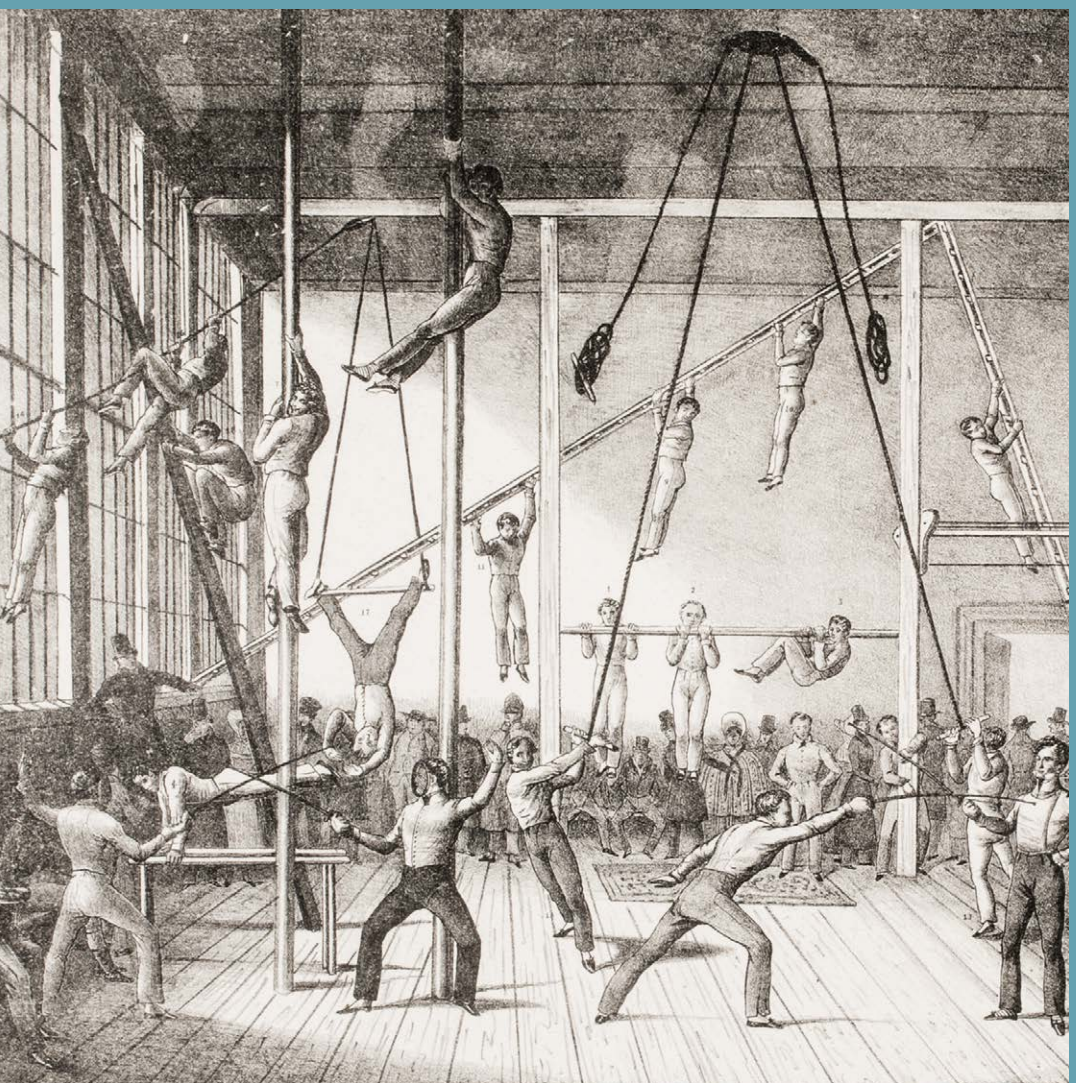
Moving the Past

Embodied Research on Discontinued Movement Cultures

Edited by

Maciej Talaga



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Maciej Talaga, Editor

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Introduction

Maciej Talaga
University of Warsaw

Physical or bodily practices function not only as practical means to address basic human needs, such as preparing food or taking care of one's health, but as cultural expressions as well. Almost a century ago, Marcel Mauss observed that body techniques vary across cultures and times, sometimes playing important roles as constituents of collective or personal identities.[1] A specific method of doing something may become widely recognised as characteristic of particular group or even individual, as in the cases of the 'Dagestani drag' in modern freestyle wrestling or 'Cruyff turn' in football/soccer. More recently, Jürgen Streeck demonstrated that hand gestures not only communicate, but also participate in the cognitive process by facilitating exploration of one's own thoughts and anchoring them in the space shared with others.[2] All this draws attention to the historical, societal, and technical dimensions of physical practices, or simply movements.

Movement culture and (dis)continuity

Inspired by Henning Eichberg's conceptualisation, in the present volume we focus on 'movement culture', understood as a subset of the broader category of physical culture.[3] While physical culture encompasses all practices, philosophies, and traditions surrounding the body's physical and aesthetic development, movement culture focuses on the embodied practices – activities like sports, dance, or martial arts – in their technical, kinaesthetic concreteness. How these movements are cultivated reveals much about the values, priorities, and identities of their practitioners and the societies they inhabit. Less intuitively, those practices that fall out of favour and lose continuity can also teach us a lot about the same societies and the cultural processes responsible for their thriving and decline. This volume aims to venture into this counter-intuitive avenue, which has so far been trodden but modestly by scholars, and delve into the complex question of discontinued movement cultures. By examining how these practices can be studied, reconstructed, and revitalised, we hope to unveil the potential for bridging historical gaps in understanding human movement and its cultural significance.

Continuity in living movement culture is primarily maintained through the active transmission of knowledge and practice from practitioners to practitioners. This involves both formalised instruction and informal learning. For example, dance styles or martial arts are often transmitted through apprenticeship, relying on master-student relationships to preserve their techniques and philosophies. This transmission typically includes tacit knowledge – those subtle, embodied skills that cannot be codified but are integral to the practice. The presence of living practitioners ensures the adaptation and evolution of practices in response to new contexts while maintaining their cultural essence. The resilience of a movement culture depends on various factors, including its adaptability, relevance to contemporary society, and institutional support. When these elements are in place, practices often flourish and grow. However, when they are disrupted – due to colonisation, modernisation, or changing cultural priorities – the continuity of these practices can be threatened.

[1] Mauss 1971, originally published in French in 1934.
[2] Streeck 2009; he notes that even the common English verb 'to comprehend,' referring to abstract reasoning and intellectual understanding, derives from the mundane, literal action of prehending, that is, grasping with the hand.
[3] Eichberg 2009.

Analogously, discontinued movement cultures are those in which the living chain of transmission has been broken, leaving no active practitioners to continue the tradition. These lost practices exist only in fragmented traces – artefacts, textual records, iconography, or oral history. With their original context lost, these cultural forms often seem frozen in time. Yet, the fragments provide valuable insights into the lives and values of past societies and offer potential pathways for reconstruction.

Historical European martial arts as a discontinued movement culture

Research into discontinued movement cultures involves meticulous analysis of historical and material traces. A promising area of study is Historical European Martial Arts (HEMA), which groups modern practitioners reconstructing combat systems from the Middle Ages and Renaissance. Initially a non-academic endeavour, it started to draw the attention of academicians in the 21st century, with scholars like Daniel Jaquet, Timothy Dawson, Bartłomiej Walczak, and this author proposing more or less formalised methods for interpreting martial arts manuals, weaponry, and artistic depictions to revive combat techniques.[4]

HEMA distinguishes itself within the broader area of martial arts studies by focusing explicitly on practices with no living transmission, relying on archaeology and historical sources to reconstruct movement.[5] Comprising practices that used to be culturally significant in the past and still have allure in contemporary society, such as swordsmanship or wrestling, HEMA is also embedded in a wider cultural context. In the past, martial arts functioned in a reciprocal relationship with other bodily practices, such as health regimens or military drills, modes of self-expression, as well as intellectual currents. Nowadays, they respond to collective interest in or nostalgia for the past, reflected in contemporary medievalisms in cinema, video games, and fantasy literature.[6] This multi-sidedness and research potential renders HEMA a phenomenon worthy of study by historians, archaeologists, anthropologists, and sociologists. It is also a unique field demanding unorthodox approaches, in which bodily practice is an integral part of the research strategy.

Embodied archives and reconstructing movement cultures

A crucial concept in studying discontinued practices is the 'embodied archive', understood as skill – intangible, tacit, performative potential and knowledge – sedimented and stored in human bodies in result of years of acculturation and training. Sarah Kenderdine, Lily Hibberd, and Jeffrey Shaw consider these archives – the tacit knowledge embodied in living practitioners – as a crucial resource responsible for keeping bodily practices alive and the key component of intangible cultural heritage.[7] These scholars posit that while the human body holding the embodied archives cannot be preserved forever, the content of the archives can be captured and preserved indefinitely in immersive digital forms. Even more importantly for the present argument, they argue that, once properly digitised, embodied archives can be used to virtually reenact historical practices in different settings, allowing researchers to unlock new insights into lost traditions. For instance, the *Remaking Confucian Rites* project uses computer modelling to simulate and reenact ancient Chinese rituals. This method combines cutting-edge technology with human performance, enabling repeated iterations and refinements of ritual practices. In their paper, Kenderdine, Hibberd, and Shaw argue that such processes make the ephemeral aspects of heritage tangible and analysable, offering a radically new approach to understanding discontinued intangible heritage:

[4] Dawson 2016; Jaquet and Kiss 2015; Jaquet 2016a; Talaga 2020; Talaga, Wrzalik, and Janus 2021; Talaga and Ridgeway 2020; Walczak 2011, 2022.
[5] Islas and Jennings 2023; for a general introduction into the martial arts studies as an academic field, see Bowman 2017.
[6] Alvestad and Houghton 2021.
[7] Kenderdine, Hibberd, and Shaw 2021.

> *The large-scale operation to record, encode and display the tacit contents of the Archery Rite reveals some of the potential for its renewed transmission through virtual interaction, presence and immersion within Confucian ritual knowledge systems. As it couples reenactment with the power of computational modelling, this approach could unlock and revivify (...) the ritual expressions of the modern Confucian body.*[8]

While the results of such technologically driven projects are impressive, they are not the only way to approach the study of discontinued practices. Grassroots communities, such as HEMA practitioners, demonstrate that valuable research can emerge from collective efforts with limited resources. These communities engage in hands-on experimentation, testing hypotheses through physical practice, and generating data that enrich the academic study of movement cultures. Leveraging their expertise to re-stage and analyse certain aspects of discontinued intangible heritage, like Kenderdine *et al.* did with digital models, is a distinct theoretical possibility even without harnessing expensive advanced technologies. Indeed, there is a compelling argument for prioritising human embodiment over digital prostheses as the primary 'storage' medium for intangible cultural heritage. Unlike static digital models, living practitioners offer a dynamic and adaptive approach to preservation. In living cultures, it is them that embody the practices, adapting movement cultures to new contexts while remaining anchored in historical authenticity. In discontinued practices, this approach promises that that reconstructed cultural heritage becomes a living, evolving movement culture rather than a fossilised relic confined to (virtual) museums.

Aims of the book

A few years ago, in an afterword to three milestone conferences on historical European martial arts studies, Daniel Jaquet noted that the future of this field depends on the scholars' ability to reconcile experiential research rooted in hands-on practice with the rigour of academic historical inquiry:

> *More proof of concepts and case studies should appear in publication to help minimise confusion about the scholarly value of experiencing and experimenting within historical martial arts. As with other fields of martial arts studies, innovative ways of bridging the gap between researcher and practitioner must be found, as well as new approaches on the matter of how to actually publish research on embodied knowledge.*[9]

The present volume responds to this call and goes even further by offering a collection of case studies seeking to highlight how even discontinued movement cultures – not only martial arts – can be revitalised and embodied in the present. By combining academic research, practical experimentation in the broadest sense, and community engagement, we argue that it is possible to bridge the gap between contemporary practice and historical knowledge. If textual (historical) and material (archaeological) sources reflecting discontinued movement cultures are approached by today's researchers as constraints limiting and structuring their creativity and imagination, then the present practice and embodied knowledge developed within these limits will gradually grow closer to the historical. And even when it does not, the failure may expose the discrepancies between the past and the present that would otherwise remain hidden. The contributions collected in this book made explicit or implicit use of this principle, demonstrating that this approach not only deepens our understanding of the past but also enriches the cultural landscape of the present.

Finally, this volume seeks to reveal an important gap in the discourse on intangible cultural heritage. The UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage from 2003 emphasises the protection of living traditions but does not directly address discontinued practices. As a result, intangible heritage with no living practitioners often exists in a state of limbo,

[8] Kenderdine, Hibberd, and Shaw 2021: 263.
[9] Jaquet 2016b: 120.

neither fully recognised nor actively preserved. By demonstrating that discontinued practices can be meaningfully studied and embodied today, we hope to draw scholarly and institutional attention to these neglected aspects of cultural heritage. Such phenomena as HEMA show that present communities of practice may emerge spontaneously in response to an organic yearning for the revival of discontinued movement cultures, opening unique potential for reconstructing and safeguarding lost cultural heritage.

Synopsis of the chapters

The main part of the volume opens with a theoretical contribution by Bartłomiej Walczak, titled *Triangle of Diverging Incentives*. The chapter supplements the general theoretical and methodological remarks laid out in this *Introduction* by describing the specific challenges involved in embodied research on antagonistic practices, with the author's perspective informed mostly by the study of late-medieval European martial arts based on surviving textual sources. Designed as an expansion to previously published research framework, it introduces important theoretical distinctions dividing the holistic process of Reconstruction of past embodied technique into three complementary areas, tentatively labelled as Re-enactment, Reworking/Reproduction, and Resurrection/Revival. Through a systematic analysis of these, the author provides a practical set of guidelines helping researchers better design embodied studies employing contemporary practice to understand historical movement cultures.

In *Leveraging Reenactment and Historical European Martial Arts (HEMA) for the Understanding of Ancient Combat*, Paul M. Bardunias and Benjamin R. Truska offer a case study on ancient Greek hoplite warfare illustrating the methodological challenges involved in studying collective antagonistic behaviour in the absence of explicit technical literature and specialised iconographic sources. They demonstrate how the materiality of artefacts and human bodies engaged in the investigated embodied practices create a set of constraints which can be used to create experimental settings using contemporary subjects to test hypotheses about the past. Acknowledging embodied skill as a crucial experimental variable, Bardunias and Truska discuss also the benefits of cooperation between researchers of past movement cultures and present communities of practice cultivating expertise in adjacent areas.

A similar challenge, complicated by the scarcity of sources, is tackled in *Crooks, Hooks, Tips, and Taps* by Ruadhán MacFadden. Taking on the task of reconstructing an entirely extinct folk wrestling style from Ireland, the author had to make use of what was available – a handful of 19th-century photographs and first-hand descriptions, linguistic data, and his own body as a supplementary research tool. The results obtained this way are presented and critically evaluated, revealing both the potential and limitations of embodied research on discontinued movement cultures. An interesting aspect of the study is the interpersonal cooperation necessitated by reconstruction of wrestling techniques, which cannot be meaningfully explored through and within a single human body. Exploration of this question led the author to ponder the possibility of (re)creating a community of practice as both a result and a crucial part of the process of reconstruction.

In contrast, the next chapter deals with a research environment rich in material relics as well as technical literature providing both textual and iconographical reference for the investigated practices. *Gripping Affordances of Select Post-Medieval European Sidearms* by Jerzy Miklaszewski is an in-depth study of the reciprocal interaction between artefact design and movement culture, as exemplified by post-medieval cold steel weapons. By carefully juxtaposing the anatomy of human hand with the hilts found on surviving post-medieval sabres and broadswords from European collections, Miklaszewski reconstructs the material substrate which gave birth to period's swordsmanship methods, each a

highly-specialised movement culture in itself. This allows him to establish a data-based point of reference for the contemporary practices based on the study of historical fight books and weaponry.

Boots on the Ground by Charles Lin takes the readers again away from scrupulous analyses of archaeological artefacts and their representation in period technical literature. Instead, the study centres on the human bodies cooperating with material objects to confront the physical challenge of marching. Being an account of an embodied investigation undertaken by a team of seasoned medieval reenactors, it demonstrates how relatively abstract questions, such as 'how does it feel to march like a late-medieval infantryman?', can be structured into a coherent and informative study design without the rigidity of formal experimental method. Lin then uses the experiential insights gained during the march to highlight the agency of the physical environment (landscape, infrastructure), human bodies (physiology, conditioning), social dynamics (discipline, mutual support), and cultural factors (artefacts to carry, expected pace) in shaping the past and present performances.

In the next chapter, titled *Going Medieval on the Body*, Maciej Talaga and Krzysztof Kozak contribute another embodied study relying primarily on experiential insights. However, unlike in the previous chapter on marching, their research is not based on a single event but rather a prolonged physical engagement with the investigated movement culture – a one-year-long personal exploration of a late-medieval physical conditioning and health regimen reconstructed based primarily on German sources. The longitudinal study design provided an opportunity to explore the emergence of skill over time, the sedimentation of training-induced changes in the body, and the resulting shifts in interpretative perspective on the historical sources. These outcomes then enable moving from narrowly-understood movement culture (exercises) to higher-order social constructs (body culture in late-medieval Germany) and their reinterpretation.

Finally, the volume is closed with *Coda: Why Moving the Past?*, a short critical-theoretical essay by the editor. Maciej Talaga reflects on the shared insights and methodological commitments that emerge across the volume's diverse case studies. It highlights how embodied reconstructions fit into Walczak's ADVISE method, the methodological postulates of archaeology of motion, and Gibson's theory of affordances, enabling a dynamic engagement with discontinued movement cultures. He emphasises that contributors collectively demonstrated that historical practices, though fragmented or forgotten, can be meaningfully revived through interdisciplinary, ethically reflective experimentation. In doing so, their results call for an expanded understanding of intangible cultural heritage that would embrace not only continuous traditions but also those reclaimed through experiential yet critical research.

Chapter 1.
Triangle of Diverging Incentives. Methods for Reconstruction of Personal Combat Techniques

Bartłomiej Walczak
Independent researcher

Introduction

Medieval and Renaissance Europe left us a significant legacy of manuscripts and books depicting or describing techniques of personal combat.[1] They range from a set of plain illustrations, longer textual descriptions, or any combination of the two.[2] Their purpose also varied from being a personal memory device, a sketchbook for larger publication, a compilation of previous sources, advertisement or a commissioned work, a commentary, or an actual teaching aid. For convenience we gather them all under the label of "fight books" or *Fechtbücher*.[3]

Despite variety in form and intended purpose, fight books share certain tropes of pragmatic literature: they provide recipes for solving specific problems. In our case these problems manifest as opponent's attacks intended to subdue or cause harm. Sometimes the recipes are accompanied by general advice or theoretical explanations, but in most cases they consist of hypothetical, idealised *exempla* where skilled actors overcome their opponents.[4] This is true even for illustrations without accompanying text, which – to the best of my understanding – most likely served as a visual reminder of a previously encountered situation.

Here's one such 15th-century *exemplum* for fighting in armour with a two-handed pole-axe:

> *(...) if you have the tail [weapon's bottom end] forward, without moving or stepping, rush the cross of your axe in front of his, to engage it crossways, so that it can only hold up the stroke which does not fall on you. And as soon as the crossing has been effected, disengage your axe, casting at him with the tail from low to high, sweeping violently between his hand and the cross of his axe, to make it drop from his hand.*[5]

Despite describing the desired outcome, these solutions were not meant to always guarantee a success. In many cases this assumption is implicit, but the above *exemplum* continues with a remedy for a potential failure:

> *And if you should fail, you may quickly return on your guard. And if you have made it jump out of his hand, you can do whatever seems good to you by means of a tour de bras or something else.*

A successful outcome depended not only on having skills and capabilities to perform the prescribed motions, but also to recognise the problem and select the applicable solution from a variety of other

[1] Verelst, Dawson, and Jaquet 2016.
[2] Żabiński 2010: 33.
[3] For the etymology and more fine-grained distinction between *Fechtbücher* and the rest of the fight book corpus, see Hagedorn 2016.
[4] Ijäs 2020.
[5] *Le Jeu de la Hache*, 15th-century fight book. Translation after Dupuis and Deluz 2017.

possible options in the first place. Both invalid selection or subpar execution might be met with opponent's counter, and such counters are often presented as part of the same or following *exempla:*

> *If you strike him first by means of a tour de bras, and he protects himself in the fashion above-said, you can do the same thing as him with the tail, as described above.*

All fight books share the same premise: if one is able to adopt the prescribed behaviour in described circumstances, their odds of being successful in combat significantly increase. Limited access to such techniques – whether in written or oral form – creates a knowledge asymmetry and may provide a meaningful advantage. The actual outcome, however, is primarily dictated by the relative difference of combatants capabilities and skills, or who can execute better actions in a timely and effective manner. This adversarial relationship between actors adds another dimension to an already difficult undertaking of reconstructing a performance-based art.

Reconstruction goals and challenges

Descriptions in *exempla* guide actors through a seemingly predetermined sequence of movements. These individual motions are labelled as 'Elementary Actions'.[6] In principle, on a purely kinematic level, these should be common to all human actors regardless of historical context and not that difficult to reproduce. However, such reconstruction is a form of choreography lacking any pressure for optimisation or adjustments required for effective timely application against a non- cooperating skilled opponent and also carries relatively little academic value.

Actions in *exempla* are executed in context: they have implicit or explicit **intent** and **demand** certain level of competence from performing actors.[7] Groups of elementary actions sharing a specific intent become 'Body Techniques', while a network of body techniques organised around the *goal* of solving a specific problem in a particular way form actor's 'Expected Behaviour'.[8] Finally, actor's expected behaviour is partially determined and limited by a *role* which they play in a given *exemplum*, for example 'opponent', 'bad fencer', or 'master'.[9] In other words, *exempla* propose adopting specific behaviours to solve particular problems.

Individual actor's goals are deeply rooted in historical context and they not only shape, but actually drive their behaviour, and therefore point us to viable problems and solutions that could exist within that particular context. We hope that by exploring recorded problems and solutions through embodied practice we can gain additional insight into past actors' intentions, goals, and expectations, or as Talaga aptly describes it:

> *Archaeology of motion aims to produce reconstructions of body techniques. (...) [I]n this sense [it] does not equal reenactment, (...) because it is impossible to repeat a past event, that is, what a particular person or persons did at some point in history. However, (...)* ***it is possible to replicate the results of a past event****, thus gaining some knowledge about the process that led to these outcomes. Reconstruction of motion, therefore,* ***brings back not bodies or actions, but knowledge****.*[10]

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[6] Walczak 2006, 2011.

[7] In the context of reconstruction actors should be understood as not just individual human bodies alone, but in most cases as a composite of bodies and material artefacts such as weapons and armour (Herman *et al.* 2020, Talaga 2023), and sometimes also with another actor, such as a horse, acting together towards a single goal. In the case of our *exemplum*, we are talking about a combatant dressed in full plate armour, wielding a two-handed pole weapon, fighting on foot.

[8] For a more detailed discussion, see Walczak 2022. The notion of Body Techniques was added to the framework presented here in Talaga 2023.

[9] These are some of the most common roles that I already described in more detail in a previous paper, see Walczak 2022.

[10] Talaga 2023: 511, emphasis added.

Recorded *exempla* – in order to have a wider application – are already partially de-contextualised and do not describe any particular historical event. Following the distinction put forth by Spatz, they present us the core, unchanging, transmissible concept of a movement solution ('technique'), that each time must be adjusted by actors to fit unique conditions that they happen to find themselves in ('practice').[11]

We could simply consider these action sequences to be actual events and attempt to reenact them as described. However, this approach misses the critical aspect which caused these techniques to be invented and recorded in the first place: an attempt to prevail over a **non-cooperating, skilled** actor who is actively trying to disrupt our performance. To take this into account, we should instead treat *exempla* as a set of choices that a skilled actor would make, facing a skilled opponent with their own repertoire of threats and responses. The process of selection is an integral part of recorded material and therefore of the skill itself.

Therefore, in our attempts to reconstruct a possible past event to replicate its results, our event should provide a degree of freedom of choice to at least one, but preferably both actors. Otherwise, our results and conclusions might at best be limited and at worst invalid, causing the knowledge transfer to fail. At the same time this freedom should be limited by our understanding of historical context and is bound to generate a significant number of 'Unexpected Behaviours', that we will need to address. Such reconstruction poses a number of conundrums that are difficult to reconcile.

In this light, our reconstruction of a past event becomes more of a guided simulation, than reenactment. As such, it requires two things: an appropriate approximation of environment and skilled actors. We usually start with neither.

When it comes to environment – including replicas of actor's gear – we need to decide on which aspects will need careful reproduction, and what we can get away with by approximation or even skip altogether. This is most often determined by the questions that we want to ask, sources that we examine and our access to time and resources. This aspect is not that different from any other reconstruction effort, and therefore in the interest of space I must direct interested readers to the wealthy literature covering this subject.[12]

Unfortunately, even given the perfect environment, we are still faced with a task to reconstruct not just one skilled actor, but at least two, usually also at different skill levels. We aim to produce actors who in the simulated environmental circumstances and under adversarial pressure and significant time-constraint would prefer to adopt described behaviours because they honestly believe that these solutions allow them to reach their goals in the most effective way.

Affordances and skill

I mentioned that actor's goals shape and drive their behaviour, but what makes one *actually act* in a given way? To answer this, it is useful to reframe the problem in the language of Ecological Psychology and Ecological Dynamics.

Gibson introduced a very useful concept of 'affordance', defined broadly as an 'action possibility formed by the relationship between an agent and its environment ' and understood as an opportunity

[11] Spatz 2015.

[12] I would suggest starting with Dupré *et al.* 2020, and then looking for papers or books relevant to the subject at hand, including cultural aspects.

that is always there to be perceived by any actor.[13] Later Chemero expanded this neutral definition with a suggestion that some 'affordances are meaningful to [actors]: they provide opportunity for particular kinds of behaviour'.[14] Finally, Dings proposed that actors not only perceive an opportunity, but actually experience this perception in the light of their 'concerns' – and thanks to this they select the course of action that best aligns with their current goals and dispositions.[15]

Ecological psychologists use the phrase 'an affordance solicits an action' to describe the actor's decision to act on a perceived opportunity, but in our adversarial context it feels more appropriate to place agency into the hands of that actor and reframe it as an actor *exploiting* an affordance.

Therefore – in these terms – *exempla* present cases of successful exploitation of time- and space-constrained affordances stemming from an intersection of opponent's behaviour and actor's own concerns.

Among several factors included in actor's experiencing of action solicitation, Dings mentions urgency of concerns, perception of effort, and personal history. Urgency can be understood as categorisation of affordances between 'forced to act' and 'invited to act', an extremely relevant distinction for the high-stakes environment. Perception of effort includes actor's actual and perceived physical capabilities and their current demeanour or bodily responsiveness, in my understanding especially the likelihood of achieving a successful outcome and the consequences of a possible failure. Personal history may influence this cost-benefit assessment if there has been a recent history of failures or successful outcomes, or a recent traumatic event.

Most importantly, this act of perception-selection is not a fully conscious mental, rational process, which tend to be rather slow, but almost an instant bodily experience unfolding and evolving over time. Not reasoning, but perception and proprioception happening on a neural level involving the whole body, including motor centre. Such states may immediately trigger a reflex response, especially in high-urgency, dangerous situations. Training attempts to tie this perception with motor actions that will increase the chances of a successful outcome and such perception-action coupling is the key ingredient of actor's skill.[16] Lack of an ingrained, trained, and effective immediate response slows down or even prevents the execution of what's otherwise considered to be a valid solution.

This leads us to an interesting hypothesis that the affordances exploited by recorded historical techniques must have appeared with high enough frequency and reliability to make time and resources spent on coupling their perception with appropriate actions worthwhile.

How to recognise a skilled actor?

In order to reconstruct a skilled actor, we should first know what the desired end state should be and be able to assess how close we are to reaching this goal. As already mentioned, a skilled actor would be the one whose behaviours gravitate towards the prescribed ones and who has high probability of achieving successful outcomes by applying the described solutions against an opponent with described or assumed skill level.

[13] Gibson 2014.
[14] Chemero 2003.
[15] Roughly understood as goals and intentions presently relevant to actor's present bodily state and state of environment. For more, see Dings 2017.
[16] Davids 2012

But this is not enough. We need more specific and actionable criteria. In the language of affordances, it means that the reconstructed actor should gain the following bodily and cognitive capabilities:[17]

Action Capability – an ability to effectively execute one or more elementary actions in succession under specific bodily and time constraints. In our *exemplum* it means being able to effectively strike with the pole-axe head (*tour de bras*) or with its tail with sufficient strength numerous times, defending oneself against such an attack with the cross-strike so that one is not hit, etc.

(Affordance) Exploitation Capability – an ability to perceive an affordance, select an action aimed at exploiting it, and execute it in a manner that succeeds in achieving actor's intention or goal, eg. noticing that the opponent is in distance to be hit in the head with *tour de bras* and successfully executing the attack, noticing that opponent defended by cross-strike and executing tail strike properly before they can react.

(Affordance) Shaping Capability – an ability to predict possible future affordances, select and execute actions that change environment to make these affordances more likely to appear, for example approaching the opponent with axe's tail in front, waiting for their strike to the head, having the proper counter ready, and being able to perform it in such a way as to prepare for the follow-up action.

These capabilities are usually different for different roles: the role of 'opponent' in most cases has lesser Exploitation and Shaping Capabilities – although not necessarily Action Capabilities – than the 'intended audience' or 'master'. On the other hand, 'bad fencer's' capabilities will be on a much lower level overall, revealing to the opponent a set of different affordances . Therefore, our process of reconstruction must include not only gaining awareness of what capabilities must be acquired for which roles, but also a systematic approach of attaining them. Gaining competency makes new affordances – previously hidden or inaccessible – apparent and possible to exploit. This changes personal experience of what is possible and brings with itself embodied knowledge about the conditions under which those actions will succeed or fail. Such understanding is no longer derived solely from the external authority of a written source, but is also grounded in actor's own expertise.

It also means that after surpassing the required level of capabilities, recorded affordances might begin to lose their expected effectiveness in favour of others that then reveal themselves. This **affordance drift** is a natural phenomenon that points to the moment when one's embodied experience begins to misalign with the author's. When that happens, extreme care is needed to differentiate the knowledge still grounded in that source's historical context from its modern counterpart to avoid projecting it into the past.[18] However, without reaching this point it is difficult to establish with certainty that one has actually achieved the expected skill level.

Additionally, as previously mentioned, effective Exploitation and Shaping Capabilities depend also on the relative difference of combatant skill levels. Small difference will make certain affordances not exploitable or even hidden, while a greater disparity might cause other affordances to become more attractive and effective. For example, a 'bad fencer' role is assigned the behaviour of taking a longer time to prepare their attacks, which allows a skilled actor to perform a pre-emptive strike

[17] On some level these of course are just affordances, but to avoid an awkward 'affordance of affordance exploitation' I decided to stick to a more traditional and self-describing terms from the capacity-capability-performance triangle as described in Holsbeeke *et al.* 2009.

[18] Interestingly, another source might actually require actor's skill level to include such a drift, suggesting how the evolution of skill happened naturally. As an example, a certain sword strike named *Schielhau* is introduced in the 14th- and 15th-century sources as a very successful action with little elaboration, but another 16th-century source shows several examples on how it can be countered without much effort.

and defeat the opponent in the midst of their action. Doing this against another skilled actor might be dangerous or outright impossible.

Therefore, when trying to reconstruct a skilled actor in the context of a particular source, we should pay attention to what affordances are ascribed to a given role and aim to achieve the skill level that slightly exceeds the threshold at which they become comfortably exploitable.

Embodied methods for reconstruction of a skilled actor

Before we proceed with embodied reconstruction, I would strongly advise to gain at least a rudimentary familiarity with a breadth of firmly established scholarly disciplines, such as palaeography, linguistics, or textual criticism, that provide fundamental and supplemental knowledge which should inform our endeavour. The more we know about the source, its author, their intended audience, the period and culture that they were immersed in, the better our chances at avoiding anachronisms or easily falsified hypotheses resulting for example from scribal errors or omissions.[19] On the material side, archaeology informs us about form and dynamics of period artefacts, such as clothes, weapons and armour, which Talaga argues are actors in their own right.[20]

We must also make several additional initial assumptions, that of course might be later challenged:

- Recorded techniques were related to period practice of personal combat.
- These techniques and their selection were shaped by author's personal practice or at least their understanding thereof.
- The author was not deceitful and was attempting to convey their own skills and/or knowledge to their future selves, students, patrons or other readers and practitioners.
- The author was competent in what they recorded.

