Spaces of funeral meaning.
Modelling socio-spatial relations in burial contexts

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Abstract

Burials have long been one of the most important sources of archaeology, especially when studying past social practices and structure. Unlike archaeological finds from settlements, objects from graves can be assumed to have been placed there for a certain purpose. The same logic holds true for *where* these object were placed: We must also understand the (ritual) acts of deposition and construction as intentional practice that moves the spatial configurations created by their placements into focus. Indeed, since the advent of the spatial turn, ideas of space as a social and cultural construct have also affected how archaeologists research and think about graves. However, the spatiality of burials as an expression of social structure has yet to be explored by means of digital methods. The paper wants to take a first step in filling this gap by conceptualizing a data model drawing on the sociology of space by Martina Löw that can then be used to facilitate computational analyses of socio-spatial relations. For this purpose, it introduces a first version of a model created using the CIDOC CRM, the compatible models CRMinf and CRMsoc, as well as additional custom classes to extend the model to adequately represent the social actions making up the construction of these relationships.

Introduction

Burials have long been one of the most important sources of archaeology, especially when studying past social practices and structure. Unlike archaeological finds from settlements, objects from graves can be assumed to have been placed there for a certain purpose. Therefore, the way the deceased are presented is not to be understood as a “mirror image” (Haffner 1989) of their lives but instead as an intentional selection of artefacts and architectural features materializing different social identities (Saxe 1970) or a “social persona” (Binford 1971) to be communicated through their burial.

The same logic holds true for *where* these object were placed: We must also understand the (ritual) acts of deposition and construction as intentional practice that moves the spatial configurations created by their placements into focus. In the same way as the typochronological characteristics of grave goods allow inferences on status, gender, or even age, the arrangements of the burial space must be assumed to carry a variety of communicative meanings which, while not always reconstructable, can still – at least in parts – be observed.

This focus on space as a social variable is not new but in line with a number of ideas connected to the so-called spatial turn (for example, Lefebvre 1974; Simmel 2009; Werlen 1993) that understands space as a social and cultural construct and considers “space’s key role in the process by which people construct their understandings of the world” (Blake 2007, 230). As such, the spatial turn has also affected how archaeologists research and think about graves (among others, Arnold 2002; Bejko 2016; Hofmann and Attula 2017). As Helaine Silverman summarises in the introduction to a special issue of the *Archaeological Papers of the American*

Anthropological Association on “the Space and Place of Death”, studies now deal with “issues such as the siting of mortuary facilities; the interplay of agency and expressive style in the funerary context as these relate to the physical space and taking place of mortuary custom; and the recognition, cultural reconstruction, and explanation of death landscapes” (Silverman 2002, 1).

Mostly, these phenomena have been studied with approaches of traditional archaeology, focusing on a comparison of individual finds and sites. In fact, there seems to be a gap in applying these theories to analyses by means of digital methods which in this paper, includes formal, quantitative approaches, for example network analysis, but does explicitly not rule out qualitative applications. Still, especially if focused on the second aspect mentioned by Silverman, i.e. “the interplay of agency and expressive style”, a relational perspective on and analysis of the subject matter promises large potential for research on a variety of topics: ~~F~~or example, the analysis of associations between grave goods, or between grave goods and the body could lead to insights into functions and socio-political significances of these artefacts; relational deposition patterns could be identified and connected to ritual activities or indicate zones materializing different aspects of identities; which, in general, could allow inferences on social practices and processes.

However, to exploit these potentials of formal analysis, basic questions of knowledge management have yet to be addressed. To begin with, ontologies and exemplary data models that allow for the expression of non-geodetic conceptions of space are needed which have not yet been widely explored.

This paper wants to introduce a first version of a data model representing the construction of social space in a burial context. For this purpose, the paper draws on theories by Martina Löw on the sociology of space which will be explained further below. Then, it introduces a specific case study of elite burials of the Late Urnfield Period which motivated this research. After a review of existing standards and their suitability to model this type of spatial configuration, focusing on the CIDOC CRM and its compatible models, it suggests a possible model and an exemplary mapping which, in a next step, can be tested against a larger dataset and extended or adapted as needed. In doing so, the paper centres on one specific spatial configuration, namely the placement of objects in relation to each other in the grave. Finally, next steps and challenges are discussed.

