collaborative research projects. This also aids in the sophistication of current methodologies and in the development of relics research into a field in its own right. The authors' research was further supported by Kazan's appointment in 2017 as a Collegium Research Fellow at the Turku Institute of Advanced Studies. This has provided the possibility to explore new approaches to relics within the interdisciplinary environment of an international centre of excellence, surrounded by leading researchers in a range of disciplines. The role was also situated within the University of Turku Department of Archaeology, allowing for valuable insights to be gained from collaboration with the ongoing Turku Cathedral Relics Project.

Religious relics: a resurgent phenomenon

The increased academic attention to relics has coincided with the revival of relics in both the Orthodox East and Latin West since the 1990s.¹⁸ Relics are once again also providing a platform for international diplomacy: in 2017, a rib of St Nicholas, on loan from the Basilica San Nicola in Bari, Italy, toured Russia, where it was publicly venerated by Russian President Vladimir Putin.¹⁹ Meanwhile, in 2016, a bone fragment said to be from the elbow of St Thomas Becket, preserved in the Basilica of Esztergom, Hungary, visited the UK to take part in a ceremonial ‘pilgrimage’ from London to Canterbury, involving the President of Hungary and leading Catholic and Anglican clergy.²⁰ This phenomenon is not limited to Christianity, but can be observed across the world: in August 2015, for example, India sent the Kapilavastu relics of the Buddha, preserved in the National Museum in Delhi, on a tour of Sri Lanka, while later that year Chinese authorities arranged for a tooth relic of the Buddha from the Lingguang Si Temple in Beijing to be sent on a tour of Burma, in what has been interpreted as a rival acts of relic diplomacy.²¹ In the case of Russia and China, state interest in relics has been seen as part of a wider revival of religion in these countries.²² Relics therefore are again presenting an important platform for dialogue, attracting global attention. Their research is thus of high interest and has the potential to deliver significant impact within and beyond academia.

Ethics in the study of relics

At present, international research and conservation practices advise careful consideration in cases where objects are recognised as culturally sensitive material or as human remains. The International Council of Museums (ICOM) requires that “collections of human remains and material of sacred significance should be acquired only if they can be housed securely and cared for respectfully. This must be accomplished in a manner consistent with professional standards and the interests and beliefs of members of the community, ethnic or religious groups from which the objects originated, where these are known” (ICOM 2017: 10). In many cases, relics can be of sacred significance or represent material that is still culturally sensitive today, although the degree of sensitivity or religious devotion has not been quantified and may vary. Also, for objects with long itineraries, the identity of the group from which a relic originates is not always clear. The appropriate

application of such requirements to the study religious or secular relics will require further clarification and consensus, as well as the development of an ethical framework which may enable it to emerge as a recognised field of study in its own right. Today, ethical practices in archaeology, conservation and scientific research concerning human remains vary widely. A major question concerns how to balance the interests of scientific research with requests to repatriate unburied human remains (Strauss 2016). In this millennium, the UK has emerged as a leader in this field, issuing advice for the archaeological excavation of human remains and for their conservation in museum collections, as well as for their scientific study and sampling. Legislation concerning the treatment of human tissue less than 100 years of age was consolidated under the Human Tissue Act of 2004, with an exception made for religious relics (Parry 2013). Guidance has been subsequently issued by the UK government for the ethical treatment of human remains, including on the ethics of destructive sampling, and on dealing with claims for the repatriation of human remains. In this case, a distinction has been made between requests from genealogical relatives of the deceased, those from cultural communities with a connection to the remains, and those from the country of origin of these (Department for Culture, Media and Sport (UK) 2005: 26-27). Further advice regarding the treatment of human remains excavated in burial grounds has been issued by a joint panel of UK government, Church of England and Historic England (Advisory Panel on the Archaeology of Burials in England 2017).

