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Playing with the Mind: Magic Tricks in Late Medieval Europe

Vanessa da Silva Baptista, University College London, UK, vanessa.baptista.10@ucl.ac.uk

Late medieval manuscript recipe collections frequently record recipes for amusing effects, which this article terms as 'magic tricks'. Using a source base of 100 largely unstudied manuscript recipe collections, I demonstrate in this paper that these magic tricks point toward a common experience and appreciation of illusionist magic which was intimately related to medieval attitudes towards physical matter and the mind. I consider magic tricks under the rubric of the Chemical Humanities, arguing that they are evidence of a common experience of chemical knowledge in late medieval Europe which inspired experimentation with utilitarian processes and substances to create amusing and entertaining effects. Even if magic tricks were not always actually performed, how they represent the imagined potential of material substances can highlight how different sectors of medieval European society, motivated by different interests, engaged with practical technical knowledge. This article also considers how medieval magic tricks, and consequently illusionist magic, interacted with the mind. Using the work of influential medieval theologians, I argue that magic tricks were understood as a distinct type of illusion predicated on the misdirection of humanity's inherently faulty perception. Further, my analysis of illusions in medieval romance shows that it is possible to reconstruct the specific social and cultural spaces that allowed medieval people to experience certain deceptions as illusionist magic. Whether as an avenue for analysing how medieval people minded matter, or interrogated matters of the mind, medieval European magic tricks highlight a playful attitude to chemical practice and the experience of deceit.

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Introduction

Hidden in the folios of many late medieval manuscript recipe collections are instructions for making rings jump across tables, causing cooked meat to appear raw, turning red roses white, lighting fire with water, making people and objects impervious to fire, and various other feats. These recipes, which I term 'magic tricks', exploited substances that were commonly used in artisanal practice—often sulphur, mercury, quicklime, and egg whites—to produce entertaining and wonderful effects. The scholarship of magic tricks and illusionist magic has largely focused on Jean Eugene Robert-Houdin and other 19th-century entertainers of the 'Golden Age' of magic.[1] More recently, Sophie Lachapelle (2015: 38–39) has investigated amateur engagement with magic tricks in 18th and 19th-century Europe. Scholarship of medieval magic, however, is largely directed toward ritual magic and common medico-magical practices such as charms. Beyond some interesting but relatively brief discussions of the complementary ideas of trickery and illusion in medieval magic as presented in the *Secretum philosophorum* (Goulding, 2006: 138; Friedman, 1998: 81–83), at the time of writing the only study dedicated to European medieval magic tricks is Bruno Roy's (1980) article 'The Household Encyclopaedia as Magic Kit'. While making only passing reference to it, Richard Kieckhefer (1989: 92–93) highlights the importance of illusionist magic to our understanding of what magic meant to medieval people. Using a source base of 100 largely unstudied manuscript recipe collections discovered over the course of my doctoral research, this paper addresses this gap in the scholarship of medieval European magic. I demonstrate that the magic tricks recorded in medieval manuscript recipe collections point toward a common experience and appreciation of illusionist magic which was intimately related to medieval attitudes towards matter and the mind.

The manuscripts under investigation are mostly dateable to the 14th and 15th centuries and are predominately of English provenance.[2] While my research, therefore, speaks largely to an English context and although there was possibly some variation to how magic tricks circulated, the similarities between my English and continental manuscripts suggest that magic tricks circulated throughout Western Europe in much the same way. The recipe collections containing magic tricks can be broadly categorised along a continuum from formal texts with titles and structuring principles that were likely intended for wider circulation, to informal and often personal compilations

[1] In this paper 'magic tricks' refers to recipes and instructions that produce seemingly impossible effects; 'illusionist magic' refers to the activity of performing magic tricks more broadly. Put simply, magic tricks are to illusionist magic what culinary recipes are to the art of cooking.

[2] Six manuscripts are datable to the 12th or 13th centuries. Only 28 manuscripts in my source base are likely from continental Europe: ten from Italy, nine from France, eight from Germany, and one from the Netherlands.

including marginal notes and addenda. In my source base, 32 manuscripts contain only formal texts, 47 contain only informal compilations, and 21 contain both. The manuscripts housing these collections were read and used in a variety of settings by a variety of people. Most manuscripts in my source base can be placed into three categories: medical manuscripts which can contain both theoretical and practical medical texts, including vast remedy collections; technical manuscripts which may contain tracts as diverse as alchemy and art technology; and miscellaneous manuscripts which have no dominant genre.[3] Library catalogues, codicological, and palaeographical evidence place 60 manuscripts in an institutional environment, such as a monastery or university, while 40 more were likely produced and used by lay people including non-university-trained physicians and gentry families. This group of manuscripts therefore represents a set of diverse intersecting communities that roughly align to the broad cross-section of society that Laurel Braswell (1984: 337) has argued was the audience of utilitarian and scientific prose in late medieval England.