Materials and methods

The Sociology of Space

To create a model representing socially constructed spaces, it is first necessary to understand and conceptualize exactly what should to be modelled. Many theories exist that could serve as a starting point, yet, in this study, the “Sociology of Space” as developed by Martina Löw has been chosen (Löw 2001; 2016; cited in this paper is the English translation). This was mainly because of her emphasis on social practice, and her understanding of space as inherently relational. She identifies two processes or social actions involved in the constitution of space: the “placing of social goods and people or […] the positioning of markings that are primarily symbolic to identify ensembles of goods and people”, which she calls *spacing*; and

an *operation of synthesis* in which these arrangements are “amalgamated to spaces by way of processes of perception, imagination, and memory” (Löw 2016, 134–35).

For mortuary studies, it is important to note that Löw acknowledges the unconscious nature of the *spacing* process but also emphasizes how „people are able to understand and explain how they create spaces“ (Löw 2016, 137). This corresponds to the intentionality assumed for funeral assemblages as detailed above: While the concrete materialization of social identities of the deceased follows unconscious knowledge of social structures and structure of the burial community, their selection is performed with intent and purpose.

Another benefit of this theory is that, coming from modern sociology, it asks questions about people and societies archaeologists might not be able to answer, but which are important to consider and reflect upon nevertheless to arrive at more thorough conceptions of the past. Some examples include the role of people as arranging spaces but also as being arranged or arranging themselves to become part of these spaces, or the external effectuality of objects and people, for example scent and sound, which can critically influence the outcome of the *synthesis* (Löw 2016, 165–66, 188).

Elite burials of the Late Urnfield Period

The other starting point for this paper was a case study analyzing representations of elite identities in burials of the Late Urnfield period (Deicke 2021). The area of research covers a region north of the Alps that stretches from the East of France to the entrance of the Carpathian Basin. Here, the custom of elaborate burial re-emerges at the dawn of the Bronze Age after a period when depositional activity predominantly manifested in hoards. While the main focus of this study was on a network analysis of grave goods and features and their entanglements in extraordinary burials, a first foray into modelling and analysing spatial relationships was also undertaken. Basic relations, i.e., “next to”, “above”, “under” etc., were experimentally added to the existing graph database. This tentative exploration resulted in insights that enriched the original study: The explicit and formal documentation of spatial arrangements showed that knives, which were before seen as a monolithic category, could be differentiated in function based on their material. Bronze knives were placed mainly in or on top of ceramic vessels and accompanied by animal bones (most likely a meat offering or remains of a funeral feast), while iron knives showed a distinctive association with the remains of the body, independent of its actual treatment as cremation or inhumation (Deicke 2021, 152–53). As far as can be observed, this pattern showed in some form at all sites in the dataset where iron knives appeared[1]. While these findings might seem trivial at first, the different treatment of the same type of object depending on its material ties into the increasingly widespread adoption of iron at the transition from Bronze to Iron Age. The deposition of the iron knife not in a utilitarian

[1] Those sites consist of (from West to East): France: Saint-Romain-de-Jalionas (dép. Isère), „Les Tâches“, Tumulus Géraud: iron knife to the right of the inhumation, bronze knife across animal bones (Brun 1987, 216–17). – Austria: Franzhausen, Gde. Nußdorf ob der Traisen (Bez. Sankt Pölten-Land), Franzhausen-Kokoron, grave 119: fragments of two iron knives inside urn, bronze knife across remains of a vessel with animal bones (Lochner and Hellerschmid 2016b, table 71); Stillfried an der March (Bez. Gänserndorf), grave 6: fragment of an iron knife, possibly inside urn (table 7 and 8 of the original publication show differing placements), bronze knife next to animal bones (Kaus 1984, table 7–8). – Slovakia: Senica (okr. Senica), Grab 1: iron knife by body (Romsauer 1999, 169, fig. 2,3). – Czech Republic: Brno-Obřany (okr. Brno-město), grave 169: iron knife on top of sword pointing at human remains (Adámek 1961, 95 fig. 99); Hostomice (okr. Teplice), Hostomice 2: three iron knives and a bronze knife, placement not documented (Kytlicová 2007, 263–64).

context but as part of the personal accoutrements of the deceased hints at the important role of this new technology in elite strategies of preservation, consolidation, and attainment of power. Additionally, this pattern could not consistently be observed in graves which contained only bronze knives[2]: While it held true at sites where iron knives had already been introduced[3], at the cemetery of Künzing, bronze knives – where they appeared – were placed with the ashes of the cremation[4].