The above does not mean that the recorded solutions were necessarily optimal for that time. It is quite possible that our reconstruction efforts will lead us towards the conclusion that author's competency was mediocre, low, or even only aspirational, and the recorded solutions turn out to be merely wishful thinking or theatrical rather than tactical.[21] However, from the knowledge transfer perspective it is more beneficial to begin with higher expectations, rather than risk premature dismissal.

Most recent advances in theory of embodied reconstruction of performative arts and crafts, offer us essentially two methods that we can apply towards our quest of becoming skilled actors:[22]

- **Reenactment** will help us to faithfully repeat the motions and movement patterns presented in the source.
- Treating *exempla* as recorded experiments and attempt to replicate the results through **Reworking** will help us gain more clarity around when a given body technique can fail or be successful.

However, none of them address the adversarial aspect of personal combat and do not offer opportunities for pressure testing or for acquiring capabilities such as adjustment of techniques

[19] Jaquet, Sørenson, and Cognot 2015.
[20] Talaga 2020, 2023.
[21] One 16th-century manuscript contains a marginal note by its later owner that says 'This technique cannot be performed in armour'. Until this is actually tested, we do not know if this comment says more about that original technique or the capabilities of the person who wrote these words.
[22] See, for example, Dupré *et al.* 2020.

to current environment, their creative application, limiting and disrupting another actor's performance, or knowing what to do when someone else attempts such disruption. These can only appear in unstructured "experiments/encounters/simulations" or emerge by accident.

Hermann *et al.* proposed and performed such unstructured, **actualistic** experiments as part of their work on Bronze Age swordsmanship, although their design was limited in scope to the questions that they wanted to ask and by the source material that could have been applied.[23] They also relied on actually finding actors that could be considered semi-skilled in the matter at hand and did not elaborate in any way on how to actually develop such skills.

I would like to propose another Reconstruction method useful for achieving the status of a skilled actor in adversarial performance-based arts: **Revival**. The name stems from attempts to resurrect a possible past event in its entirety: reconstructing an environment where a simulation of an encounter can take place and allowing actors more freedom in applying their learned skills and solutions to pursue their goals.

The idea of creative application of past techniques is definitely not new, when we take into account experiments done as part of living history and experimental archaeology, or various competitions and tournaments performed with historical or semi-historical gear, however I would like to stress that **as a method of Reconstruction**, Revival is used strictly to reach skill level that does not limit or inhibit our knowledge transfer. As such, its value lies not necessarily in the external performative aspect or practice, but in the ability to align one's capabilities with those required by the source's author so that our verification achieves the desired level of competency.

Let us now describe the role and application of each method in our reconstruction process.

Reenactment

Researchers try to faithfully repeat described or depicted actions or motions and preserve the external appearance of such a performance to the letter, often paying extreme attention to details. In many cases, reenactment also attempts to reproduce the wider context in which such performance could have happened, going way beyond retaining required function and focusing on the form as much as possible in the hope that wider immersion brings additional bits of implicit knowledge and affordances that would be otherwise missed.[24]

Also, during initial stages of hands-on translation of text to movement, performing a faithful reproduction of a motor sequence without giving it a second thought is in most cases not only the best, but also the only sensible first step. Our bodies need to learn new movement patterns, new problems, new solutions and begin to adapt. We discover perceived intentions and affordances, which in turn allows us to decide which capabilities we should be pursuing later. Full cooperation of all actors and attention to detail is required to avoid premature optimisation, 'averaging out', and unconscious technique alterations resulting from researchers' past experience or bias. This protects us against making a misstep at the very beginning of our journey.

Reenactment can also be applied to activities that may help with bodily adaptation in other ways, such as acrobatics, rock lifting and rock throwing, or horse-back riding. If pursued as a regular

[23] Hermann *et al.* 2020.

[24] Personal examples include qualitative difference in wrestling while wearing a doublet with attached hose as compared to a modern outfit or an ability to perform certain footwork while wearing period shoes.

practice, these might lead towards modern actors attaining affordance capabilities in a manner similar to past actors, aligning the available past and modern affordances better.[25]

Reenactment has some possible pitfalls that prevent it from being not only the sole reconstruction technique, but also the leading one. Performance is scripted and not that much (if at all) interested in the deeper 'why' of things, not even mentioning 'why nots' or 'what ifs'. It requires relatively low level of Action Capabilities, offering an enticing entry point, but does not facilitate growth beyond the rudimentary basics and in the end limits the knowledge and affordance insights that can be gained.

By taking the source material for granted and the sole source of truth, it can devolve into a heavily ritualised practice that – despite having a sound theoretical background – is in fact fragile, inflexible and heavily dependent on the 'correct' or idealised actors' performance. The more dogmatic it becomes, the more difficult it is to apply it in any less stringent conditions and the less keen its practitioners are to try it out outside of strictly controlled environments. In extreme cases this may lead to the formation of mental defence mechanisms such as 'we do not spar because we do not want to kill each other' and avoidance of any external critique.

Regardless, Reenactment is a great tool for initial research steps and an excellent method of communicating the outcomes to a wider public. Presenting a well-executed scripted combat performance of recorded techniques put together in a meaningful, entertaining manner is a much better communication tool than any tournament or competition bout. Those are much less readable to the lay public, much less predictable, and with limited educational value.

Reworking

Reworking is sometimes referred to as **Replication** in the laboratory/scientific sense of the word. Here we approach the source material as if it were a record of successful experiment results that can be independently verified. Through repeated embodied practice we can interrogate the content for its validity and correspondence to our understanding of modern and past realities. Contrary to Reenactment, the practice is not limited to repeating described actions, but is being adjusted depending on the questions that we want to ask.

Interestingly, the obvious 'does it actually work?' is not something that we can actually answer. Even a more nuanced 'does it seem to be effective under described or implied conditions?' still depends on the capabilities of involved actors and is perhaps only answerable at the very end of the reconstruction process.

The key is to adopt an approach that attempts to converge on plausible answers from many different directions. We may begin by inverting the original question into 'under what conditions could such a recipe work as described?' and then progress through 'what are the conditions that prevent it from working?' and 'why is this solution preferred to other possible solutions?' up to 'what affordances are being exploited here' or 'what action capabilities should I acquire to be competent here?'. We can then apply the same not just to individual techniques, but to various technique groups sharing common features.

The more competency we gain in those areas, the more specific these questions and the more fine-tuned our interpretations become. As a result, part of the process involves improving one's own practice to grow necessary capabilities. Returning to source material after adapting one's body

[25] See Talaga and Kozak, this volume.

almost always yields additional insights, previously missed or obscured. This repeated cycle of research informing practice and practice feeding back into research is up to a certain point self-correcting and forms the core of Reworking.

We learn a lot about the strong and weak sides of *exempla*, about limits of their applicability and when they would actually fail if applied. It encourages exploration of researcher's biases and depends on bringing them into awareness. The resulting performance tends to be less fragile than during Reenactment and there is some pressure for acquiring moderate levels of Action and Exploitation Capabilities.

On the downside, the process is exploratory and therefore messy. We routinely create, assess, and verify hundreds of hypotheses about form and function of every single piece of text or picture. Most of them sooner or later end up discarded. Many of those left still change. We may invest into exploring promising angles that turn out to be dead-ends. Researchers must be at the same time open-minded, flexible and dedicated, willing to change not just their opinions, but also previously established practices. On top of this, both successes and failures should ideally be recorded and shared, because for the common knowledge they are almost equally important. Awareness of already explored dead-ends prevents others from unwillingly repeating mistakes and allows them to be more efficiently re-evaluated when new insights arrive. Material not shared or not recorded in some way is often forgotten.

Reworking's main blind spot is that it is still mostly focused on expected, prescribed solutions. We can only get a small glimpse of preconditions that allow these solutions to become successful, of failed executions, or of the unscripted moments of hesitation, where a lot of unexpected may happen. We learn plenty about the trees but the forest may still elude us.

It is very possible to become overly focused on perfecting execution of individual techniques to the point of artificially narrowing down their edge conditions, especially timing and distance, and distorting what the source's author could have possibly considered as an acceptable performance.

Reworking practice is also mostly just a tool for getting answers and outcomes, and rarely can directly serve any additional purpose (performative, educational, or social). As such it is always customised to best fit the subject and its researchers. It can be extremely effective, very often raises a lot of additional questions and brings a lot of additional insights that can stimulate further research, but in many cases due to personal nature does not lend itself to creating repeatable practices or even shared experiences. Such pursuit is demanding and has very limited appeal outside a narrow circle of passionate individuals.

Revival

I propose the name '**Revival'** for all efforts that rely on attempts to reconstruct or create an environment inside which actors can engage in situations where they can apply reconstructed techniques to pursue their goals. Contrary to Reenactment, actors' performance is not in any way scripted, instead they engage in adversarial activities and are semi-free to choose their actions.[26] Contrary to Reworking, they are also not working together and interrogating the source material, they are just acting, doing their best to succeed and prevent others from doing so within certain constraints.

[26] Semi-free, not only because we usually want to limit ourselves to problems and solutions that we are reconstructing, but also because we still do not want to intentionally harm another participant.

We adopt the premise that successful movement solutions are the ones best attuned to the environment and arising problems, and then invert it. Having already assumed that the solutions recorded in a given fight book were deemed as successful by its author, we attempt to figure out what kind of environment would promote some actors to willingly create described problems and others to choose these solutions as a response that helps them achieve their goals.

As such, Revival places high emphasis on acquiring personal Action and Exploitation Capabilities and is the only method that allows Shaping Capabilities to even come into play. It usually manifests as a free sparring or a competition/tournament bout. Different types of simulators, protective equipment, and rulesets are designed and used, participants may come from many backgrounds and have different skill levels and physical capabilities.

This method gives us an opportunity to test reconstructed techniques against an opponent who is unwilling to cooperate, sometimes under significant pressure. Regardless of its other limitations and dangers, this is most likely as close as an average modern reconstructor can ever come to apply their skills and knowledge during an actual adversarial encounter. Without this type of feedback it is possible to get stuck with a rigid practice and never grow one's capabilities to the extent that a true confrontation would possibly require.

Not all structured competitions count as Revival, though. For a tournament bout or another confrontation to be considered as such, it needs to be pre-planned, consciously performed as an experiment, and evaluated afterwards. Winning or losing does not matter for the reconstruction process, but having a clear idea of what kind of hypotheses are being tested during a Revival event does. It is not so much about 'experiencing' the fight, but about putting these insights back into the whole reconstruction process. This goal distinguishes competing athletes from reconstructors, or merely 'experiencing' from actually 'experimenting' practitioners.[27]

Shortcomings of Revival are many. Weapon simulators and protective gear are a compromise between realism and safety. Accepted level of aggression and violence plays an important role too, lowering the stakes and introducing the 'there is always one more try' mentality that favours high-risk/high-reward actions. Even the best rulesets skew incentives and at some point lead to gamification, where top-level performers optimise their solutions towards excelling in this particular game.[28] This not only changes solutions, but also shifts the problem space. At some point the competitive environment may even no longer allow for the originally recorded problems to arise in the first place, making it almost useless for the purposes of reconstruction. Such evolution so far seems universal and inevitable.

On top of this, as already mentioned, the historically recorded solutions might not have been actually optimal – it may have been sufficient for them to be **good enough** in addressing problems that were arising **at the time**. Other, better solutions might not have yet been available then, but can be discovered now, making historical techniques mostly useless in competitve environment. Sources also often assume different knowledge levels between roles, something that is extremely difficult to simulate when actors are already familiar with historical techniques and their counters and actively train to win against them.

[27] For more on the distinction between experiencing and experimenting in the studies on historical European martial arts, see Jaquet, Sørensen, and Cognot 2015.

[28] This phenomenon has been studied for practitioners of reconstructed European swordsmanship in Gassman, Gassman, and Coultre 2017.

Asymmetrical, constraint-based confrontations or scenario-based confrontations can help, but are extremely difficult to design as truly competitive events, have lesser usefulness for exploring unexpected behaviours, and tend to have limited appeal outside of a narrow circle of researchers.

When applied judiciously, Revival can – on top of granting ability to pressure-test our reconstructions – provide a great incentive to focus reconstructor's practice on enhancing their capabilities, shed light on possible shortcomings and limitations of application of recorded solutions, as well as be a great generator of possible unexpected behaviours.

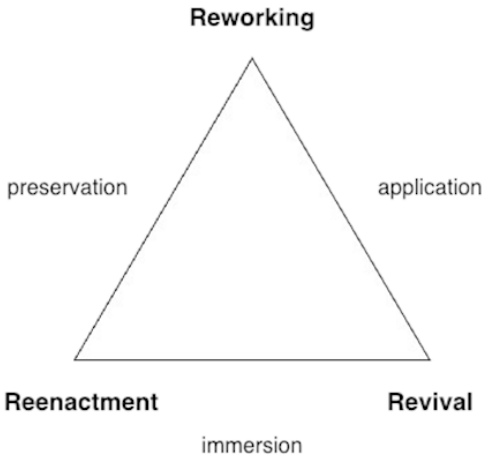

Figure 1. The Triangle of Diverging Incentives depicting three embodied reconstruction methods (corners) and areas they help with or do not care about much about (sides).

Diverging incentives

It might be useful to imagine Reenactment, Reworking and Revival as points of a triangle, where each side marks an area that the two adjacent methods both care about, but must at least partially disregard the third one (Fig. 1):

As reconstructors, we care a lot about **preservation** of the movement patterns in their originally recorded form, assuming them to be a product of material and cultural environment. It is our most important point of reference. When that form is altered or discarded during reconstruction, it might be a sign that we are also diverging from the original context. Such distortions also raise concerns about the validity of our assumptions, hypotheses, and conclusions. Reenactment preserves the form verbatim for future reference (perhaps not unlike *kata* in many Eastern Martial Arts) and Reworking attempts to find out the form functionality and limitations, while still remaining true to it.

To become skilled actors, we must care about the actual **application** of the techniques: how, when, and also why. If we do not find these answers, we will not be able to identify and acquire necessary capabilities, and therefore we will not be able to apply the solutions to actual problems. Reworking attempts to figure out these questions for individual techniques or their groups, Revival puts them to the test and seeks the extent of applicability in an actualised non-scripted simulation practice.

Recorded techniques were designed for a certain context. Actors were part of a wider environment which influenced the affordances they perceived and therefore their actions. **Immersion** in such environment can help experience individual elements as part of the larger whole and possibly provide insights into why certain choices occurred or when certain techniques would be avoided or preferred. Reenactment **immerses** actors inside a reconstructed world of material artefacts from the period, while Revival lets them forget about researcher attitude and embrace competitive, adversarial spirit.

Each of these three methods has their strong, unique side that can be used to access aspects impossible to reach via other means. It comes at a cost: each method broadens our awareness of perceived and exploited affordances in its area of expertise, but also introduces the affordance drift which – if not corrected – may produce deceptive, distorted, and anachronistic knowledge no longer relevant to historical research.

For example: during Reenactment we often place limits on how an opponent may move or attack so that our current interpretation of a given technique **preserves** the form. Instead of improving our skill of technique **application**, we focus on perfecting its single variation, which lessens our adaptability. During Reworking we communicate about results and experiment setups all the time, breaking the **immersion**. In Revival in anticipation of a technique or its counter we may change distance or position, so that the original problems no longer have space to appear and the form is no longer **preserved**. All of these create valid body experiences, but each gradually and inevitably moves us away from the original context and makes our embodied knowledge no longer aligned with recorded affordances (Fig. 2).

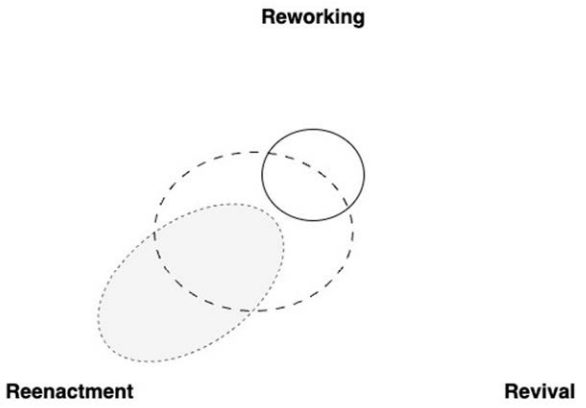

Figure 2. Affordances drift. After reading the text we begin with a small, untested, rough idea of recorded available affordances (solid circle). After exploring them using Reenactment, our understanding and embodiment grows in that direction, but we also lose access to those areas which Reenactment willingly de-emphasises (dashed circle). If we keep focusing just on Reenactment, we become expert at exploiting affordances accessible to this method (grey, dotted circle), but the drift might be so large, that we lose touch with the recorded affordances that we began our journey with (solid circle). This applies to any of these three methods equally.

Keeping them in check

Figuring out the point of diminishing returns or when pursuing a given method (Reenactment, Reworking, or Revival) in its current shape becomes counter-productive is not trivial. It gets even harder the more researchers invest in the pursuit due to the sunk cost fallacy to which nobody is immune. In many cases these signals will come from the outside as criticisms, therefore one should remain vigilant and open to external feedback.

It is crucial to understand that such moments of crisis do not automatically invalidate all gains or that the method as a whole is no longer applicable. In most cases we only reached a "locally optimised state". Applying other methods should help progress further and avoid getting stuck with distorted knowledge. At first it probably means to act against to what has already been learned or achieved, but this is needed to pull us out of the hole that we willingly dug ourselves into (Fig. 3).

Working with different methods seems to be the most efficient way to provide distance and perspective necessary for becoming a skilled actor. Hopefully at some point we will be able to reevaluate our previous approach in the light of newly obtained insights and capabilities and notice how we can bring aspects that we initially missed or dismissed over there as well. Remaining flexible, receptive to new observations and feedback is crucial for success. If after this experiment we still end up with only a confirmation of our previous practice, it should probably be a red flag by itself. Maybe more exploration is needed.

My personal view is that anyone interested in rigorous reconstruction of personal combat techniques should never be fully devoted to just one method. Making one of them one's primary focus is fine, but others should be routinely explored not just to pay lip service, but in a conscious attempt to avoid the inevitable drift and distortion.

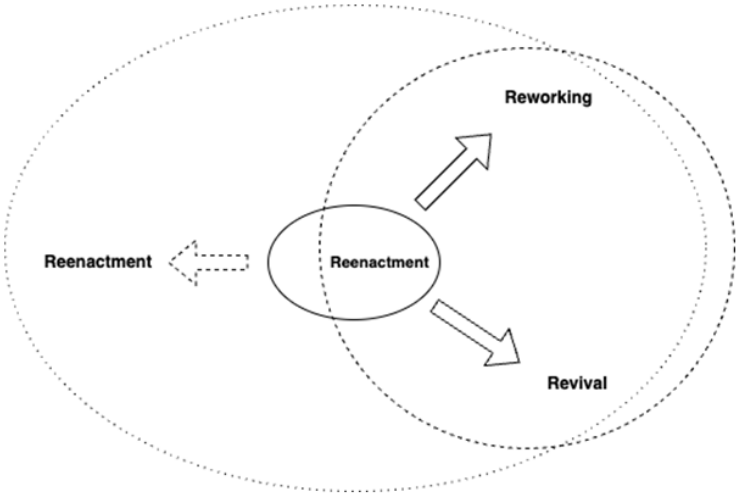

Figure 3. Countering the drift by staying flexible. Starting with Reenactment (solid ellipse) we can only access a small part of affordance landscape. When we add Reworking and Revival (solid arrows), our overall understanding and capabilities grow (dashed circle), despite losing access to some of previously gained Reenactment insights and skills. After going back to Reenactment (dashed arrow) we will quickly recover what we lost and discover new affordances previously unavailable to us (dotted ellipse) and in this way avoid stagnation and minimise the distortion.

Application to ADVISE

I would like to conclude this paper by briefly explaining the roles of Reenactment, Reworking and Revival in ADVISE methodology designed specifically for embodied reconstruction of personal combat skills. I will do my best to make this understandable for readers unfamiliar with it, but those who need more clarity I direct to a number of papers on the subject.[29]

ADVISE consists of six stages, each focusing on a different aspect of interpretation and reconstruction. They are presented in sequential order for clarity, but researchers are encouraged to freely move between them whenever they feel it benefits their process – it should be treated as a heuristic rather than a blueprint.

Stage A – Actions: analysis of individual motion patterns

The 'lowest' or most basic level of ADVISE deals with atomic analysis of recorded actions, usually progressing through *exempla* one by one. At first, it mostly adopts the **Reenactment** goals and mindset: actions are repeated as closely as possible without questioning their effectiveness to establish how the overall kinematic 'picture' looks and feels like.

Reworking can follow soon after or even in parallel, on two layers: textual and kinematic. In the textual we make an inventory of elementary actions, goals that drive each actor's behaviour, adopted roles, decisions made and so on. In the kinematic layer we try out various possible execution

[29] Walczak 2006, 2011, 2022.

variants in practice and attempt to pick which one best serves the described function. We identify movement intentions, existing, shaped, and exploited affordances, expected actor's capabilities and compare them to our own to find areas where we need to improve and where we might even have an advantage.

It is useful to occasionally fall back to Reenactment to check if we did not drift too much and if our reconstructed execution is still conforming to the source text and also to see if our insights might change our Reenactment *practice*.

Revival is rarely used at this level, because we are exploring isolated techniques and expected behaviours.

Stage D – Decisions: division into groups

At this level we are exploring boundaries of techniques by putting them together in groups that share certain elements (beginning, ending, decision points or literally anything else they might have in common) and experiment by tweaking conditions. The goal is to find out what constitutes an affordance for one solution and what for another.

Reenactment still has some value here, but mostly in a corrective role. We can use it to judge the overall flow of selected techniques and their faithfulness to the source material. The performance is no longer fully scripted, though, and it is possible that actors will incorrectly interpret conditions for selecting a particular technique and make choices that can lead to formation of unexpected situations and behaviours, which we note down but rarely explore. If and when we do, we should be mindful that we switched from Reenactment into Revival.

At this level, **Reworking** is certainly the most fruitful. We repeat recorded 'experiments' many times and alter actors or executions (for example a slightly different angle, strength, commitment, distance, timing) to see when the proposed solutions still make sense and when they lead either to other described solutions or result in unexpected situations or behaviours. We gauge decision points frequency and capacity, gain some initial knowledge about the place of each technique in the system, their underlying principles and tactical aspect that often go unmentioned. Repeating patterns, situations, and action chains begin to emerge, forming attractors. Sometimes they are unique enough to be considered signatory for a given source/author, sometimes revealing affordances and exploitation capabilities that go against our prior experience.

Revival is mostly passive and serves to discover unexpected affordances. It appears naturally during practice in two cases: after making a bad choice ('what do I do now?') or when an actor perceives an unmentioned affordance that they would be able to exploit ('what if I did this instead?'). Failed selection resulting in a novel situation will either offer us a chance to switch to another described solution and stay within the confines of the system, thus exposing alternative action chains, or will reveal different, unexpected affordances that we might want to explore in more detail in other stages.

Stage V – Verification: effectiveness and environment reconstruction

Verification is the kingdom of **Revival**, heavily driven by **Reworking**. The goal here is to examine if the described and reconstructed solutions indeed successfully deal with problems that arise inside the simulated environment, that is functionally (but not necessarily in form!) as close as possible to the one suggested by the source material.

Ideally we perform numerous experiments, both confrontational and non-confrontational. Non-confrontational ones usually consist of handling original artefacts or their replicas and assessing how they behave and perform when we enact reconstructed actions. Confrontational ones are bouts with different scenarios, rulesets, using safe simulators and protective gear against different non- cooperating opponents from different backgrounds (Revival). All of this should be optimised towards what questions we want to find answers to (Reworking). In practice this of course is limited to resources available to us at the time – both in terms of equipment and willingness of other actors to participate.

Reenactment plays its important role too. First, it advises which elements and characteristics must be considered when designing environment and gear. Then, during actual experiments or events, it provides a reference point to measure how far away our actual performance is from what we were hoping to see. It also often sets boundaries that help to avoid pursuing implausible scenarios and really keeps Revival in check.

The outcome of Verification is not only a gauge on effectiveness of our reconstruction and our action, exploitation and shaping capabilities, but also a set of unexpected behaviours, as well as competing alternative problems and solutions that can feed Reworking and provide answers or spark additional questions.

Stage I – Interpolation: internal exploration and internal evolution

To get a better understanding of the affordance landscape available to the original author we perform exploration bounded by the framing of the source material. We use elementary actions out of their original place as described in *exempla*, but merged into different sequence chains, in different situations, although still trying not to leave the problem-solution space defined by the source material. We may also attempt to simulate the natural evolution of the material, where we take the solution space and use it as a new problem space.

The goal is to check if such exploration of plausible hypotheticals helps to address emerging unexpected behaviours, opens up additional affordances, or on the contrary – needlessly complicates the reconstructed system and brings into light inferior affordances which might have as well been abandoned by the author consciously without the need of being mentioned.

This mostly requires tools that belong to **Reworking**: systematic experimentation, generation, assessment, and rejection of many hypotheses. But **Revival** is also strongly present, especially with natural evolution experiments, since we need the freedom of discovering and exploring arising unexpected behaviours.

Reenactment keeps tabs on the inevitable drift and cuts off ideas and exploration angles that are too implausible to bring us any relevant insight.

Stage S – Synthesis: getting the bird's eye view

Synthesis is mostly a conceptual stage with little embodied practice actually happening. We attempt to take a step or two back, see the big picture of our reconstruction results and make several assessments and considerations, including:

- Which questions or doubts are still left without answers?
- Are there gaps in our understanding of specific techniques?
- Does our reconstruction seem effective in the context that the source material was devised for?

- Does it seem too effective for that context?
- Are some techniques significantly more or less effective than others?
- Have we reached required skill level or can we progress more?
- Can we design or modify skill-acquisition practices that are better aligned with the source material?

It is also a good place to share findings with a wider community and look at further research opportunities. All three methods benefit and play their part here.

Thanks to having an overall view of the whole thing, **Reenactment** can be used to prepare and enact performances that would effectively communicate to the public a plausible picture of the past, including show combat that is both historically accurate and interesting.

Reworking can generate new questions, new hypotheses to test, practice updates, but also interim or final results that are fit for publication in the academic community.

Revival gets to revise environment design, gear updates and encounter rulesets that might lead to better alignment of emergent solutions and recorded solutions. It can propose a practice that makes the content accessible to wider public or a tournament convention.

Stage E – Evolution: influence of external input and pressure

This stage centres around bringing external input into researched source material to either fill a gap or just explore what happens. It is driven mostly by **Reworking** asking a question that cannot be otherwise explained or ignored, such as 'what happens when we try to hit the opponent's hand in the system that has no prescribed hand defence'. Due to the lack of written directions, we must adopt **Revival** to perform these experiments and work through reconstructed skilled actors who would attempt to find a solution that does not drift away too much from the original solutions space. Then **Reenactment** and **Reworking** should again help assess the probability and consequences of such a change in terms of newly uncovered affordances, motions, etc.

Outcomes of this phase are usually good counter-hypotheticals, showing 'what could happen if', but must be treated with utmost caution and clearly marked if introduced as the actual 'knowledge' component of reconstruction.

To make the whole thing go full-circle, pre-existing skills and capabilities of modern actors must also be considered as external input into the reconstruction process and treated as such with caution. They may help, but they may as well not be in alignment with the reconstructed problem-solution space and require fine-tuning, to avoid described distortion and drift.

Conclusion

Personal combat techniques preserved in written or illustrated form are not just self-contained prescribed performances, like dances or pieces of music, but bear more resemblance to didactic treatises containing a set of suggested behaviours to adopt under specific circumstances. Except actual motor solutions, inherent part of recorded teachings are: perception of affordances, problem recognition, solution selection and its application in an adversarial, high-stakes, high-intensity environment.

Straightforward reenactment of recorded techniques in most cases leads only to their superficial reconstruction and limited – or even faulty – knowledge acquisition. Meaningful reconstruction

should focus on producing skilled actors for all roles mentioned in the sources. Relevant skill consists not only of capability to perform described actions, as is the case in most non-adversarial arts, but also for perception, selection, exploitation, and shaping of affordances that enable those actions to be successful. The only way to acquire these is through simulated encounters informed by historical context.

Existing reconstruction toolkit does not provide all the necessary tools. New methods and frameworks are needed and they must be used in concert with established techniques to correct for the inevitable affordance drift associated with pursuing just one method.

I suggested **Reenactment** (faithful repetition), **Reworking** (exploration of applicability and edge conditions) from amongst the established methods, and proposed the third one: **Revival** (assessing reconstruction effectiveness in simulated environments) to add the missing component. The Triangle of Diverging Incentives showcases their strong and weak spots:

- Reenactment and Revival both give us access to an immersive, unbroken, rich experience, a simulation of some aspects of reality that past actors might have been part of, but Reworking must remain detached, picking and choosing what it wants to focus on next and really not having tools for the exploration of experience continuity.
- Reenactment and Reworking are focused primarily on staying faithful to recorded material and exploring the 'knowns', not really delving much into the realm of possibilities and guesses, while Revival allows much greater freedom and creativity in both creating and solving problems.
- Reworking and Revival care a lot about actual effectiveness and applicability of the reconstructed techniques and solutions as well as their performance (actor's capabilities), while Reenactment is not worried about it, setting the outcomes from the start and not being an actual contest of skill.
- The strongest point of Reenactment is its faithfulness to the source material and material history that can also provide an unbroken, immersive experience and is the best educational tool for lay public.
- Reworking – thanks to its very analytical, critical, and methodical approach – allows researchers to focus on very specific questions and arrive at interpretations and executions that are both true to the source material and have certain degree of applicability or at least understanding of how and when they could have worked as intended.
- Revival is about finding out an environment in which reconstructed techniques could work optimally and getting access to higher-level capabilities, implicit in the source material.

Despite diverging incentives, it is possible to make them work together towards the common goal, especially when researchers are aware and vigilant. As an example of such synergy I described their roles in each stage of ADVISE methodology.

Through such deliberate, meaningful, and guided exploration, our modern bodies may become more attuned to recorded affordances, allowing us to serve as viable vessels for the transmission of past combat techniques. As a byproduct we also discover not only explicit and implicit affordances, problems, solutions, and behaviours, but also those that the author might not have been aware of.

These are additional, important data points that can help us place the source in a broader historical context and sometimes even challenge our initial assumptions. Apparent absence of solutions for modern perceived affordances can be as interesting, as the presence of others.

Acquired embodied knowledge may grant us insights into the original knowledge based purely on the authority of written sources, allowing us to confirm, nuance, or contest it. Realisations

do not need to be limited to performance of individuals, but can also unearth social and cultural affordances, and modern performance may actually become a window into the past not just for the researchers involved, but also for others.

Chapter 2.
Leveraging Reenactment and Historical European Martial Arts (HEMA) for the Understanding of Ancient Combat

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The Greek Phalanx reenactment group

Ancient warriors capture the imagination of modern audiences.[1] Living history, the recreation and presentation of past cultures, draws large audiences to fairs and demonstrations at archaeological sites.[2] There are numerous groups who engage in live action role-playing (LARP) of medieval and ancient warriors and engage in mock combat on a large scale.[3] Although this presents a challenge to historians and archaeologists in policing historical inaccuracies that become popularised in the media, it also presents opportunities to further our knowledge by harnessing the talents and enthusiasm of reenactors.

The study of ancient Greek warfare has benefitted greatly from input from reenactment groups[4]. The iconic Greek warrior of the 8th to 3rd century BC was the hoplite, characterised by his panoply of one or more spears, a large round shield, a usually bronze helmet, greaves and cuirass or a corselet of organic material. A view of the way hoplites fought came into form in the mid-19th century AD at a time when analogies were drawn from the large conscript armies of the day that underwent extensive drills to achieve high levels of discipline and cohesion. George Grote wrote: 'The Hoplites, or heavy-armed infantry of historical Greece, maintained a close order and well-dressed line, charging the enemy with their spears protended at even distance, and coming thus to close conflict without breaking their rank'.[5] This view would diverge into two distinct paradigms over the 20th and early 21st century.[6] One side of the debate built upon the foundation outlined by Grote and concluded that hoplite combat was primarily a matter of opposing forces charging in unison and crashing together like 'a human battering ram'.[7] In support of this notion, they suggested that the panoply of hoplites was exceptionally heavy and not suitable for fighting outside of a tight formation.[8] Pushing elements of the opposing battle line out of alignment and causing a breach in the formation was seen as the focus of hoplite combat[9]. This coordinated push is known in the discussion of hoplite combat as the *othismos*, from the verb *otheo* ('to push'), and was likened to a charge to build up momentum for the collision and then a rugby scrum.[10]

[1] Movies like the *Gladiator* and *300* series are among the top grossing movies of the year of their release, and television series like *Rome* and *Vikings* have high ratings.
[2] https://www.livinghistoryarchive.com/ for a clearing house of events.
[3] https://www.sca.org/ is perhaps the oldest and one of the largest.
[4] See Mathew 2012 and Bardunias and Rey 2016.
[5] Grote 1846: 106.
[6] Kagan and Viggiano 2013: 1–56.
[7] Hanson 1991, 69.
[8] Hanson 1989, 56.
[9] Hanson 1989, 154–159.
[10] Grundy 1948: 267.