This paper will be in two parts. In the first section, I examine the material reality of magic tricks. In most cases magic tricks were collected with practical texts of medicine, alchemy, or art technology, or more theoretical texts that hoped to explain the inherent properties of natural substances and their applications. Magic tricks were always collected in the context of the manipulation of materials and processes. As a genre, they are best considered as a form of *Fachliteratur* meaning practical, utilitarian, and informative texts. They are also recipes, or *Rezeptiliteratur*, a subsect of *Fachliteratur*, defined as practical instructions toward the production of an object or effect (Stannard, 1982: 59). As recipes, magic tricks are processes revolving around specific actions taken with specific substances to produce a specific effect. They are thus principally concerned with how matter might be manipulated to create amusing, wonderful, or otherwise unexcepted sights. In late medieval Europe, both substances and their effects were multipurpose. Most magic tricks utilised substances that were central to various trades and crafts from construction to gilding, soap making to book repair, pigment making to leather tanning. Considering magic tricks under the rubric of the Chemical Humanities, by focusing on their substances, processes, and relationships with more utilitarian activities, reveals how late medieval people understood the possibilities of the material world. Even if magic tricks were not always actually performed, how they represent the imagined potential of material substances highlights how different groups of medieval people, motivated by different interests, engaged with practical technical knowledge.

[3] 28 manuscripts in my source base are medical, 19 are technical, and 48 are miscellaneous. Of the remaining six, three are predominately astrological and another three theological.

In the second section of this paper, I analyse how medieval magic tricks interacted with the mind of their audiences. From the perspective of the audience, illusionist magic is an entirely cognitive experience. A magic trick is predicated on the performer's careful manipulation of the audience's attention, which allows the spectator to experience the effect of a magic trick without discovering its method. Using the theoretical reflections of modern magicians, I situate medieval magic tricks and illusionist magic as experiences that were ultimately constructed in the mind. Like modern day illusionist magic, this construction relied on the distinction of illusionist magic from acts that deliberately aimed to deceive or that claimed to be the result of supernatural intervention (Lamont, 2007: 5). Robert Goulding (2019: 326) has recently explored the relationship between illusion and deceit in the works of prominent medieval theologians such as William of Auvergne and Nicole Oresme. His article, however, paid only cursory attention to the references made to illusionist magic in these texts. I will build on Goulding's arguments, placing the work of these theologians in conversation with texts that contain magic tricks in order to argue that medieval writers considered magic tricks to be a distinct type of illusion predicated on the misdirection of humanity's inherently faulty perception—a central concept of the performance of modern illusionist magic (Lamont and Wiseman, 2005: 1–81). By reading these theologians and magic trick collections alongside the literary genre of medieval romance, I show that it is possible to reconstruct the specific social and cultural spaces that enabled medieval audiences to experience certain deceptions as illusionist magic.

Minding Matter: Ludic Experimentation

The study of medieval magic tricks contributes to the emerging field of the 'Chemical Humanities' which seeks to 'to reflect on the historical, social, and cultural dimensions of chemistry and assess their meanings for human and non-human actors in both the past and the present' (Piorko, Hendriksen and Werrett, 2022: 6). Within this framework, magic tricks are the evidence of a common experience of chemical knowledge in late medieval Europe which inspired experimentation with utilitarian substances to create amusing and entertaining effects. Using sulphur as an example, I will argue that magic tricks most likely originated in the workshop and suggest how they may have been transmitted outside of this utilitarian space. The adaptation of sulphur and its properties is also presented as an example of a tendency toward a playful experimentation with common substances and processes that can be observed across medieval artisanal crafts and other specialist occupations such as cooking. Finally, I demonstrate that some magic tricks which simply do not work can be related to an increasing interest in craft substances, like sulphur, and their properties amongst non-specialist learned

elites who developed a theoretical rather than practical and experienced understanding of their functioning. There was no concept of chemistry as a discipline in the late Middle Ages (Moureau, 2022: 1). However, magic tricks, their connections to various practical crafts, their consumption as both heuristic instructions and theoretical possibilities, and their broad audience, shed some light on the various ways that a range of medieval people understood and manipulated substances and matter for diverse ends.

The focus on sulphur is informed by its ubiquity both within the manuscripts I have examined and within medieval craft practice more broadly. Sulphur is the most common substance used in magic tricks appearing in over half the manuscripts in my source base within both informal recipe collections and more formal texts. Sulphur was a financially lucrative, familiar, and multipurpose substance in the medieval Latin West. Medicinally, sulphur's antibacterial properties were exploited in unguents to treat haemorrhoids and skin diseases such as leprosy. It was also believed to function as a laxative (Mehler, 2015: 194). Beyond medicine, sulphur preserved wine by halting the fermentation process, conserved hops for beer brewing, and was an essential substance in highly specialised medieval crafts such as metallurgy and gunpowder production (Mehler, 2015: 194–5; Bucklow, 2009: 86). Sulphur's pervasiveness is unsurprising: it is the fifth most common element on earth and is easily found in fumaroles near volcanoes. In medieval Europe, sulphur was harvested from several plentiful deposits in numerous sites of recent volcanic activity and was commonly sold in medieval apothecaries. Sulphur's incursion into various aspects of everyday life and the discovery of new sulphur deposits in Iceland in the 13th century led to an increased interest in its economic value amongst rulers and merchants who began to control the sulphur trade and export large quantities of it during this century (Mehler, 2015: 193). Sulphur's centrality to a variety of medieval trades is clearly paralleled by, and perhaps a cause of, its omnipresence in magic tricks.