These emerging patterns reveal a complexity that requires a large scale analysis to study further: Based on this experimental approach, a research process can be derived that would ideally result in similar insights into function and meaning of other grave goods or architectural elements. First, contexts of spatially connected objects and features would be identified, as in this case the associations of bronze knives with animal remains and iron knives with the body. Next, functional interpretations and semantic meanings would be attributed to these spatial contexts, i.e., connotations of (ritual) feasting or personal items, possibly connected to an elevated socio-political status. Finally, these attributions would allow inferences on socio-political, -economical or -cultural practices and phenomena, exemplified here in the rise of iron metallurgy and the emergence of new forms of status representation.

However, as outlined above, to realize and further develop this methodology, more formal and standardized ways to encode the processes of *spacing* and *synthesis* in the burial context as data structures have to be considered.

Modelling space: a short review of existing standards

When modelling data from the domain of cultural heritage, the CIDOC CRM[5] and its compatible models[6] are the obvious starting points. The main model as well as, for example, CRMgeo (Hiebel et al. 2015) or CRMba (Ronzino et al. 2016) provide ample possibilities to understand and express location and relations between locations. Additionally, the focus of the CIDOC CRM on events as "central […] and essential for almost all modelling tasks" (Bekiari et al. 2022, 33) corresponds well with the emphasis on social actions and processes put forth by Löw's theories. Yet, before applying these classes and properties to a data model of the social construction of space, it has to be evaluated to which extent their semantics are in accordance with this purpose. As an ontology is commonly understood as "an explicit, formal specification of a shared conceptualization" (Studer, Benjamins, and Fensel 1998, 184), non-semantic use of these models contradicts their logic and limits the potentials arising from the use of a well-known standard ontology such as interoperability or the potential application of reasoning-approaches. Therefore, a short review of existing standards in regards to their ability to describe space and spatial relationships has to be conducted.

[2] However, it has to be noted that for most of the graves in the dataset containing bronze knives, detailed documentation was not available.
[3] Austria: Franzhausen-Kokoron, grave 31: bronze knife with animal bones placed on ceramic bowl (Lochner and Hellerschmid 2016b, table 15); Stillfried an der March (Bez. Gänserndorf), grave 38: bronze knife in assemblage with animal bones and ceramic sherds (Kaus 1984, table 7).
[4] Grave 2 (Schopper 1995, 195 fig. 17, 4); grave 141 (Schopper 1995, 269 fig. 36, 6); grave 143 (Schopper 1995, 269 fig. 36, 2).
[5] In this paper, version 7.1.2 as the last official version of the CRM is referenced (Bekiari et al. 2022).
[6] https://www.cidoc-crm.org/collaborations (accessed 2023-08-10).

The CIDOC CRM itself focuses on “positioning in space of what has happened and the things involved, as well as reasoning about respective spatial relations”. As such, it covers the documentation of geometric expressions of place, relations between places, and the history of object or actor locations, among others. Central to the CRM’s understanding of space is the class *E53 Place* which can be specified by *E94 space primitive*, e.g. coordinates. Temporal changes of location can be expressed through the *E9 Move* of a *E18 Physical Thing*. To express relations between places, a range of properties can be applied, namely *P189 approximates*, *P89 fall within (contains)*, *P122 borders with*, and *P121 overlaps with* (Bekiari et al. 2022, 37–38). Noticeably, in this understanding it is not objects that have spatial relations, but the places that these objects occupy. While this necessity to define individual places for all elements of a grave might appear slightly unwieldy at first, it is consistent with theories of the spatial turn that differentiate between place and space. As Löw phrases it, “[p]laces emerge through placements, but are not identical with the placement […]” (Löw 2016, 167).

However, while these properties are able to encode the type of relation, they do not necessarily carry directional meaning, i.e., to which side the place of an object borders another one. This might be due in part to the fact that the choice of directional categories (right and left, or West and East, for example) is bound to depend on the goals and theoretical framework of a specific project. On the other hand, relations such as “under”, “above”, or “inside” can already be expressed by the precise application of these properties.