The authors have therefore applied these ethical guidelines and legislation, and sought to further clarify and build consensus on their application to relics (Parry 2015). Since 2011, they have communicated extensively with church, museum, scientific and state authorities across Europe, to consult the needs and interests of these stakeholders and building a broad support network in support of ethical scientific research into relics. Given that relics and human remains are subject to different guidance and regulations across Europe and the wider world, the development of interdisciplinary relics research as an international field of study offers an opportunity to consolidate practices for the ethical treatment and study of human remains. The authors have so far consulted both the Vatican and the Ecumenical Patriarchate of the Greek Orthodox Church, requesting their blessing to pursue scientific research on relics in a respectful and acceptable manner. The po-

sition of the Roman Catholic Church regarding the treatment and investigation of various categories of relics was also recently clarified by the December 2017 Instruction, issued by the Congregation for the Causes of Saints (Angelo Card. Amato 2017). The authors present understanding is that requests for scientific investigation of religious relics are to be made to the bishop in whose diocese or eparchy the relic is located. For certain monastic communities, for example in the Greek Orthodox Church, the abbot has authority to decide on each case.

The authors deemed this engagement with religious authorities as an integral part of an ethical approach to the study of objects which, while originating in the distant past, are part of a living religious heritage in the present day. Meanwhile, a further area for investigation would be the assessment of a relic's religious status or cultural sensitivity within a wider range of different groups to which it might be considered connected. This could involve a survey not only of religious authorities at local and international level, but also of faith and non-faith groups from the area or areas with which a relic is considered connected. This may enable the assessment of a relic's perception by these different audiences, and result in the acquisition of informed consent from relevant stakeholders in cases where a relic is adjudged to be religiously or cultural sensitive, in addition to the required permission from relic owners and other relevant authorities.

Current Methods and analyses

The data acquired from relics by scientific testing is quantitative and digital in nature, allowing direct access to the facts of the past. While this appears ostensibly free from the subjective choices of presentation and the vagaries of language that characterise written or oral historical sources, the use of this data in historical and archaeological research nevertheless requires caution. In selecting materials for research and interpreting their significance, one must remain mindful of one's own subjective bias. Careful consideration should therefore be given to the scope of a study, especially those taking place within a particular collection or across multiple collections. While attempts to unravel the motivations of past generations of relic collectors, however necessary, are fraught with difficulties, one's own approach to the study of relics is something one is far better equipped to assess and revise.

Relics research: general approach

To date, the authors have approached the study of relics in the following manner:

i. First steps: networks, consultation and collaboration

Religious relics present a large and sensitive subject for research. As described above, the authors have



Fig. 1: The authors (Kazan, left, and Higham, right) prepare to study a relic attributed to St John the Baptist from the Guelph Treasure, at the Nelson-Atkins Museum of Art in Kansas City (MO), USA. Photo: P. Benson

spent a great deal of time consulting and communicating with relevant authorities to acquire the information or permissions required. Furthermore, as our research has progressed, it has become apparent that an increasing range of disciplines are required to gain as full an understanding as possible about the subject. Time is therefore required to develop collaborations with leading experts in a range of fields.

ii. Relics: a comparative study

Having been initially invited to date relics attributed to John the Baptist, the authors extended their research into relics by adopting a comparative approach. While most relic research to date has consisted of case studies, the authors hoped to set the results of their find in context. In the case of St John the Baptist, a survey was made by Kazan of over 200 major relics attributed to the saint surviving in modern collections worldwide. An initial, explorative study was made of relics from six of these locations, which were sampled by Higham and a student, Jamie Cameron, for scientific analysis (radiocarbon dating, stable isotope analysis and aDNA). The selection was constrained by issues of access, but material was selected to explore further the different types of connections existing between relics (Fig. 1). Three relics were therefore selected from a single geographical region (Belgium), two others (USA) were said to have originated from the same medieval collection (the Guelph Treasure, originally preserved at the cathedral of Brunswick in Germany, and now scattered across different collections), and the last was chosen due to its curious nature, a collection of three human leg bones (3 fibulas) in the National Museum of Denmark, integrated within a traditional type of later medieval artwork – a carved wooden head of St John the Baptist on a platter (Fig. 2).

iii. Selecting evidence for research

The results of these studies have been informative, helping the team to focus its approach. For example, as described above with regard to nominal authenticity, in seeking to study relics that are the most highly comparable (e.g. in attribution, provenance, location, context), it appears useful to first seek out relics with the most ancient provenance in order to establish a basic understanding of the early origins of a particular relic tradition. This understanding can then be supplemented by information from later contexts, which may consist of fragments of relics from



Fig. 2: St John the Baptist relics from Ørslev Church, Denmark. The platter is a later replacement. Photo: Lennart Larsen, National Museum of Denmark.