A common magic trick in my source base seeks to make a performer impervious to fire or heat either by making them appear to be on fire or allowing them to hold fire or other hot items without injury. These tricks were often achieved using egg whites and sulphur, sometimes in combination with common plants like marshmallow and purslane. Egg whites and yolks, in addition to their obvious culinary applications, were used extensively in medieval Europe to make glues and pigments (Thompson, 1956:74). A medieval craftsperson, particularly one involved in pigment-making, would have used sulphur in conjunction with egg whites to make gold and red pigments, perhaps leading to the incidental discovery of this magic trick. I have found two magic tricks in two different 15th-century manuscripts where eggs whites are used in combination with sulphur to allow the performer to appear to carry fire in their hands without

injury. The performer first coats their hand in a mixture of egg white and sap from a marshmallow plant before sprinkling themselves with sulphur.[4] When fire is applied, the sulphur in this mixture ignites and quickly exhausts itself without an additional fuel source (Musson, 1952: 6–7). If done correctly, this recipe would have worked. In these experiments the combustibility of sulphur and the fire-retardant nature of egg whites, properties that would have been familiar to medieval craftspeople, were theatrically exploited to make the performer appear to carry fire without injuring themselves.

While magic tricks share many substances and processes with craft practice, they are not frequently recorded in craft treatises. The two recipes discussed above are from a technical and a medical manuscript, respectively, both likely belonging to clerics with wide-ranging interests in substances and experiments judging by the other texts found in these volumes. Magic tricks are most often recorded in small groups in larger recipe collections alongside and undifferentiated from medical, alchemical, and simple craft recipes. Although most art technological crafts were concentrated in monastic and cathedral workshops or guilds during the 12th and 13th centuries, these crafts were increasingly practiced in court workshops and wealthy gentry households that produced their own books from the 14th and 15th centuries (Kroustallis, 2016: 307–8). The appearance of medieval magic tricks in manuscript recipe collections, then, directly coincides with the movement of craft practice, and associated chemical knowledge and experience, outside of specialist workshops and into more diverse environments. As the 15th century progressed, less affluent literate households also began to engage with craft practice, particularly as related to book production and repair. The domestic application of workshop practice, in the form of codicological recipes for book glues, inks, and paints, is well represented in medieval domestic recipe collections from the second half of the 14th century (Clarke, 2018: 15). This same period saw increasing literacy rates which encouraged personal notetaking and personal book production. After the Black Death, economic factors further encouraged book production and repair within gentry households (Clarke, 2018: 15). As craft practice and knowledge transcended the workshop, perhaps magic tricks also did so.

Magic tricks are a form of play centred on the reinterpretation and adaptation of craft substances and techniques. They align with Johan Huizinga's (1955: 7–11) definition of play as a repeatable, voluntary, unproductive activity that is separate from ordinary life, limited by accepted rules, and restricted in both time and space. More recently, Mary Carruthers (2013: 17–20) has demonstrated that all human making in the Middle

[4] London, Wellcome Library, MS 517, 80v and Oxford, Bodleian Library, MS Ashmole 1435, p.12. Many more recipes allow a performer to set their hand on fire, to appear completely on fire, or to carry hot coals without injury.

Ages was conceived as a game that depended on the interaction between a creator or performer, an artefact, and an audience for its meaning. The same is true for magic tricks where the experience is reliant on the intent of the performer, their use of substances, and the interpretation of the audience. For example, my source base contains recipes for bleaching red roses, or other red flowers, white with sulphur. The same technique was also used to preserve flowers. This magic trick could be variously interpreted as a practical act, a mere demonstration of sulphur's chemical properties, or, if performed with appropriate zeal, a magic trick.[5] Similarly, sulphur was used in medieval European craft practice to give metals or ink the appearance of copper or gold (Córdoba, 2014: 264–65). In some texts, this effect is again presented as an amusement (Anon, 2006: 150). This flexibility in the interpretation of chemical processes, their effects, and their ultimate goals is even more important when coupled with the fact that the artisan and the amateur entertainer could be the same person. The craftsperson could just as easily adapt the processes of their vocation toward endeavour as toward play.

Magic tricks that aim to protect the performer from injury, or which change the appearance of flowers and coins, suggest that the line between utility and frivolity was very thin. In these examples the interpretation of the effect as a magic trick would have been reliant on a specific performance context. Other magic tricks, however, are clearly intended to be amusing and entertaining. Paul Binski (2014: 44) argued for the universal importance of the ludic in all medieval invention which allowed the orthodox or the ordinary to be used unorthodoxly or extraordinarily. As craft and chemical knowledge became increasingly widespread in late medieval Europe the use of craft materials in magic tricks became more obviously ludic. In addition to the above-mentioned magic tricks, sulphur's combustibility was also exploited for several other small, playful, and entertaining effects that could have been performed in the home and which had no purpose beyond amusement. An especially remarkable category are recipes to light a candle from an image painted on the wall which appear seven times in my source base.