Some of the compatible models build on this condensed envisioning of space and spatial relations. Yet, most of them are clearly intended for the documentation of different cases and research questions than presented in this paper. For example, the CRMgeo states as its primary purpose “integrating all kinds of geoinformation that is available in GIS formats into CIDOC CRM representations” (Hiebel et al. 2015, 4) which constitutes precisely the perception of spatial information that this exercise intends to move away from. The CRMarchaeo focuses on “describing stratigraphic genesis and modifications and the natural phenomena or human intervention that led to their creation […].” While its understanding of stratigraphy as the result of a production event potentially induced by human intentions carries definite potential for the analysis of the production of socially configured spaces, the original intent of describing “the nature and shape of existing stratifications and surfaces” in the context of the archaeological excavation process must be respected and prohibits its application to the semantics of space (Doerr u. a. 2020, 5). The same holds true for the CRMba that contains additional properties dedicated to the description of spatial relations as well, but explicitly deals with the documentation of archaeological buildings (Ronzino et al. 2016).

While these models deal with the factual characterization of space and spatial relations, other models can also be considered to add encodings of prehistoric social processes or reasoning decisions by modern researchers. The CRMinf or “argumentation model” aims to document “the management, integration, mediation, interchange and access to data about reasoning by a description of the semantic relationships between the premises, conclusions and activities of reasoning” (Stead et al. 2019, 3). As such, it seems especially suited to integrate the processes of assigning meaning and of interpretation that infer various spatial contexts from social *spacings* into the model.

Understanding a burial as the result of social practice and ritual actions further suggests the inclusion of these underlying processes into the modelling. While the case study presented in this paper has not yet reached the phase to deduce these types of social relations, potentially,

their encoding could be provided by the CRMsoc. This model aims to "document social phenomena and constructs", and to "represent and relate social facts and life" (Alamercery et al. 2019, 2). As of the writing of this paper, the specification is published as version 0.1 and in its draft stage. Still, the model might serve as a fruitful addition to formally express the hypothesised social structures behind the finds and architecture of the burial.

Finally, the question must be asked if for such a specific research question that seems to lie beyond the intended applications of the CIDOC CRM and its compatible model, other ontologies or schemata could prove useful. To this end, some standards were evaluated, for example the Basic Formal Ontology (BFO), an upper ontology mainly used in the biomedical domain (Smith 2015). Yet, this evaluation shows that as the case study is clearly situated in the domain of cultural heritage, centring archaeological finds and features as the basis for its interpretative acts, the advantages of using a domain ontology such as the CIDOC CRM outweigh the disadvantages represented by the gaps identified in the process. Therefore, a first version of a data model was created by drawing on the CIDOC CRM which will be presented in the next chapter.

Results

A formal model of funeral spatial arrangements

While in many cases from business applications, data modelling focuses not only on a purposeful description of the domain but also on usage aspects such as "balancing the needs of the application, the performance characteristics of the database engine, and the data retrieval patterns"[7], in research-driven database design, the structure of the data will generally aim to express the structure of the domain from the perspective of a specific research question or purpose.[8] In this case, this means that while the model should support a certain degree of interoperability, for example by using a widely known standard ontology as a common frame of reference, the specific research purpose of modelling space as a social structure takes precedent.

Furthermore, in this case, the exercise of creating a data model can also be understood as ontological work in the original philosophical sense: identifying entities and conceptualizing their relationships in the process of constructing social spaces and spatial arrangements (Arp, Smith, and Spear 2015, xxi). Accordingly, three components can be identified to map out the construction of social space according to Löw (2016, 132–35):

1. The "building blocks of space", i.e., living beings and social goods
2. Their relationships with each other
3. The acts of *spacing* and *synthesis*

Additionally, a fourth components needs to be added: as the interpretation of the spatial arrangements, of *spacings*, and even more so of *synthesis* and semantic meaning is highly

[7] See also documentation of the popular database solution MongoDB (https://www.mongodb.com/docs/manual/core/data-modeling-introduction/, accessed 2023-08-10).
[8] See also Flanders' and Jannidis' distinction between curation- and research-driven modelling (Flanders and Jannidis 2019, 86).

subjective, this process, its actor(s) and their reasoning for arriving at these conclusions should also be added to the model:

4. Interpretative process

As a first result of the modelling exercise[9], it turned out that the CIDOC CRM proved to be largely sufficient to represent the processes of *spacing* and *synthesis* as conceptualised by Löw, supplemented by classes from the compatible models CRMinf and CRMsoc. Merely some classes and one property had to be added to satisfy the requirements of the specific use case, creating a first suggestion of a custom ontology.

In this process, the four components listed above were not translated one-to-one into modules of the model (fig. 1). Rather, the "building blocks" are represented by archaeologically observable phenomena (purple) as well as the assumed actors of the burial community and ritual (green); their relationships are manifested in properties of the CIDOC CRM, but also in the class *socE Relationship*; for the acts of *spacing* and *synthesis* additional classes were created which make up the process of the constitution of space (red); and the interpretative process was mapped out as a first experiment by adding classes of the CRMInf (blue). Following, some considerations that went into the model will be explained in more detail.