earlier known provenances or separate material attributed to the same source. Knowledge of existing examples such as these may also have influenced the development of subsequent traditions elsewhere. Furthermore, the selection of relics that exert a broad appeal will permit the comparative study of examples from across a wide geographical area. These two criteria can be combined for greater effect. We therefore chose to concentrate on Early Christian relics, including those of figures that appear in the Synoptic Gospels. These offer insights into relic veneration over the longest period of time and across the largest geographical areas. A range of examples will be sought for comparison, especially from the earliest known contexts. It will then be possible to draw meaningful conclusions on the source, circulation and use of these objects during the Middle Ages and beyond.

v. Relics and Collections

In order to inform one's selection and approach to this material, an initial assessment of the available historical sources and documented evidence (e.g. objects in church and museum collections) is required. The process of selecting material is not only an important

part of any scientific study, but was also a key feature in the assemblage of relic collections. Surviving relic and museum collections, as well as inventories that describe lost collections or the earlier compositions of ones that survive, can provide valuable information about the resources, contacts and preferences of the collectors over time. It has even been remarked that the “practice of collecting things in some places was in itself more important than what could be said about collected things” (Geurds 2013: 2). The presence of different relics, or combinations of relics, within different collections, along with patterns of acquisition, as well as significant absences or gaps within these records, offers an important opportunity for comparative research of Europe’s Christian relic tradition.

v. Approaching relics and the contexts that define them

Along with the character of a relic collection’s composition as mentioned above, a number of artistic, textual and architectural contexts (such as containers, decorations, *authentica* tags or symbols) can serve to enshrine and define an object as a relic (cf. Hahn 2010: 291). These may be considered individually and collectively, as a non-verbal, cultural “language” in their own right (cf. Leone 2014: S60, S70-S71). As with historical texts, therefore, the understanding

of relics requires the deconstruction of these material contexts and the exploration of the motivations behind them, as far as this is possible. This deconstruction can be attempted through a process of deduction, based on the comparative study of existing evidence. Given the limits of research time and resources, and the ethical practice of limiting unnecessary invasive sampling, an exploration of a relic’s known history and material context, including the chronology, fabric, treatment, iconography, and origins of these, along with any evidence available concerning the relic itself (appearance, osteological data), is therefore required before selecting it for scientific study (Fig. 3).

vi. Reassessing and revising: an ongoing process

The scientific analysis of relics and their contexts can thus be used to establish a basic understanding of their past, which can be compared and contrasted with available written and oral sources in order to establish useful questions and likely hypotheses concerning an object’s history (e.g. why and how such objects came to be treated as relics, and what happened to them subsequently). In the case of the authors’ research on the Wood of the True Cross, for example, this prompted the formulation of a list of aspects (including provenance, reliquary context,



Fig. 3: Preliminary examination of a relic and *authentica* in context, Eglise Saint-Jean Baptiste, Namur. Photo: Oxford Relics Cluster.

size, wood species, chronology) relevant to the assessment of individual relics within the wider history of the relic (Kazan & Higham 2019). An integrated method is consequently desirable, a rolling and reflexive “fusion of horizons” that considers new data from a range of scientific analyses in the light of historical sources and the non-verbal ‘languages’ of art, architecture and ritual, while also continuing to explore and develop methodologies for selecting and studying relics.²⁴

Scientific approaches

The authors’ research employs the latest scientific analyses in a growing range of disciplines, which are available either at RLAHA in Oxford or through leading institutions and experts elsewhere. Collaboration with historians and art historians, experts in the material and period in question, offers invaluable assistance in framing research questions and interpreting scientific findings. In addition to providing new information concerning their origins, the modern