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[5] This recipe is found in the following: *De influencia superiore in istis vegetalibus inferioribus*, Cambridge, Gonville and Caius College Library, MS 413/630, 156v; *De influencia superiore in istis vegetalibus inferioribus*, Cambridge, Trinity College Library, MS O.7.23, 27r; *De influencia superiore in istis vegetalibus inferioribus*, London, British Library, Additional MS 18752, 27v; *De influencia superiore in istis vegetalibus inferioribus*, London, British Library, Additional MS 32622, 78v; *De influencia superiore in istis vegetalibus inferioribus*, London, British Library, Egerton MS 2852, 63r; *De influencia superiore in istis vegetalibus inferioribus*, London, British Library, Sloane MS 2579, 50v; *De influencia superiore in istis vegetalibus inferioribus*, Oxford, Bodleian Library, MS Digby 1066, 23r; *Experimenta Solomonis*, Paris, Bibliotheque Nationale de France, Lat. 7105, 157v; Cambridge, St John's College Library, MS F.18, 61v; Cambridge, Trinity College Library, MS O.2.13, 87v and 134v; London, British Library, Additional MS 4698, 90r; London, British Library, Additional MS 19674, 62r; London, British Library, Arundel MS 251, 17v; London, British Library, Sloane MS 3548, 108r; London, British Library, Sloane MS 3564, 62r; London, Wellcome Library, MS 408, 51r; Oxford, Bodleian Library, Ashmole MS 1435, p. 5; Oxford, Corpus Christi College Library, MS 132, 24r; and Oxford, Corpus Christi College Library, MS 291, 95r.

For example, in a 14th-century domestic manuscript, London, British Library, Sloane MS 3548, an image is painted on a wall and then coated with sulphur and petroleum.[6] When a recently extinguished candle is touched to the image, the candle will reignite. This recipe, if done carefully, might have been efficacious: the residual heat from the candle could ignite the sulphur, and the petroleum, if it had not dried, could act as an accelerant which, in turn, would ignite the wick of the candle.

The playful attitude to materials and processes demonstrated in magic tricks was a feature of medieval art more broadly. Carruthers' (2013: 17) theory of artful play posits that medieval art occupied a play space that was overlain onto reality creating a place protected by boundaries and rules that allowed matters relating to everyday life to be explored or experimented with. Although Carruthers' discussion focuses on rhetoric and the plastic arts, her concept of artful play can be extended to innovative uses of craft materials. If the artist's canvas or author's parchment presents a play space where medieval people could interrogate matters related to the social and cultural aspects of human existence, then the artisan's workshop itself could present a play space where matters related to physical existence and possibility could be interrogated. The architect, Villard de Honnecourt (1200-1266), for example, experimented with wood, pulleys, rope, and other materials common to his trade to design mechanical wonders such as a pointing angel and a nodding eagle (Truitt, 2015: 118–21). Gunpowder, a mixture composed of sulphur, saltpetre, and carbon, is another striking instance of this playful exploration of the possibilities of substances. Upon its introduction to Europe in the latter part of the 13th century, gunpowder caught the interest of state officials, military engineers, and others who sought to experiment with and fully exploit this new and exciting substance. The explosive nature of gunpowder was thus variously used on the battlefield as artillery, and for recreational pyrotechnics at the theatre or during coronations (Partington, 1992: 81).

This ludic approach to specialist craft extended into other trades such as cooking, highlighting that it was a relatively common facet of medieval European culture rather than solely related to workshop activities. At an elite level, cooking required the presence of trained specialists who were familiar with certain substances and techniques. These specialists, driven by their own desire to innovate or by the demands

[6] London, British Library, Sloane MS 3548, 19v. Versions of this recipe using petroleum, turpentine, or sulphur alone are found in following: *Hic incipiunt experimenta bona et optima*, Oxford, Bodleian Library, MS Digby 86, 47v; *Incipiunt quedam experimenta que Salamon rex composuit ob amorem et imploracionem cuiusdum excellentissime regine et sunt experimenta nature*, London, British Library, Sloane MS 121, 90v; *Pulvis ad ignem grecum iattandum ita fiet*, London, British Library, Royal 12 B XXV, 247r; London, British Library, Additional MS 48179, 86r; London, British Library, Arundel MS 251, 19r; and Oxford, Bodleian Library, MS Digby 67, 37v.

of their patrons, used specialised techniques to create wonderful effects. For example, 14th and 15th-century French, Italian and English elite cookbooks contain various recipes for imitation foods such as plant-based cheeses and meats, imitation roasts covered in ground gingerbread to look like meat, and fake egg yolks coloured with saffron (Scully 1995: 103–4). Such imitations enabled banqueting to continue during fast days, thus alleviating the burden of fasting (Adamson 2003: 71). By the end of the 14th century, these relatively simple disguising and imitation techniques had progressed into more elaborate feats such as the redressing of roasted peacocks in their skins. In less affluent settings this playful approach to food preparation reflects contemporary magic tricks. *Le Vivendier,* for example, is a 15th-century anonymous French cookbook which survives in a single miscellany of medical, botanical, and household recipes. It contains a recipe to make a roast chicken turn and sing by binding its neck at both ends, filling the throat with mercury and sulphur, and putting the chicken in a hot place (Anon, 1997: 82–83). A similar recipe using only mercury appears in my source base six times.[7]

Chemical and technical knowledge could also be a literary genre in late medieval Europe. Most medieval tracts dedicated to specialist crafts, from pigment-making to cookery, were recorded neither for nor by the people who practiced these trades. They were instead compiled by non-specialist outsiders out of curiosity rather than vocation (Halleux, 1989: 7). The transmission of craft recipes, and perhaps therefore incidentally magic tricks, was partially compelled by a growing valorisation of craft procedures amongst learned individuals which was itself partially influenced by the increasing importance of alchemy in courtly and learned circles. In her examination of 40 German art technological recipe collections produced between the 14th and 16th centuries, Sylvie Neven (2016:42) demonstrated that because alchemists and pigment-makers used similar chemical processes, the circulation of alchemical and art technological knowledge outside of workshop settings in courts, universities, and monasteries may indicate that oral transmission of knowledge was taking place between scribes, artists, artisans, and scholars. Non-specialist, educated individuals visited workshops, recording practices as described or demonstrated to them by specialist artisans. Magic tricks may have also been transmitted in this way. In addition to demonstrating the tricks of their trade, a craftsperson may have indulged in demonstrating how their knowledge and skill could be adapted to create entertaining effects. Because they were not practically skilled in these endeavours, the learned compilers introduced errors