As mentioned above, the social processes and rituals surrounding the burial itself were not yet the focus of the research project, so this part of the model presents only a rough outline of the burial community, the relationship between its members, and their actions. The *E69 Death* of a person motivates an *E39 actors* to initiate the *SC1 Spacing*-activity that constitutes the first step of the construction of the burial space. It is important to note that in accordance with the CRM specification (Bekiari et al. 2022, 83), this node can signify one or more actors as it is unclear how many persons were effectively involved in the construction of an Urnfield burial. To account for the probability of further ritual actions surrounding the burial, another *E7 Acitivity* is added, though this part of the model should certainly only be seen as a stand-in for a more thorough exploration of ritualistic practice.

The person(s) constructs the grave by adding elements through *SC1 Spacing*, which constitutes an *E9 Move*-event, to *E53 places* that in their entirety constitute the burial space itself. These elements can be *E22 Human-Made Objects*, i.e., grave goods, *E20 Biological Objects*, i.e., animal bones, even *E21 Persons* itself as cremation or inhumation, but also *E25 Human-Made Features*. This accounts for the fact that architectural elements of the grave are understood as carriers of semantic meaning as well. Examples are the close links of sword depositions, tumuli, and inhumation rites that evolve in the late Urnfield and early Hallstatt Culture (Deicke 2021, 151; Kurz 1997, 108–9, 119; 123), or the association of elaborate grave architecture with the concept of energy expenditure, implying political control over human labour forces (Tainter 1975, 2; Wason 2004, 137–38). For Löw, living persons themselves are

[9] The model presented in this paper is an updated version of the one presented at the conference itself. Changes were made according to discussions in and around the session.