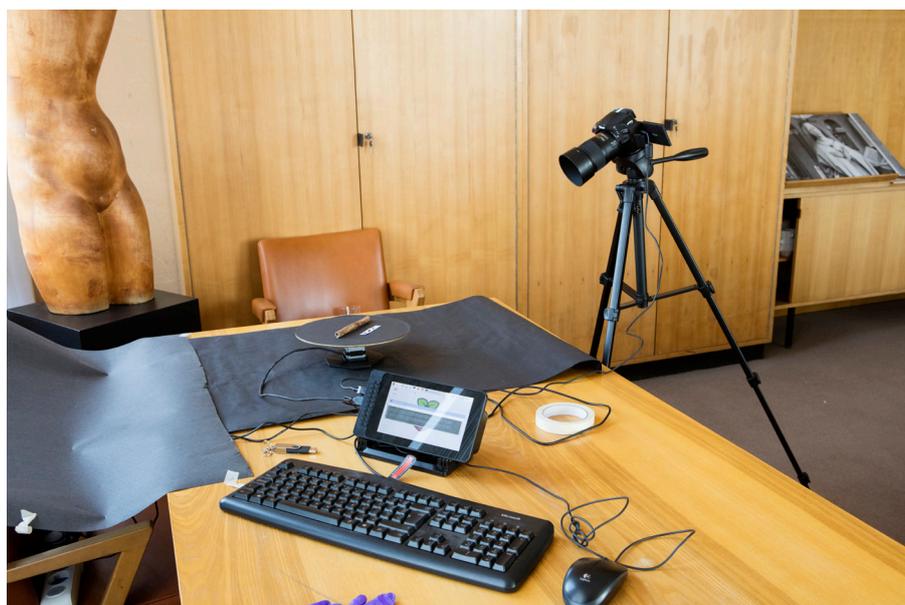
study of relic collections also offers the possibility of rediscovering new objects and even texts hidden inside caskets and altars that have been sealed for centuries, as well as a chance to document and assess the current condition of heritage. The presence of a conservator is therefore usually required, and in certain cases specialist skills are needed for the opening and re-sealing of relic containers (Fig. 4), and for the preservation (e.g. at correct temperature and humidity levels) of any materials removed for further study. X-ray, ultrasound or CT imaging can also be used to assist decisions concerning the opening of a reliquary by giving an indication of its internal structure and contents. Furthermore, specialist art historical expertise in palaeography, textiles and metalwork, for example, is also required for the interpretation of new texts and material discovered during the opening of reliquaries, and in the selection and sampling of such materials for scientific analyses (e.g. radio-carbon dating, dye analysis, animal species analysis).

The documentation of all research materials for



Fig. 4: Metal conservator L.-P. Baert (Royal Museums of Belgium) removes a relic package for further study, under the supervision of the medievalist and relic conservator Philippe George (centre) and representatives from the church authorities and Belgian KIK-IRPA national heritage institute. Photo: G. Kazan

Fig. 5: Computerised turntable system with multi-camera setup developed at RLAHA accelerates the photographic documentation of relics for the creation of 3D photogrammetric images. Photo: G. Kazan



further study through photos, measurements and observation is essential. This is particularly important for religious heritage in Northern Europe or the Middle East, where evidence that can often be endangered by incidents of theft, arson, vandalism and general decay due to lack of funds. The authors' documentation of texts and objects on-site is carried out photographically and in note form. In the case of relics in particular, measurements are taken along with photographs from multiple angles, allowing for the preparation of 3D images by photogrammetry. For this, a new, computerised turntable device connected to three cameras at different heights has been developed by Richard Allen (RLAHA) (Fig. 5).

Religious relics often comprise of human remains, concerning which modern scientific analyses offer a wide range of data (Department of Culture, Media and Sport (UK) 2005: 8). This can generally be divided into two main areas: details concerning an individual's life history (such as their health, diet, geographical movements, sex, genetic origin, appearance, relationships to others, life-style, age and cause of death), and details concerning the fate of their remains (such as how and when these were divided, circulated, treated, and packed away). A comparison of such data can also offer further insights, such as concerning patterns of sourcing and circulation, as well as permitting the identification of anonymous relics with others for which an attribution or source is known.

Osteology/physical anthropology remains the primary method for the identification and assessment of skeletal remains (Fig. 6), providing information concerning an individual's age, sex, health, and li-

festyle, as well as evidence of their post-mortem treatment. This can be supported by the use of imaging techniques such as CT scanning to offer non-invasive insights into the internal make-up of objects and their cellular structure. In the case of wood, this has been used to determine tree species non-invasively (Fig. 7). In the case of bone, Zooarchaeology



Fig. 6: Osteological inspection of relics from a Belgian church reliquary conducted on site by Dr. Eleanor Farber (Oxford Relic Cluster). Photo: G. Kazan