This was challenged by A. D. Fraser, who argued that the view of battle as pushing match was incorrect.[11] Peter Krentz and Hans van Wees formulated an opposing paradigm, where *othismos* was simply figurative language and not a real push.[12] Along with this, they cast doubt on the whole notion of highly trained hoplites maintaining close order during combat. Battle lines were drawn between paradigms, but because both sides built their views on guesses about the physical characteristics of arms and armour and what hoplites could or could not do in terms of maintaining cohesion while moving in groups, there was no way to come to agreement on what was more likely. Historians such as Lazenby[13] and Cawkwell[14] sought a middle ground or a means to pick and choose the most likely elements from the opposing arguments, but just about all that could be wrung from the reading of sources and existing archaeological finds had been exhausted. A new source of information was required.

At a time when the predominant authors on hoplite combat presented that the Corinthian helmet, the iconic headgear of the ancient Greek warrior, was a cumbersome piece that limited movement and vision in a way that forced hoplites to fight in close order, Lawrence Tritle did something radical: he picked one up.[15] Picking up a helmet and feeling its weight was a challenge to other historians because the prevailing theory was based on guesses and estimates as to how uncomfortably heavy helmets were. How sturdy was the foundation on which they were building their paradigms, and how would they even know?

What Tritle did was to provide context. Published weights and dimensions of armour from archaeological finds were sorely lacking for much of the formative period on thought about the characteristics of panoply in the late 19th and 20th centuries.[16] Historians were forced to make statements about the physical characteristics of armour based solely on conjecture from visual representations. Tritle was a veteran infantryman, and was able to compare bearing the weight of the helmet to wearing the standard issue steel pot helmet of his day. This provided a concrete analogy upon which to build a common language for comparison between authors. Just as no one would deny the philologist's role in building context for the use of words describing objects, a context for discussion is needed when the physical properties of those objects are only described in vague terms or our only evidence is artistic representation.[17] How heavy did Tritle think a Corinthian helmet was? Less heavy than the standard issue helmet of his contemporary military that required men to do extensive exercise while wearing one.

Through one simple act, Tritle provided experiential evidence to counter the conjecture of previous authors. He could have gone further. He could have tried on that Corinthian helmet, or if impossible, an accurate replica, and measured the field of vision, tested the ability to localise sound while wearing it, or taken metabolic data to determine fatigue while wearing it. He could have also recounted what it was like to wear such a helmet, describing the limitations and advantages. In this way, he could

[11] Fraser 1942: 15–16.
[12] Krentz 1985: 150–159; Van Wees 2004: 88–91.
[13] Lazenby 1991: 87-109. Lazenby lamented that 'No one alive today has ever experienced anything really like a hoplite battle.' The valid use of reenactors as analogy hinges on how stringently we define the word 'like'.
[14] Cawkwell 1989: 375-389.
[15] 'Have you ever held a Corinthian helmet, one of the basic helmets worn by hoplites? I did once and was struck not only by its remarkable craftsmanship but also its light weight: much lighter than the steel pot worn by American soldiers of the mid-twentieth century, and offering just about as much protection', see Tritle 2009: 52–53, 60.
[16] Krentz 2010: 188–190.
[17] A prime example of the need to give context to words is the word 'hoplite' itself. Literally it translates as 'one who has the tools (*hopla*) for combat' or a 'man at arms'. Confusion has ensued from a translation of the term *hoplon* as 'shield', rendering the hoplite the 'one who has a shield' or a 'shield-bearer'. Lazenby and Whitehead 1996: 27–33 showed that the use of *hoplon* as 'shield' is jargon that appeared after the term hoplite came into use, because of the tools (*hopla*) of war the shield was the most important to a hoplite.

have not only rendered the prevailing opinion likely to be false, but experimentally determined the characteristics of the Corinthian helmet and provided experiential data on what it was like to wear it that could have been used to compare helmets and as a foundation for future paradigms.

Historians often face a dilemma: either they make statements on topics far outside of their education or remain silent on topics for which there is little available data.[18] Designing experiments to prove false the statements of prior authors is the best use of experimental archaeology. The Falsification principle of Karl Popper is the underlying principle of the Scientific Method, though it has rightly been criticised by Thomas Kuhn and others.[19] But the perceived shortcomings of Popper's philosophy, that his deductive reasoning is built on a heap of assumptions, is exactly why it is a powerful tool in shifting paradigms. The statement 'A Corinthian helmet is too heavy to use in anything but a short battle' can be decisively shown to be incorrect if we were to watch a hoplite fight a long battle in one.[20] We unfortunately cannot demonstrate this without a time machine, but we can create ersatz hoplites with men wearing replica panoply.[21] Since few could argue against the notion that watching a real hoplite do something they have assured us cannot be done disproves its impossibility, critics are left arguing against the underlying assumptions: how accurate is your test subject? It is a valid argument that the experimental finding is only as good as the quality of the assumptions it is built upon, but that will have been addressed during the creation of the experiment.[22] Moving the discussion from two opinions based on no empirical evidence to one where the central question is 'how accurately constructed is your helmet?' or 'how like an ancient Greek is your test subject?' is a victory for the field of study as a whole because once we have data, we can compare the critical parameters, for example mass or metallurgy. Rather than assumptions, we have a common context built upon data from which to have the discussion. At least theoretically, changes to the experiment can be made based on criticism that satisfies all parties. But where to find an array of hoplite equivalents upon which to run tests?

One factor that has limited researchers' ability to carry out tests has been the expense of procuring accurate replicas of the elements of panoply. Twenty years ago, an authentic replica of a Greek helmet in bronze would have been the product of a select few artisans and cost between $1,500–3,000 dollars.[23] Today, a helmet of serviceable authenticity can be bought new for under $500.[24] This is the result of an increase in the number of individuals with an interest in reenacting ancient Greek hoplites.[25]Along with a simple economy of scale, reenactors have come to demand more authenticity and often provide research and new designs to the craftsmen.[26]

Leveraging reenactors to provide test subjects has many advantages. First and foremost, scale. We are regularly seeing international gatherings of 50 or more well equipped hoplite reenactors. The panoply of hoplite reenactors costs upwards of $1,000 depending on quality, and men wearing $5,000

[18] It is all too common to read phrases like something 'could not be done' or 'this is the only way it could have been done' delivered with a vehemence that belies its naïveté.
[19] Cf. Popper 1959 and Kuhn 1997.
[20] Hanson 2006: 437.
[21] Flouris *et al.* 2024: 14. Flouris and his team used modern subjects' ability to move athletically in replica Mycenaean armour to counter suggestions that such armour could only have been used by men mounted on chariots due to weight and limitations on movement.
[22] Babbage 1864: 67.
[23] Royal Oak Armoury of Canada, producing museum quality replicas, and Manning Imperial in Australia were some of the few options.
[24] Meerut, India is the home of many suppliers who have greatly increased the quality of their work in recent years, such as Daniyal Steel Crafts and Lyba Steel Craft.
[25] Since roughly 2012, large groups of hoplite reenactors from all over Europe and the Americas have been interacting and growing online through sites like the International Hoplite Discussion Group on Facebook.
[26] Matthew Amt is an example of one of the key individuals who have driven the craftsmen to create more authentic panoply (https://www.larp.com/hoplite/).

worth of armour and weapons is not uncommon at hoplite gatherings. At minimum, it would cost an investigator $50,000 just to equip an experimental group of hoplites, but volunteers provide this for free. In terms of experimental design, there are enough independent subjects to run meaningful statistics on data, such as the force and accuracy of strikes with different types with weapons. Perhaps more interesting, there are enough combatants to test many questions concerning the tactics and mobility of small units in the field.

How authentic equipment must be to make meaningful statements is very dependent on the question asked.[27] A benefit to using reenactors is that it is difficult to claim that their equipment or physical condition allowed them to do something that real hoplites could not. Their shields and armour are more likely to be heavier than the originals, rather than lighter and less restrictive, and one cannot credibly suggest that literal weekend warriors – and only a few weekends a year at that – are physically in better shape for battle than ancient hoplites. Additionally, reenactors lack the motivation of imminent death or injury. This is a double-edged sword. One one hand, all mock combat struggles to recreate the crucial element of fear in combat, with combatants far more likely to be reckless during tests. On the other hand, real hoplites were far more motivated to succeed. Balancing these impulses requires creating tests in a manner that accounts for the way in which fear and panic effect the results.[28]

For some experiments, only key features of ancient equipment may need to be replicated. When we examine the historian's analyses of group interactions, we can see how low the bar is for authenticity. There is a long list of statements on the ability of groups of men to move or not move in a coordinated manner from authors who at best draw on analogies with modern riot police or military formations.[29] It is difficult for an author to criticise the authenticity of reenactors in recreated panoply and simultaneously support the use of data drawn from modern paramilitary with vastly higher levels of training and equipment that in no way attempts to match the hoplite panoply.

To maximise the amount and utility of data derived from tests on reenactor groups, we can set out a list of best practices. As you enter a relationship with a group of reenactors, there will be a tension between your academic expertise on a subject and their practical skills and experience with the same.[30] Many will have had negative experiences with scholars and you may need to prove your intentions. The easiest way to do this is to embed in the group and witness the group doing the types of things that you wish to draw data from. This 'less-controlled' approach to experimentation has many advantages.[31] It is often best to begin a study in this manner, allowing the reenactors to demonstrate the variety of behaviours they have originated before you impose strict controls. Some practices may immediately challenge the prevailing views of historians.[32] A good example of this is the method for lowering the spear from a position of leaning against the shoulder to a ready position in the overhand grip (thumb pointing backwards, held above the shoulder as if about to be thrown). Whole chapters have been written on a variety of acrobatic processes that must be done to change a grip holding the spear on a shoulder with the thumb facing the spear point to an overhand

[27] See Eren *et al.* 2016 for a discussion on the appropriate use of differing methodologies for replicating artefacts based on the questions asked.
[28] Applying a meaningful 'cost' of injury in mock combat through prizes or elimination are a possible solution.
[29] Schwartz 2013: 165–167.
[30] Entering the circle of those who spend substantial sums of money to replicate the physical culture of ancient cultures is perhaps worthy of an anthropology study of itself.
[31] Liu 2024: 377–378.
[32] Lazenby 1991: 93. Lazenby tussles with the manner in which a hoplite could get his spear into the overhand position from the charge to combat. Reenactor's experiences may be the solution to his statement '...somehow or other it seems to have been done.'

grip with the thumb facing the spear butt.[33] Multiple reenactment groups have demonstrated a simple manoeuvre that begins with the thumb facing the spear butt, akin to the manner in which one supports a rifle butt while marching, then flips the spear up directly into the ready position. This move is completely unintuitive, so it is not surprising that it was not hit upon until the spear was physically handled by reenactors who used the overhand grip when in formation.[34]

When imposing higher levels of control on experimentation, it is crucial to get buy-in from the group. This can be difficult due to time constraints and the importance of keeping participants as naïve as possible so as not to bias outcomes. The reductive nature of the scientific process requires a narrow focus on variables and the control of most of the process, but this can channel reenactors towards a specific outcome if the question is not formulated with care. Luckily, reenactment groups are often interested in the same questions that academics are, and the turnover of members in the groups and limited occasions to gather ensure that prior training is minimal.[35] As your control of the experiment increases, so does your responsibility for the safety of participants. The inherent chaos of large groups means that experiments that are safe to perform with single reenactors, such as mock duels with padded weapons by pairs or small groups, become dangerous in larger groups. Groups of reenactors are best used to answer questions of mobility and cohesion, but because these concepts can be hard to define, the best way to approach the topic is to demonstrate something that was previously thought impossible. For example, Robert D. Luginbill suggested that once a group of hoplites began their charge in formation, they must inevitable crash directly into the men of the opposing force because it would be impossible for the group to 'halt abruptly in its tracks'.[36] Paul Bardunias showed that even multiple ranks of men packed so close that their shields overlapped could stop as a group almost immediately with no trouble and no comical tripping of men between ranks.[37] An understanding of exactly how they stopped can be determined from video analysis and testimonial data from participants regarding the behaviours employed in order to halt without tripping. That the group halted is undeniable, forcing sceptics to focus on how applicable reenactors with recreated panoply are, rather than on whether men could do this under any conditions. The question now becomes: could hoplites do what modern reenactors have demonstrated possible? More rigorous data could be collected by measuring the distances between men prior to, during, and after the advance from drone footage to come up with an index that reflects orderliness. This could then be used in other studies as a metric for group cohesion, providing context in real terms for a concept that is used often with no parameters. Such post-hoc analysis is only possible when detailed videos and photographs are taken.

The study of ancient warriors inevitably turns to matters of combat on a large scale. The need to balance safety and historical accuracy requires a balancing act between authentic equipment and realistic group combat. Recreations of hoplite helmets and armour do not provide enough protection from strikes hitting the exposed eyes or groin, and are unable to protect the neck from the shock of even blunt strikes to the head. In order to create more realistic group combat, we require combatants with more protection and experience with fighting in groups. The modern study of Historical European Martial Arts (HEMA) began as an outgrowth of the study of medieval and renaissance books on weapons use as an aid in creating combat on stage. The basis of modern HEMA is the resurrection of lost combat styles through the study of 'fight books', guides written for men who had to fight in wars or duels of their day, and surviving illustrations of men with

[33] Mathew 2012: chap. 5.
[34] Bardunias and Rey 2016: 129.
[35] The question of how much training a hoplite underwent is an important one, so it is crucial to be able to test those with minimal previous experience to confound the results of your tests.
[36] Luginbill 1997: 58.
[37] Bardunias and Rey 2016: 129.

weapons.[38] The process they follow includes both experiential information based on the perceived utility of what is described in sources and data in the form of what can physically be done with weapons. By the late 1990s, associations formed that would grow into gatherings of large groups of combatants.[39] Unlike hoplite reenactors, the emphasis in HEMA is on realistic weapons use rather than realistic appearance. Combatants make use of the best modern materials to build defensive gear such as masks and gauntlets that protect from strikes that would be injurious to hoplite reenactors. This means that any finding produced through studies involving combatants in HEMA gear are inherently less applicable to hoplite combat, so the questions have to be chosen carefully and we must acknowledge that the results may be the best that we can achieve for any dangerous topic. Confining questions to the use of weapons in groups or universal topics like group movement are ways to maximise the utility of data.

The combatants in HEMA groups bring value in the form of skill in mock combat. Not only does this make combat safer, but they are accustomed to fighting under the type of rules that we need to impose if our goal is to answer questions about the efficacy of different ways of gripping weapons or forming in groups of differing density.[40] As a group these associations will have predetermined marshals or referees to ensure safety, but will also be insured against injury and have required their members to sign legal waivers.

The availability of these two cadres of test subjects allows us to answer different questions or approach the same question from different angles. In the study of hoplites, no question was as crucial as the notion of *othismos*, or pushing by groups in battle. Scholars' views on whether whole groups of hoplites physically pushed against the opposing groups has become the defining feature of the opposing paradigms on hoplite combat.[41]

Bardunias presented an argument that both sides did not fully understand the physics involved with moving and pushing in large groups.[42] Drawing on studies of the movement of animal swarms and herds and research into the physics and behaviour of panicked crowds of humans during disasters[43], he suggested that *othismos* was not a rugby scrum, but a state where pushing and fighting could occur simultaneously as men were crushed, as they are during crowd disasters.[44] He suggested that the element that allowed hoplites to survive this state was the unique bowl shape of the shield, *aspis*, that arched from thigh to upper chest and protected the diaphragm from the compression that leads to asphyxiation.

In 2012, Bardunias' suggestions were questioned by Christopher A. Matthew on the grounds that groups of hoplites could not be packed into the state required for a crowd-crush to occur.[45] Matthew had pioneered the use of hoplite reenactors as test subjects and used them to derive data on spear strikes and manners in which men could form up in ranks with full panoply.[46] His dismissal of the crowd-*othismos* hypothesis, even though not directly tested, was a serious challenge to Bardunias,

[38] Wiktenauer website (https://wiktenauer.com/) hosts a wide variety of works by teachers of combat from the 15th and 16th centuries.
[39] For a review of the origins of the Western Martial Arts Workshop (WMAW), see Mele 2010. Although there was early crossover between HEMA groups and combat in groups like the Society for Creative Anachronism, the current state of HEMA is a far more serious field of study, see e.g. Jaquet 2016b.
[40] Konijnendijk and Bardunias 2022: 224–226.
[41] Kagan and Viggiano 2013: 34–42.
[42] Bardunias 2007: 13–14.
[43] Bardunias 2016: 133. Bardunias discusses the use of *othismos* and related terms by ancient authors in the context of pushing within crowds in the manner of modern crowd disasters.
[44] Konijnendijk and Bardunias 2022: 221–224.
[45] Matthew 2012.
[46] Konijnendijk and Bardunias 2022: 221–224.

whose argument was based on analogy with other self-organised systems and humans not wearing panoply. The discussion was at an impasse because no one had empirically tested what happens when two groups of men in hoplite panoply come together in opposition. Therefore, all arguments were based on conjecture.

The manner in which data was taken to find a way forward serves as a guide to those attempting to use modern human combatants to derive answers to ancient questions. We shall go through the course of the research plan to provide dispositive evidence of what actually occurs when groups of hoplite clash.

The first step was to acquire access to a group of hoplite reenactors. These can be found online on a variety of sites, most of which require nothing more than a sincere interest in Greek history or reenactment.[47] A historian or archaeologist may ingratiate themselves into reenactment groups by providing knowledge that is not readily available to non-academics. The reenactor community is always hungry for referrals to published research and reports on finds of weapons and armour. In 2015, an opportunity presented itself to work with hoplite reenactors at the Archaeon Dromena gathering at Marathon, Greece. To attend such an event, it is necessary to wear a recreated panoply, either of your own making of borrowed from members of the group.[48] A large gathering of 50–100 reenactors will be made up of subgroups from many different countries, so getting to know as many of the group leaders as possible is useful. It is important to provide instructions for what you plan on doing ahead of time in order to ensure interest and give groups a chance to either comment or abstain completely. Notably, the *othismos* trials described below were popular among hoplite reenactors, who saw them as something of a welcome game, paving the way for further research trials.

The most important question was to counter Matthew's statements that '[c]ontrary to Bardunias' conclusions, the bulk of the aspis would make it impossible for the members of a phalanx to crowd each other (...) both the shield and the individual would be unlikely to withstand such pressures'.[49] Bardunias showed based on the physics involved that many elements of the traditional view of *othismos* were incorrect, but all of them hinged on the ability of hoplites to push like a crowd.[50] The initial experimental design had to consider that it was unknown how dangerous the tests would be, so it was simply a test of force generation with no weapons use, and in no way a recreation of ancient battle. It was possible that shields and humans would become crushed, so to mitigate the chaos of a crowd, the experiment was reduced to a single file of up to ten men leaning against an immovable object, a large tree fitted with a compression sensor, in the manner of individuals caught in a crowd crush.[51] No shields or men were crushed, even though the average pushing force of a single file of ten was 247kg (544lbs), while three interlocked files of six registered 368kg (811lbs) on the shield in the middle file pushed against the tree. As often happens, a group of reenactors wanted to test something different than we had planned. By accommodating their wish to push in the style described by Hanson, with the left shoulder in the bowl of the *aspis*, we could directly compare that style of pushing with crowd-like leaning against the man ahead. Because their file was only eight men, a pair of trials of eight men were used for comparison (Fig. 1). The data suggests that, at least as far as modern hoplite reenactors are concerned, we can reject Matthew's statement that men with *aspis* shields could neither generate great force, nor survive such a crush if they did. Along with the

[47] The groups involved in the initial studies were contacted through https://www.romanarmytalk.com/rat/.
[48] When historian Roel Konijnendijk attended the large hoplite gathering at Plataia, Greece, in 2024, members were able to provide a complete, if minimal panoply.
[49] Matthew 2012.
[50] Bardunias 2007: 14.
[51] Bardunias 2016: 134–135.

force data, subjects provided a wealth of experiential information on what occurred when crushed. The consensus was that the *aspis* shield did keep them safe and, though not a comfortable state, they could have remained crushed for a 'long time' without the need to stop.

The results of this experiment were vulnerable to challenge because the file was not pushing against another file. The limitations of the first experiment, potential danger of two chaotic groups crowded together and the need to test pushing without spears were removed when access was gained to the Western Martial Arts Workshop in 2019. Two groups of combatants in full HEMA protective gear and 60cm non-rimmed steel or synthetic *rotella*-type shields were formed in opposing groups of approximately four files by six ranks. The force sensor was contained in a specially constructed shield and held in the front rank in one of the central files. Because the participants were well protected, some in steel cuirass, and trained to fight under a set of rules and listen to the marshal's warnings, the hazards of the crush were minimised. Force was generated in the manner of a crowd crush, but at a reduced level, 306kg (675lbs), compared to the previous test.[52]

Interviews conducted after the tests explained the reduction in force was due to the participants' use of the *rotella,* which is a concave shield like the *aspis* but 20–30cm smaller in diameter. Consequently, they were large enough to protect the diaphragm, but, unlike the *aspis*, compressed the lower abdomen instead of the relatively uncompressible thigh. The effect of the crush was to cause blood to rush to the head of some combatants, who then cease to lean into the opposing force and instead push back on their own rear rankers, signalling them to loosen up. When two groups pushed each other, force rose and fell in waves, suggesting that there is an underlying chaos in force generation that could lead to rapid drops and extreme highs when just by chance the coordination was perfect. This suggests that force generation could be optimised in the manner in which the rhythmic beats of music may coordinate force waves in crowds at concerts.

Data was also drawn from the comments of participants. When armed with spears, they could use them even in the press, but were too close to the opponent directly in front of them to use them against those combatants. Instead, they had to strike into the enemy formation almost blindly. This suggests that the short swords they carried as back up weapons may have been a better option for hoplites in this situation as suggested by the Orthodox. Interestingly, a handful of combatants were forced to drop out of the tests due to psychological rather than physical stress. The crush, combined with spear shafts smacking against helmets of both friend and foe, made for a difficult situation and exacerbated the feeling of claustrophobia due to being crowded.

Because previous experiments had demonstrated that the physical danger in *othismos* from compression was minimal, at Plataea in 2022, it was decided to try an experiment with opposing groups of hoplites.[53] The maximum force created by four files of five deep was 326kg (720lbs), but unfortunately the clash took place on a mild slope and it was difficult to maintain a high level of compression. Unsurprisingly, the down-slope group was driven back.

A last test was conducted at Plataea in 2024. This test was designed less to test force creation than the ability of hoplites to fight with short weapons. Due to safety issues with a crowd, there were no swords. Instead, men were to engage in a friendly slap-fight. While no data was derived from this, men were able to both attack and defend themselves in the press, and 'kills' were not immediate as opponents were able to bind up each other's wrists and stave off strikes.

[52] Konijnendijk and Bardunias 2022: 224.
[53] Images of some experiments can be found online at: https://plataea2022.com/.

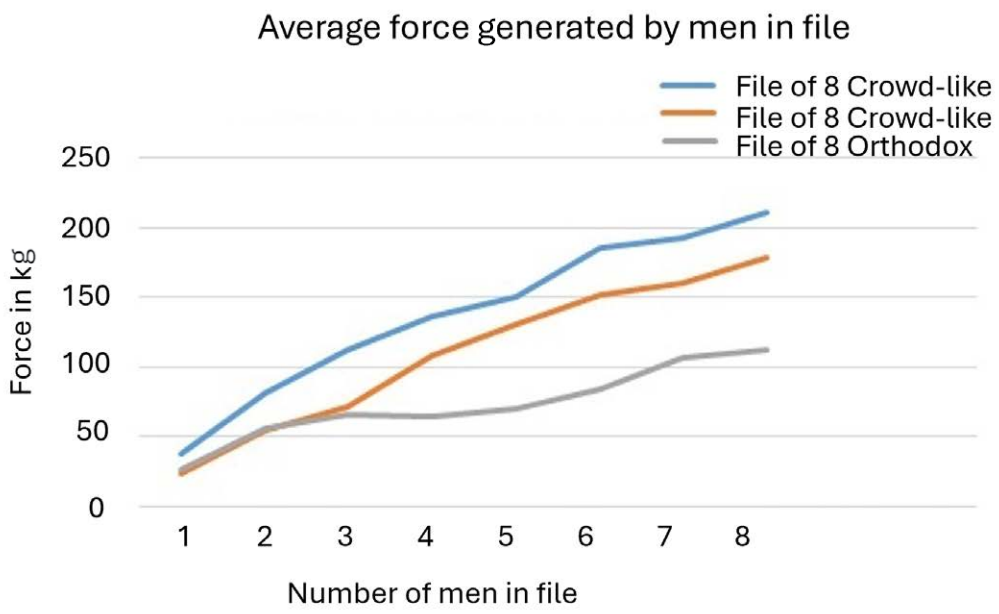

Figure 1. Force averaged over 10 seconds for files of one to eight men. In two trials men leaned forward in the crowd-like fashion suggested by Bardunias, while in one trial men pushed through their left shoulders in the manner described by the Orthodox authors. Force transfer through men in file is inefficient unless packed in a dense, belly-to-back fashion. The increase in force around man 6 in the Orthodox file occurred because men in the front naturally collapsed into the crowd-like density under increasing force.

Once the fundamental question of whether a modern group of men dressed in panoply and holding *aspis* shields could generate and survive a crowd-crush had been addressed and shown to be possible, a major challenge to both the crowd-*othismos* model and the concept of *othismos* in general was eliminated.[54] Either special pleading about the differences between modern and ancient men or the authenticity of panoply is required, or these objections are considered invalid.

The experiments above are aimed at answering questions of 'how' not 'why'. If *othismos* was a crowd-crush of men at extremely close quarters, why would they do so? Answering this question forces us to move beyond what can be demonstrated by experimentation, but will demonstrate how context can be worked into an understanding of ancient warfare. One of the first times we read of *othismos* is in a fight over the body of King Leonidas. We might imagine that physically crowding and pushing the opposing forces back away from the fallen king may have been a faster and more reliable option than simply fighting over his body and hoping to beat back the opponents.[55] When we consider that controlling the ground upon which the corpses of hoplites generated from battle are arrayed is a fundamental condition determining who won a hoplite battle,[56] pushing the opposite unit

[54] Taylor 2021: 447–448. Taylor attempted to provide an alternative to the crowd-*othismos* model, with 'physical shoving and jostling' of the rear ranks.' He presents that this is 'not a scrum or crush...but a pushing back on their own men not the enemy to give them solidity' and '...the front ranks- whether they wished to or not...step forward'. He simply re-described the crowd-*othismos* model, which is exactly this, but does not take the next obvious step of describing what occurs when opposing *promachoi* are not allowed to step back and crowded against one another. At that point pushing from the rear ranks is transferred to the enemy ranks through the *promachoi*.

[55] Herodotus, *The Histories*: 7.225.1

[56] Krentz 2002: Krentz states that 'Greeks took no unwritten law more seriously' than to collect the dead and allow your foes to collect the dead, signalling victory.

backwards and physically excluding them from control of ground where men previously fell may well have been a strong signal that they are losing the battle and lead to a rout if they are unable to crowd their foes back to gain control.[57] To show how the acceptance of a crowd-like *othismos* has ramifications beyond the battlefield, consider that what we have described is the democratization of the type of struggle over the bodies of the fallen that was earlier reserved for Kings in the Illiad.[58]

Additional experiments were run to attempt to falsify the statements of previous authors. As previously described above, hoplites could halt abruptly after charging without tripping each other up. Experiments with charging ranks of hoplites provided additional insight. Authors have questioned the ability of hoplites to maintain a close formation while running.[59] Tests with men formed in four files five deep and with men in wide ranksof only two deep showed that hoplites can maintain cohesion within a rank marching and running if the men stay in physical contact. If the shields overlap slightly, adjacent men can lock their right elbows behind the shield of the man beside them and this contact helps keep men in alignment. Where cohesion does come apart is between ranks. Each successive rank pulls away from the one in front as they charge, then to coalesce again upon contact. The best results are often those that are most counterintuitive. It was seen that the notion of charging to add momentum to your group for the collision with an opposing group is false. Once a group is approximately four ranks deep, deeper opposing ranks cannot simply bowl it over in an initial charge. Because of the manner in which ranks pull apart in the charge, the impact is in successive independent collisions rather than as a single mass, and the force is absorbed by both the enemy ranks and the colliders' own ranks ahead of them that have already halted.

The series of experiments outlined above, with differing levels of rigor and different types of data generated, show how experimentation with modern human subjects can be used to address gaps in our understanding of ancient warfare. By showing that the statements of many scholars are unlikely to be valid if we assume that a modern man in recreated panoply can be used as a stand-in for an ancient warrior, a context is provided for these controversial concepts that can allow the conversation to move past previous impasses. The data suggests that hoplites could charge and maintain cohesion, but that the charge itself was unlikely to be done for reasons of pushing force. Great force could be generated by crowds of hoplites and the *aspis* shield allowed them to survive them with a minimum of discomfort. Fighting with weapons is possible while in a crowd-crush, but swords are probably preferable due to the long reach of spears. Taken together, these build a framework that tears down both the original concept of *othismos* and most of the critiques of the notion that there was pushing by whole groups while fighting. Although these findings render much of the ink spilled in the discussion of *othismos* irrelevant, they provide a new foundation for discussion that could serve to bridge the gap between paradigms.

[57] Wong 2005: 600–602
[58] Van Wees 1998: 6
[59] Goldsworthy 1997: 11–14.

Chapter 3.
Crooks, Hooks, Trips, and Taps.
Reconstructing Irish Collar and Elbow Wrestling

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Introduction

Wrestling, as both a recreational activity and an inescapable aspect of close-quarters combat during warfare, has a long history in Ireland. Wrestling matches have been depicted on High Crosses and the walls of monasteries, were once a regular feature at country fairs,[1] and on at least one occasion were used to settle a leadership dispute within a regionally powerful clan in west Donegal.[2]

In the same way that there were many different local approaches to playing Gaelic Football and Hurling before those sports were standardized and codified by the Gaelic Athletic Association in the 1870s, there was, historically, no unified approach to wrestling in Ireland. The prevalence of hug-like clinches in the aforementioned depictions of wrestling on High Crosses suggests that the backhold method – still practiced in the modern day in Scotland and northern England – was prevalent. There are references to rulesets in which trips or other lower body techniques were expressly forbidden,[3] and to a form of belt wrestling in which competitors were required to wear and take their grips on a sturdy leather girdle.[4]

By the middle of the 19th century, the method known as 'Collar and Elbow' had clearly emerged as the most popular framework for conducting wrestling matches in Ireland. In its most common competitive form, Collar and Elbow involved both competitors gripping each other by the jacket (i.e. the eponymous 'collar-and-elbow' hold) and then working primarily with their legs to off-balance, trip, or otherwise knock their opponent to the ground for a decisive 'back-fall'. From Ireland – in particular its traditional stronghold in the eastern province of Leinster – Collar and Elbow was carried abroad by waves of emigration, and rapidly grew in popularity as the Irish diaspora settled in the far corners of the globe. National and regional championships drew sold-out crowds, as spectators rushed to witness the most skilled exponents of 'the Irish method' of wrestling as far afield as the United States, Australia, and New Zealand.[5]

However, by the turn of the century, Collar and Elbow, having enjoyed a meteoric rise in popularity over the preceding decades, was to experience an equally precipitous decline. Its measured, technical pace came to be regarded as less exciting than that of the more dynamic, modern methods of wrestling such as Catch-as-Catch-Can (aka. 'Catch Wrestling') and Greco-Roman, and, receiving little to no support from sporting bodies such as the Gaelic Athletic Association,[6] it soon

[1] MacLysaght 1979: 151.
[2] Walsh 1920: 57.
[3] Owenson 1855: 30.
[4] Hyde 1895: 51.
[5] Laughlin Hughes 1933: 39–48.
[6] MacFadden 2021: 144–152.

faded entirely from the combat sports landscape both in Ireland and abroad. It left behind little in terms of visual material (photographs, illustrations etc.), no technique treatises, and no living lineage of practitioners.

This paper examines the process by which one can nonetheless reconstruct some of the most common techniques in Collar and Elbow wrestling, based on surviving historical sources and experiential practice.

Challenges

There are two notable challenges that render it difficult to determine exactly how a Collar and Elbow bout would have looked.