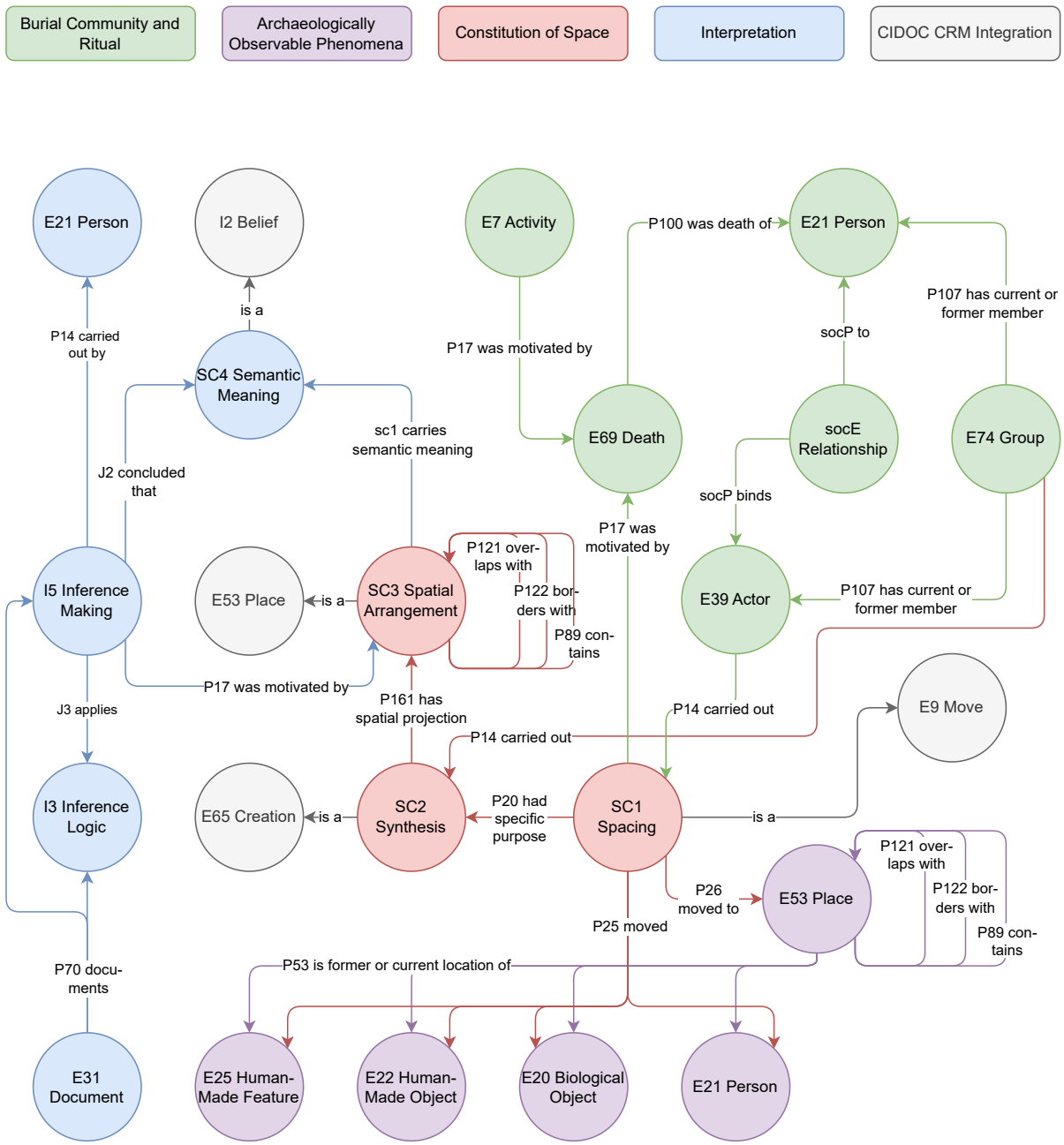

fig. 1: Conceptual model of the construction of social space through the acts of spacing *and* synthesis *according to Martina Löw (2016). Created with diagrams.net.*

also a part of the spatial arrangement, yet, while this can be expressed by the model, it is not expressively considered due to the challenges in accounting for contributions by living actors to the funeral placements with archaeological means.

One or more *SC1 Spacing*-events correspond to a *SC2 Synthesis* which is seen as heavily influenced by social routines, norms and structure of the burial community (Löw 2016, 144), and therefore, is carried out by the respective *E74 Group*. It is conceptualized as a subclass of *E65 Creation*. Yet, to some extent, *E81 Transformation* could fit better in this context as the *SC1 Spacing* also marks a transformation, moving living beings or social goods from the context of the living to the context of the dead (see also Deicke 2020, 44–50). Yet, according to the CRM specification, *E81 Transformation* only applies to *E18 Physical Thing*, not to abstract ideas such as spatial conceptions (Bekiari et al. 2022, 103). The two actions of *SC1*

Spacing and *SC2 Synthesis* lead to the creation of a *SC3 Spatial Arrangement* that carries *SC4 Semantic Meaning*. This meaning is concluded in an interpretative act expressed through classes from the CRMinf. In a sense, modelling *SC4 Semantic Meaning* as a *I2 Belief* and as the product of a *I5 Inference Making* positions it as an inversion of the *synthesis* – the interpretative act that gave meaning to a certain spatial configuration of objects has to be retraced by today's scholars to decipher this meaning. Both *I5 Inference Making* as well as the *I3 Inference Logic* that was applied to arrive at this conclusion can be documented by *E31 Document*, if already published, and should otherwise be explained directly in the database. Lastly, it should be mentioned that just as the places inhabited by individual objects can overlap, border or contain each other, so can the composite spaces of the *SC3 Spatial Arrangements*, to form new *spacings* and *syntheses*.