[7] *Hic incipiunt experimenta bona et optima,* Oxford, Bodleian Library, Digby MS 86, 47r; London, British Library, Additional MS 19674, 62r; London, Wellcome MS 517, 80r; Munich, Bayerische Staatsbibliothek, Codex Latinus Monacensis 444, 221v; Oxford, Bodleian, Ashmole MS 1435, 3v; andThe Tollemache Book of Secrets, Suffolk, Helmingham Hall LH. II 27r.

into the procedures they were observing, leading to recipes that did not work or that did not work as written.

The incursion of learned outsiders into craft spaces and the subsequent recording of technical and chemical knowledge was accompanied by theoretical approaches to experimentation indicating that that there existed a specific elite medieval culture that valued the concept of chemical exploration and experimentation without being committed to its practice. This is clearly seen in magic tricks that obviously do not understand the lived reality of the properties of particular substances. For example, a text titled *Pulvis ad ignem grecum iactandum ita fiet (A powder for Greek Fire which is for throwing is made as follows*) in British Library, Royal MS 12 B XXV, a 14th or 15th-century institutional medical manuscript, is one of the earliest examples in my source base of a recipe to light a fire with water. In this recipe quicklime is combined with pulverised sulphur and smeared onto a building which will burn when it rains.[8] Although mixing water and quicklime produces heat which might ignite sulphur if combined in the correct proportion, James Partington (1998: 28) argued that the fire, if any, caused by these recipes would have been weak. The learned but non-specialist readers and compilers perhaps knew, theoretically, that sulphur was a highly flammable substance and that quicklime produced heat in combination with water, therefore leading them to incorrectly assume that this mixture would produce fire. This recipe and others like it imply that in a learned, amateur context, recipes that were clearly inefficacious may have been copied because the compiler knew, or thought they knew, how individual substances behaved.

Matters of the Mind: (Mis)Directing the Attention

Magic tricks and illusionist magic can be used to explore medieval thinking about the mind and its manipulation. As acts that manipulate the relationship between what is seen and what is possible, medieval magic tricks and illusionist magic demonstrate medieval attitudes to the process of misdirection, the fallibility of perception, and conceptualisations of illicit and licit deceit. However, magic tricks predominantly appear in recipe collections alongside diverse material and therefore rarely offer insight into how they were intended to be understood. The *Dialectica* chapter of the *Secretum philosophorum* is the sole exception, displaying a complex understanding of misdirection which is similar to that of modern illusionist magic, where performers are anxious to differentiate themselves from mentalists and other performers who claim to truly possess supernatural powers (Lamont, 2007: 5). Analysing the writings of 13th

[8] *Pulvis ad ignem grecum iactandum ita fiet*, London, British Library, Royal MS 12 B XXV, 246v–247r.

and 14th-century scholars William of Auvergne (1180–1249), Roger Bacon (1219–1292), and Nicole Oresme (1320–1382) alongside *Dialectica* allows magic tricks to be more concretely situated within the medieval European intellectual and cultural context. Further, the social and cultural acceptability of illusionist magic and other forms of amusing deceit in late medieval society can be determined through an analysis of illusion in medieval romance. Medieval writers used magic tricks as rhetorical tools emphasising, by turns, their association with frivolous entertainment or deliberate deception.

Magic tricks are predicated on the misdirection of perception for the purposes of entertainment. *Dialectica,* the third chapter of the *Secretum philosophorum,* a 13th-century Latin text surviving in 25 14th and 15th-century English manuscripts, demonstrates how misdirection was conceived as a practical endeavour (Clarke, 2009: 51).[9] As this text usually travelled with a range of material including medical, alchemical, and astrological texts, it was likely consumed by a wide range of literate people in medieval England. The *Secretum philosophorum* consists of seven chapters which promise to reveal the secrets of the Liberal Arts. However, in reality, this text was a repository of craft and technical recipes for inks, pigments, magic tricks, other pieces of practical advice, and amusing recipes. For example, the opening chapter on grammar contains recipes for making pens, and the chapter devoted to rhetoric includes riddles. *Dialectica* contains 40 deceptions of the senses (*decepcio sensum*), taking each sense in turn beginning with taste. It seeks to teach the reader to 'distinguish between what is true and what is false or what is apparently true' (Anon, 2006: 152).[10] Not only are there truths and falsehoods, but there are also falsehoods that have the appearance of truth. That this appears in the section of the *Secretum philosophorum* which is nominally concerned with logic but contains magic tricks is significant for its place in the history of magic. It highlights that, even in the late Middle Ages, magic tricks were understood as cognitive effects reliant on the ability to separate facts from fabrications.

The compiler of the *Secretum philosophorum* explicitly associated tricks based on misdirection, and therefore the manipulation of the mind, with illusionist magic, collecting them under the title '*sophisticaciones que vocantur iugulaciones*', deceptions which are called jugglers' tricks (Anon, 2006: 147 and 157). This section includes tricks to make a rush appear to grow, restore a rush that had been cut in half, and free hands tied behind the back. Misdirection is a central concept in the performance of modern illusionist magic and forms the basis of all illusions. All magic tricks consist of an

[9] I have seen 20 manuscripts that contain the *Secretum philosophorum.* While they vary considerably in word order and syntax, all are consistent in sentiment.