Lack of visual material

Over the course of its 19th-century heyday, Collar and Elbow inspired many words from sporting aficionados all over the world. The same cannot be said, unfortunately, for images. Other than a handful of monochrome newspaper illustrations scattered across the decades, there is an almost entirely absent visual record of the style that was once one of the most popular methods of wrestling in the Western world. In addition, these sparse surviving illustrations only depict wrestlers in a static, posed collar-and-elbow hold, and do little to demonstrate the movements, strategies, and techniques that would have been employed once the bout was in progress.

In certain cases, not even this basic mandatory hold was depicted correctly. For example, an 1886 illustration in a Philadelphia newspaper depicts the wrestlers gripping each other with their left hand on the collar and their right on the sleeve;[7] in contrast, the prevailing Collar and Elbow rulesets of the time specifically required the opposite grip, with the right hand on the collar and the left on the sleeve. Likewise, an illustration of a wrestling bout at a police athletics contest – clearly described in the caption as 'a collar-and-elbow wrestling match' – depicts the wrestlers gripping each other's jackets in a way that would have been forbidden under the standard Collar and Elbow competition rules, and suggests that the illustrator had unintentionally depicted the visually similar jacketed style of Cornish wrestling instead.[8]

Even fewer photographs of historical Collar and Elbow practitioners have as-yet been uncovered. In terms of the jackets and the grips thereon, these photos are invariably more accurate than their illustrated counterparts, since the photographic subjects were all active wrestlers who would have been familiar with the rules of the style. Thus, they serve as a particularly valuable insight into how Collar and Elbow practitioners looked, since they were not produced by illustrators who may have been working off vague second-hand descriptions of a bout, or accidentally conflating one wrestling style with another.

Nonetheless, like the illustrations, these photos ultimately depict only static poses. At the time of writing, we do not know of any images – in any medium – of verified historical Collar and Elbow bouts in progress, nor even of any staged historical demonstrations of techniques.

[7] *The Times* (Philadelphia), 28 Nov. 1886.
[8] *Harper's Weekly*, 26 Jan. 1878.

No technique treatises

When attempting to reconstruct the live movements of Collar and Elbow wrestling, the dearth of historical photographs is an inconvenient hurdle. It is, however, an understandable one, considering that the late-19th-century zenith of Collar and Elbow's popularity was a time when sports photography was still very much in its infancy. One can thus – grudgingly – forgive the absence of any crisp action shots from the 1884 championship match between J. H. McLaughlin and Henry Moses Dufur in Detroit,[9] or from the 1888 match between John Keating and Hudson (no first name given) for the championship of Australia,[10] or the countless matches that took place in Dublin's Phoenix Park every Sunday throughout the 1880s.

More frustrating by far is the lack of anything resembling a technique treatise for Collar and Elbow. This is a particularly glaring gap in the available historical material for the style, since such efforts to catalogue the techniques and strategies of other wrestling styles have been common for centuries; indeed, for millennia. The eastern wall of the tomb of Baqet III, a regional governor during the Eleventh Dynasty of ancient Egypt (21st century BCE), features paintings of several dozen wrestling positions and techniques,[11] so clearly distinguishable that one could quite reasonably use them as a curriculum with which to reconstruct a typical wrestling match of the time and place. The Papyrus Oxyrhynchus 466, a fragmentary manuscript from 2nd-century AD Greece, delivers pedagogical guidance on the best way to execute the fundamental wrestling grips and holds of classical Greek wrestling.[12] In medieval Europe, various *Fechtbücher* or *Ringbücher* (martial arts treatises) – most notably the 1539 work *Ringer Kunst: Fünf und Achtzig Stücke* ('The Art of Wrestling: Eighty-Five Pieces') by Fabian von Auerswald – contain detailed illustrations and accompanying written instructions on the intricacies of wrestling for both warfare and sport. By the late 19th century, such treatises had come to be enhanced with monochrome photographs of wrestlers demonstrating each technique. One of the most detailed of these treatises, simply titled *Wrestling* (1890),[13] catalogues the techniques of the four traditional wrestling styles of England (Cumberland and Westmorland, Cornish and Devonshire, Lancashire, and Catch-As-Catch-Can). Similar works, intended as manuals for self-study or pedagogical guides for wrestling coaches, were produced over the ensuing decades for Catch-As-Catch-Can[14] and the traditional wrestling of Iceland[15] and India.[16]

Unfortunately, no such technique treatises have yet been uncovered for Collar and Elbow.

Available resources

Since we lack any meaningful visual records of Collar and Elbow other than the aforementioned illustrations and photographs of static poses, and no technical treatises exist, we are required to draw upon other resources in order to determine how the style looked in practice.

[9] *Detroit Free Press*, 30 Jan. 1884.
[10] *Australian Star*, 4 Aug. 1888.
[11] Newberry 1893: 48.
[12] Grenfell 1903: 137–139.
[13] Armstrong 1890.
[14] Hitchcock 1912.
[15] Jósefsson 1908.
[16] Patwardhan 1927.

Competition ruleset

In Ireland, there were region-specific approaches to conducting Collar and Elbow wrestling bouts. For instance, in Kildare a fall was counted if a wrestler touched the ground with any part of his body above the knees,[17] whereas in Dublin we encounter references to both this 'above the knee' definition of a fall, and another under which it was necessary to make one's opponent hit the ground with his shoulders in order to win.[18] These Irish rulesets were occasionally used internationally, as evidenced by an account of a St. Patrick's Day sporting event in Sydney in which the Collar and Elbow wrestling was specifically stated to have been held under 'Dublin rules'.[19]

The most common standardized ruleset for Collar and Elbow wrestling was ultimately published in the United States, as part of a larger compilation of sporting guidelines called the *Manual of Sporting Rules* (1873). This Collar and Elbow ruleset eventually came to be referred to colloquially as the 'Ed James rules', after the book's publisher, and quickly established themselves as the gold standard for conducting competitive Collar and Elbow bouts both in the US and abroad. At certain wrestling events, audience members were provided with physical copies of the Ed James rules and encouraged to loudly protest if they noticed any competitors deviating from the standard.[20]

The full Ed James rules for Collar and Elbow are presented below for reference. I have underlined what I believe to be the most relevant points that one needs to consider when reconstructing the style via experiential practice.

1. *The men shall wear knit shirt and short coat or jacket, not extending below the hips, with strong collar and elbow for grasp of the opponent, and thin rubber sandals on the feet.*
2. *Each man shall take hold of the collar of his opponent with his right hand, while with the left hand he must take hold of his elbow.*
3. *Both men shall stand up breast to breast, with limber arms and show fair and equal play.*
4. *Either man who shall break his hold with one or both hands to save himself from a fall, shall forfeit said fall.*
5. *Kicking the limbs or privates strictly prohibited, and the offence forfeits the contest.*
6. *The falls must be square back falls, or two hips and one shoulders, or two shoulders and one hip to strike the ground or floor, to constitute a fall.*
7. *Striking upon the face, side, or knees is no fall, and nothing shall be allowed for forcing a man from such positions to his back.*
8. *Going down on one or both knees is fair, as long as both men keep their holds.*
9. *No butting shall be allowed under any circumstances.*
10. *Not less than ten nor more than twenty minutes' rest allowed between each wrestling bout.*
11. *The match shall be first fall, best two in three, or three in five, according to stipulation.*
12. *The ring to be twenty-four feet across, and nobody to be allowed inside except the referee and two umpires, who shall be chosen on the day of the contest. Referee's decision to be final.*

Newspaper reports of collar and elbow matches

As the popularity of Collar and Elbow wrestling spread across the English-speaking world, the number of competitive matches increased accordingly, as did the newspaper reports of those

[17] *The Gaelic American*, 2 Mar. 1870.
[18] Stoker 1907: 33.
[19] *Referee*, 14 Apr. 1887.
[20] *The New York Herald*, 13 Oct. 1876.

matches. The level of technical detail in these reports varies from the entirely absent to the intricately detailed. The latter form of report is exemplified by what could in all likelihood be considered the apogee of Collar and Elbow sports journalism in any country – the gripping, multi-page account in the *Detroit Free Press* of the 1884 championship match between Henry Moses Dufur and J. H. McLaughlin, in which the author breathlessly recounts every feint, trip, counter, and fall exchanged by the two men over the course of their nearly two-hour struggle:

> *Slowly Dufur's leg seemed to yield, a slight inclination of Dufur's back in favor of Mac was visible, and there! Over goes Dufur! No, he does not! His joints loosen and tighten again instantly, a flash of gray passes and with a snap Dufur has twisted himself like a rubber band and stands squarely on his feet with good grip, a smiling face and plenty of wind ready to continue with Mac to the end. It was a marvelous escape by pure nerve and skill, and was rewarded with a tremendous and sympathetic storm of applause.*
>
> *This seemed to nettle Mac, for he went again with a grapevine and got it, and this time, he got it well. For with a giant tug he broke Dufur's footing, lifted him as though but a toy and threw him so quickly that no twist, bridge, or turn could be made. The visitor and then champion of the world had lost the first fall of his career in a public match. Time, 13 minutes.*[21]

In fact, if one was to simply re-enact the sequence of actions described in this report, one would already have achieved a reasonable approximation of a historical Collar and Elbow match. Other reports from the period, even when not rendered with the same level of detail, provide further insight into the recurring techniques and strategies employed by Collar and Elbow practitioners. We can then undertake to replicate these techniques via experiential practice.

Reconstructing collar and elbow via experiential practice

Designing a suitable wrestling jacket

One of the primary factors that distinguished Collar and Elbow from the other popular Western wrestling styles of the 19th century was that both competitors were required to wear jackets, on which the necessary hold would be taken. In Ireland, there were no written specifications for the jacket; competitors were simply reasonably expected to show up in something suitably sturdy. We thus see references to wrestlers entering the ring wearing everything from 'sleeved waistcoats'[22] to basic 'sack jackets',[23] which occasionally led to pre- or mid-match disputes when one wrestler felt his opponent's choice of jacket was deliberately calculated to provide him with an unfair advantage.

> *When the men entered the ring, quite a wrangle ensued between their backers over the coat worn by Cullen. It was of the fashion known in those days as the 'set-to' (a corruption of surtout). Dunne claimed its long skirts would prevent his seeing Cullen's legs but Cullen refused to use any other, and finally Dunne acquiesced and the contest began.*[24]

The Ed James ruleset sought to eliminate this ambiguity by specifying that jackets needed to be short, so as not to hinder the range of leg attacks that Collar and Elbow was known for, with 'strong collar and elbow for grasp of opponent.' There were no further specifications regarding material or colour, and even after the Ed James rules came to be regarded as standard, we see several

[21] *Detroit Free Press*, 30 Jan. 1884.
[22] *Irish Independent*, 15 Sep. 1936.
[23] *Marlborough Daily Times*, 19 Mar. 1886.
[24] *The Gaelic American*, 2 Mar. 1870.

references to wrestlers attempting to benefit from some sartorial gamesmanship by deliberately wearing jackets that were too loose for their opponents to effectively manipulate.[25] Thus, at no point was there ever a historical garment that could be described as a standard, uniform Collar and Elbow jacket.

Figure 1. The standardised modern jacket for Collar and Elbow wrestling.

Participants in the reconstruction study initially made use of a variety of jackets from other grappling sports (for example, the *gi* jacket for Judo and Brazilian Jiu-Jitsu), but soon customized jackets were produced and provided. The design was based on that of a typical jacket of mid-to-late 19th century Ireland, with the notable modification of shortened sleeves to emphasize the need for participants to take their left-hand grip on the elbow and no lower. All testing then took place using only these jackets, in order to ensure that each participant's attire was as standardized as possible (Fig. 1).

Assuming (and maintaining) the correct stance

An additional factor that distinguished Collar and Elbow from the other popular wrestling styles of the period is that wrestlers were required to maintain an upright stance at all times throughout the bout. Since it was such a leg-centric form of wrestling, in which offense was generated largely via combinations of trips and foot blocks, the easiest method of stalling in a Collar and Elbow match was to hunch forward and pull one's hips back so that one's legs were harder to reach. Such overly defensive tactics tended to be regarded with disdain by observers, who would often loudly rebuke the offending wrestler for timidity: 'Look at the hump Kenny has on his shouldhers[sic], watching like a badger in a barrel'.[26]

Any wrestler who wished to court admiration needed to remain loose and light on his feet, ready to engage and exchange with his opponent: 'Tom has as purty a stan' as ever I saw with a boy; as straight an' as light as Sharpfoot the dancin' masther[sic]'.[27] This is something that the Ed James ruleset specifically sought to enforce with its third point: 'Both men shall stand up breast to breast, with limber arms and show fair and equal play'.

Despite this, throughout the reports of 19th-century bouts it is not rare to encounter references to wrestlers who risked admonition, if not outright disqualification, by persistently leaning forward and keeping their legs out of tripping range when they felt they were overmatched.

> *Cox clung to defensive tactics throughout, and it was long before Dufur became very aggressive. The sagging back of the former was very much complained of by the partisans of the Marlboro man ... still the referee frequently reminded him to 'straighten up'.*[28]
>
> *Another short breathing time was taken, during which McLaughlin called the referee's attention to the fact that Martin persisted in keeping his arms stiff, when the rules expressly provide that in Collar and Elbow*

[25] *Buffalo Morning Express*, 20 Oct. 1880; *St. Albans Daily Messenger*, 3 Mar. 1877; *The Boston Globe*, 1 Dec. 1878.
[26] Anon. 1849: 205.
[27] Anon. 1849: 205.
[28] *Boston Post*, 28 June 1878.

> *wrestling the men shall stand breast to breast and give their arms free play. The referee acknowledged the justice of the complaint, and instructed Martin to keep within the rule.*[29]

> *Dinnie at once went on the defensive, standing well out, and lowering his head so to watch the other's legs that he lost inches of his height. In a little while Cannon complained of this. 'Stand up to your work, man,' said he, but without avail. He then appealed to the referee, who, in reply, remarked, 'Stand up, [Dinnie], and let us see some wrestling.' Dinnie quietly smiled and obeyed orders'.*[30]

Since an upright stance (with relaxed, limber arms) was such an integral, vigorously enforced aspect of Collar and Elbow, participants in the study were instructed to stand and move accordingly. If at any point a participant began to keep their partner at bay with stiff arms, pull their hips back, or otherwise assume an overly defensive posture, they were immediately reminded to correct their stance and execute the techniques in a way that was consistent with the historical competitive ruleset.

Footwork

A third factor that defined Collar and Elbow wrestling was its focus on lower body techniques – i.e. hooking with the leg, blocking with the foot, and other assorted trips, bolstered with the frequent addition of turning hip tosses. The hold on the jacket was used to push, pull, and off-balance the opponent, but ultimately a wrestler was expected to make diligent use of his legs to bring him down. Observers frequently noted that, during Collar and Elbow matches between two skilled exponents of the art, the wrestlers' feet were almost constantly moving and probing for weaknesses; tapping and feinting at each other like boxers throwing combinations of punches.

> *In the play for an opening, the feet are kept constantly in motion, the expert tapping his opponent's calves, shins, knees, and even hips with his instep, the whole consisting of a series of artful feints, by which he invites an attack, or takes advantage of an unskilful manoeuvre... There are movements which occur in this form of wrestling which, to the uninitiated, appear to be a confused shuffle of the legs and feet, but which are really a series of brilliant stratagems, the result of years of study and practice.*[31]

Other observers of the time described Collar and Elbow similarly as 'pedal science',[32] 'footsparring',[33] or 'a fist fight with the feet'.[34] Participants in the reconstruction study were thus encouraged to replicate this characteristic footwork by consistently maintaining offensive movement with their feet and legs as they wrestled with their partners. In this way, they were free to move around and experiment with the types of trips that worked best for them, while also being provided with specific techniques to attempt.

Techniques

As detailed earlier, for certain schools and form of wrestling throughout history, we are fortunate to have access to technique treatises. If one wishes to reconstruct that particular school or form of wrestling, one need only follow the treatise and implement, for example, the eighty-five lessons detailed in Fabian von Auerswald's *Ringer Kunst*. A modern equivalent exists for Judo in the form of the *Gokyo-no-Waza*, the syllabus of 67 (originally 40) recognized throws that students of Judo must

[29] *St. Louis Globe*, 27 Mar. 1876.
[30] *Sportsman*, Mar. 9 1887
[31] *Syracuse Journal*, 7 May 1902.
[32] *New York Herald*, 4 Mar. 1869
[33] *The Gaelic American*, 2 Mar. 1870.
[34] *The Northern Pacific Farmer*, 27 Jan. 1881.

learn in order to progress through the ranking system. If one learns those throws, one learns Judo. On the other hand, if one begins to incorporate throws or other innovations that are not included in this syllabus – or in von Auerswald's medieval equivalent – could it be argued that one is now no longer practicing the style in question? That, indeed, is a potentially emotive debate that is far beyond the scope of this paper.

Since we lack a historical technique treatise for Collar and Elbow, it is impossible to definitively state how many techniques were considered to be a part of the style. It is, however, unlikely that there was ever anything approaching a strict syllabus to which practitioners had to rigidly adhere. One journalist of the time suggested that the 'well known and most common 'locks' are about 12 in number', but in addition 'each wrestler has a number of private 'locks'... on which he depends for victory in a closely contended match'.[35] A wrestler was thus free to trip or off-balance his opponent as he saw fit, provided his attack remained legal within the wider competitive framework of Collar and Elbow: i.e. while maintaining his hold on the jacket and keeping an upright stance and loose arms.

However, even with this lack of a syllabus to which Collar and Elbow wrestlers were required to adhere, from studying the newspaper reports of competitive bouts we can observe that there were certain techniques to which they gravitated more than others, and with which they had the most success. I will look at three of those techniques here.

A brief note on terminology: there was often very little consistency to the names by which techniques were referred. The same mechanical action might be referred to as a 'toe lock' in one report, a 'toe hold' in another, and a 'cross-toe' in yet another. It is unclear whether this was a case of region-specific terminologies, in-house style guides for specific newspapers, or simply the personal preference of the journalist in question. There were, additionally, sometimes notable transatlantic divergences in terminology for the same technique (for example, 'crook' in Ireland vs. 'grapevine' in the United States). In this section, I have simply chosen to use the name under which I most commonly encountered the technique in question.

Hip lock

> *For one hour and a half they continued the struggle, giving a splendid exhibition of footsparring, tripping, and blocking. Then Larkin feinted with his right foot and, quick as a flash, threw in his left and, getting Carey on his hip, threw him with great force, winning the fall and the match.*[36]
>
> *All at once, Owens turned his back like lightning and tried to catch McMahon on his right hip. McMahon squirmed out just in time to escape a hip-lock which would have been certain defeat for him.*[37]
>
> *Quickly arising, Dufur again renewed the struggle and caught an outside twist on Mac's left leg. Mac essayed to break it, at which Dufur with a turn, a stoop, and a lift combined in a movement as quick as flash, had the Detroit man on his hip and finally on the floor for a fall in much less time than it takes to read about it.*[38]

This technique involves wrestler A turning and hoisting wrestler B onto the side of his hip, or the back of both hips. Wrestler A then rotates his upper body so that wrestler B is thrown to the ground (Fig. 2).

[35] *Syracuse Journal*, 7 May 1902.
[36] *The Gaelic American*, 2 Mar. 1870.
[37] *The Sun* (New York), 7 Aug. 1879.
[38] *Detroit Free Press*, 30 Jan. 1884.

Toe lock (aka. toe hold or cross-toe)

> *A moment later, Clark got a toe lock on Gardiner. That is to say, he got his right toe around Gardiner's left ankle, then by a powerful twist whirled him off his feet and landed him on the flat of his back, winning the first fall in 8 ½ minutes.*[39]
>
> *In a breath both stood up again, but scarcely had Owens regained his feet, and was evidently not expecting another attack, when Dufur's right foot shot out, pinning Owens' left foot down and bringing the full force of his massive shoulders to bear. Owens was laid out with as handsome a 'cross-toe' as ever was seen.*[40]
>
> *The men resumed their original positions, when, quicker than lightning, Owens thrust his left foot out and caught McMahon on the right ankle, at the same time twitching the other's shoulders to the left. McMahon fell flat on both shoulders and hips, while the spectators cheered. The time of the first fall was 20 minutes.*[41]

This technique involves wrestler A using his foot to block one of wrestler B's feet, and then using his hold on wrestler B's jacket to vigorously pull him forwards/sidewards in the direction in which he is no longer able to step (Fig. 3).

Crook (aka. grapevine)

> *A contestant who with a trip and a twitch got his man off balance, would then shoot his right leg forward, swish it around the left leg of the victim in serpentine forward and lock his right foot over the left foot of his adversary. Once under this hold, the victim had the choice of going to the pad or struggling to break it, with the prospect of getting a fractured or dislocated leg. Many serious injuries resulted from the inside grapevine.*[42]
>
> *Any man that [Dempsey] got a 'crook' at either fell or got his leg broken. Dempsey accomplished this feat by getting his toe or the top of his boot at the back of his opponent's leg right under the shin, and if his opponent did not fall Dempsey held on with his crook until he broke his leg.*[43]
>
> *After brief sparring, Mac again got a grapevine on Dufur. The Massachusetts man stiffened his legs; Mac tugged away at his opponent's shoulders and back, while the intertwined legs grew together with the rolls of their great sinews swelling side by side until it seemed as though they may burst.*[44]

This technique involves wrestler A weaving their leg in and around the opposing leg of wrestler B. Using this point of contact, wrestler A can then lift wrestler B's foot off the ground and wrench their leg backwards and forwards as necessary, compromising their balance (Fig. 4). The Crook (the name by which the technique was most commonly known in Ireland) or Grapevine (the North American equivalent) was one of the most frequently used techniques in Collar and Elbow matches, and attained a reputation as the 'grim accessory' of the style due to its potential to cause injury to the opponent's knee.[45]

[39] *The Wheeling Sunday Register*, 16 Mar. 1884.
[40] *The Boston Globe*, 12 June 1879.
[41] *The Sun* (New York), 7 Aug. 1879.
[42] *The Pittsburgh Press*, 6. Jan 1918
[43] Gennis and Gennis 1937–1939: 253–254
[44] *Detroit Free Press*, 30 Jan. 1884
[45] *The Sun*, 18 Jan. 1918.

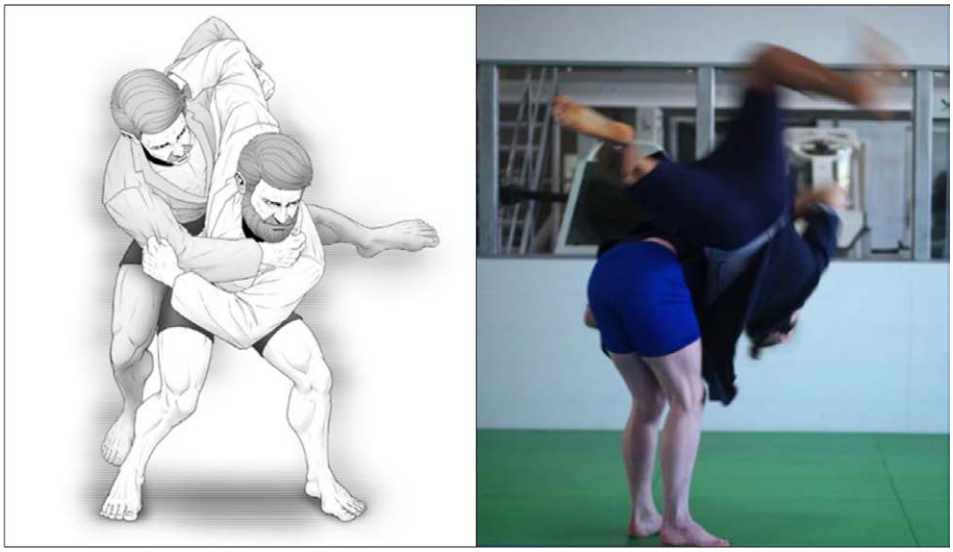

Figure 2. The Hip Lock.

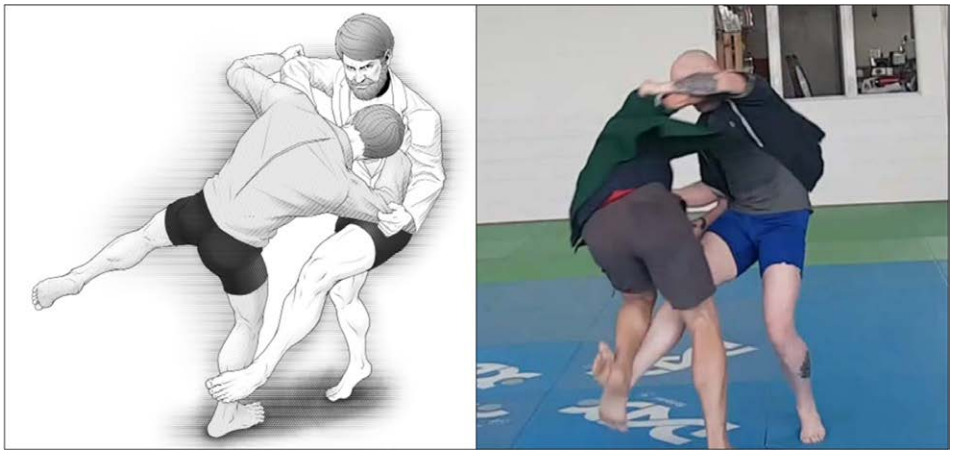

Figure 3. The Toe Lock.

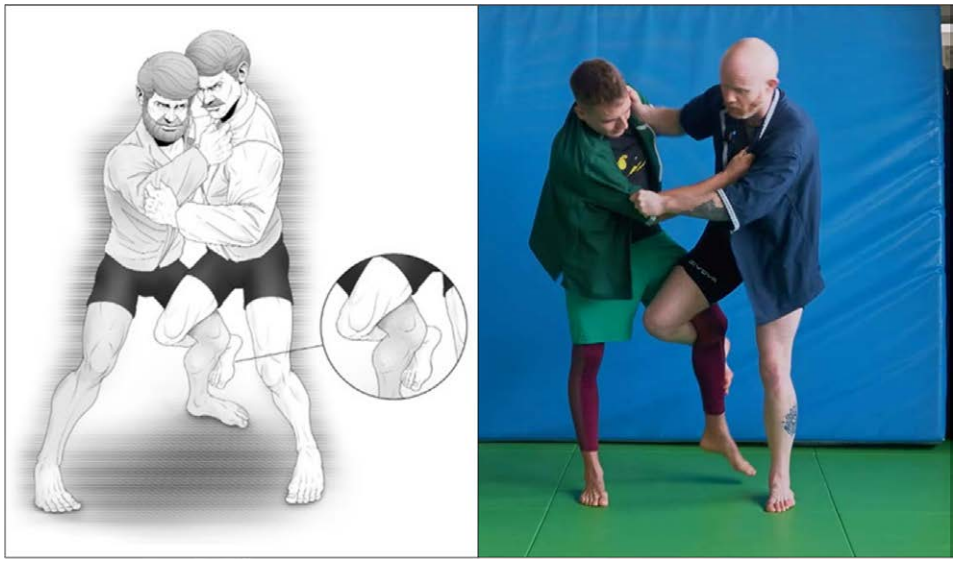

Figure 4. The Crook, also known as Grapevine.

The limitations of collar and elbow wrestling as a revived practice

While considerable progress can and has been made in recreating the techniques and strategies of Collar and Elbow wrestling, there are certain limitations that need to be acknowledged when one evaluates both the historical accuracy of the reconstructed style, and its potential future as a revived contemporary practice.

Since there is little visual material to draw upon, and no living lineage of practitioners to consult, any modern iteration of Collar and Elbow is necessarily interpretive. Practitioners must rely on written descriptions of matches to infer the nuances of stance, footwork, and technique. However, these descriptions were typically written by sports journalists rather than wrestlers themselves, and thus may lack the precision required to fully capture the technical framework of the style as it was practiced historically. Even reports that provide detailed accounts of specific throws or counters often describe them in ways that require extrapolation and interpretation, leading to inevitable variations in the way they are executed by modern practitioners.

Furthermore, the majority of participants in the reconstruction study come from other martial arts backgrounds, such as Judo, Brazilian Jiu-Jitsu (BJJ), or Mixed Martial Arts (MMA). On one hand, it could be argued that this is a practical necessity, since wrestling is a physically demanding and inherently risky activity, and any study involving the live execution of wrestling movements requires experienced participants who already possess a strong understanding of grappling mechanics. For example, the risks of practising the 'Crook' or 'Grapevine' – a technique that was infamous for causing knee injuries – can be reduced by ensuring the participants are experienced wrestlers who are able to apply the technique in a competitive manner, while remaining aware of the dangers of heedlessly applying lateral pressure to their partner's knee. Even the simple act of falling safely is one that requires experience.

However, this also means that these practitioners may – consciously or unconsciously – introduce movements, strategies, and training methodologies from their existing disciplines. For example, a Judoka might instinctively apply a hip throw in a way that aligns with Judo principles (that is, the three-phase *kuzushi–tsukuri–kake* approach to throwing) rather than the way in which a 19th-century Collar and Elbow wrestler may have approached the technique.

While efforts can be made to minimize the influence of external styles, such as by strictly adhering to historical rulesets and focusing on techniques explicitly described in primary sources, it remains difficult to ensure that a revived Collar and Elbow practice is entirely faithful to its historical form. In this sense, modern Collar and Elbow wrestling is as much an informed reconstruction as it is a revival, and its evolution will likely be shaped by contemporary combat sports influences just as much as by historical research.

Beyond issues of historical accuracy, any modern revival of Collar and Elbow faces a more pragmatic challenge: the significantly changed landscape of combat sports. In the 19th century, Collar and Elbow was one of the most popular forms of wrestling in the Western world, regularly drawing large crowds and high-profile competitors. Today, however, it must contend with an array of well-established grappling styles that dominate the global martial arts scene and have reshaped public perceptions of grappling. Modern grappling sports place a stronger emphasis on well-rounded skill development, particularly in MMA, where proficiency in both stand-up wrestling and ground-based submission grappling is essential. Since Collar and Elbow is a fixed-grip, stand-up wrestling style that lacks groundwork or submissions, it may struggle to attract athletes looking for a comprehensive

grappling system, and in general is unlikely to ever again experience the same level of mainstream adoption as styles that are perceived as more applicable to contemporary combat sports.

Instead, Collar and Elbow's revival is more likely to find success as a niche field of interest, appealing to individuals with an interest in Irish history, heritage sports, or traditional wrestling. This is not necessarily a weakness; rather, it positions Collar and Elbow as a practice within the larger discipline of Historical European Martial Arts (HEMA), which has gained a dedicated following among enthusiasts despite remaining outside the mainstream combat sports world. If structured correctly, Collar and Elbow could develop as a small but thriving discipline, with practitioners engaging in research-based reconstructions, controlled sparring, and historical reenactments.

The future of Collar and Elbow as a revived practice will thus depend largely on how it is framed within the broader martial arts community. If marketed primarily as a competitive combat sport, it will struggle to compete with the well-established modern grappling styles. However, if positioned as a cultural and historical practice – one that offers a unique insight into Irish martial and wider sporting traditions – it may cultivate a passionate, albeit smaller, practitioner base.

Conclusion

Despite the dearth of visual records and the complete absence of any surviving technical treatises, a reconstruction of Collar and Elbow wrestling has been nonetheless made possible through a combination of the close examination of other historical sources, and experiential practice. The characteristics that defined the 'Irish method' – an upright stance, fixed jacket grips, and an emphasis on lower body attacks – can be determined from the published competition ruleset and first-hand reports of historical bouts. Through more detailed analyses of those historical bout reports, we can identify common strategies (most notably the use of footwork and frequent 'taps' and 'blocks' with the feet to distract and off-balance the opponent) as well as key techniques such as the Hip Lock, Toe Lock, and the Crook/Grapevine. Wearing standardised jackets that conform to those specified in the historical ruleset, modern practitioners can apply the documented strategies and techniques in sparring sessions or competitive bouts, allowing for a reasonable approximation of how Collar and Elbow wrestling may have looked and functioned in its prime.

This project provides a possible template for the exploration of other lost or neglected grappling traditions, demonstrating the viability of reviving combat sports from fragmented historical sources. Continued efforts to uncover additional historical sources, including first-hand accounts, private collections, or previously overlooked archives, may result in further refinements to our understanding of Collar and Elbow wrestling. A more detailed ethnographic study could also yield insights into possible technical survivals of Collar and Elbow in regions historically associated with the style (for example, Kildare or Vermont).

Furthermore, the cultural and social dimensions of Collar and Elbow wrestling warrant deeper exploration. As a sport that flourished during a period of intense Irish emigration, understanding its role within Irish communities abroad – whether as a means of identity preservation, social bonding, or simple physical competition – could enrich our appreciation of its wider cultural significance. The intersections of Collar and Elbow with other Irish sporting and combative traditions, such as Gaelic football, hurling, or faction fighting, may also be a fruitful avenue of study.