mple mapping: Grave 119 of Franzhausen-Kokoron

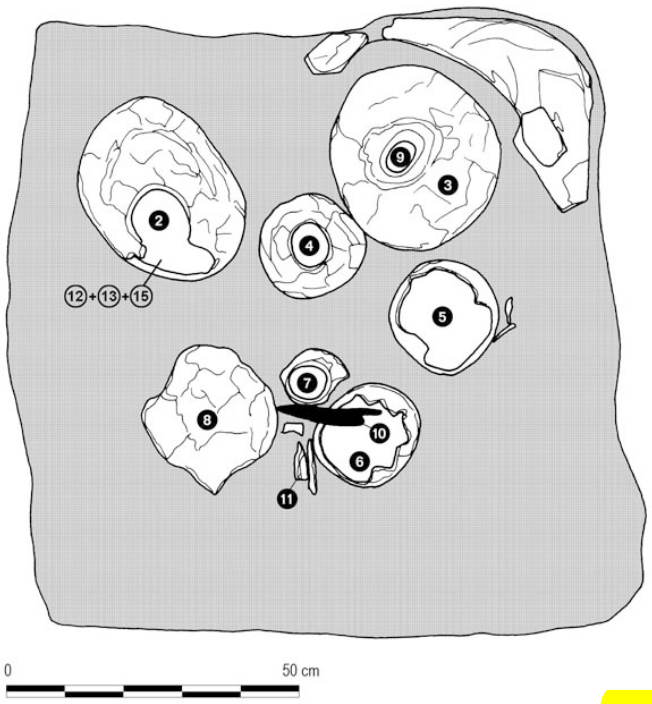

fig. 2: Grave 119 of Franzhausen-Kokoron. 2 – urn; 6, 7 – ceramic vessel; 10 – bronze knife; 11 – animal bones (sheep); 13, 15 – fragments of two iron knives (Lochner and Hellerschmid 2016b, table 71)

Technically, the next step of the knowledge engineering process would be the creation of a logical data model to reduce complexity and to facilitate implementation in a database, data entry, and querying. Yet, to better illustrate the intentions of the conceptual model, an exemplary partial mapping of a burial containing iron as well as bronze knives is presented below. Grave 119 of the cemetery of Franzhausen (Nußdorf ob der Traisen, Lower Austria) contained fragments of two iron knives placed inside the urn alongside the ashes of a cremated body, and a bronze knife that was laid across the remains of a vessel and accompanied by animal bones (fig. 2; Lochner/Hellerschmid 2016, Grab 119).

Due to the complexity of the model, the mapping (fig. 3) incorporates only those entities of the inventory connected to the iron knives and their possible functions, namely the urn (*E22*), the iron knives (*E22*, combined into one node), and the cremation as the remains of the person of the deceased (*E21*). This last *E21*-node also represents the *E21 Person* whose death motivates the acts of *spacing and synthesis*, who is part of the burial community of Franzhausen-Kokoron (*E74*), and who can be assumed to have had a specific relation to the *E39 Actor* performing the placement.

At the centre of the mapping are the three *SC1 Spacing* events referring to the placement of the urn, iron knives, and cremation, and the spatial relations between them. They are connected to two events of *SC2 Synthesis* which in turn, create three specific *SC3 Spatial Contexts* with different *SC4 Semantic Meanings*. One of those presents the initial decision of