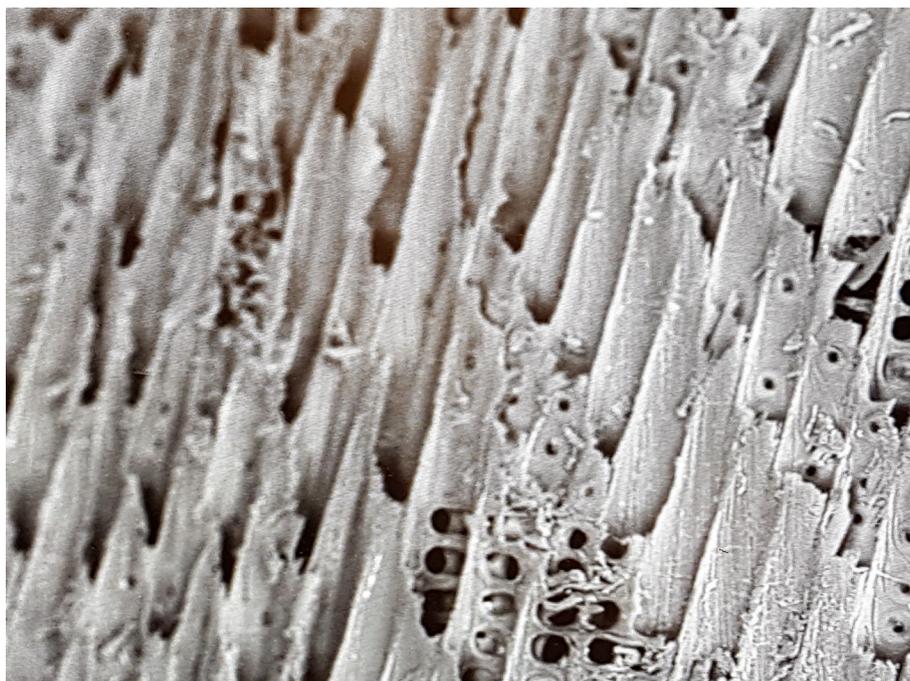


Fig. 7: High-powered CT imaging at the University of Helsinki MicroCT laboratory reveals the internal structure of a wood relic. Photo: G. Kazan

by Mass-Spectrometry (ZooMS), provides an important initial analysis to identify small fragments of uncertain origin to genus and sometimes species level. Organic and inorganic substances present on the surface of relics, or comprising secondary relics in their own right, as well as the fabric of related objects can be characterised using a range of methods, such as gas chromatography / mass spectrometry (GC/MS), FTIR and Raman spectroscopy, Scanning Electron Microscopy with Energy-Dispersive X-ray analysis (SEM-EDX), Particle-Induced X-ray Emission (PIXE) and X-ray Fluorescence (XRF), which is especially useful for determining the composition of metals and thus, potentially, date their production and locate their geological origin. Such analyses can also identify traces of materials from the previous containers and cladding used for relics, as well as substances used in their veneration or conservation. So far, the authors have based their studies around AMS radiocarbon dating and relevant, supporting analyses (e.g. ZooMS to screen relics of unidentified species for animal origin), taking advantage of the increasingly sophisticated methods available at ORAU. This allows for objects to be placed within their correct chronological context, and is thus of critical importance for historical research. Sample size depends on the material and the quality of an object's preservation. Typically, between 100 mg and 300 mg is required for bone samples, while for wood, which is more concentrated in carbon, as little as 5 mg is needed. The authors' research to date has determined that relic material often survives in

excellent condition, allowing the new capabilities of scientific analysis to be tested to their limits, further reducing sample size. Samples of bone material can be extracted almost imperceptibly using a “key-hole” sampling technique, by which a small hole (1mm to 2mm diameter) is made in the bone using a tungsten carbide drill, and use to hollow out sample material from within the object (Fig. 8).



Fig. 8: A surgical drill is used to obtain bone powder from a relic using the “Keyhole” sampling method. The quantity of powder on the foil indicates the sample amount required for a successful radiocarbon date. Photo: Oxford Relics Cluster

The isotopes present in samples can also provide other information: for example, the ratio between ^{13}C and ^{12}C , expressed in parts per mille, can indicate the types of food an individual ate in their lifetime, while nitrogen isotopic ratios (^{15}N and ^{14}N) can reveal the position of an individual in the food chain (in the case of humans: vegans, vegetarians and omnivores) and the types of food eaten (e.g. diets high in marine protein). Where sufficient reference data exists, other forms of stable isotope analysis (e.g. strontium and oxygen) can also be applied to reveal further aspects of diet, geographical origin and migration.