[10] 'Dyalectica docet discernere verum a falso vel ab apparenci vero.' (Anon, 2006: 143).

effect and a method. In a successful magic trick, the audience experiences the effect without discovering the method. The author clearly envisioned these instructions as performances of misdirection: as acts that others 'would consider done by magic' should the performer be careful to ensure that the 'trick is not discovered' (Anon, 2006: 160).[11] As John Friedman (1998: 81) and Goulding (2006: 193) argue, the *Secretum philosophorum* reveals an appetite for a safe engagement with the appearance of magic. The *Dialectica* also frequently implies an audience and gives prominence to the specific staging of certain tricks. For instance, to make a rush grow, the performer must pretend to look for a second rush while folding one that is already in their hand, thereby misdirecting the audience (Anon, 2006: 148). This emphasis on showmanship and the careful manipulation of the audience's attention indicates that the compiler interpreted these instructions as amusing tricks whose success relied solely on the effective management of their audience's cognitive processes.

Dialectica's assessment of entertaining magic is paralleled and further elaborated in the writing of medieval theorists who understood all magic to be inherently illusory (Goulding, 2019: 326). This included the performances of jugglers which were always defined as deceptions of the senses. William of Auvergne (1674: 1059), the influential bishop of Paris, argued in *De universo* that there existed a category of deceptive magical act achieved through sleight-of-hand (*agilitate habilitateque manuum*). He placed this firmly within the context of performed, and presumably public, entertainment. William of Auvergne spoke of 'acts achieved through placings and movings, commonly called handlings and shufflings' that 'inspire great admiration until their methods were made known' (William of Auvergne, 1674: 1059).[12] Roger Bacon, the English Franciscan friar and philosopher, made similar arguments about the manipulation of perception in *Opus majus*. He stated that foolish people were impressed by effects produced through acts of conspiracy (*consensum*), the use of obscuring darkness (*tenebras*), deceptive instruments (*instrumenta sophistica*), and subtle hand movements (*subtilitas motionis manualis*) (Bacon, 1990: vol 1. 241). These are all methods of misdirection still employed by modern illusionist magicians implying that Bacon was referring, in part, to performers and entertainers. While possibly a forgery, *Epistola de secretis operibus artis et naturae et de nullitate magiae* solidifies this rationalisation of seemingly wonderful occurrences, directly associating them with the dexterity of jugglers or the vocal control of ventriloquists (Zambelli, 2007: 47–48; Pseudo-Bacon, 2012: 523).

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[11] 'Putabitur autem a multis id fieri per artem magiciam'; 'ne precipiatur eorum cautela.' (Anon, 2006: 150).

[12] 'sicut reposticiones et transpostiones quarundam rerum et vocantur vulgariter tractationes, vel trajectationes et sunt magnae admirationis hominibus, donec innocescant modi quibus fiunt.' English translation my own.

These sources demonstrate that medieval intellectuals correlated illusionist magic directly to misdirection.

For medieval theorists, then, the mind was fundamentally manipulable. Nicole Oresme, counsellor to King Charles V and prolific scholar, was especially interested in the fallibility and malleability of human perception, outlining the various ways that the relationship between what is truly present and what is seen could be disrupted. Like William of Auvergne and Roger Bacon, Nicole Oresme (1968: 354–57) argued that magicians could make things which appear to be impossible by changing the senses with perception altering drugs, truly changing things through natural but uncommon manipulation, or through mathematical illusions.[13] These mathematical illusions were tricks of perspective with mirrors, sleight-of-hand, and transformations such as those employed by jesters and described in the *Secretum philosophorum* (Oresme, 1968: 358–59).[14] He emphasised that these were not acts of magic but rather trickery. Going further than William of Auvergne and Roger Bacon, Nicole Oresme (1985: 160–61) contended that perception could also be inadvertently deceived. He explained in *De causis mirabilium* that elevated emotional states and sickness could lead a person to experience an extraordinary event: a fearful man may confuse a wolf or a cat for a demon, a melancholic or someone at risk of epilepsy may be similarly confronted with marvels. He further contended that people make errors of perception even when not emotionally or psychologically compromised, so that a group of people may perceive the same object to be different sizes, colours, or shapes (Oresme, 1985: 156–57). Through Oresme's work it is possible to identify a direct relationship between how illusionist magic was thought to function and the nature of the human mind.

Misdirecting and deceitful practices can be found in various medieval contexts, highlighting that it must go hand in hand with a specific type of framing in order to be experienced as a magic trick. For example, the fallibility of human perception was exploited in medical practice. The author of the *Secretum philosophorum* stated that a physician may give 'a patient water to drink that he thinks is wine in colour and flavour, because sometimes patients greatly desire that which provokes their illness' (Anon, 2006: 152).[15] Additionally, in handbooks of medical practice physicians were

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[13] 'triciplici autem modo per talem applicationem vel usum rerum magi quedam faciunt apparere que videntur impossibilia fieri per naturam: uno quidem modo per immutationem sensuum, alio modo vera immutatione rerum obiectarum, et tertio modo mathematica illusione.'