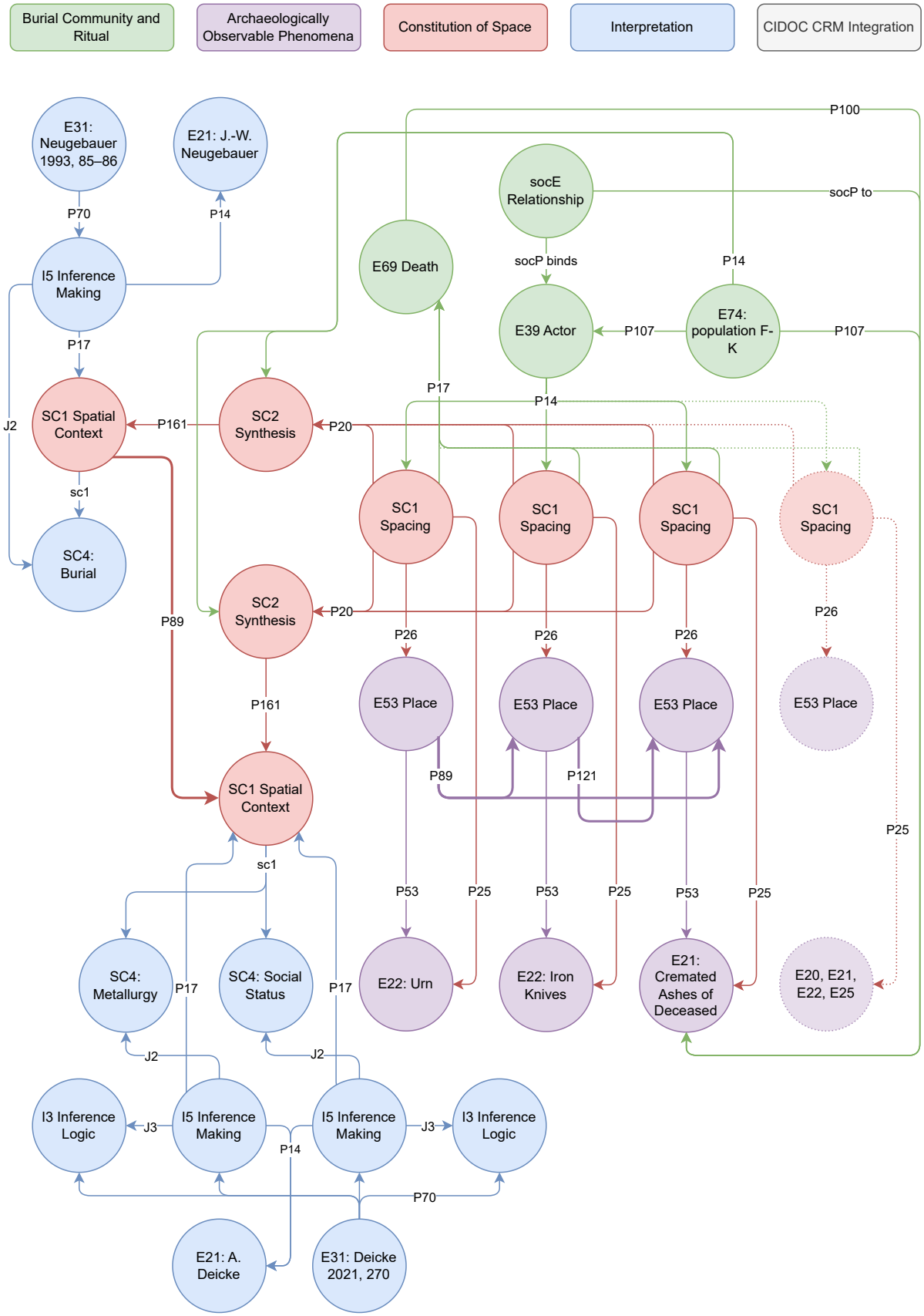

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fig. 3: Mapping of the constitution of the spatial arrangements of grave 119 of Franzhausen-Kokoron. Bold: Spatial relations; dotted: stand-in for the other entities making up the burial space. Created with diagrams.net.

the original excavator, Johannes-Wolfgang Neugebauer, to define this assemblage of finds and features as a burial (Neugebauer 1993, 85–86). The second and third one document the interpretative acts of ascribing these arrangements meaning for the expression of social status and a connection to iron metallurgy by the author, documented in the study introduced above.

In summary, the mapping documents which groupings of *spacing*-events different researchers understand as meaningful, and in which way. In making these processes explicit and their interpretation transparent, they facilitate their analysis and ensure the reproducibility of the results gained.

Discussion and Outlook

In summary, a general model of the construction of burial spaces was created using the CIDOC CRM, the compatible models CRMinf and CRMsoc, as well as additional custom classes to extend the model to adequately represent the social actions behind this construction process. While the model contains substantial complexity, the decision of how much of this complexity is necessary to implement depends on the specific research project; certainly parts such as the interpretative process or the representation of the burial community and rituals could be substituted by a careful qualitative contextualization and description. As was said in the beginning, part of this exercise was aimed at philosophical ontological work, to envision which entities and relationships are participating in the process of the construction of social spaces. In this regard, it has to be noted that not all elements of Martina Löw's theories have been included in this version of the model, as, for example, the "external effectualities" mentioned above are not yet represented.

In a next step, the model will be transferred into a logical data model for a graph database containing the data from the case study. Two approaches are considered for quantitative analysis: (a), to develop algorithms on the basis of the extended CRM that allow for the querying of this knowledge base and could point researchers to other patterns such as the one described above; (b), to export selected relationships and to analyse them using methods and measures of network analysis.

As mentioned above, the ensuing research pipeline will be tested and, if necessary, the model will be adapted accordingly. For this process, some challenges remain to be considered. For example, the question remains if the existing properties of the CIDOC CRM that describe spatial relations are expressive enough to adequately illustrate the arrangements between grave goods, architecture and organic remains, or if it will prove necessary to develop a more detailed controlled vocabulary. Also, it might be fruitful to integrate further categories into the model that potentially influence *spacing* and *synthesis*, for example, gender or age of the deceased, or the materiality of objects which is now subsumed into the respective *E22 Human-Made Object*-nodes.

Still, with this first modelling effort, an important step has been taken to lay a foundation for the study of socially constructed space by means of digital methods. It opens up a wide range of potentials for future studies to detect patterns of mortuary spatial arrangements, to contribute to a more detailed understanding of past funeral norms, function and meaning of grave goods and architecture, and consequently, to draw inferences on the social structure of the burial community in which these spaces were produced.

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Conflict of interest disclosure

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