By reconstructing and reviving this distinctive Irish grappling tradition, we not only preserve a vital piece of cultural history but also contribute to the broader field of historical martial arts research, demonstrating the potential for bringing lost combat sports back to life through applied academic and practical methodologies.

Chapter 4.
Gripping Affordances of Select Post-Medieval European Sidearms

Jerzy Miklaszewski
Indpendent researcher

Introduction

The human hand is often considered an extension of the brain that can be further extended by manually-operated tools - themselves extensions of the body. In fact, the co-evolution of the human (hominin) hand and tools is well-evidenced.[1] Hand-operated weapons were among the earliest tools used by humans and have retained cultural significance ever since, becoming sophisticated artefacts in the process.[2] Hence, the relationship between the ways a weapon is gripped and its handle construction is a complex subject. This article investigates post-medieval Polish and German sabres and broadsword, exploring how the grip anatomy influenced historical weapon design and fencing methodologies, understood as distinct movement cultures within the physical culture of the period covering an extensive timeline from post-medieval times through the Napoleonic era and into the 19th century.

This time period was chosen because it represents the peak of sabre development. Many structural elements of both handle and blade design evolved during this era, making them easier to visualise and study. Additionally, there is a wealth of written material from this period, which allows for meaningful comparison of interpretations and enables critical testing and verification of the study's claims. As a result, the evaluation of the underlying theory becomes clearer and more precise, enhancing the reliability of the research. In contrast, later periods saw a greater unification of fencing systems, making it more difficult to trace how specific aspects of weapon construction influenced actual usability.

Sabres and broadswords from the investigated period exhibit some of the most diverse handle designs among sidearms. These designs often followed the stylistic and functional trends of their time. Given that fencing methodologies are also shaped by prevailing fashions, this research seeks to uncover whether a direct relationship exists between handle construction and fencing techniques, and how these elements influenced each other. Therefore, the analysis aims to answer several pivotal questions:

- How does the weapon handle design respond to and affect gripping patterns?
- What influence does the handle morphology have on the overall weapon design?
- How did gripping techniques evolve alongside fencing methodologies (movement cultures)?
- How can understanding the anatomy of gripping aid in reconstructing historical fencing methodologies?

Study design

This study employed a semi-structured combination of experimental reconstruction, physical testing, and expert consultation over several years. The present author was the principal investigator

[1] Lundborg 2014: 173–190.
[2] Young 2003.

Figure 1. Custom hilts crafted by this author for the museum exhibition 'Szable w dłoń!' [To Sabres!], held in 2018 at Collegium Maius, the Museum of the Jagiellonian University in Cracow. These sabre hilts represent various stages in the development of Ottoman sabre hilts from the 16th to the 18th centuries. They were later used in the research on gripping affordances discussed here. To enable consistent and repeatable testing under controlled conditions, simple functional constructions were created for each hilt design.

– both the experimenter and the test subject when exploring the interaction between the modern human hand and the handles of historical weapons. A supportive role was also played occasionally by members of the Silkfencing group, an ensemble of HEMA practitioners of varying level of experience. The interim results of this exploration were documented and disseminated in public-facing videos published in social media.

Custom-designed handle shapes and simplified blade prototypes were constructed with interchangeable components, allowing for direct tactile comparison of how different grip types functioned with varied handle geometries (Fig. 1). Several sparring weapons were also built and tested in numerous sparring sessions, during which the author focused on applying specific historical fencing systems and drills to observe the mechanical implications of grip patterns in live practice.

In addition, the research involved collaboration with Szymon Sitko, a physiotherapist from IDRA Fizjoterapia, Poland. Together, a series of analytical exercises were developed to better understand the biomechanics of each gripping pattern. These included training regimens targeting the hand and arm musculature to activate specific muscle groups involved in historical fencing actions. These drills were then incorporated into fencing training protocols followed by the principal investigator and some of his collaborators from Silkfencing to explore their practical application. The endeavour remains open and future investigations may incorporate additional testing methods, broader comparative datasets, and further interdisciplinary collaboration.

Grips in anatomy and anthropology

The study of human gripping has been a significant focus of research in fields such as physiotherapy, medicine, anthropology, and primatology. Notably, John R. Napier's groundbreaking work in 1956 provided a foundational understanding of hand anatomy and functionality. Napier identified two primary prehensile actions, which he called the 'precision grip' and the 'power grip': 'If prehensile activities are to be regarded as the application of a system of forces in a given direction then the nature of prehensile activity can be resolved into two concepts - that of precision and that of power'.[3]

1. **Precision Grip**: Involves fine motor control without forceful grasping.
2. **Power Grip**: Characterised by forceful grasping, leveraging the thenar and hypothenar muscles.

Napier's insights remain critical in understanding how grips influence weapon design (esp. handles) and fencing techniques.

Functional anatomy of the hand

To appreciate the mechanics of grips, key anatomical terms are necessary:

- **Thenar Eminence**: The muscular pad below the thumb.
- **Hypothenar Eminence**: The muscular pad below the little finger.
- **Finger Movements**:
  - **Extension**: Moving fingers away from the palm.
  - **Abduction**: Spreading fingers apart.
  - **Adduction**: Bringing fingers together.
  - **Flexion**: Moving fingers toward the palm.
  - **Opposition**: Moving the thumb toward another finger, crucial for gripping.

Power and precision grips

Four grips were identified based on previous studies and are discussed below to address the following research problems:[4]

1. **Level of the grip surface***:* Determines how well the hand contacts the weapon handle, affecting stability during use.
2. **Level of leverage on fingers and the ability to return the weapon**: Influences how effectively the weapon can be controlled and repositioned.
3. **Point control due to muscle tension**: Affects precision by managing the tension required to direct the weapon's tip.
4. **Ability to regain control after a conscious loss of the grip**: Examines the ease of recovering grip after deliberate or accidental release.
5. **Strengthening a feature of a particular grip with respect to precision or power***:* Explores how gripping techniques balance fine control and force application depending on the context.

Power grips

- **Cylindrical Grip**: The grip is characterised by the flexion of digits 2-5 and flexion and adduction of the thumb around the object but in opposing directions.

[3] Napier 1956: 906.
[4] Loudon, Swift, and Bell 2008.

- **Spherical Grip**: Flexion of the fingers and thumb around a spherical object, like holding a ball.[5]

Precision grips

- **Two-Point Pad Pinch**: The thumb and the pad of the index finger are utilised to manoeuvre objects such as a light bulb.
- **Three-Point Pad Pinch**: The thumb opposes digits 2 and 3 with pads of the distal phalanges, such as during the opening (unscrewing) of a bottle cap.
- **Lateral Pinch**: A thin object held between the lateral surface of the index finger and the thumb, such as when using a key.

To understand the interplay of grips and fencing techniques, it is essential to note the distinction outlined in 1962 by Johan M. F. Landsmeer.[6] Landsmeer emphasised that while power grips involve a unified forceful grasp, precision grips require a nuanced interplay of muscles, creating an interdigital antagonism rather than a forceful middle-hand grasp. This foundation sets the stage for a deeper exploration of grips in post-medieval fencing.

Exploring sword-specific grips

To analyse the anatomy of gripping in the context of historical European fencing methodologies, specific terminology commonly used in martial arts is applied:

- **Hammer Grip**
- **Handshake Grip**
- **Thumb Grip**
- **Hybrid Grips**

While these terms are only partially derived from fields like anthropology or physiotherapy, their functional analysis is valuable in understanding weapon handling.

Hammer Grip

The Hammer Grip, a form of the Cylindrical Grip, is recognised as the most stable grip during moments of violent exertion of the upper limb (Fig. 2). It allows for a relaxed use of upper limb muscles without significantly impacting weapons performance. The fundamental action of this grip heavily relies on the lateral prehension of the thumb. Depending on the handle's construction – its size and shape – this grip can lead to full abduction of the thumb, enhancing precision. Additionally, the Hammer Grip offers the flexibility to incorporate other variations of the Cylindrical Grip, making it a versatile choice in weapon handling.

Figure 2. Hammer Grip presented on an original 1796 pattern light cavalry sabre. Note that this handle design was adopted by Prussians in the 19th century and served in its many variations up until the early 20th century.

[5] Hedge 2013.
[6] Landsmeer 1962.

Handshake Grip

The Handshake Grip, another form of the Cylindrical Grip, offers a more complete filling of the hand with the handle (Fig. 3). Compared to the Hammer Grip, it allows for more efficient use of the thenar area and the thumb. Additionally, it provides better support to the thenar eminence through the elevation of the hypothenar area, making it a more refined option for certain applications in weapon handling.

Four subtypes of the Handshake Grip can be identified, depending on the gripping length and the extent to which pad pinch and lateral prehension are employed. These subtypes allow for adjustments in grip dynamics, enabling variations in weapon control and precision:

- **Common Type**: Used when no additional support beyond the shape of the handle exists. Any tilting of the handle greatly supports its stability. This type of grip will hereafter be referred to simply as the Handshake Grip (Fig. 3:A).
- **Pistol Grip**: This occurs when the pommel can be gripped with an elongated Hammer Grip, enhancing wrist movement freedom. This grip benefits greatly from the presence of knucklebows or pommels that allow proper hooking of the grip (Fig. 3:B).
- **Rapier Grip**: A variation of the Handshake Grip where the thumb and index fingers grip around the crossguard to enhance stability (Fig. 3:C). This grip incorporates appropriate precision grips for improved point control.
- **Finger Loop Grip**: This Handshake Grip variation includes a finger loop for enhancing the grip with a lateral pinch, providing better point control (Fig. 3:D). This grip represents an evolved form of the Rapier, Pistol, or Handshake Grip, depending on its placement on the handle and the specific finger used for additional support. It functions as a transitional configuration that adapts to the ergonomics of the weapon to enhance both point control and gripping stability. Several types of finger-loop-equipped guards gave rise to this grip's name. The most common versions either feature a leather loop for the index finger or a longer leather loop or metal hook accommodating both the index and middle fingers. In both cases, they help reduce grip tension – either in the upper or lower hand – by redistributing pressure and supporting different finger combinations. The subject of grip tension distribution will be explored in more depth later in the text.

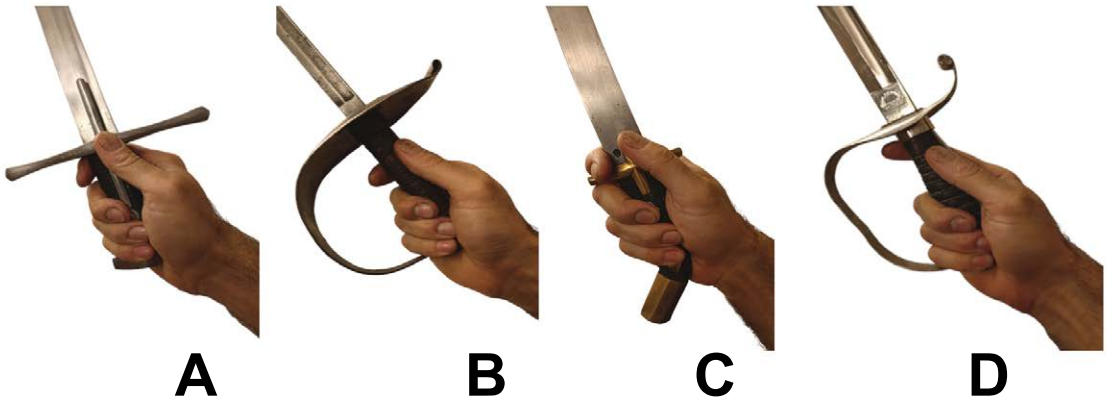

Figure 3. Four types of Handshake Grip presented on different weapon designs. Note that the Rapier Grip may vary in accordance to the hilt design – it may be well placed on a finger loop equipped weapon.

The Thumb Grip

The Thumb Grip exploits the precision grip's characteristic use of the thumb as the jaw of a clamp (Fig. 4). By utilising the thumb in adduction as a stabilising component, this grip provides significant control over the weapon's point and edge. However, it lacks the stability associated with the typical Hammer Grip. Additionally, the Thumb Grip immobilises the handle within the hand, leaving little room for conscious loosening of the grip.

Depending on the ways of countering the push of the thumb, there exist several types of the Thumb Grip:

- **Short Thumb Grip**: When one is using the Lateral Pinch technique to support the Cylindrical Grip (Fig. 4:A). This grip strengthens point control and provides substantial stability but reduces wrist mobility under tension. It is most often seen with lighter weapons.
- **Hammer Thumb Grip**: A Hammer Grip supported by placing an extended thumb along the back of the handle (Fig. 4:B). Often, the small finger is positioned against the pommel. This grip, instead of emphasising precision, adds more power to the cut through thumb flexion at the cost of lateral stability. It is the most common sabre grip suggested in German swordsmanship manuals of the 18th century.[7] More importantly, this grip is a precise representation of the Hammer Grip augmented by the use of a thumb ring, enhancing both stability and control.[8]
- **Finger Loop Thumb Grip**: A short Thumb Grip supported by an extended position of the index finger, which not only pinches laterally but also pulls or pinches with the pad or side of the pad. This variation does not necessarily require the use of a finger loop itself; it may simply involve the extended position of the index finger (Fig. 4:C). It is often associated with lighter weapon types.
- **Smallsword Thumb Grip**: This type of short Thumb Grip partially incorporates the Spherical Grip at its foundation (Fig. 4:D). This adjustment emphasises how much of the thumb's thenar is used for stability. Its main stability function is transferred to the Pinching Grip of three fingers, leaving the thenar as additional support. This grip is commonly associated with weapons that rely on precise point manipulation.
- **Pistol Thumb Grip**: A variation of the Thumb Grip where the thumb's thenar is positioned more perpendicular to the handle. This positioning often results from the hand being placed at the level of the pommel or slightly below it (Fig. 4:E). While it enhances wrist mobility, it compromises stability upon impact. This grip is notably employed in certain Austrian and later Polish sabre fencing traditions.

Issue of the Thumb and Handshake Grips

The Thumb Grip and the Handshake Grip often overlap visually, as they not only utilise similar hand mechanisms but can also appear as rotated versions of each other. Understanding this rotation is crucial. The key distinction lies in the position of the thenar in relation to the back of the handle. When the thumb's thenar completely covers the back of the handle – even when the thumb is placed

[7] This type of grip appears in many sabre treatises; surprisingly, the clearest examples can often be found in 19th-century manuals, which document the use of curved sabres in a structured way. However, the grip method described also appears in earlier cavalry sabre treatises, such as that of Carl Timmlich, who writes: 'If you close the fist around the guard and additionally place the thumb on its top, the grip is of little use; (...) The forward placement of the thumb not only promotes this forward acceleration, makes it easier and gives it more pressure', see Timmlich 1796: 14.

[8] The thumb ring, when analysed in terms of grip ergonomics, functions as a highly supportive element. Its correct use closely resembles the Hammer Thumb Grip, allowing better thumb flexion and thus increasing lateral stability. However, applying too much tension to the thumb ring may reduce the wrist's forward mobility.

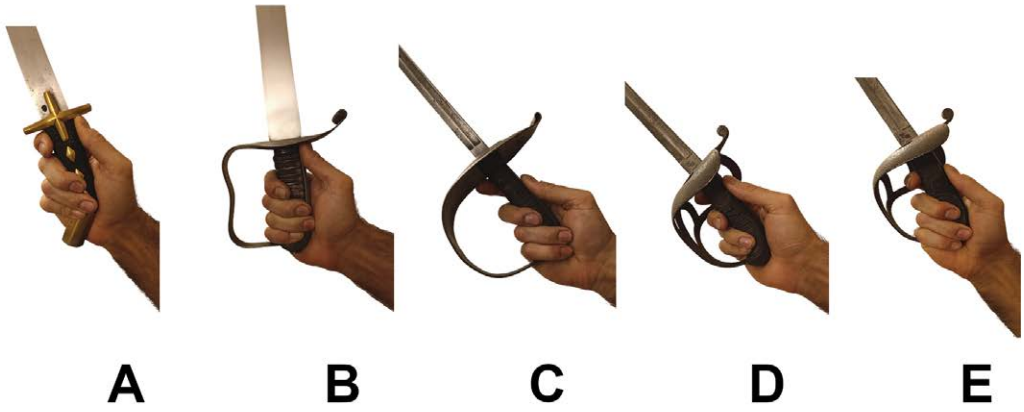

Figure 4. Five forms of the Thumb Grip. Although the differences between these grips may appear subtle, each one engages distinct aspects of hand function. These variations have a significant impact on the handling and overall functionality of the sabre.

on the back of the handle – it pushes laterally instead of directly through flexion. This results in two major functional differences:

- The thumb's thenar acts as a counter to the flexion of the fingers (primarily the 5th, 4th, and 3rd), meaning that the larger and more effective this area's surface is, the greater the thenar's stability.
  - In the Thumb Grip, the thenar directly opposes the oppositioned hypothenar of the small finger. To maintain effectiveness, this must be stabilised with the tips of the fingers, causing larger surfaces in the pommel area to have little or even antagonistic value to grip stability.
- The alignment of the 2nd to 5th fingers towards the front of the handle.
  - In the variants of Handshake Grip, the hand's position aligns the joints' curvature to the front of the handle, leading to essential features that will be discussed further in the article.

Eastern power *versus* western precision

Two specimens from the analysed period serve as appropriate examples for comparison. First is the Turkish sabre of the 16th/17th century, a prime example of a popular weapon choice not only in the Ottoman Empire but also in eastern Poland, Hungary, and Russia well into the 17th century.

The asymmetric conical handle of the early Turkish sabre introduces stiffness and strain throughout the upper limb during cutting motions, particularly if the arm is extended forcefully without transitioning to longer grips. The forward asymmetry of the grip allows a transition from the Hammer Grip to the handshake or long Thumb Grip for greater versatility. However, the grip's surface, much smaller near the pommel, limits the stopping power during a fully extended cut.

This design aligns with mechanics of cuts performed with a crooked arm, a technique occasionally mentioned in later sources.[9] The handle also enables limited hypothenar elevation to support the thenar eminence during thrusts. Additionally, the handle enhances broad striking mechanics,

[9] An example of the most modern treatise depicting that movement would be Segers 1834: 92 – 'It should only be noted that sabre cuts are not executed from the wrist, but rather drawn with a slightly bent arm, using both pull and pressure, so that they are more sliced, whereas rappier cuts are more thrown'.

Figure 5. This early kilij clearly demonstrates the characteristics of this grip, in which the handle fits anatomically into the hand, improving handling comfort – yet it lacks any supportive elements to enhance stability.

allowing for consecutive cuts or single, very fast circular cuts, albeit with longer recovery times or risks of over-swinging (Fig. 5).

These mechanics correlate well with the fencing methods described by a contemporary Spanish master-at-arms, Luis Pacheco de Narvaez (ca. 1570–1640), in his chapter on the 'Alfanje', discussing how the Turks fought.[10] According to him, they relied on precise, broad, powerful strikes. Correspondingly, these sabres were often fitted with broad blades, which, along with the aforementioned handle construction, made them particularly suited for simple fencing movements. The lack of significant hand protection further supports the theory of broad cutting techniques, as it suggests the hand was less likely to be targeted due to its continuous movement in broad actions.

Second is the German rapier of the 17th century.[11] This weapon features a lenticular handle typical of earlier Renaissance-period German swords and daggers, allowing the grip to fill the hand fully. While this design does not facilitate an easy transition of the grip along the handle, it relaxes the shoulder joint, providing a broader range of wrist operations.

The Rapier Grip adaptation allows the use of the three-point pad precision grip, broadening the point control and developing wrist rotation freedom. The handle construction pushes the weapon into a more forward point position. A relaxed shoulder in the extended arm position enables a broad array of fencing actions, often focused on point work. Cuts can range from broad, wrist, or shoulder-propelled circular motions, facilitated by upper limb power, to small thrust-like cuts initiated from the elbow (Fig. 6).

The developed hand protection suggests techniques that bring the hand forward, making it an easy target. The concentration of mass around the hand area influences the mechanics of movement,

[10] Pacheco de Narváez 1600.

[11] This element requires broader context. The rapier – widely recognised as a thrust-oriented weapon due to its distinctive shape and structure – was, in fact, a foundational sidearm of the German early-modern cut fencing tradition. While the rapier shaped the core of fencing systems across the German states in the 17th century, a particular form that emerged in the mid-17th century became central to cut fencing training. This variant, often resembling a cup-hilt rapier but fitted with a broader blade, came to be known as the *rappier*, especially in 19th-century terminology. The term referred not only to a specific type of weapon but also to an entire system of fencing.Notable authors such as Segers 1834, Timmlich 1796, and Werner 1824 – writing on sabre or broadsword fencing explicitly mention or even demonstrate that the foundations of fencing should be taught with the *rappier*. The first documented use of the *rappier* as a distinct tool for cut fencing appears in Erhardus Henning's treatise, see Henning 1658 and Van Noort 2019. The *rappier*'s role as a training weapon extended into partitioned Poland, where even literary figures like Adam Mickiewicz used the term to describe cut fencing weapons wielded by Polish fighters, see e.g. Mickiewicz 1834. During the 18th century, this training weapon also appears under the broader term *degen*. Although the term directly translates to smallsword, works such as Schmidt 1736 clearly use it to denote the broader-bladed *rappiers*. For this reason, understanding the *rappier* is crucial for grasping the context of German cut fencing tradition. Its design, as well as the fencing systems developed around it, helped shape the weapons and methods of European fencing for centuries to come.

relying heavily on forward arm extension. These features align closely with typical characteristics of cut-focused fencing in German regions, which were heavily influenced by rapier sources. Here, actions are developed from an arm-forward stance, emphasising attack preparation while discouraging large swings. Hand cuts are frequently mentioned in both historical sources and memoirs.

To better understand the progression of grip dynamics and handle adaptation of the power grip, we will now examine a specimen from a later period: a light Ottoman *kilij*, typically equipped with a Persian *shamshir* blade.

In contrary to the early form of Ottoman *kilij*, the light, later weapon has a thin, straight handle allowing a much less size of the handle to be filling the grip in case of Hammer Grip. These cause that the method of grip has to be adjusted to the size of the handle transferring more towards Handshake and Thumb grips, which allows using different finger and thenar positions for a more effective stability for such a thin handle (Fig. 7).

Figure 6. A typical 17th-century German swept-hilt rapier guard. This design improves several aspects of blade control and point stability.

This handle features a distinctively crooked pommel, providing enhanced support for the 5th digit and better engagement of the hypothenar eminence. This design increases grip stability for longer holds while allowing controlled loosening for easier transitions. By snapping the pommel with the small finger, fast strikes can be executed efficiently, as relaxing the upper grip reduces restrictions, enabling swift wrist rotation. This technique facilitates highly effective circular cuts with minimal effort.

Regarding historical use, sources such as Chevalier Chatelain, M. J. de Saint Martin, and W. Eton provide extensive commentary on the tactics and movement of Ottoman sabres during their respective periods.[12] They emphasise the use of various light grips to enable swift manoeuvres with the sabre. Despite the significant changes in weapon construction, Ottoman fencers continued to employ powerful circular cuts, often executed with a crooked arm. Notably, they retained beating or displacement-type parries for defence, as their minimal hand protection necessitated active defensive movements.

This approach closely resembles the use of the earlier *kilij* while introducing a distinct adaptation in power-oriented circular cutting techniques suited to a different hilt structure. The early *kilij*'s design maximised striking power by utilising handle asymmetry, channelling the force primarily through momentum generated by the entire arm's movement. In contrast, later designs abandoned the tilted handle in favour of a developed pommel, which provided greater stability and facilitated a snapping motion using the lower part of the handle. This adjustment shifted the emphasis on momentum generation from full-arm motion to a more controlled wrist-driven action, allowing for more precision and shortening the speed of its execution.

[12] Chatelain 1818; De Saint Martin 1804; Eton 1799.

Figure 7. Example of the sabre hilt design from the late 18th century. While the ball pommel was more commonly used during this period, the example shown above features an even more agile and elegant design.

This comparison serves to illustrate two extreme archetypes of gripping styles – those associated with power-driven movements and those favouring precision. The early *kilij*, with its slight inclination and minimal structural support near the handle, prioritises acceleration and cutting force but lacks the stabilising and precision-enhancing features found in weapons like the German rapier, which includes a *ricasso* and extended handle. This marks the *kilij* as a model of the power grip in its purest form.

The inclusion of the later *kilij* offers an evolutionary perspective. While it introduces structural improvements such as a straighter handle and a stabilising pommel – features that enhance wrist action and promote relaxed hand engagement – it still maintains the core dynamics of power-based movement. The power grip model persists but is now enriched by the capacity for wrist-driven cuts and more adaptive, loose-hand techniques, which reflect a hybridisation of force and finesse.

Eastern power in the european hand

The shaping of the grip around different sections of the handle reveals two distinct models. The Rapier Grip emphasises the upper part of the hand, where tension is concentrated in the first and second fingers, while the thenar and hypothenar eminences serve stabilising roles. In contrast, Eastern sabres, especially those with asymmetrical hilts, promote grip engagement in the fourth and fifth fingers, stabilised by the thumb's thenar, with the first and second fingers playing a supportive role.

The construction of Hungarian sabres reinforces this grip model, as can be observed in early 17th-century manuals such as those by Sebastian Heussler and Michael Hundt.[13] A notable evolution of this grip appears in Austrian and later Polish and Hungarian manuals, where the hand placement on the grip shifts increasingly lower. An extreme example can be seen in the Arlow and Litomysky manual from 1894, where the pommel rests in the thenar area and the thumb lies along the spine of the handle (Pistol Thumb Grip).[14] This shift highlights the expanded functional role of the thumb's thenar as a primary point of contact – a topic discussed in more detail elsewhere in this article.

A strong grip at the base of the handle is facilitated by several features, especially in Austrian and Hungarian sabres. The first and most important is the clear widening of the handle near the pommel. This is well illustrated by Polish sabres from the second half of the 17th century, where the broadening of the so-called 'almond' creates a larger surface for the little finger, extending the stabilising role of the hypothenar. This allows for greater control and reduces wrist tension.

[13] Heussler 1615; Hundt 1611.
[14] Arlow and Litomysky 1894.

While this feature does not appear earlier in asymmetric weapons, one might find a similar concept in late 16th-century symmetrical handles of German cutting weapons, such as *dussacke*. Many of these weapons have characteristically flattened pommels, possibly providing similar support. The correlation is strengthened by the fact that both Polish sabres and German *dussacke*, in addition to their broad pommels, use thumb rings and a similarly lowered handle profile.

Another attribute tied to low handles is their characteristic inclination, which generally appears in two forms. The first is seen mainly in Hungarian and later Polish sabres: a bend halfway along the handle, creating a seemingly symmetrical taper. The function of this bend can be better understood by examining the extreme case of the hilts used on estocs in Poland and Hungary, especially among cavalry units. These hilts function similarly to the handle described earlier in the Arlow and Litomysky's manual.

This angle positions the handle to better support the thumb's thenar while aligning the blade with the forearm. This allows for a more stable extended-arm position during a cut and reduces wrist strain when performing wide cuts with a blade that has a heavy tip. An extended arm naturally provides more degrees of freedom than a bent one. Such handle structure also supports the previously described snapping motion used to release the blade by closing the hand rapidly.

The Precision Grip Within Power-Oriented Sabre Systems

One of the more intriguing shifts in gripping styles can be observed in how Germans held the smallsword. While the very light, strictly point-oriented nature of the smallsword encouraged the use of precision grips – centring tension in the second and third fingers for responsiveness during fine fencing motions – German sources from the late 18th century indicate a continued emphasis on gripping with the lower hand. This suggests an underlying preference for a power-based grip structure, even in weapons that demanded point control. Timmlich, in his 1781 manual on smallsword fencing, illustrates this clearly:

> ***§. 10.*** *The Degen is held so that the quillons are between the thumb and index finger, the handle rests right in the center of the hand, and the end lies straight in the middle of the hollow under the ball of the thumb. The little finger is the strongest in the hand; however, it is not necessary for it to grasp the entire handle, but only half of it, to ensure that the handle remains firmly in the center of the hand, which is particularly necessary for making straight thrusts.*
>
> ***§. 11.*** *Some (especially the French) hold the Degen between the index and middle fingers; however, this grip is not good because one is not as adept at making a strong Ligade or beating with it.*[15]

This example becomes even more significant when considering the shift occurring at the turn of the 19th century, when French cut fencing began to influence many German systems. Initially, numerous schools adopted a version of the French hanging guard, making only minor adjustments to their movement mechanics to accommodate it. One notable case is the Starzewski school, which emphasised a firm grip on the lower part of the handle. However, by the latter half of the 19th century, many German schools had transitioned toward a gripping style more closely resembling that of the French smallsword – emphasising point control and consequently shifting the grip's tension toward the upper part of the handle.

This development had a significant influence on handle design and overall weapon structure, often resulting in swords that were lighter toward the point. Consequently, the balance and centre

[15] Timmlich 1781.

of rotation shifted much closer to the guard. In the second half of the 19th century especially, a noticeable trend toward lighter, more point-oriented weapons emerged.

German sabres of the time began incorporating specific ergonomic features in their handle design. Examples such as the Prussian cavalry sword Model 1852/79, the Austrian Model 1861, and the Prussian KD89 featured thinner handles and more optimised support for the index finger. These adaptations catered to fencing styles that emphasised control, finesse, and precision point work.

This evolution becomes particularly noticeable when comparing weapons used by different unit types across German-speaking armies. A notable example can be found in the work of Johann A. L. Werner, who writes:

> *Since these weapons are meant to be guided more with the arm and wrist together than with the wrist alone, their grips – especially in the case of sabres – are curved downward. As there is no bar to prevent the hand from slipping, the index finger is placed through a ring or strap attached to the top of the guard to prevent this. If such a ring is not present, the weapon is held naturally with the full fist, so that the knuckle bow runs over the middle knuckles of the fingers. Thus, apart from the thumb, which is laid along the direction of the blade, there is no special positioning required for the other fingers.*[16]

This passage highlights the significance of grip pressure placement. Werner emphasizes that, in the absence of a dedicated guard element like a finger ring, the grip risks becoming unstable due to the concentration of pressure in the upper part of the hand. His solution – gripping with the full fist – demonstrates how essential the redistribution of grip tension is for weapon control in such designs.

Although there are rare cases where Model 1861 sabres were fitted with wide blades seemingly derived from oriental or 18th-century Hungarian heavy sabres, these examples remain exceptions rather than indicative of a broader trend.

Each of these sabre designs was supported by distinct underlying movement mechanics. A clearer understanding of these mechanics can be gained by analysing specific drills from the 18th and early 19th centuries – three of which are clearly described in *Recueil de Théories Étrangères sur le Maniement du Sabre, ou l'Escrime à Cheval*.[17] This source offers an excellent comparative overview of the dominant cavalry fencing doctrines of the early 19th century: Prussian, Austrian and Hessian. The Hessian drill exhibits a style that may be considered anachronistic, as it emphasises movement of the entire arm. While most fencing doctrines of the 18th and 19th centuries focused on extended-arm positioning and wrist rotations, full-arm swinging cuts were relatively rare during this period. Such motions are more frequently found in 17th- and early 18th-century manuals, often described as products of instinctive or natural training.

While this may appear counterintuitive, the aforementioned mechanics correspond well with both gripping patterns. Although they emphasise the Hammer Grip and its extended form – the Hammer Thumb Grip – they also highlight an efficient way of using tension in the upper part of the hand, especially in the first, second, and third digits. Even when employing a power grip, which is typically associated with maximum hand engagement, this broader joint movement allows the cut to be executed effectively with tension concentrated in the upper fingers, driving the point forward.

In this area, an observation worth further research can be presented. The Hammer Thumb Grip appears to have been in use well before the widespread adoption of thumb rings in cutting weapons

[16] Werner 1824: 42.
[17] Officier Général 1826.

throughout Poland and German-speaking regions from the mid-16th century. This feature, however, begins to decline toward the late 18th century, with most cavalry sidearms gradually losing this structural element. As Timmlich notes: 'This elevation would moreover be useful as a support for the thumb. With its help, the sidearm is much easier to operate than when the thumb is stuck in a thumb ring'.[18] The thumb-ring-enhanced Thumb Grip tends to lose its effectiveness and restrict wrist mobility when excessive tension is applied to the upper part of the grip. This suggests that the decline of the thumb ring may have been influenced not only by changes in weapon design but also by a shift in gripping methods toward configurations that favour freer wrist articulation.

This is even more important if one realises that although normally the tension put on the 4th and 5th digit allows for greater wrist mobility, in the Hessian doctrine the wrist movement is of secondary importance, its major advantage relying on the mobility of the shoulder and elbow joints. In this way it stands in contrast to two other doctrines presented in the book, which teach to deliver blows with arm extended and with the sole use of the wrist movement, slightly supported with shoulder movement. In these two other drills, the extended arm action is executed either on 'locked' or 'loose' wrist position.