Genetic analysis of historic or pre-historic remains (aDNA), which allows an individual's genetic data to be identified using Next Generation Sequencing (NGS), is an area of research that is rapidly developing, with the sequencing of entire ancient genomes becoming increasingly possible. This can reveal information such as genetic relationships between people, sex of the individual, phenotypic traits (eye, hair colour etc.). aDNA analysis offers the most secure comparisons between relics, allowing parts of the same or related individuals to be identified. Samples of 30mg or less are extracted, ideally within a clean laboratory environment, purified and amplified. With the number of published ancient and modern genomes rising rapidly, aDNA analysis offers new opportunities for interpreting the genetic and probable geographical origin of a relic, with implications for its sourcing and circulation.

Other useful new methods available for which small samples (~1-20 mg) are required include ZooMS, and microbiome analysis, which uses the aDNA of microbes present in the plaque from an individual's teeth to determine their diet and disease history. In addition, further aspects of a relic's context can be assessed using textile, weave and dye analysis, dendrochronology, minerology, geology, microbiology and hair analysis. In some cases, archaeobotany and archaeoentomology can also be used to identify the particular environment or season of the year in which an object was sealed up, based on the plant, pollen or insect remains present. All these analyses and others are becoming increasingly available and sophisticated, offering new insights into our understanding of relics and raising new questions regarding existing methodologies.

Relics: present and the future

The authors are presently engaged in a number of major studies, concerning religious relics, the re-

mains of medieval kings and historic objects. These include the first interdisciplinary, comparative scientific study of relics of the True Cross²⁴, as well as modern case studies of relics of St John the Baptist and the Apostles, and the remains of early British and European royalty. In collaboration with the Turku Cathedral Relics Project, National Museum of Denmark, and Nordic research group on medieval saints' relics, established by Prof. Lena Liepe (Linnaeus University) in April 2019, the authors are also exploring new opportunities for relic research in the Nordic region.

Research on Christian relics in the Nordic region is particularly interesting for a number of reasons. Written sources can be less plentiful, or more hagiographical or legendary in nature, making data from scientific analysis particularly valuable. Also, the number of published relics from the region is relatively limited (less than 400 finds, approximately). In many cases, these relics are the property of museum collections, and are not the subject of an active religious tradition, making scientific research less of a sensitive issue in most cases. However, while the Catholic cult of Christian saints and their relics effectively ended in most of northern Europe at the Reformation, devotion to particular saints continued. This could be, for example, under their guise of founders or patrons of national churches, such as in the Faroe Islands, where the Lutheran Church continues to be celebrate the annual feast of St Olav, or as popular traditions, such as the continued reverence for St Nicholas, albeit with most of the formal religious aspects removed. Meanwhile, certain relics, hidden away by local communities, survived the Reformation, such as the collections of Linköping Cathedral in Sweden and of Turku Cathedral in Finland, re-discovered the seventeenth and twentieth centuries respectively.²⁵ Elsewhere, relics encased within ancient altars simply remained in place, such as those of Seem Church, near Ribe in southwest Jutland, to be rediscovered centuries later (Vellew 1974). Today, these objects offer rare glimpses into a past which, in some cases, is still undocumented, revealing the contacts and networks that once bound medieval Christendom together. Data obtained from relics, such as from the remains of St Erik of Sweden (Sten 2011), is therefore especially valuable to our understanding of the presently undocumented history of this region.