[14] 'quo apparent immutate sed per illam partem matematice que dicitur perspectiva aut per aliquam aliam proportionalem astantes illudit, sicut per specula, per agilitatem motus, per traiectationes, et per alia multam et ita solent facere quidam ioculatores.'

[15] 'Nam videmus medicos dare aliquando infirmo aquam ad bibendum que putatur ab infirmis esse vinum in colore et sapore, quod aliquando infirmi maxime affectant illud quod auget infirmitates illorum,' (Anon, 2006: 143).

instructed in how to 'cold read' patients or their intermediaries to accurately ascertain their gender, age, or severity of sickness and warned to be vigilant of deceitful patients who would send white wine and other preparations instead of urine for examination in an attempt to test the physician's expertise (Arnau de Vilanova, 2010: 394–95).[16] These acts would not have been experienced as magic tricks. Modern magicians define illusionist magic as a 'unique form of deception, in which we know that we are being deceived and are still deceived.' (Lamont and Steinmeyer, 2018: 9). Like theatre, it relies on an agreed pretence between the performer and the audience (Butterworth, 1999: 53). Without this agreement, the manipulation of the senses or understanding is simply a trick. Illusionist magic is thus a social experience wherein both the magician and the public are aware of, and consent to, the deceit (Lamont, 2007: 1).

Magic tricks must therefore take place in a 'magic circle' which dictates a specific relationship between players, and in case of magic tricks and other deceitful entertainments, between the audience and performer (Huizinga, 1995: 10). The importance of this magic circle is continually highlighted in medieval romance which frequently includes scenes of entertaining, benevolent, and nefarious magic. Contemporary literary genres such a romance speak to and explore commonly understood concepts of the culture in which they are produced. Hannah Skoda (2013: 13) has shown that medieval literary texts 'engaged with social and cultural norms, problematised them, and embodied the dialogue between those norms, the composers and the audiences who read, listened to, and watched them'. Literary texts themselves can therefore be read as magic circles which allow for the safe interrogation of certain concepts, such as the relationship between illusion, deceit, and entertainment. They act as a mirror for social and cultural norms, providing yet another avenue for the contextualisation of magic tricks, illusionist magic, and entertaining deceit more broadly. Medieval authors used the conventions and freedoms of the romance genre to scrutinise the relationship between the deceiver and the deceived. How a medieval audience would have read and comprehended deceit in romance, and other literary genres, was guided by the knowledge of the fictional internal audience, the intention of the deceiver, and the agreed pretence, or lack thereof, underpinning the relationship between these characters.

Using medieval romance, then, it is possible to unpack how medieval writers and their audiences understood and interrogated the cognitive and social processes that distinguished licit from illicit deceit. The enchanter (*encanteor*) Barbarin from the

[16] Cold reading encompasses a set of techniques by which mentalists and mediums study the reaction of their mark to guide whether their high probability guesses are right or wrong.

12th-century French romance *Floire et Blanchefleur* is a useful analogue for the experience of magical performance at court. In this narrative, Barbarin is commissioned by the royal family to cheer the lovesick Floire with his *ju,* his games (d'Orbigny, 2003: 186–99, ln. 785–990). Barbarin is introduced as a powerful creator of illusions able to turn stone to cheese, compel men to tremble, make asses play the harp, cause cows to fly, and even cut off his own head (d'Orbigny, 2003: 186, ln. 797–808). Despite all his power, however, Barbarin is explicitly depicted as an entertainer who was invited to showcase his illusions. Roy (1980: 61) suggested that characters such as Barbarin were exaggerated caricatures of jugglers and other entertainers who would have been familiar to a medieval audience. Indeed, Barbarin's *ju* are similar to the magic tricks in my source base which seek to transform household objects, make the body impervious to harm, or to control people and animals. This scene in *Floire et Blanchefleur* mirrored contemporary elite entertainment which was itself reproduced more modestly in late medieval recipe collections. The romance presents magical entertainment as a public experience, closely related to less extravagant illusions preserved in manuscript recipe books. How Barbarin's performance is presented to and received by the audience reveals contemporary attitudes to magical entertainment and how this was differentiated from illicit nefarious magic.

Despite Barbarin's characterisation as an entertainer, the romance is careful to set clear parameters within which he can operate. It does so by emphasising the importance of the informed consent of the audience. Much like illusionist magic, Barbarin's illusions could only be enjoyed as entertainment when the audience was certain that what they were witnessing was an illusion. Barbarin's first performance caused panic amongst the courtiers who failed to recognise it as a trick. First, plumes of smoke exuded from Barbarin's nose obscuring him from view. Then the palace appeared engulfed in flames. The audience, believing what they were witnessing to be true, ran in terror before realising their error: 'Now they see it, and now they don't. / then they are well aware what fools they become / when he creates enchantments' (d'Orbigny, 2003: 188, ln. 835–37).[17] As William Sayers (2006: 211) has argued, it was only after this initial vision of destruction and experience of fear that the public came to understand Barbarin's spectacles to be illusionist magic. It is only when they are armed with this understanding that they can engage in an agreed pretence with the performer and begin to enjoy the illusions fully. This juxtaposition of ignorance and knowledge highlights the centrality of cognitive processing to the experience of magic tricks. While Barbarin's illusions are more elaborate than anything a contemporary juggler could reasonably

[17] 'Or le voient et or nel voient./Dont sorent bien que fol estoient / quant il criement encantement.' English translation my own.

hope to achieve, they could still only be enjoyed as entertainment when the audience was certain that what they were witnessing was merely a trick of the eye.