This creates a very interesting situation, where a purely power-based grip is not simply defined by finger engagement alone but rather by which joints initiate and drive the cut. In the Hessian drill, the shoulder and elbow act as primary sources of motion, while wrist articulation remains secondary. This stands in contrast to the Austrian and Prussian systems presented in the same treatise, where an extended arm – locked or flexible at the wrist – is used to generate velocity through more refined control. These differences illustrate how grip tension and its anatomical focus (upper vs. lower hand) were adapted to different tactical doctrines and cutting mechanics. Both the locked and loose wrist positions belong to power-based systems that incorporate elements of precision. The locked wrist relies on a rigid hand to manoeuvre the weapon through a straightened arm, while the loose wrist takes advantage of grip transitions – typically between Hammer and Handshake grips – to perpetuate blade momentum. This enhances the weapon's alignment with the intended cutting plane, allowing for increased stability without compromising power.

Conclusion

This article investigates how the anatomy and mechanics of the human grip influenced the construction of sabre and rapier handles in post-medieval Europe. It demonstrates that grips are not passive reactions to handle design – rather, they actively shape how weapons are constructed and used. Applying principles from hand anatomy and prehensile function, the text classifies grips into key types (hammer, handshake, thumb, and hybrid) and links each to weapon ergonomics and fencing applications.

Each gripping type engages distinct muscular regions and responds to handle geometry – such as pommel shape, handle length, and symmetry. These interactions determined the stability, control, and functionality of various cutting and thrusting techniques. Power-oriented grips prioritised stability and momentum through lower-hand engagement, while precision grips required finer control enabled by upper-hand engagement and wrist articulation.

By tracing the interplay between hand anatomy, handle construction, and gripping techniques this paper demonstrates that weapon design is not merely an aesthetic or technological construct, but a product of active discovery of constraints of the human body and the materiality of the artefacts. When put to motion in the modern hand, the post-medieval sabres and rapiers analysed here reveal

[18] Timmlich 1796: 14.

how variations in handle shape, size, and asymmetry correspond to distinct gripping mechanics and fencing methodologies. Power-oriented grips and precision-focused grips each demanded specific handle geometries, which in turn shaped the evolution of martial practice across Europe. The affordances of the swordsmen's hands required swordmakers to design responsive weapons.

The Turkish sabre's asymmetric handle prioritised broad, momentum-based cuts, while the German rapier's lenticular handle facilitated fine point work and wrist articulation. The later Ottoman *kilij* refined these concepts with a pronounced pommel to optimise grip stability and cutting efficiency. Ultimately, the Hungarian sabre synthesised Eastern power and Western precision, embodying a cross-cultural exchange of ergonomic and martial principles. This process also exemplifies the flip-side of the user-artefact-maker dynamics revealed by earlier sabre types – being a product of a culture intensively mixing Western heritage with Eastern influence, the Hungarian sabre was a sophisticated artefact created to afford a fencing style reconciling two distinct philosophies of combat constantly challenging each other on duelling grounds and battlefields.

Understanding these relationships enriches historical reconstructions of fencing techniques, guiding modern practitioners in faithful recreations of period styles. Moreover, this biomechanical perspective can inform contemporary tool and weapon design by highlighting the inseparable link between human anatomy and weapon functionalities. Future research could extend this approach to other weapon families and regional traditions, further exploring how culture has shaped – and been shaped by – artefacts meant to act as extensions of the human hand.

Chapter 5.
Boots on the Ground:
Late-Medieval Infantry Marches and Infrastructure

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Introduction

Our group embarked on a 48km march over three days, wearing late 15th-century medieval military gear (Fig. 1). The purpose was to demonstrate the feasibility of long-distance, sustainable marches along medieval infrastructure in friendly territory. We stopped at two structures along the way to rest for the night. While our results were mixed, we gathered a wealth of valuable insights.

The core idea behind this march is that infrastructure shapes the parameters of travel. By recreating medieval infrastructure, we can simulate the way late medieval soldiers would have travelled. For example, modern road trips typically do not require travellers to carry tents or enough fuel for the entire journey, because motels and gas stations are readily available along the route. Similarly, by travelling on roads with amenities like inns with kitchens and access to fresh water – similar to those on medieval roads – we were able to travel with equipment that closely matched what historical soldiers would have used.

Figure 1. Our group. Left to right, Marlene Hurst, Michael Creech, Sean Ellis, me (Charles Lin), and William Buschur.

This event was designed to stand in contrast to those where a stationary camp with tents is set up. In the United States, the lack of authentic medieval structures or backdrops often leads to most historical reenactment events relying on tents for both shelter and as a backdrop for activities. However, setting up and breaking down camp requires significant effort, and valuables left in and around the tent further limit movement. As a result, most activities tend to be confined to the immediate area around the tent. Additionally, because activities are largely stationary, participants are not penalised for bringing along extra, heavy items that they may not actually need. These factors together make it difficult to engage in marching, which is perhaps the most iconic activity of infantry.

The route and infrastructure

The march travelled along the towpath of the Chesapeake and Ohio (C&O) Canal (Fig. 2), starting from Washington, DC and ending at Lockhouse 25, 48km away (Fig. 3). The C&O Towpath is a 19th-century piece of infrastructure that predates both the automobile and the train, and originally allowed pack animals to tow barges along the canal. It is flat, runs parallel to the Potomac River, and has many places along the route where fresh water can be acquired. The longest stretch of distance that we were without water was 7.7km. The C&O Canal also has several primitive lockhouses for rent along its length, which we used as notional inns or friendly accommodations.

By comparison, a similar hypothetical march from Altendorf, a town near Nuremberg, to Nuremberg itself, a distance of 46km, runs along the Regnitz and Pegnitz rivers, and in the 15th century had a

Figure 2. The Chesapeake and Ohio Towpath.

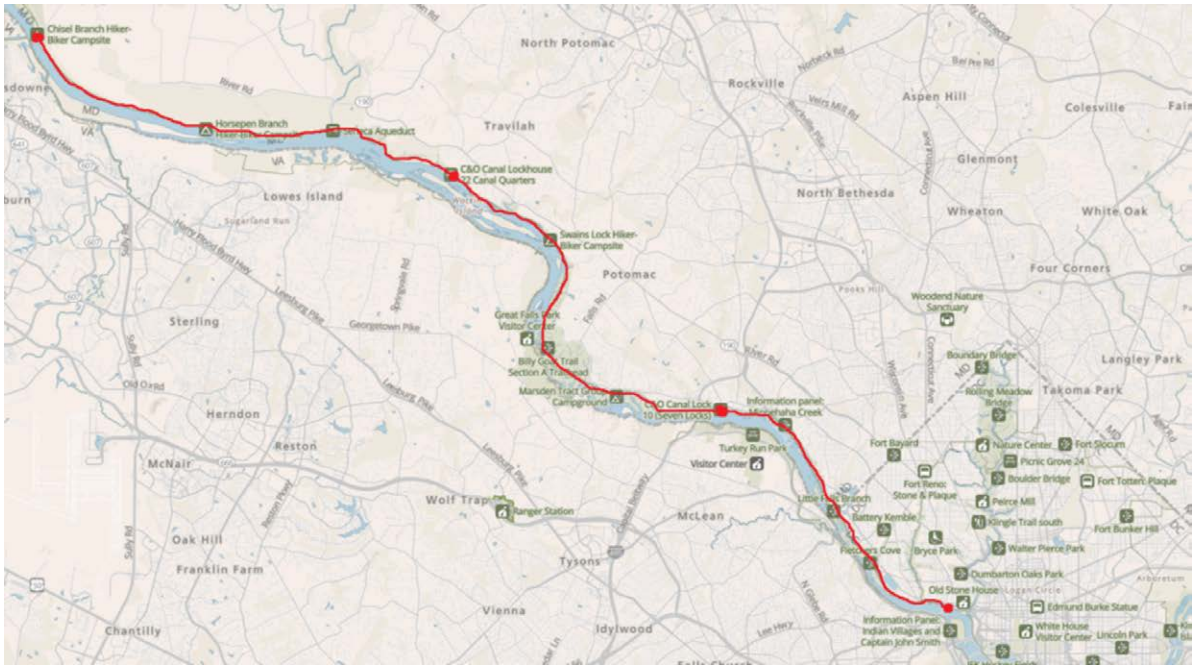

Figure 3. Our path along the Chesapeake and Ohio Towpath, with our rest stops noted with red dots.

higher density of infrastructure than what we relied on, based on the named towns we know existed by the late 15th century (Tab. 1; Fig. 4).

The planned pace for our march was generally less than what we see in historical sources. For example, Charles the Bold's ordinances require the army to march for two days, covering at least five leagues (16.24km, if *lieue ancienne* are assumed) on each, and rest on the third day if necessary.[1] A levy of German infantry in 1466 travelled from Dresden to Plauen by a route of 160km in six days, including rest days, and returned by a route of 137km also in six days.[2] This translates to between 22.83 and 26.67km a day on average.

We reserved two lockhouses at 12.9 and 32.2km of our march, respectively. These lockhouses had varying levels of technology. The first was constructed in the early 19th century, but was outfitted in the style of the 1930s. It had electricity, water, heat, showers, etc. The second was a very rustic cabin in the style of the 1830s, with no electricity or running water. In both houses, the use of artificial light was prohibited for those tasks that were relevant to the march. Self-care, sewing, or repair had to be conducted under sun, fire, or candle light. Although historically these types of tasks were not necessarily performed by soldiers themselves, and instead might be completed by servants, camp followers, locals, or other support persons, this restriction would create plausible tradeoffs given that daylight would be a limited resource.[3] Spending more of the day marching would mean we would have less daylight for maintenance tasks.[4]

[1] Vaughan 2004.
[2] Herzer 2024: 166.
[3] Lynn 2008.
[4] Cooking, light inside the bedroom, restrooms, and navigating near the canal were allowed to use artificial light.

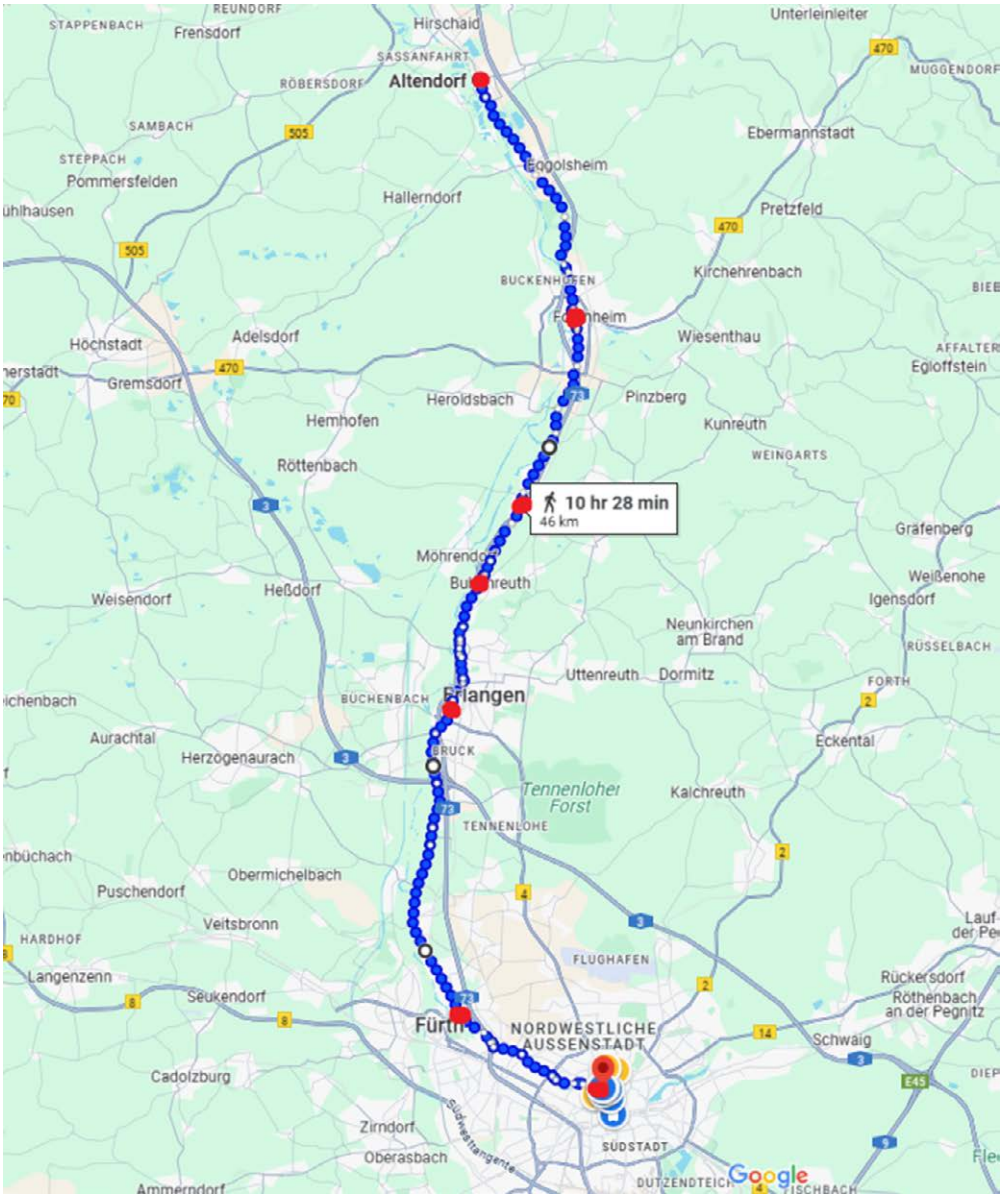

Figure 4. A hypothetical path from Altendorf to Nuremberg along the Regnitz and Pegnitz rivers, with towns are known to have existed in the late 15th century noted with red dots.

Table 1. Comparison of the marching infrastructure along our route and its hypothetical medieval analogue.

C&O Towpath, USA	**Altendorf to Nuremberg, Germany**
(START) Georgetown (12.9km) Lockhouse 10 (32.2km) Lockhouse 22 (48.3km) Lockhouse 25	(START) Altendorf (first written record in 1096) (10.8km) Forchheim (805) (18.2km) Baiersdorf (1062) (22.9km) Bubenreuth (1243) (27.5km) Erlangen (1002) (42.3km) Fürth (1007) (46.0km) Nuremberg (1050)

Support vehicle

We used a modern vehicle as a support car, driven by group member Marlene, which had three major roles. First, it replicated a small baggage wagon. Second, it would travel forward to the lockhouses before we arrived and set up the infrastructure, such as cooking stations at an inn, that would theoretically already be present for our arrival. Third, it served as a medical/safety vehicle in the event someone could no longer complete the march.

In the first role, the support vehicle as baggage wagon helped reduce the carried load of each person to a manageable level – below 20.0kg (Tab. 2). I instructed every person to keep the baggage put on the vehicle as simple as possible – most people were able to get theirs weight under 15lbs (6.8kg). This included things like blankets, warm clothing, spare clothing, eating set, and toiletries. For all five of us, I estimate the personal baggage did not weigh more than 100lbs (45kg) in total. One late 15th-century German war manual states that for every 12,000 men, 550 wagons were needed, which averages 22 men per wagon (Fig. 5). At this ratio, the baggage weight for each wagon would be roughly 330lbs, which is likely well below a wagon's carrying capacity.[5]

In the second role, the support vehicle replicated infrastructure that would have already existed before our marching group arrived, such as inns in the towns along the route (Fig. 4). Marlene quickly set up a kitchen and prepared meals for us. This service allowed us to not have to count the weight of cooking equipment and paraphernalia among our group baggage. We were able to get a hot dinner, a breakfast, and carry a lunch each day.

In the third role, the support vehicle served as a medical/safety vehicle, in the event that someone was not able to complete the march, or to take up gear that was abandoned. This ended up playing a critical part later on.

This approach to support vehicles and baggage stands in contrast to most other living history and reenactment events. When an animal-drawn wagon is not available, it is common for groups to use a hand-drawn cart as a substitute. While this can help maintain the immersive atmosphere of a historical setting, a hand-drawn cart simply does not offer the same capacity or functionality. In our case, we chose to replace missing historical transport with the modern support vehicle that, in our estimation, offered equivalent capability. This allowed us to preserve the key physical element of our activity – marching – without compromising the overall experience.

Apart from historically-plausible equipment (Tab. 2), we carried some extra items that we have little evidence that late-medieval soldiers on the march carried. First, we all had purses on our belts that hid our cell phones and other small emergency items. These cell phones were not just convenient, but also served as multifunction safety devices (communication, light, navigation). Our purses also carried a small multitool, a small keychain light, and a lighter. Second, we each carried approximately 0.75–1.0 litre of water, either in historical containers, or modern containers concealed with a bag. This reflects a modern understanding about the consequences of dehydration, but given the frequency of water sources along our route, I do not think it was strictly necessary. In addition, I carried group emergency items on the march: a first aid kit, a radio, a satellite communicator, and a small water filter.

[5] Neubauer 1963.

Figure 5. Infantry marching next to wagons. Anonymous, Mittelalterliche Hausbuch von Schloss Wolfegg, Germany, ca. 1470, 51v–52r. Wikimedia Commons.

Table 2. Personal load carried by group members.

Group member	Charles Lin	William Buschur	Michael Creech	Sean Ellis
Carried personal items	Sallet Mail Collar Cuirass Copper Canteen Belt Purse w/items Pouch w/emergency items Dagger w/sheath Hood Doublet Hose (footed) Turnshoes (low boot) Shirt Underwear Poleaxe	Sallet Haubergeon Ceramic Canteen Belt Purse w/items Longsword w/ scabbard Hood Coat Doublet Hose (stirrup) Socks Turnshoes Shirt Underwear Spear	Sallet/Barbute Haubergeon Breastplate Wallet Bag Water Bottle Belt Purse w/items Messer w/scabbard Dagger w/sheath Hood Coat Doublet Hose (stirrup) Modern Shoes Shirt Underwear Spear	Wool Hat Breastplate Shoulder Bag Water Bottle Belt Purse w/items Dagger w/sheath [Group Food] Hood Doublet Gloves Hose (stirrup) Socks Turnshoes Shirt Underwear Spear
Total dry weight carried	18.6kg	18.1kg	16.3kg	10.0kg

Day 1

We had an initial inspection and loaded our baggage into the support vehicle. Personal gear was loaded first, and group baggage went in last. Group baggage always had the 'last in first out' rule, because it contained items that would be of critical modern use (first aid kits and radios) and historical use (repair kits, food items). We arranged to rendezvous with our support vehicle at 1.6km. This short distance is a valuable 'shake out' opportunity to make immediate gear swaps.

After a slight delay, we departed at 9:50am. Our goal pace was 3.2km/h including breaks (roughly 3.5km/h moving pace), a slow but sustainable pace. We initially went a little too fast from excitement, but quickly found the right pace. We reached the C&O Towpath and encountered many hikers and bicyclists near Georgetown, but did not stop to engage with any. We stopped for a long lunch next to the Potomac River (Fig. 6).

Water

In our march, we broke up the distance by intervals between water locations. Generally, this was every 3–5km, which meant we did not have to carry much water on us as we went. Rather, we drank as much as we could at each stop, and topped up our containers, which carried 0.75–1.0 litre each. Given the historical density of towns along our historical analogue route, I think this practice

Figure 6. Lunch in front of the Potomac.

is feasible, and could explain why we rarely see depictions of soldiers carrying water containers. Dehydration was not an issue, but this was also aided by the fact that the temperature was ideal for marching, between 10 and 20 degrees Celsius.

Daylight

We were conscious of the available daylight we had for our march, and tried to prioritise travel and critical tasks during daylight (Fig. 7). We arrived at our first shelter, Lockhouse 10, around 3:00pm, which gave us roughly three and a half hours to set up camp before sunset. I had everyone unload baggage – group baggage first, and then personal baggage. We assigned bunks and gear storage locations, and 'sanitised' certain portions of the house, removing obviously modern items.

Afterwards, the priorities for everyone were to take care of their body first (feet, hydration, etc.), then their shoes, then their hose, then their weapons and armour, and then everything else. I was generally preoccupied with how much daylight we had left. Once it grew dark, certain tasks, such as sewing, repairs, or foot care, would become harder. In addition, in the dark it would be very easy to misplace and lose things, so I put a lot of effort into organising our gear while it was still light out.

Three and a half hours turned out to be plenty of time to take care of our needs, and I think most people had taken care of organising and maintenance tasks by 5:30pm, one hour before sunset

Figure 7. A quick gathering before setting up camp to address priorities.

Figure 8. Gear organised before the sunset.

Figure 9. Playing a game of Karnöffel with Flemish hunting themed playing cards.

Figure 10. Morning inspection before the day's marching.

(Fig. 8). We had a wonderful dinner of venison sausage pottage and apple fennel salad. We had time to learn and play several games of *Karnöffel*, a very counterintuitive trick-taking game, with a set of Flemish hunting cards (Fig. 9).

Day 2

We started Day 2 with morning inspection at sunrise, 7:30am, with helmet, sidearm, and weapons (Fig. 10). Although we used modern electronic devices to keep time, we rationalised this compromise with the fact that many churches would have rung their bells at a similar time to recite the *Angelus* in the morning.[6]

One thing I noted about the morning inspection was that it gave me an extremely valuable opportunity to either i) immediately launch a morning mission and/or ii) brief everyone in one place about the upcoming day. I found the previous evening that when everyone was busy taking care of tasks, it was hard to collectively brief everyone on new information. Designated group meeting opportunities, even if brief, gave me a valuable chance to efficiently address everyone at once. It allowed me to discuss the parameters of the upcoming march, which would inform individual equipment selection. I did not micromanage everyone's gear, but rather gave them information

[6] The precise time is not known, but there is at least one clear example in the case of Cropredy, Oxfordshire, where in 1512 a bequest was made to the churchwardens on condition that they should 'toll dayly the Avees bell at six of the clok in the mornyng, at xii of the clok at noone and at foure of the clok at afternoone', see Thurston 1907.

about the length and terrain of the march, the temperature, the known water points, and expected pace, and let them make their own decisions.

Support vehicle in action

At 8km of Day 2, Michael's ankle was troubling him. He had injured it about a year ago, and it was bothering him as we continued along the rocky roads. He decided to not continue the march – Marlene picked him up at Great Falls Visitor Centre, which was 20.9km overall, and he supported Marlene with her work. This episode highlighted the importance of having the support vehicle – it allowed us to push our limits safely, while also having a backup plan in case it was too much.

We got into Lockhouse 22 with roughly two hours of daylight left. We were exhausted, but I made sure we set up our camp as well as we could and were taking care of the priorities we established the night before. I imagine that as time wore on, fatigue, reduced camp discipline, and chaos can compound each other, so it was important to constantly exert effort to stay organised and prioritise critical tasks.

Lockhouse 22 was very rustic – we had a simple but delicious meal, Marlene made a bean stew with kale and smoked trout. We were too exhausted for cards after dinner, and went straight to bed.

Day 3

Morning inspection was at 7:00am, about half an hour before the sun rose. Everyone was on time and properly equipped. Will, Sean, and I were very sore, but otherwise able to continue. Our pace started around 3.1km/h, but descended to about 2.4km/h by the end.

Music

In an effort to distract from physical discomfort, we began singing to one another (Fig. 11). This proved effective in passing the time and highlighted the psychological value of music in enduring physically demanding conditions. The selection of songs was not necessarily based on historical authenticity, but rather aligned with the emotional states of the individuals involved. At times, the songs reflected themes of monotonous labour, poor life choices, or regret. On other occasions, they conveyed optimism, triumph, or took the form of repetitive, nonsensical mantras. This use of music served both as a coping mechanism and a means of maintaining morale.

Locals

On Day 3, we ran into a man named Young, a Korean cyclist who asked about what we were up to during our break. We told him what we were up to, and he seemed interested in helping – I asked him for information about the road and water conditions up ahead. He knew the area very well and told us that one of the water sources we were counting on was not potable (we used a backpacking filter there).

This interaction occurred naturally and highlighted the potential value of engaging with locals when travelling through unfamiliar areas. In friendly territory, such encounters can yield accurate and up-to-date information about roads, water sources, and rest stops. Even in less hospitable environments, local populations might still provide – willingly or under duress – critical information or assistance, such as shelter or food, though such support would be far less predictable.

This experience underscored a previously unaccounted-for aspect of infrastructure: the presence of knowledgeable individuals along travel routes. While the original planning process relied heavily on

Figure 11. The last day of march, singing to each other.

extensive online resources, it became evident that the availability of local, real-time information can significantly enhance both the efficiency and reliability of movement.

Because of our foot pain and exhaustion, our pace slowed, and we arrived approximately three hours later than the originally planned arrival time. We reached Lockhouse 25, located 48.3km from our start point, at 6:20pm, just as the sun was setting. The initial plan included a period of rest followed by a 7.5km night march to White's Ferry before concluding the journey. Portions of the trail had been scouted the previous night by Will and Marlene, who confirmed that the combination of moonlight and ambient light pollution would provide sufficient visibility to safely navigate the towpath without risk of falling into the canal. Although all participants remained physically capable of continuing, the decision was ultimately made to conclude the march at that stage, in the interest of safety and responsible judgment.

On planning

As we grew more tired and as it grew darker and colder, the probability of critical mistake – misplaced gear, a twisted ankle, or a fall in the canal was rising. For example, I forgot my canteen on the morning of Day 3, but, luckily, Marlene found it and got it to us before we left. Additionally, our general capacity to handle emergencies and unexpected developments, which I shorthand as 'headroom' was diminishing. Our support vehicle had one less slot because Michael was riding with Marlene. Our trail had spotty cell reception, and we established the radios we were carrying had an effective range of less

than 3km. Night time meant that emergencies would be exacerbated by the cold, and that there would be fewer (if any) hikers on the trail if we were in an emergency.

This serves as an important lesson for anyone considering similar undertakings. When planning challenging or potentially hazardous activities that involve others, there is a clear responsibility to ensure their safety. It is essential not only to have contingency plans for specific emergencies – such as injuries, medical incidents, evacuation needs, or issues with water safety – but also to continually evaluate how the overall capacity to respond to unforeseen emergencies may evolve over the course of the event.

Lessons learned

The objective was to demonstrate sustainable long-distance movement, and the endeavour yielded valuable insights into the requirements of such a task. Given the current level of conditioning and load carried, a pace allowing to cover 48km over three days did not appear to be fully sustainable. However, with minor adjustments, this distance would likely become achievable in the near term. The primary limiting factors were physical, manifesting in a few specific ways. Sean felt the load on his shoulders, as he was using a new breastplate that was slightly too loose at the hips. However, neither Will (with a haubergeon) nor I (with cuirass) felt shoulder pain. A lot of my background preparation involves rucking in modern gear, which likely helped me avoid shoulder fatigue.

The main challenge for all of us was the rockiness of the road, which was rough on all of our lower joints, especially our feet. Michael made the prudent decision to bow out on Day 2 to preserve his ankle, and the distance wore on Will's foot the most on Day 3. We spent a lot of time talking about shoes – we nearly all agreed turnshoes with a reinforced, more rigid sole would be valuable. In the future, we plan to either reinforce our soles with a clump sole, where a reinforcement or repair sole was sewn or nailed onto the existing sole, or wear shoes with a rand and an extra sole sewn on.[7]

Additionally, I suffered from three very large, bloody blisters. I was the only one using footed hose – and the seams at the foot, combined with not enough kilometres walked perviously in that specific hose and shoe combination, led to large, bloody blisters on my feet. I lanced and drained them every day, and they were painful but manageable. One other downside of footed hose is that it is very difficult to easily check your feet. I could probably keep going on them, but it certainly would not be sustainable.

For the run-up to this, I had the idea of trying to 'save' my shoe leather by using modern minimalist ones – I know now that if I were to take long distance marching seriously, I should invest in being able to replace shoe soles (either by myself or professionally), to be able to condition my feet to the specifics of my shoe and hose. However, medieval people with their premodern lifestyle likely had much tougher feet than me, a modern desk-bound civil servant, and we are not even comparing to professional soldiers.[8]

In the end, it is clear that some level of historical accuracy will always be unattainable. This raises the question of what compromises make sense, especially when dealing with modern bodies that are not accustomed to walking long distances in minimal footwear. One practical solution might be reinforcing turnshoes with thicker soles to protect our feet from a rocky road. That, combined with more dedicated foot conditioning, are two major improvements we are excited to try out for our next attempt.

[7] For an archaeological example, see Goubitz, van Driel-Murray, and Groenman-van Waateringe 2007: 77.
[8] For more on the influence of historically-informed lifestyle on feet toughness, see Talaga and Kozak, this volume (next chapter).

Chapter 6.
Going Medieval on the Body. An Autoethnographic Study on a Late-Medieval Fighter's Physical Conditioning Regimen

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Introduction

In medieval thought, the body was not merely a vessel but a dynamic medium through which one engaged with the world. Bodily exercises and martial training – whose structure is partly revealed to us in written and iconographical sources – were thus embodied acts affecting one's public image, shaping social identity, cultivating honour, and affirming manhood. This chapter draws from a larger interdisciplinary study of late-medieval German movement culture, but focuses only on one facet of it – general, non-fighting-specific, bodily conditioning silently assumed by late-medieval authors writing on martial practices.[1] A previous review of the historical sources shedding light on medieval physical exercise regimens showed that the era, contrary to popular belief, had a recognisable and layered body culture, in which practices aimed at elevating and cultivating physical fitness were important and actively developed.[2] At the same time, these sources should be understood as representative for but a select fraction of the medieval European society, namely the order of the *bellatores*, that is, 'fighters'.

Depending on the particular chronological and cultural setting – the investigated sources spanned several centuries and different polities – the social composition of the group of fighters would differ. For instance, in 13th-century France it would include almost exclusively professional warriors (knights and land-owning nobility), whereas by the 15th century the heterogeneous group of 'burghers' would have already asserted their place among the *bellatores* in many places, such as the Holy Roman Empire, both in practice and in social collective imagination.[3] Consequently, since the larger study on which this chapter is based was focused on martial arts described in a German fight book from around 1400, likely penned by an urbanite (merchant, craftsman, university student?), the term 'fighter' will refer to persons of various socio-cultural backgrounds – not only knights and nobles, but also urban commoners invested in martial training. Based on the aforementioned review of sources, techniques of physical conditioning appear to have been an important constituent of the sense of identity shared by fighters coming from different echelons of the medieval society. Seen as a cultural asset, they were shared, discussed, and exchanged, whilst surviving auto-biographical accounts from the period attest to their actual implementation in everyday practice, which presumably led to development of a distinct kind of embodiment characteristic of medieval fighters.[4]

[1] The larger study mentioned will soon be published as Talaga forthcoming.
[2] Talaga 2025.
[3] Arnold 1985; Chandler 2013; Duby 1980; Jaquet, Schmid, and Tzouriadis 2023.
[4] For the general discussion, see Talaga 2025; and Uwe and Jaser 2015. For the discussion of the notion of 'hardness', see Bruso 2017.

Building upon this historical context, it is worth noting that contemporary efforts to reconstruct medieval martial practices – most notably within the movement known as Historical European Martial Arts (HEMA) – implicitly engage with the task of reviving not only technical knowledge but also the distinct kind of embodiment characteristic of medieval fighters. Originating in the late 20th century and gaining momentum with the proliferation of digital access to manuscript and early prints collections, HEMA represents a social project aimed at reclaiming Europe's martial heritage, with a particular emphasis on the late-medieval and early-modern periods. However, scholars studying HEMA as a revivalist movement, such as Eric Burkart and Daniel Jaquet, Claus Sørensen, and Fabrice Cognot, have pointed out that significant differences in bodily capacities separate modern practitioners from their medieval role models.[5] These differences – ranging from somatic norms to training environments and everyday movement habits – constitute one of the principal challenges to any genuine reconstruction of historical martial embodiment, adding to the inherent opacity of textual media when it comes to transmission of embodied knowledge:

> *Following the works of Michael Polanyi, we can furthermore conclude that media referring to fighting systems are always incomplete. They have to be, because the implicit knowledge or tacit knowing to which they refer cannot be fully verbalised or depicted. So, despite the late medieval tendencies to theorise and document fighting systems, the communicational gap between the skilled practitioner and its audience persists.*[6]

Acknowledging these discrepancies is therefore crucial if embodied historical research is to transcend mere technical imitation and move towards a more historically attuned re-engagement with the physical culture of the past.

Hence, the central question posed here is: How did the physicality of a late-medieval German fighter differ from that of a modern HEMA practitioner, if at all? We attempted to answer it through an embodied case study – a longitudinal experiment combined with self-observation performed by the first author – Maciej Talaga (MT), an archaeologist, anthropologist, and HEMA practitioner – in constant consultation with the second author – Krzysztof Kozak (KK), a HEMA practitioner and professional physical preparation coach. Our contribution thus outlines a mixed-method approach combining scientific experimentation and auto-ethnographical research in a study on historical embodied knowledge. The integration of quantitative and self-reflective methodologies into the study of the past allows us to explore how historical embodiment can be re-engaged through modern bodies. In doing so, we negotiate the tension between the lived body and the often opaque textual prescriptions of embodied knowledge preserved in late-medieval texts.