The development of an international scholarly community for the field of interdisciplinary relic studies, particularly in Belgium and the Nordic countries, has seen notable progress. The interna-

tional workshop “Relics of the Saints – Remnants of Papacy in Reformed Churches”, Turku (31.10. – 1.11.2014), hosted by the Turku Cathedral Relics Project team, provided an opportunity for relics researchers in the Nordic region to discuss their work, with Philippe George and Mark van Strydonck contributing insights from their long experience in this field. The foundation of the Oxford Relics Cluster in October 2015, with its series of seminars and meetings, was followed by “Relics@the lab” - the first international workshop in this field, organised by the Royal Institute of Cultural Heritage (KIK-IRPA) and held in Brussels, Belgium (27-28.10.2016) (Van Strydonck *et al.* 2018). Following the present conference, *Life and cult of Canute the Holy: Interdisciplinary research seminar in Odense* (6-7.10.2017), the Archaeological Society of Namur (SAN) held the “Labs, Art and Relics Workshop” at the Royal Library of Belgium in Brussels. (22-23.11.2018). Collaboration in this new field is thus gaining momentum, as cross-disciplinary interest in the opportunities presented by relics continues to grow. The authors’ collaboration with the Turku Cathedral Relics Project in Finland has led them to consider relics from across the Nordic region. Scholars from the region from a range of fields (conservation, archaeology, art history) met at the recent workshop “Nordic research on medieval saints’ relics” (Helsinki, 1-3.4.2019) convened by Prof. Lena Liepe (Linnaeus University, Sweden). The authors have been developing a network of relics researchers since 2013 and are supporting Prof. Liepe’s existing efforts to develop a research network for the study relics and religious art in the Nordic region.

Progress is also being made in the field of database development. Prof. Liepe’s ongoing project “Mapping Lived Religion: Medieval cults of saints in Sweden and Finland” is preparing a digital resource of relics and other material from Nordic countries. In collaboration with Prof. Taavitsainen, Prof. Liepe, Jens Velle, Øystein Ekroll and others, Kazan has also developed a preliminary working database, shared online among Nordic scholars, which will be developed further as research in the region advances. This is expected to be eventually absorbed and replaced by Prof. Liepe’s project database, once the latter is complete. Furthermore, a pilot study was carried out in 2015 by Kazan and research student Jamie Cameron, in which part of an unpublished collection of obscure relics in Liège cathedral was inventoried and photographed by researchers from the Oxford Relics Cluster, with an initial database listing created

for the cathedral’s ongoing use. This has allowed the cathedral to rapidly locate relics of interest within the collection, and provided a number of methodological insights to the researchers. A broader database project is now under development, in collaboration with other European researchers and institutions.

While the above research is expected to provide elements needed for the development of relic studies as a subject in its own right, it also underlines the crucial role of the audience in identifying objects as relics. Furthermore, as proposed above, neuroscientific and psychological studies of the minds and brains of audiences can also shed light on a separate aspect of relics: how they are defined, and how we respond to them. Through such research, it is hoped that findings will be made from the study of these vestiges of our past that make possible new applications for the world of today.

We therefore find ourselves at a new frontier in our perception of the past. The scientific study of religious and secular relics represents a new resource of historical data, allowing us to re-evaluate our understanding of our shared history and perceptions of cultural identity. The resurgence of popular devotion and global popular interest with regard to religious relics also offers a new opportunity to revisit our perceptions of these holy objects and what they represent, within the context of scientific, historical and archaeological research in this field. While the study of relics is very old, a growing number of scholars are now aiming to offer new methods, benefits and opportunities across a wide field, providing an integrated approach to interdisciplinary research collaboration in the twenty-first century.

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Notes

¹ At present, this is especially clear in the field of genetics, where the number of published ancient genomes has multiplied rapidly from 5 in 2010 to almost 4000 in 2018 (Reich 2018: xviii).

² In ca. 400, Jerome's opponent, Vigilantius, derides relics as some unknown dust kept in a little vessel, wrapped in costly cloth (Jerome, *Contra Vigilantium* 4-5).

³ This evokes Pierre Nora's concept of *lieux de mémoire*, the fundamental purpose being "to stop time, to block the work of forgetting, to establish a state of things, to immortalize death, to materialize the immaterial" through "an endless recycling of their meaning" (Nora 1989: 24). Cf. Nora 1984: 19.

⁴ "The same objects are before us. . . they are permanent and the same; but when we look upon them in cold unfeeling old age, can we, changed in our temper, our pursuits, our feelings changed in our form, our limbs, and our strength, can we be ourselves called the same?" (Scott 1886: 92).