The 14th-century French romance the *Roman de Perceforest* presents a particularly complex understanding of magic tricks in the comparison of the illusions produced by the Queen of the Sheer Mountain and those of her tyrannical husband, Aroés. Unlike Barbarin, neither character is described as a performer. Instead, both use illusions for political purposes: the Queen of the Sheer Mountain to bestow favour and Aroés to attain power and deification. The Queen's illusions are presented in contexts where the audience might expect to see fantastic sights that they could recognise as illusionist entertainment: during feasts and at coronations—public and political events. Aroés performed his illusions outside these spaces to manipulate his subjects (Anon, 2007: 58–129). The absence of agreed pretence between Aroés and his people marks him as morally corrupt. His ultimate goal was to trick his audience for his own gain. Aroés used elaborate tricks outside of acknowledged performance spaces to present himself as a god, promising his subjects protection from all other gods, a cure from sickness, a painless death, and entry to a paradise of his making (Anon, 2007: 89). The illusions were so captivating that they tricked even those who were aware of the ruse, emphasising again the role of cognition in the experience of illusionist magic. His daughter Flamine, for instance, despite knowing that the wonders before her were artifice, could not help but be seduced by them (Anon, 2007: 107). Because of his active and self-serving intent to deceive, the audience reads Aroés as a villain. If the Queen of the Sheer Mountain is understood as a performer of illusionist magic on the stage, Aroés is the unscrupulous fraudster in the dark parlour.

Conclusion

Reading medieval magic tricks through the lens of the Chemical Humanities allows them to be integrated into a broader medieval appreciation of skill, practical knowledge, and ludic experimentation. Medieval magic tricks were a type of play that encouraged the manipulation and reinterpretation of substances and chemical knowledge. My analysis of the use of sulphur in magic tricks has demonstrated that substances and their properties were understood to be multi-functional. Sulphur could just as easily be used in the artisan's workshop or the alchemist's laboratory as in the amateur magician's parlour. Indeed, the same person could occupy all three roles at different times, taking the materials and processes of their trades or vocations and applying them in different circumstances. As material processes, magic tricks are an expression of the playful approach to craft that can be observed across medieval culture. Whether ingenuity in engineering that led to the creation of automata, innovation in art technology that

produced more perfectly formed gemstones than could occur in nature, or inventiveness in the kitchen that allowed feasting to continue during fast days, medieval specialists adapted the practical aspects of their trades for creative and surprising ends. Matter and material processes were vehicles for the expression and demonstration of human creativity and potential. Additionally, through the Chemical Humanities, we can also examine how medieval people constructed their understanding of substances and technical processes. The transmission of technical knowledge, including magic tricks, out of the workshop is evidence of a growing non-specialist interest in technical processes and experimentation. At all levels of society, medieval people were interested in substances and their possibilities.

Magic tricks were not just constructed technically but also cognitively. They are a useful analytic tool for interrogating how medieval people understood cognitive processes and the construction of their social environments. Using a range of medieval genres, including the work of medieval theologians, magic trick texts themselves, and romance literature, I have demonstrated that magic tricks were conceptualised as a specific mental experience. In this way, modern and medieval notions of magic tricks are in parallel. In both cases, magic tricks are predicated on the disruption between what is seen and what is known to be possible. The *Secretum philosophorum* and the work of significant medieval theologians heavily imply that magic tricks relied on processes of misdirection wherein the performer actively and knowingly manipulated the perception of their audience. These texts further reveal that perception was understood as inherently faulty and malleable. Not only are magic tricks cognitive experiences, but they also take place within certain mental spaces that rely on the knowledge and consent of the audience. A central aspect of modern magic is that the audience is always aware of the deception and has, at least implicitly, consented to this deceit. The importance of this consent is at its clearest in the depiction of magical entertainment and magical deceit in medieval romance which centres the knowledge of the audience and the intent of the performer. These texts demonstrate that medieval societies carefully constructed social and cognitive spaces that allowed for particular social and physical disruption to safely take place.

Whether as an avenue for analysing how medieval societies minded matter or interrogated matters of the mind, medieval European magic tricks highlight a playful attitude to chemical practice and the experience of deceit. I have shown that in medieval Europe, people playfully experimented with reality and the limits of their potential by investigating the various ways that substances could be combined and manipulated then deploying these findings across multiple registers and for various ends. I have also demonstrated how medieval people understood magic tricks, and other forms of deceit,

to be tricks of the mind that could be safely engaged with given the correct parameters. Further research into recipe literature may present similar connections between utilitarian practices, play, and mentalities. Indeed, Lucia Raggetti's (2021: 23–24) work on fraud and entertainment in medieval Arabo-Islamic technical literature has shown that, in the context of the market square, the manipulation of matter went together with the manipulation of cognition. Entertainers, stall holders, and frauds alike would use similar materials and practices to produce similar results which ultimately affected the perception of their audiences. Medieval European household recipe books may shed further light on the daily life of ordinary, if necessarily literate, medieval people. Cosmetics, invisible inks, and prank recipes are frequently found in these collections alongside magic tricks and pragmatic recipes for healing. Studying the relationships between their substances and processes may unravel even greater connections between practical arts and their cognitive associations. Recipes can reveal what medieval people actually did with substances and what they imagined might be possible.

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