The chapter is structured into three principal sections. The first outlines the theoretical underpinnings and methodological rationale for the study, introducing the concepts of 'archaeology of motion' and 'embodied hermeneutics'. The second section details the design and practical realisation of the case study, including discussions of the experiment subjects and design, training regimens used, implementation of auto-ethnographic research methods, data documentation, and the use of digital tools for the qualitative analysis. Finally, the third section presents a reflective discussion on the epistemic implications of engaging with the historical physical exercises through one's own body – a raucous dialogue that, like a living spiral, evolves through repeated cycles of exhausting practice, sweat-soaked reflection, and methodical reinterpretation.

[5] Burkart 2016a; Jaquet, Sørensen, and Cognot 2015.
[6] Burkart 2017: 123.

Theoretical framework and methodological rationale

The body as text and action

Timothy Ingold reminds us that understanding emerges from the interplay between exploratory movement of an animate, pro-active agent, such as a human being, and the meaning dwelling in the latent structure of environment.[7] Put simply, we **discover** the world through sensuous engagement rather than **construct** it in our minds through reason. By adopting Ingold's perspective, our study challenges the strong constructivist bias of historians, many of whom are vehemently opposed to the idea that the past can be somehow 'out there', to be experienced through the body.[8] On the one hand, we approach the body as a text – a palimpsest of historical prescriptions, embodied experiences, and cultural codes.[9] On the other hand, we acknowledge that actual medieval texts – codices, notebooks, early prints, brochures, drawings, and so forth – which represent embodied practices, such as physical conditioning regimens or artisanal techniques, were not didactic manuals in the modern sense. Rather, they were 'referential writings', invitations to act, to feel, and to re-experience certain physical and cognitive processes in one's own time and place, and through one's own body.[10] Rightfully seen as akin to 'recipes', they guided readers-practitioners towards a way of being that simultaneously constituted and transcended the physical.[11] The process of 'reading' a recipe-like text thus inevitably becomes an embodied act, where the historical technique is rediscovered not through detached conceptual interpretation alone but through a dialogical interplay between the reader's own bodily motion and the textual residue of the past – an embodied kind of hermeneutics, in which **thinking** is inseparable from **doing**.

Embodied hermeneutics and the ADVISE method

The larger study which informed this chapter adopted a methodological stance resonating with the hermeneutical circle, where interpretation – that is, walking a path towards understanding – is a dynamic, iterative process.[12] At its core was a method developed by Bartłomiej Walczak for investigating discontinued personal combat techniques and dubbed ADVISE, an acronym for Analysis, Division, Verification, Interpolation, Synthesis, and External Input.[13] Each stage of this method corresponds to a phase in the embodied re-reading of historical texts:

Analysis initiates the journey by isolating the fundamental kinaesthetic components – termed 'Elementary Actions' – from the text.

Division groups these basic motions into coherent body techniques organised around shared functions and related decisions explicitly or implicitly indicated in the text, inviting reflection on the cognitive and conceptual aspects of the investigated embodied practices.

Verification is a process of testing these reconstructions through practical experimentation, where embodied feedback is meticulously recorded and examined, often prompting returns to earlier stages.

[7] Ingold 2021.
[8] Pihlainen 2014.
[9] Sofaer 2006.
[10] Pihlainen 2019.
[11] Smith 2016.
[12] Talaga forthcoming.
[13] Walczak, 2011, 2021.

Interpolation explores beyond what is explicitly stated in the source, extending reconstructed motions into new applications, but in a self-reflective fashion, with close attention paid to the risk of introducing modern biases or contradicting the source.

Synthesis then weaves together the insights of prior stages, attempting to reconcile creative applications with the explicit examples in the source by uncovering the underlying principles and imagined contexts that shape the original embodied logic.

Finally, **External Input** draws selectively from other sources – iconography, contemporary manuals, modern kinesiology, or parallel traditions – to address structural gaps or ambiguities. These additions are treated not as definitive corrections but as hypotheses evaluated in dialogue with both the source text and the embodied findings from earlier stages.

Throughout the whole interpretative process, the feedback loop between reading and doing is paramount. As one experiments with the reconstructed techniques – experiencing both the empowerment and frustration brought by the collision between the mediated historical embodied knowledge and one's own unaccustomed body – the very act of moving reveals new textual nuances, inviting further investigation. This process is not linear but rather a spiralling motion, reflective of the organic and evolving nature of understanding.[14]

Here, however, the narrowed-down focus – on physical conditioning regimen, not the totality of embodied knowledge related to martial arts – means that only certain parts of the ADVISE methodology were relevant. Analysis and Division were straightforward to apply to physical exercises – Elementary Actions attested in historical sources could be reconstructed into Body Techniques, when the purpose of the studied motions was taken into account (e.g. the mundane motion of lifting a heavy stone becomes an exercise, when it is deliberately sought and repeated in order to develop strength). Verification of physical conditioning methods proved significantly removed in time compared to combat techniques. Unlike in the latter, whose (dis)functionality is manifested immediately during execution (a sword parry either protects as prescribed or not), the impact of physical exercises, or lack thereof, could be evaluated only after several months. Interpolation was quite limited when it comes to exploring the form of the exercises, but played an important role in the reconstruction of the training regimen, when different activities were combined together in creative ways to compose particular training sessions. Synthesis manifested as the final contextualisation and cultural-historical interpretation of the training outcomes. Perhaps most obviously, the External Input stage was vital in case of many medieval physical exercises, because the available sources left next to no information on the finer details of their execution which could affect their long-term efficiency and short-term safety for the practitioner-researcher. We discuss this question further in the section on the specific exercises reconstructed for the presented study.[15]

Archaeology of motion, autoethnography, and Qualitative Text Analysis

For our study, we enriched the methodological framework of ADVISE by borrowing from Autoethnography. This way we arrived at a more complete embodied historical research method – archaeology of motion.[16] A core tenet of this approach is that by using their own body as both instrument and subject of research, a historian is able to record an intimate account of embodied practice revealing aspects of the past which cannot be mediated by textual or iconographical sources.

[14] Talaga, Wrzalik, and Janus 2021.
[15] For more on the peculiarities and importance of the External Input stage of the ADVISE-based research, see Walczak, this volume.
[16] Talaga, Wrzalik, and Janus 2021; Talaga forthcoming.

But the same intimacy confronts them with a challenge of (inter)subjectivity – how to generalise from deeply personal, barely verbalised, and hardly quantifiable experiences? Autoethnographers have engaged this issue from a variety of angles, developing a number of methodological solutions enhancing the empirical value of experiential insights. These solutions include structured note-making, journaling, and visual documentation during fieldwork as well as guidelines for desk research aimed at placing the personal experiences in a broader socio-cultural context.[17] Close attention is also paid to the positionality or situatedness of the researcher, that is, biases and blind spots resulting from their cultural background and personal biography.[18]

In our study, field observations were preserved primarily through journaling based on the so-called 'sensitising questions',[19] meant to prevent the journal from devolving into a stream of consciousness and to facilitate focusing on the research goals: 1) 'how did I feel before training?'; 2) 'how intensive was the training and what was my response to it?'; 3) 'how did I feel after training?'; 4) 'what material artefacts or other objects participated in training and how they affected me?'; 5) 'did anything important happened during practice sword fights?'; and 6) 'did I have any other interesting observations?'. Not all of the questions had to be addressed in each entry, for instance Question 5 was irrelevant for days without sword fights. Nevertheless, all the questions were reviewed during each journaling session – which took place daily, except for days off, either immediately after practice or before bedtime – to ensure adherence to the objectives.[20] In addition, visual documentation – mostly videos – was taken during select activities, especially practice fights, periodic fitness tests, and some exercise sessions, for instance to monitor weightlifting technique or provide evidence of skill acquisition. Photographs were used to document artefacts used in the study, for instance shoes and their gradual wear-and-tear, as well as changes to MT's body, such as increased callousness of his hands or feet.

In parallel, Qualitative Text Analysis (QTA) was employed at the final 'desk' stage of this study – when the field notes, journal, and visual documentation were being examined jointly – to bridge the gap between the visceral and the textual, ensuring that the re-readings of the source material remained grounded in its original context. QTA is a systematic method that relies on qualitative coding – a process that transforms raw, multifaceted data into coherent thematic narratives.[21] In our case, it served as a bridge between lived experience and scholarly reflection, providing a rigorous counterpoint to the experiential and often 'messy' nature of embodied practice and hands-on research.[22]

Case study design and implementation

Longitudinal study in historical embodied technique

Conducted amidst a global pandemic (COVID-19) and shifting social dynamics, the study was designed as a twelve-month (October 2020–October 2021) immersive investigation into late-medieval movement culture, which gave birth to the German vernacular manuscript Hs3227a, dated to *c.* AD

[17] Chang 2016.
[18] Kara 2020.
[19] Corbin and Strauss 2015.
[20] Whenever proper journaling was postponed until the end of the day, the strategy of 'jotting' was used right after or even during the training session to facilitate later writing. In ethnographic note-making, 'jottings' are defined as 'a brief written record of events and impressions captured in key words and phrases (...) [that] will jog the memory later in the day when [the ethnographer] attempts to recall the details of significant actions and to construct evocative descriptions of the scene' (Emerson, Fretz, and Shaw 2011: 29).
[21] Kuckartz 2014.
[22] Smith and Hannan 2017.

1400.[23] The main objective was to examine whether and to what extent the embodied knowledge related to a discontinued practice – physical conditioning of a late-medieval fighter – could be experienced and rediscovered through the researcher's own body.

This involved a prolonged period of training, reflective qualitative journaling, and periodic quantitative assessments of physical performance and fitness. Importantly, the design was longitudinal, meaning that it was not a series of separate experimental trials conducted in laboratory conditions, but a single process stretched over a full year and taking place 'in the wild'. This allowed for ongoing monitoring and documentation of unfolding phenomena in an actualistic setting – approximating real-life scenarios – but at the same time entailed certain limitations, most notably regarding precise control over and quantification of investigated variables.[24]

The whole study was centred on comprehensive martial training, including swordfighting and wrestling besides general physical conditioning, which may be conceived as both physical and axiological.[25] However, due to editorial limitations, the present text focuses almost exclusively on the bodily transformation recorded over the course of the study. A more complete picture, considering this training as a dialogue with the past wherein the researcher sets out to 'unlearn' modern motor habits and return to a more 'medieval' physicality and mentality, will be published in a future book.[26]

Subjects and the training regimen

The study involved eight participants split into two samples, one adhering to a historically-informed training regimen centred around martial arts (more details below) and the other training at modern HEMA clubs. The former was only the principal researcher – MT – while the latter included seven individuals acting as the control group (Controls #1–7).[27] Due to the pandemic regulations effective in Poland at the onset of the study, which limited non-essential travelling and prohibited operation of most sports clubs, these Controls were recruited online through Polish social media channels dedicated to HEMA. Both samples comprised male HEMA practitioners from Poland and were similar in terms of age (MT = 32 at the onset; Controls = 24–35, 29.6 on average). However, MT had longer HEMA training experience (MT = 13 years; Controls = 2–8 years, 6.9 on average). Moreover, the historically-informed training regimen required higher frequency than is typical for modern HEMA practitioners (MT = 13–15 hours a week; Controls = 5–12 hours a week, 8.9 on average) and involved wrestling, plus related acrobatics and callisthenics, which was absent in Controls. As per the objectives of the study, over the course of twelve months, MT followed this regimen using implements available in the Middle Ages (stones or tree logs instead of barbells or dumbbells, outdoors instead indoors, barefoot or in leather replica shoes, etc.), whereas the controls trained normally throughout the same period, initially at home and later in their respective HEMA clubs, using modern methods and equipment. Both MT and Controls were subjected to periodic fitness tests monitoring changes in their basic motor traits, allowing for comparisons between the impact of historically-informed *vis-à-vis* modern HEMA training.[28]

[23] The precise dating of the manuscript has been debated for more than two decades, see Burkart 2016b. However, the latest estimates, based on content analysis and palaeography, place it between the late 1380s and 1410s, cf. Talaga forthcoming and Burkart forthcoming (quoting personal communication with Dr Rainer Welle).

[24] Jaquet 2016a.

[25] Talaga 2022.

[26] Talaga forthcoming.

[27] The control group initially comprised eight subjects, but one of them failed to follow the regimen throughout the study period due to pandemic disruptions and was thus not included in the analysis.

[28] MT was tested five times in total – twice in 2020, in September (baseline) and December – and three times in 2021 – in April, July, and October. The control group were to be tested the same way, but due to pandemic restrictions and personal reasons only four tests were conducted for most Controls, with the first test in winter 2020/2021 acting as the baseline and

The aforementioned fitness tests were carried out every three months to gauge changes in three physical fitness components crucial in martial training: dynamic muscular strength (power) in lower and upper limbs, general anaerobic endurance, and grip strength-endurance (Andrade et al. 2019). The tasks in each periodic trial included medicine ball throws (both hands and single-handed), standing broad jumps (forward and backward, both legs and single-leg), vertical countermovement jumps, a maximum-duration hanging test, and a modified Running Anaerobic Sprint Test, with all results averaged from three attempts to ensure consistency.[29] This way, the employed battery of tests provided an accurate assessment of the subjects' overall physical fitness, covering all the fundamental traits – muscular strength, strength-endurance, and power; cardiovascular endurance; and neuromuscular coordination. In the case of MT, the trials were administered and recorded in real time on video by an assistant (Olga, MT's wife) and described post-factum in journal entries by MT. For Controls, the trials were administered either by the participants alone or with the help of assistants (family members or clubmates), with the anonymised raw quantified data supplied by them online in specially-prepared test protocols.

The training regimen was designed to encompass three main domains: wrestling, swordsmanship, and general physical conditioning. However, the structure of the weekly regimen shifted during the study. Initially, the main focus was on wrestling and fundamental motor skills, because at this stage the chief concern was to minimise the presumed gap in the general physical fitness between MT and a hypothetical medieval fighter. Wrestling, weightlifting using stones and other natural objects, running, and callisthenics (bodyweight gymnastic exercises) were hence prioritised. These activities not only featured prominently in medieval lists, but were also deemed essential by the anonymous author of the investigated medieval fight book (manuscript 3227a), who considered wrestling proficiency and having a healthy, well-conditioned body as prerequisites for learning any other form of fighting.[30] As the study progressed, the emphasis gradually shifted towards swordsmanship, the martial art most intricately described in the source text. However, wrestling and general conditioning remained a staple in the regimen. The time allocated to particular activities at different stages of the study is illustrated in Table 1.

As presented above, throughout twelve months MT adhered to a disciplined schedule of thirteen to seventeen hours of exercising spread across six days each week, except holidays. Each session was carefully documented in a structured field journal, which recorded not only quantitative measures – such as numbers of sets and repetitions, or durations of particular exercises – but also qualitative reflections on bodily sensations, emotional states, and the interplay between artefacts and physical performance, according to a list of sensitising questions aligned with the research questions addressed in the study. These entries served as both a record of progress and a fertile ground for reflexive insight into the embodied experience of training, as exemplified in Table 2.

three subsequent in the spring, summer, and autumn 2021 meant to monitor progress. Hence, unless stated otherwise, all comparisons discussed below are based on data obtained from the first four tests for both MT and Controls.

[29] A fuller description of the physical fitness tests will be provided in Talaga forthcoming. For more on the RAST protocol, see Zagatto, Beck, and Gobatto 2009.

[30] The manuscript lists a number of qualities required from a good fighter (fol. 17r), including some at least partly related to physicality – *gerader leip vnd gesvnder* (fit and healthy body), *rischeit* (speed), and *gelenkheit* (flexibility). In the same passage, it also hints that these are to be acquired through *vbunge* (practice). In another place (fol. 18r), it encourages readers to *vebe ritterschaft* (practice knightly crafts), understood as wrestling (*ringens*) and handling of a range of weapons. Its author reiterates the foundational role of wrestling once more later (fol. 86r), stating that *alle höbischeit kompt von deme ringen vnd alle fechten komen ursachlich vnd gruntlich vom ringen* (all bodily grace comes from wrestling and all fighting arts ultimately derive from wrestling). For more on the importance of wrestling in the education of medieval German nobility, see Welle 1993.

Table 1. Training regimen followed at different stages of the embodied case study.

OCTOBER–DECEMBER 2020	**JANUARY–MARCH 2021**	**APRIL–OCTOBER 2021**
13h/week	**15h/week**	**17h/week**
2 x wrestling and acrobatics (5h) 1 x swordsmanship (2h) 2 x weightlifting, climbing, and throwing (5h) 1 x cross-country running and jumping for 2–5 km (1h)	1 x wrestling and acrobatics (2.5h) 2 x swordsmanship (4h) 1 x weightlifting (2.5h) 1 x throwing, climbing, and jumping (2h) 1 x fast-paced cross-country running for 2km (1h) 6 x weapon practice on dummy (3h)	1 x wrestling and acrobatics (2.5h) 3 x swordsmanship (6h) 1 x weightlifting (2.5h) 1 x throwing, climbing, and jumping (2h) 1 x sprints/interval cross-country running for 2km (1h) 6 x weapon practice on dummy (3h) + HEMA competition in June

Table 2. Sample field journal entry, translated (from Polish) and dissected into particular structural segments.

*From top to bottom: 'Date and time of day' was useful for locating entries and controlling resting periods between training days; 'Overview of exercises' provided easy access to basic information about the kind of effort during a given day; 'Notes' was a place for expanding upon the overview and writing down additional observations which had to fit one of six predefined sensitising questions. In the present sample, particular sections of the entry corresponded to five of these questions – '***how did I feel before training?***', 'how intensive was the training and what was my response to it?', 'how did I feel after training?', '***did I have any other interesting observations?***', and 'what material artefacts or other objects participated in training and how they affected me?'.*

4 Nov 2020, evening	Date and time of day
2.5hrs, evening: wrestling session (paired with a matched partner)	Overview of exercises
NOTES: **I am getting better. Although I was low on energy today and my calves still felt yesterday's running, I managed to go through the whole warm-up and didn't suffer much.** *And the intensity was high as always. I even did the prescribed 50 bridges in a single series for the first time (so far I had usually done 46–48 reps before Coach had us switch to another exercise). I also did three 3-minute sparrings and had to pause for a minute only in the second one, as my calf cramped. Today I was assigned with partners whom I matched in size and skills, which meant I hit the ground less often and even succeeded to score my first points – including a throw which may rightfully be considered as a kind of 'Fireman's Carry', only done from a kneeling position. On the downside, during the first sparring I was hit in the eye socket quite strongly with the elbow and now I am walking around with a shiner ;)* All in all, I feel very a positive impact of the training on my fitness – I regained mobility in the neck and got rid of neck pain which haunted me for a few years. **I can't help thinking about the quote '*alle höbischeit kompt von deme ringen*' and the importance of wrestling for the *kinesis* and self-identification of the German knighthood and aristocracy discussed by Reiner Welle. Wrestling accentuates dynamics of motion and is good for teaching coordination, all the while shaping functional strength through exercises using wrestler's own bodyweight and that of their opponent.** *The only thing that puzzles me is injury prevention in historical conditions – how would they avoid serious injuries in training, on what surfaces would they practice, etc. It is also interesting whether the absence of modern freestyle shooting for the legs was somehow related to it. Perhaps they considered it too dangerous for the legs or feared the guillotine choke? – on a wrestling mat one may let themselves be caught and even thrown on the head without major harm, popular guillotine defences are based on this, e.g. in Khabib Nurmagomedov, but I'm not sure if this strategy would be equally valid on other surfaces, e.g. grass or sand.*	Notes

Material culture and the reconstruction of artefacts

A crucial aspect of the study was the reproduction of historical artefacts – swords, shoes, and clothing – that would help approximate the medieval material-cultural milieu, or the affordance landscape, likely experienced by the presumed intended reader of manuscript 3227a, that is, a young fighter aspiring to martial mastery (Fig. 1).[31] The inclusion of replicas added a layer of human-artefact interaction to the project, since they asserted a kind of material agency not only during training sessions, but also between them. Clothing and weapons demanded cleaning, repairs, and adjustments, reminding not only about the mundane practicalities surrounding medieval physical conditioning but also drawing out its implicitly collective nature – if nothing else, the hours spent fixing shoes or cleaning swords made evident the relief potentially provided by servants or squires, the lifeblood of a medieval warriors' lifestyle![32]

Moreover, sewing hard leather soles with fingers already tired from daily sword drills and strength exercises became more than mere maintenance – it was a genuine form of physical and mental training, a trying meditation making one acutely aware why *Regimen sanitatis Salernitanum*, a medieval didactic poem expositing the principles of self-care developed by the famous medical school of Salerno, counted handwork among the physical exercises, on par with swordfighting or running.

Therefore, the replicas were not merely props; they were active participants in the embodied research. The texture of the leather, the weight of the sword, and the grip provided by the medieval-style shoes all contributed to an immersive environment that anchored the study in material reality. They were, in a way, portals to a medieval world, grounding the theoretical interpretation in tangible experience.

Figure 1. Replica shoes (left) and replica sword (right) used throughout the study. Photos by M. Talaga.

Reconstruction of exercises

This embodied study sought to expose the researcher's body to the movements and exertions that once shaped late-medieval fighters, while ensuring safe practice over twelve months. To that end, collaboration with KK, a physical conditioning trainer and HEMA coach, was established. Drawing from KK's expertise, medieval descriptions and images were translated into modern, biomechanically

[31] The concept of affordances and affordance landscape as applied to archaeology and reconstruction of historical embodied practices is discussed in my earlier work, see Talaga 2020. The affordance landscape and the intended readership of manuscript 3227a will be covered in greater detail in the future book, see Talaga forthcoming. For more on the importance of affordances for reconstructing adversarial practices, see Walczak, this volume.

[32] It should be noted, however, that an ordinary medieval combatant might be required to do all basic repairs and self-care on their own. For a relevant discussion related to the practice of marching, see Lin, this volume.

safe patterns that remained true to historical forms. The method proceeded in two steps: extracting essential features of each exercise from sources, and modelling them through modern equivalents. In straightforward cases of relatively well-attested exercises, such as stone throwing, this process was direct. Two examples below – lifting heavy stones and pressing stones overhead – show how it was done in less obvious situations.

Lifting heavy stones

Only three late-medieval images are known to depict men in the process of lifting stones (Fig. 2), all appearing as a preparation for throwing. Yet, logically, lifting heavy stones must have been practiced independently, either to enable effective throwing or as conditioning itself, which justifies including it in the investigated training regimen. The depictions show two distinct forms of lifting: a hip hinge resembling the modern deadlift (Fig. 2:A–B), and a low cradle akin to a squat (Fig. 2:C). Modern deadlifts usually use a symmetrical stance, but medieval depictions likely show a staggered posture, with one foot placed in front of the other. Thus, a modern staggered deadlift was used as the model (Fig. 3:A), modified for handleless stones (Fig. 3:B).

The third depiction (Fig. 2:C) shows the stone cradled on the abdomen with bent knees, suggesting a strongman-like lift. This movement naturally reappeared when MT carried stones during fieldwork. KK recommended the Zercher squat (Fig. 4:A) as the safest equivalent: hinging at the hips to lift the stone, pulling it to the chest, and rising while embracing the load (Fig. 4:B). Though medieval images do not display the full range of these motions, they strongly suggest their embodied logic, making them viable reconstructions according to the ADVISE methodological criteria.

Pressing stones overhead

Another common exercise depicted in medieval sources involves lifting stones overhead with one hand. While similar to the modern one-arm shoulder press, the medieval versions feature a

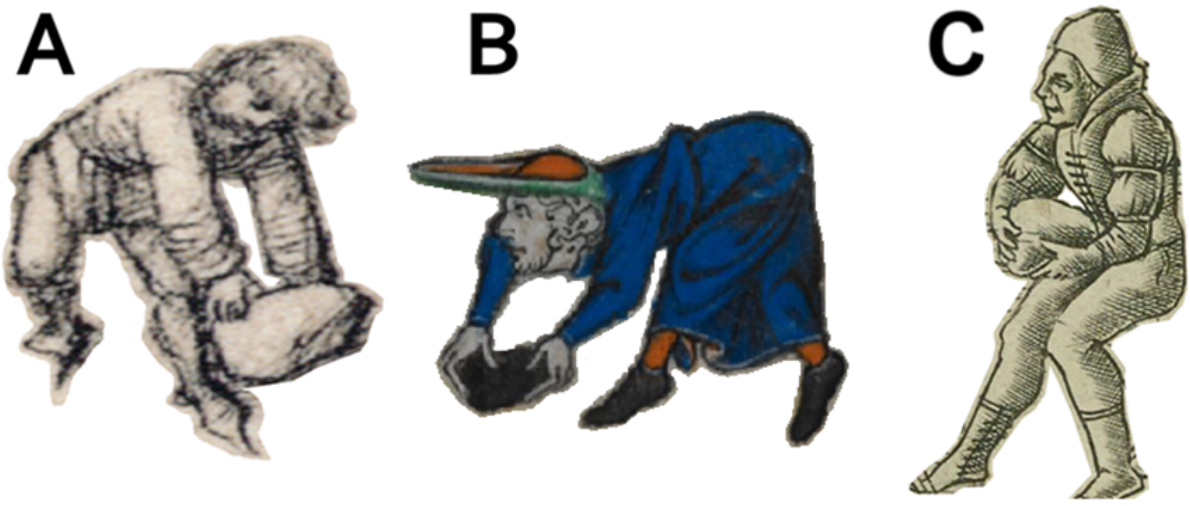

Figure 2. Examples of late-medieval heavy stone lifting motor patterns: A, B – hip hinging to lift the weight off the ground while holding it from above (deadlift); B – lifting the weight cradled close to one's body (squat). Sources: A – Mittelalterliches Hausbuch von Schloss Wolfegg, Germany, c. 1470, private collection, fol. 14r, Wikimedia Commons; B – The Maastricht Hours, Netherlands, c. 1300–1325, British Library, fol. 90r, public domain; C – fragment of an engraving by Baccio Baldini, Italy (?), c. 1460. Bibliothèque nationale de France, online: http://ark.bnf.fr/ark:/12148/cb45565649g, public domain.

Figure 3. Staggered deadlift: A – with a kettlebell (held with one hand), drawing by MT based on a modern instructional video available online; B – with a heavy stone, perfomed by MT, field documentation, 5 September 2021.

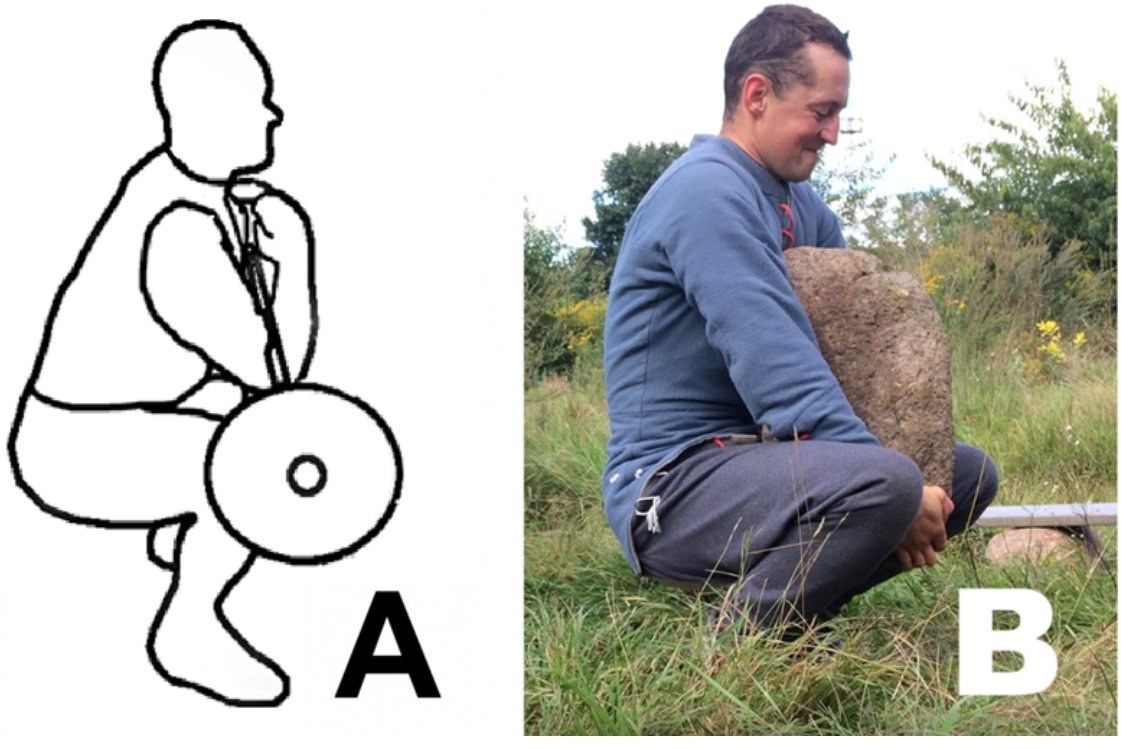

Figure 4. Zercher squat: A – with a barbell, drawing by MT based on a modern instructional video available online; B – with a heavy stone, performed by MT, field documentation, 5 September 2021.

closer stance, a fixed free arm at the hip, and an unstable, handleless stone in lieu of a dumbbell or kettlebell (Fig. 5). Following the ADVISE method, the external input in this reconstruction was limited to modern safety measures – breathing and core bracing techniques protecting the spine – while stylistic adjustments were made to match medieval depictions (Fig. 6:A–B). This allowed the exercise to recover some of the embodied challenges likely faced by historical practitioners.

Results and discussion

Experimental results in a comparative context

The twelve-month embodied experiment produced gains in strength-endurance, power, anaerobic capacity, and grip strength in MT, who followed the historically-informed training regimen detailed above. His results consistently outpaced those of the Controls – the gap became visible already during the first periodic fitness test (in the third month of the study) and only grew later (Fig. 7).

This may suggest that the historically-informed, more holistic regimen encompassing a broad range of physical activities provided better physical conditioning than less varied exercise routines followed by amateur fencers in HEMA clubs. The volume and intensity of MT's workload, considerably higher than in the control group, as well as his longer training experience, undoubtedly contributed to this advantage, so in itself it does not reveal much about the objective efficiency of medieval physical conditioning methods; perhaps a methodical exercise programme applied to seasoned professional athletes would provide greater gains over the same period. Hence, to understand how the medieval method compared to modern professional physical conditioning, we compared the results with three sport-scientific experiments conducted on experienced practitioners with similar training workloads. Finding comparably longitudinal studies proved impossible, so we used shorter interventions, where researchers introduced general strength or strength-endurance training to the subjects' sport-specific regimens and measured the impact of this change after three months

Figure 5. Pressing the stone over the head (top left corner). Note also the wide range of other physical exercises, including martial arts and callisthenics. De Sphaera, c. 1470, Lat. 209, Biblioteca Estense Universitaria di Modena, Italy, Wikimedia Commons.

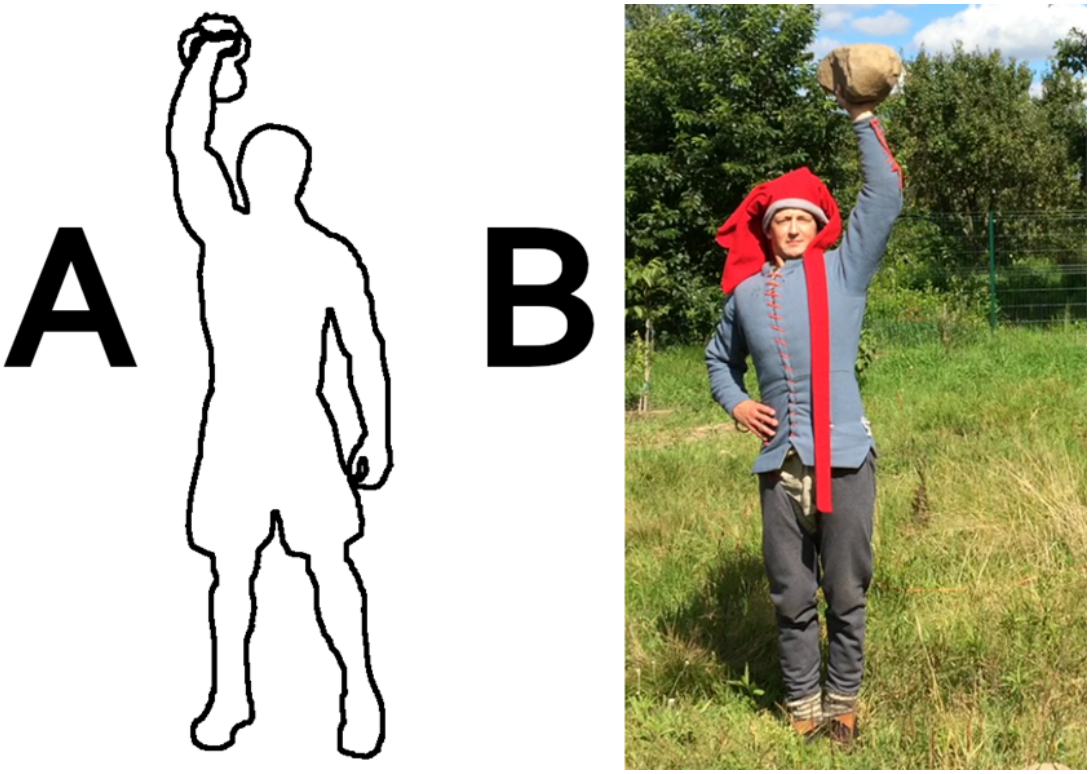

Figure 6. One-handed shoulder press: A – with a kettlebell, drawing by MT based on a modern instructional video available online; B – with a light stone, performed by MT, field documentation, 5 September 2021.