⁵ "For as if it is the same body, still alive and flourishing, those beholding it embrace it with the eyes, the mouth, the ears. And when they have approached it with all the senses, they pour tears out over it from piety and emotion. And as if he was intact and appearing, they address to the martyr a plea that he would intercede on their behalf." (Gregory of Nyssa, *De Sancto Theodoro*: 85)

⁶ "By touching, I think, we experience a sense of our own implication in a history longer and broader than our personal one: I am – and it is – and touch can somehow affirm that truth" (Josipovici 1996: 70).

⁷ "The part is understood within the whole from which it originated, and the whole is understood from the part in which it finds expression" (Droysen 1977:35). "Complete knowledge always involves an apparent circle, that each part can be understood only out of the whole to which it belongs and vice versa. All knowledge that is scientific must be constructed in this way. To put oneself in the position of the author means to follow through with this relationship between the whole and the parts." Schliermacher (1986:84). Cf. Johnsen and Olsen 1992: 421, 425-426.

⁸ See Davie 2000: 163-167 on the conceptualising of churches as museums, and Berns 2017: 88, with reference to praying before holy objects in museum exhibitions).

⁹ Whereas the use of the term 'metonymic', rather than 'synecdochal', may need further clarification, and the classification of the Turin Shroud might be debated (index, icon, or 'metonymic sign'), this particular relic raises a number of valuable points. For example, the Turin Shroud provides a framework for the understanding of the hierarchy of religious relics applied in Roman Catholic Christianity. Primary or first-class relics would thus be classified as 'metonymic signs' (or, more accurately, 'synecdochal signs'), consecrated materials such as the Eucharist and the Gospels as 'metonymic symbols', and secondary and tertiary relics as indices, with religious images acting as a form of iconic communication.

¹⁰ Unlike history, for example, it is claimed that memory, situated between tradition and modernity, "does not attempt to rescue the past, but is in the service of the present and the future" (Todorov 1995: 8). Cf. le Goff 1988: 31. Nora, meanwhile, argued that history's purpose is to suppress and destroy memory (Nora 1989:

9).

¹¹ See n.5.

¹² For a study of the uses and enduring importance of Christian relics, see George 2013.

¹³ According to contemporary sources, sweet smell emanated from the relics of the Forty Martyrs (Sozomen, *Historia Ecclesiastica* IX.2) and St Stephen (See *Revelatio S. Stephani*: 214-215) upon their discoveries in the early fifth century.

¹⁴ For healing, see Rufinus, *Historia Ecclesiastica* I.8 (ca. 397). For restoring the dead to life, see Judas Cyriacus Legend of the Invention of the Cross (5th-6th c.) in Drijvers 1997. For causing liquids to boil, see Piacenza Pilgrim (ca. 570), Antoninus of Piacenza, *Itinerarium* XX (Wilkinson 2002: 139). See also Frolov 1961: 25.

¹⁵ See Gretser 1598, 1605, 1616; Rohault de Fleury 1870.

¹⁶ Van Strydonck *et al.* 2006; Van Strydonck *et al.* 2018: 2.

¹⁷ Project members: University of Turku - Prof. J.P. Taavitsainen, Prof. V. Immonen; Finnish National Board of Antiquities: A. Arponen. Kazan joined the Turku project in 2017 as a TIAS Collegium Fellow (University of Turku).

¹⁸ For an example of the decline of Christian relics in the

mid-twentieth century and their revival in the 1990s, see Bertram 2013.

¹⁹ Source: BBC Online, *Why St Nicholas works wonders for Russians*.

²⁰ Source: Information about the May events relates to St Thomas Becket's relic from Esztergom (Hungarian Embassy in London 2016).

²¹ Chinese Buddha sacred tooth relic conveyed to Myanmar for obeisance (*Sina Online News* 2011), Exposition of the Sacred Kapilavastu Relics in Sri Lanka, see High Commission of India, Colombo, Sri Lanka 2012, discussed in Material Religion Editorial 2013.

²² See BBC Online, *Why St Nicholas works wonders for Russians*; Ramachandran 2019.

²³ Cf. Gadamer 2004: 153-161, 367-371, 390, 398-415.

²⁴ Only a fragment of the *Titulus* preserved in the church of Sta. Croce in Rome had previously been examined (Bella & Azzi 2002). See also Kazan & Higham 2019, forthcoming.

²⁵ For descriptions and references, see Horskjær & Norberg 1956-1978 and Taavitsainen 2015.