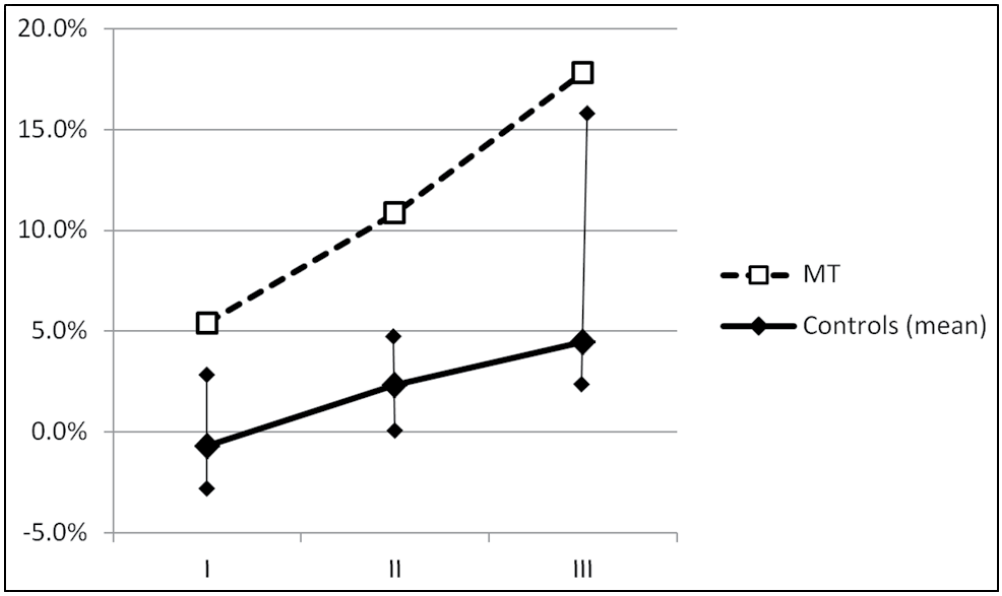

Figure 7. Comparison of gains (%) averaged from all monitored physical fitness components (strength-endurance, power, anaerobic capacity, and grip strength) in MT and the control group (mean value for Controls #1–7) during first three periodic fitness tests (in relation to the baseline; spanning nine months of training). The whiskers indicate the lowest and the highest score among Controls. I – first test (third month); II – second test (sixth month); III – third test (ninth month).

of training. To ensure comparability, we juxtaposed their findings against the first three months of MT's training, that is, the period between his switch from a typical HEMA training to the historically-informed regimen and the first periodic fitness test.

Koutedakis *et al.* studied experienced dancers training to become professionals who added two to three weekly sessions of aerobic and strength training on top of their daily dance practice.[33] Over three months, their dancers improved leg strength (leg extensions) by 12.6%, cardiorespiratory fitness (VO^2max) by 11.6%, and dance technique by 47.7%, significantly outpacing the control group training at the same dance school but without additional physical conditioning (-11.7%, -1.4%, and +7.2%, respectively). They also reported no changes in body mass, implying negligible muscle hypertrophy. Although the study did not investigate combat athletes and focused predominantly on women (27 out of 32 subjects) significantly younger than MT (aged 17–21), it remains a valuable point of comparison for our work, as it tests the effect of added general conditioning on well-trained individuals pursuing complex, coordination-heavy movement disciplines.

Redondo *et al.* divided twelve national-level male fencers training six days a week into a control group and a treatment group that, for twelve weeks, replaced two of their usual weekly fencing sessions with two physical conditioning trainings – maximal-strength exercises during the first six weeks of the study, and explosive-strength (plyometric) sessions for the remaining six weeks.[34] By the end of the program, the treatment group had significantly increased maximal strength in the legs (barbell squat) and upper body, vertical-jump performance (countermovement jump), and fencing movement times – all with unchanged body mass and composition, showing that these strength gains effectively transferred to sport-specific actions. This makes the data a particularly useful point of comparison, since – like MT in our study – the fencers integrated general strength and power training into an already intense martial routine, offering insight into how such conditioning can affect experienced practitioners of a sport closely related to HEMA.

McLester, Bishop, and Guilliams compared two resistance training schedules with the same total weekly workload – one day per week (3 sets/session) versus three days per week (1 set/session) – in a group of experienced recreational lifters over twelve weeks.[35] Both groups made solid gains in lower (leg press) and upper body strength (press, push, and pull exercises), but the higher-frequency group saw around 60% better improvement and added more lean mass, showing that spreading the same workload over more sessions can boost gains in strength and muscle hypertrophy. This makes it a useful comparison for our study, in which strength/power sessions were scheduled twice a week, placing it between the two protocols tested by McLester *et al.* and, thus, offering context for interpreting the efficiency of the historically-informed training structure.

The comparative insights provided by the above studies are visualised below (Figs 8 and 9). During the first three months of our study, MT experienced greatest progress in leg strength, represented by 66.7% increase in the total weight lifted per training session in Zercher-like squat exercise with stones, which was the highest value among the compared experiments. His upper body strength, understood as combined workload per session in three exercises (staggered-stance deadlift, single arm press, and bodyweight pull-up), also progressed, with 25% increase situating his result mid-way between McLester *et al.*'s one-session-per-week and three-sessions-per-week groups. But it is worth noting that during this early stage of the study, MT had two weightlifting trainings per week (Tab. 1), one focused on strength (lifting stones, pull-ups) and the other on power (throwing stones and barbells, explosive callisthenics). Hence, his result may be seen as comparable more to that of

[33] Koutedakis *et al.* 2007.
[34] Redondo *et al.* 2014.
[35] McLester, Bishop, and Guilliams 2000.

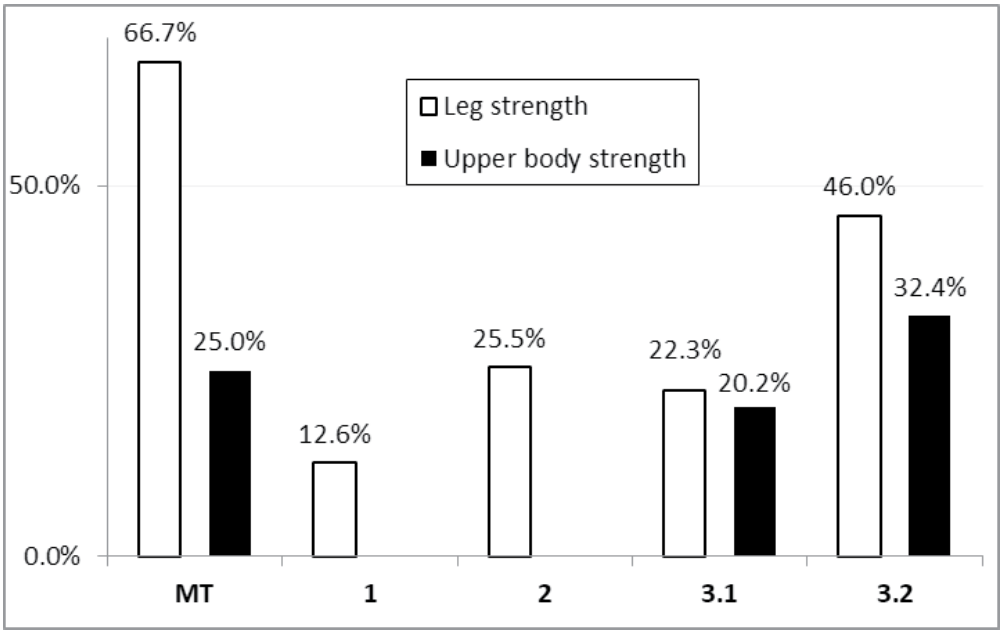

Figure 8. Leg and upper body strength gains (%) in the compared studies. MT – historically-informed regimen from our study; 1 – Koutedakis et al. 2007; 2 – Redondo et al. 2014; 3.1 – McLester, Bishop, and Guilliams 2000, one-session-per-week group; 3.2 – McLester, Bishop, and Guilliams 2000, three-sessions-per-week group.

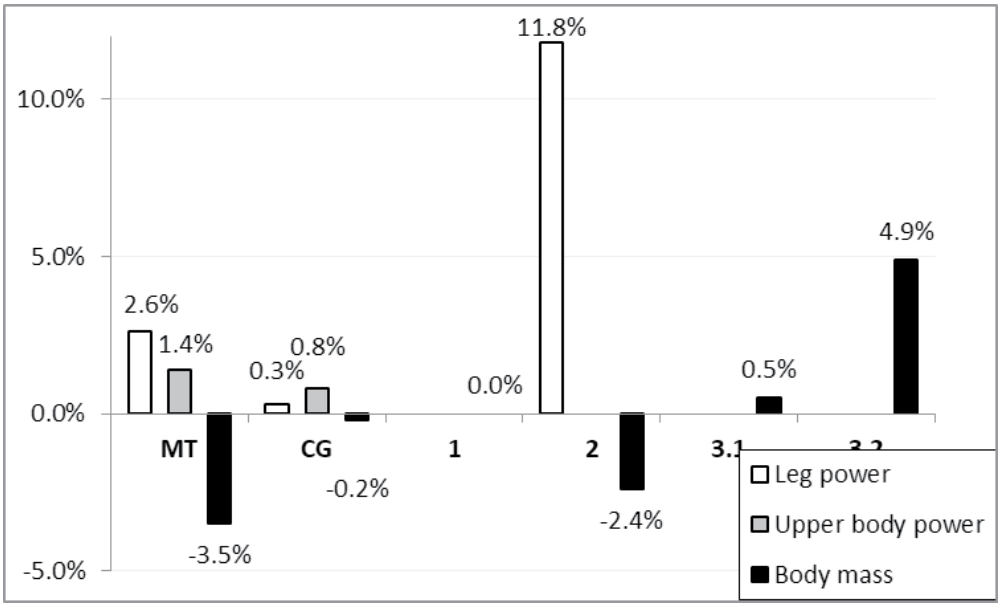

Figure 9. Leg and upper body explosive power gains (%) and body mass changes in the compared studies. MT – historically-informed regimen from our study; CG – mean gains in the control group from our study; 1 – Koutedakis et al. 2007; 2 – Redondo et al. 2014; 3.1 – McLester, Bishop, and Guilliams 2000, one-session-per-week group; 3.2 – McLester, Bishop, and Guilliams 2000, three-sessions-per-week group.

the one-session-per-week group studied by McLester and his team. The leg strength advantage noted earlier may also be illusory, since each of the compared studies used a different exercise to measure the gains, with Redondo *et al.* being closest (back squat with barbell). Moreover, MT's result (+66.7%) seems high compared to the second-best coming from McLester *et al.* (+46.0%), but the latter is a mean value – the highest actual gain registered for an individual in that study was 60.7%.

The historically-informed regimen appears less outstanding when power is concerned. During the first three months, MT had one session per week dedicated primarily to power, understood as the ability to apply force over a short time, which he exercised through throwing weights and jumping (Tab. 1). This approach resulted in power increase by 2.6%, clearly outpacing the control group in our study (+0.3% on average, with only Control #5 as an outlier noting greater progress at +3.2%) but significantly lower than in the fencers studied by Redondo *et al.*, who trained explosively twice a week in the second half of the experiment (+11.8% on average, with the lowest score at +8.1%). MT's results were more in line with those of the said fencers in body mass change – in both cases similar decreases were observed over three months (–3.5% for MT and –2.4% on average in Redondo *et al.*). This stands in contrast to recreational weightlifters from McLester *et al.*'s study, who gained body mass (through muscle growth) regardless of the training frequency. The somewhat sharper dive in bodyweight seen in MT at the beginning of the study may be attributable to the fact that he entered the regimen straight after recovering from injury for several months – a period of reduced endurance training likely adding to his body fat, which was then quickly burned during the study. Nonetheless, it seems fair to see MT's body mass dynamics as similar to the modern strength-training fencers from Redondo *et al.*, whereas his gains in leg power trail visibly behind. The difference, however, likely has less to do with the historically-informed exercise technique or implements and more with the structural differences between the regimens. The fencers had two explosive power trainings per week versus one in MT, and their specialised fencing-focused regimen put greater focus on lower body power outside of physical conditioning sessions compared to MT, whose attention during the first three months leaned more towards wrestling and general fitness than fencing (Tab. 1).

Finally, it is interesting to note that the control group in Redondo *et al.* – experienced male fencers attending six fencing-specific trainings a week – noted negative changes in leg power (–2.3% on average) similar to many of our Controls, amateur HEMA practitioners not following any structured physical conditioning outside of their historical fencing practice (+0.3% on average, but with negative scores registered for four out of seven subjects). This congruence strengthens the reliability of MT's training outcomes.

Cultural-historical implications

The experimental insights discussed above benefit from a closer look at medieval views on bodily comportment and kinetic beauty, and especially the notion of *sprezzatura*, a somatic ideal influential in the late Middle Ages on both sides of the Alps. Aldo Scaglione defined *sprezzatura* as 'nonchalantly poised self-assurance designed to impress the observer with the feeling that the man masters his art so thoroughly that he can obviously make no mistake in it'.[36] This way, he observed that in late-medieval and Renaissance courtly culture true bodily grace was understood as one's ability to make highly complex movements appear effortless – completely automatised

[36] Scaglione 1992: 234.

and fluid. According to both practitioners and scientists, such automatisation can emerge only from frequent, mindful repetition – consistency beats intensity when *sprezzatura* is the goal.[37]

Interestingly, in our study we did not assume this kind of grace as the goal. To the contrary, following the advice of Hans Talhoffer, a medieval fencing master writing about physical conditioning who advised his readers to 'train strenuously' for two or even four hours every day, we initially took it for granted that a medieval fighter's regimen would require exhaustive workloads and high intensity.[38] However, a physical crisis experienced by MT in the third month of the study reminded us that Talhoffer did not write about a regular regimen but rather an intensive preparation for an upcoming judicial duel, and that human physiology requires 24–72 hours of recovery to make near-failure training sustainable in the long run.[39] In fact, rest is even more important in regimens centred on cultivating complex motor skills and lifelong fitness[40] – such as that of late-medieval fighters, expected to master a range of bodily crafts (martial and equestrian, as well as dancing) while remaining fit for service well past their prime.[41] Moreover, as MT progressed in strength, finding heavier stones to increase workload became problematic for a simple practical reason – the pool of large stones available for exercising in a walking distance from home ran dry. Hence, after three months, KK and MT decided to modify the strength and power components of the regimen to focus predominantly on high-repetition workouts, progressing not by increasing weights but by adding repetitions per session. It is then that MT noted in the field journal that 'such approach is compatible with the historical emphasis on (almost) daily practice, as it frequently returns to the same motor patterns until they are mastered to the extent that their performance seems effortless'.[42] Thus, the notion of *sprezzatura* emerged naturally during the study, forcing itself on us rather than the other way around.

In effect, the adjusted weekly routine wove together high-repetition stone-lifting and throwing, martial drills, callisthenics, jumping, running, climbing, and occasionally even gardening, producing a range of results harder to quantify than basic fitness components. Stones (and sometimes logs), lacking handles, forced constant balancing, sharpening proprioception and grip strength in ways that modern dumbbells typically do not. Carrying slippery stones through rain or snow, outdoor headstands, and callisthenic drills on uneven ground accentuated demands on the entire body and heightened sensory awareness. The minimalist materiality and opportunistic nature of medieval physical conditioning facilitated blending it not only with martial training but also with daily life – playing with children, tending a garden – thereby supporting consistency and social engagement. Over time, this bare-handed, outdoor, and often bare-footed work cultivated calloused skin on MT's hands and feet, and built considerable cold resistance, drawing attention from onlookers.[43]

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[37] For a scientific perspective, see, for example, Wilkins and Rawson 2010; Ajemian *et al.* 2010; Picard, Matsuzaka, and Strick 2013; the humanist outlook is well summarised in Smith and Hannan 2017.

[38] *arbaitten (...) in die harr*, as transcribed in Jaquet 2017: 157.

[39] Sousa *et al.* 2024: 210, 212.

[40] Brawn *et al.* 2008; Lloyd *et al.* 2016.

[41] For instance, Hermann von Weinsberg (1518–1597), a burgher from Köln, bestowed with an ordinary physique and not particularly fond of fighting, was fit enough to serve as a town watchman and captain of a company of militiamen well into his sixties, see Jancke 2009.

[42] Entry from March 24, 2021; three months after we switched to the high-repetition approach.

[43] In a journal entry from August 28, 2021, MT noted: 'My hands became hard and rough, well suited for gripping the sword, but less so for gentle touch. My daughters and wife do not seem to like them very much'; and on October 3, 2021: 'everyone is now running in coats and cloaks, complaining that they cannot decide in the morning what to wear, because it's either too cold, when cloudy, or too hot, when the sun comes out; I, on the other hand, am free from such problems, because I dress always the same. Hat, scarf, t-shirt, trousers, and that's it! (...) Even the kindergarten teachers have noted this and asked me to maybe start coming in a hoodie, because I demoralise the children [who then want to play outdoors without their jackets]'.

As mentioned earlier, in seeking modern analogues for the historically-informed regimen, we found none that precisely matched this holistic, minimalist approach. However, O'Keefe *et al.*'s study of contemporary hunter-gatherers offered striking parallels.[44] Their subjects' daily, varied activities – natural-surface locomotion, diverse strength and endurance challenges, fine motor and cognitive tasks, moderate intensity, and tight coupling between physical effort and food intake – promoted health and injury prevention. The recommendations formulated by O'Keefe and his team based on their study (minimalist footwear; varied, lifelong movement; daily moderate effort; outdoor social exercise; ample rest) mirror advice found in many medieval fitness regimens.[45] Moreover, similarly to a pattern observed in traditional hunter-gatherers, MT's body weight and muscle size remained relatively stable throughout the study, despite significant gains in physical fitness, indicating balanced adaptation without hypertrophy or obesity.

These results challenge enduring assumptions that late-medieval fighters' training was primitive or ineffective, as well as its portrayal, based on literary depictions, as focused almost exclusively on producing 'hardness' – physical and mental callousness necessary for dealing lethal violence.[46] Our research shows that even in the very practical realm of physical conditioning, brute mass and strength were not preferred over versatility, coordination, and graceful power – in fact, the latter qualities were valued precisely because of their practical usefulness. Ruthless intensity or extreme development of one aspect of physical fitness at the expense of others would be counterproductive for a medieval fighter, who had to balance pure strength and hardness with fine motor control necessary for efficient fighting and social displays of bodily grace. Notably, the lack of pronounced hypertrophy amid large increases in strength and endurance noted in our study suggests that medieval iconography of knightly bodies – thin-waisted yet fully capable – may have been accurate (Fig. 10). This contrasts sharply with mainstream modern models of bodily excellence, such as bodybuilding, strongman competitions, or CrossFit. Of the three, CrossFit admittedly has most in common with the medieval regimen explored here – both approaches share focus on holistic functional fitness and accentuate diversity of training methods. However, CrossFit's public self-fashioning emphasises maximal speed, minimal rest, and extreme fatigue in an attempt to overcome accusations of non-seriousness levelled at it by practitioners of older, more established schools of physical conditioning.[47] By contrast, medieval routines placed consistency, cognitive engagement, and public-facing complacence above intensity and physical grind, nurturing *sprezzatura* – apparent effortlessness of performance and deliberate concealment of the hardships of training from the onlookers – as the highest mark of embodied skill.

Conclusions

In sum, the embodied exploration of late-medieval movement culture delivered three major insights and desiderata. First, medieval conditioning, despite its utilitarian value and unambiguously martial orientation, was deeply cognitive and aesthetic, fostering harmonious strengthening of body and mind. Hence, a fruitful avenue for future research would be updating the current perspective on how medieval physical culture compared to Greek *paideia* and Roman militarism, two largely opposed approaches already studied extensively.[48] Second, the *sprezzatura* permeating late-medieval exercises does not have to be seen as an abstract cultural construct imposed on physical practice, but may well be an effect of empirically grounded evolution of effective training. Third, medieval regimens – moderately intensive, diversified,

[44] O'Keefe *et al.* 2011.
[45] Talaga 2025.
[46] Bruso 2017.
[47] Claudino *et al.* 2018.
[48] Cf. Jaeger 1945–1962; Tavares and Gonçalves 2015.

Figure 10. Parsival by the lake; note the knight's unimposing musculature and lean frame. Detail from an illumination by Master of Guiron le Courtois, Lancelot-Graal, c. 1380–1385, Bibliothèque Nationale de France, Paris, Manuscrit français 343, fol. 32r. Public domain: https://gallica.bnf.fr/ark:/12148/btv1b84584343.

affordable, and socially embedded – were at least as efficient for developing strength and endurance as modern protocols, while also promoting sustained skill acquisition and holistic well-being. These outcomes should warrant further interest in the matter, preferably in interdisciplinary cooperation between historians, HEMA practitioners, and sport scientists. Finally, they also refute the notion of medieval training's inherent inferiority and validate the 'archaeology of motion' approach as a valid tool for historical inquiry.

Coda:
Why Moving the Past?

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Embodied practice as a historical method

What does it mean to bring the past to life – not as spectacle, but as inquiry? Across the chapters of this volume, the metaphor of 'moving the past' refers simultaneously to a form of enactment of what is gone and a rigorous, reflexive method of knowledge production. By treating movement practices as historical problems rather than fixed traditions, we open pathways for exploring how embodiment, culture, and memory intersect and challenge our views about the past.

Together, we show that historical knowledge of movement is not confined to surviving manuals, illustrations, or artefacts. Rather, it is embedded in techniques of the body, which – though discontinuous – remain recoverable through methodologically grounded experimentation. The theoretical frameworks of **ADVISE** (Walczak) and **archaeology of motion** (Talaga) propose that motion can be read and interpreted as a historical source – but only when read through the body. The empirical studies presented in this volume demonstrate it to be a fruitful approach and clearly show that such embodied hermeneutics demands sweat, strain, and sustained negotiation between historical prescription and present possibility. In this sense, the past can be moved, but not like a machine whose gears need to be set in motion. Rather, the process resembles lifting a heavy stone – much prior effort is required before one is finally able to break the inertia of the long-dormant rock; but when a researcher-practitioner succeeds, the act, or more precisely the path that led to it, leave them transformed, with an altered perspective on the past and their own self.

In other words, **the past is not simply (re)enacted but dialogued with**. The chapters on Irish Collar and Elbow wrestling (MacFadden) and post-medieval sabre grips (Miklaszewski), for instance, offer examples of how reconstruction fills gaps in the historical and archaeological record. Or maybe, instead 'filling' and 'gaps,' it would be more accurate to say that it '**fleshes out**' or **re-embodies** the exsanguinated, vestigial remains of discontinued movement cultures, such as their textual, pictorial, or archaeological traces. A 19th century newspaper article, a medieval painting, or an authentic Napoleonic-era sabre are akin to fleshless 'skeletons' of the past practices – reading or staring at them will not provide accurate understanding of the reality they emerged from. A much fuller picture is gained when these 'skeletons' are animated through embodied research – iterative tests, biomechanical feedback, and communal critique. The result is not a recreation of past movement *per se*, but a deeper understanding of the conditions and choices that once shaped it. That is, a reconstruction of **embodied knowledge**.

Discontinued movement cultures often appear as fragmentary or 'frozen' – texts without context, gestures without lineage. Yet, as this volume demonstrates, these fragments invite creative engagement. The chapter on hoplite combat shows how experimental re-enactment can enter academic debates and even meaningfully weigh on them (Bardunias and Truska), while the embodied study on medieval military marches highlights how material infrastructure, logistical rhythms, and bodily endurance coalesce into a form of lived historical inquiry communicable through experiential yet rigorous storytelling (Lin). The discontinuity of a tradition, then, does not preclude its relevance.

On the contrary, **breaks in transmission invite a new kind of embodied scholarship**, in which historical silences are not seen as barren voids, but as opportunities for critical and performative engagement. If not for anything else, mobilising scholarly expertise to explore such gaps in our knowledge of the past is valuable, because it holds a potential to monitor and co-shape non-academic initiatives aimed at various historical revivals, including mitigating or opposing those that exploit the scarcity of 'traditional' historical evidence to advance historically-inaccurate but politically useful narratives.

Epistemic plurality and latent principles in experiential historical research

What binds the contributions in this volume is not a rigid methodological protocol but a shared commitment to **epistemic plurality based at least partly on personal experience** – a willingness to blend embodied inquiry, archival interpretation, material reconstruction, and reflexive critique in the pursuit of historical understanding. Historians collaborate with archaeologists, sport scientists, physiotherapists, and martial artists. Quantitative metrics sit alongside autoethnographic journaling, whilst textual hermeneutics are interwoven with field experiments and sensorimotor exploration. This interdisciplinarity is neither just a form of virtue-signalling nor a matter of simply juxtaposing methods. Rather, considered together, our contributions make a case for **integrating the aforementioned methods into a dynamic interpretive ecosystem** that recognises the limitations of any single form of evidence and the necessity of iteration across media, bodies, and tools.

While this pluralistic ecosystem is made explicit in some chapters and implicit in others, all of them can be read as being **structured – sometimes latently – by the ADVISE framework** proposed by Bartłomiej Walczak, even when it is not directly invoked. ADVISE (Analysis, Division, Verification, Interpolation, Synthesis, External Input) offers a scaffold for turning historical material into testable, embodied propositions. Lin's march, for example, moves from **analysis** of historical ordinances and infrastructure through **verification** during lived reenactment and finally to **synthesis** in the form of logistical insights and embodied constraints that were not obvious from the text alone. Similarly, Talaga and Kozak's study of medieval physical conditioning operates clearly within the ADVISE cycle – most notably in their reflexive use of **external input** from sport science and **interpolation** in reconstructing likely regimens from fragmentary data.

Moreover, many chapters demonstrate a tacit sensitivity to **James Gibson's ecological theory of affordances**, a key element of the **archaeology of motion** first outlined by Maciej Talaga, Jakub Wrzalik, and Krzysztof Janus. At its core, affordances refer to action possibilities latent in an environment, perceived relative to an actor's capabilities, intentions, and context. This theoretical lens either directly animates or indirectly clarifies discussions of martial technique, weapon design, and movement choices throughout the volume. Walczak explicitly draws on ecological psychology to describe historical combat not as a deterministic sequence, but as a real-time process of exploiting dynamic affordances under pressure. Bardunias and Truska similarly explore how armour and terrain condition tactical movement, Lin demonstrates how physical infrastructure, equipment, and bodies, easily framed as a landscape of affordances, co-create the practice of marching, while Miklaszewski's study of sabre gripping hinges on the interplay between anatomical affordances of the hand and the material constraints of weapon handles. Across these examples, **affordances are culturally mediated, historically inflected invitations to act capable of 'speaking' to people across the past-present divide**. Thus, the affordances theory provides an efficient conceptual framework for translating personal embodied experiences into historical insights.

This convergence of methodological pluralism and theoretical coherence points to a deeper shared commitment. All authors demonstrate awareness **that the reconstruction of historical practice**

is less about discovering fixed truths and more about negotiating plausible pasts through a feedback loop of text, body, and motion. This reflexive loop is not only empirical, but ethical. As we emphasise, transparency about the interpretive trade-offs – between fidelity and feasibility, historical realism and modern capability – is crucial. Rather than asserting direct access to the 'authentic past', our projects acknowledge that authenticity is best understood as a **process of negotiation** – a continual recalibration of source, method, and embodied insight.

In this way, methodological openness becomes not just a research strategy, but a **form of accountability**: to the sources, to the communities reviving them, and to the very idea that the past is not a monolith to be reenacted, but a question to be experienced, lived through. This creates a model of historical research that is grounded, generative, and above all, responsive both to the epistemic demands of scholarship and to the embodied realities of those who bring the past into motion.

Towards a broader notion of heritage

The insights gathered across this volume speak not only to academic disciplines interested in studying the past but also to the broader frameworks through which cultural heritage is defined, valued, and protected. At present, international policy – most notably the 2003 UNESCO Convention on the Safeguarding of Intangible Cultural Heritage – focuses primarily on living traditions, emphasising the need to support uninterrupted chains of oral transmission, communal participation, and intergenerational continuity. While this is vital for many still-existing practices, it leaves out an entire category of intangible cultural knowledge: those **traditions whose transmission has been broken, but which remain accessible in textual, material, or iconographic form**.

In this volume, we challenge the underlying assumption that loss of direct transmission equates to irrecoverability. As the experimental reconstructions of extinct martial arts, military practices, or training regimens illustrate, **historical discontinuity does not preclude cultural vitality**. Whether through the iterative revival of Irish Collar and Elbow wrestling, the embodied exploration of late-medieval conditioning, or the grassroots institutionalisation of HEMA as a global community of practice, we demonstrate that cultural practices can be meaningfully regenerated – even without an unbroken lineage.

By embracing reconstruction not as mere simulation but as a methodologically rigorous, ethically reflective form of **cultural stewardship** – or what Walczak proposes to call 'Revival' in his contribution – practitioners are redefining what it means to inherit tradition. Such efforts do not aim to reconstruct a fixed or 'pure' past, but to engage historical forms with contemporary bodies, technologies, and epistemologies. This allows for what might be called **adaptive continuity** – a mode of heritage-making that acknowledges rupture but refuses erasure.

In this light, community-based projects like HEMA, historically-informed reenactment, or digital archives of embodied knowledge are not peripheral to heritage discourse; they are critical laboratories for **rethinking the scope of intangible heritage itself**. They exemplify how agency, care, and scholarly method can combine to produce viable reconnections with traditions that have otherwise been deemed lost.

Hence, in this volume we call for an expanded vision of intangible cultural heritage safeguarding that:

- Recognises discontinued practices as legitimate candidates for preservation and support, alongside continuous ones;

- Encourages cross-sector collaboration between grassroots communities, researchers, and heritage institutions to co-create standards of responsible revival;
- Supports experimental and digital modes of practice (e.g. embodied trials, simulation, reconstruction) as valid extensions of heritage expression;
- Advocates for flexible and inclusive definitions of authenticity, rooted not only in historical fidelity but in process transparency and ethical engagement.

In doing so, we invite cultural policy makers, curators, and institutions to consider how the future of intangible heritage may lie not only in what is passed on, but also in what is consciously re-engaged, reconstructed, and re-imagined. By enacting the past in critical and creative ways, such efforts broaden the very understanding of what heritage can mean.

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Moving the Past explores the challenges of studying discontinued movement cultures—practices and embodied skills that have lost their continuity and are no longer 'living' traditions. Comprising seven chapters, the volume combines detailed case studies with theoretical insights to address a core question: What kind of knowledge about the past can be gained when researchers use their own bodies to relearn skills preserved solely in historical and archaeological sources? Case studies examine topics ranging from ancient Greek hoplite warfare to Victorian-era Irish wrestling, medieval military drills and physical exercise regimens, and early-modern fencing. These focused analyses are complemented by a theoretical chapter and a Coda, investigating the methods, promises, and limitations of experiential research on discontinued movement cultures. The book arises from a 2021 conference panel, "Experimental and Experiential Research in Archaeology," organised by the Faculty of Archaeology, University of Warsaw (Poland). Its contributors include archaeologists, historians, anthropologists, and independent researchers with a shared interest in historical embodied practices. This interdisciplinary mix ensures a diverse perspective, appealing to academics and practitioners of re-enactment, living history, and public archaeology alike.

Maciej Talaga, PhD, is an archaeologist and anthropologist specialised in the Central-European Late Middle Ages. His main research interests revolve around pre-modern body and movement cultures, especially late-medieval German martial arts, as well as embodied and self-reflective methodologies in the study of the past. Currently working as Assistant Professor at the University of Warsaw, he conducts parallel research projects on medieval martial culture and contemporary folk wrestling as part of intangible cultural heritage.

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