

# Instrumental *Jawārī*: On Gender, Slavery, and Technology in Medieval Arabic Sources\*

LAMIA BALAFREJ

University of California, Los Angeles

(lbalafrej@humnet.ucla.edu)

## Abstract

Female domestic slaves designated as *jawārī* (sing. *jāriya*) featured in a range of medieval Arabic sources, including treatises on the mechanical arts. They appeared, for example, as liquid-serving devices and timekeepers. Scholarship on automated *jawārī*, however, has been scant; little, in fact, has been written on gender, slavery, and technology in the medieval Middle East. Generally, figurative machines have been framed as either practical, proto-robotic forms or wondrous, elite contrivances. Though seemingly innocuous, these approaches are at risk of reinscribing modern biases. In particular, the utilitarian discourse that sees machines as neutral, useful objects has been shown to manifest a position of mastery, reinforcing a slippage between worker and tool. Yet the hypothesis that the automata were objectifying, framing the *jāriya* as the object of a patron's viewpoint, might also partake in the binaries of subject and object, master and slave. To attend to the gendered and class-based politics of automated *jawārī* requires that we forgo common assumptions about both technology and objectification. The notion of instrumentality—here defined as the quality of serving as an instrument (*āla*) in a process of carrying and transmitting—may prove helpful in this regard. *Jawārī*, it turns out, were portrayed as instrumental figures in various other domains, including in domestic and spiritual contexts. *Ṣūfī* saints' encounters with inspired *jawārī*, for example, foregrounded the female servant as a vector of divine wisdom. Like the engineer's prototypes, these narratives were the product of a male, patriarchal viewpoint, oscillating between demeaning and valorizing effects; as such, they fortified some of the norms that made *jawārī* representable, notably as hypervisible, mediating agents. At the same time, these representations expose the limits of utilitarian, apolitical approaches to technology while positing *jawārī* as vehicles—more than objects—of instrumentality.

Female domestic slaves characterized as *jawārī* (sing. *jāriya*) are mentioned in a variety of medieval Arabic sources. Although the term could also designate a free young woman, in Arabic *jāriya* was most often employed for a female slave, regardless of age; preferred to less ambivalent denominations such as *ama*, it was the word of choice in the slave trade's written record, including in bills of sale for slaves and slave-buying advice manuals, as well as in the

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literary and historiographical canon. The term is also used in treatises on the mechanical arts, where *jawārī* appear, for example, as liquid-serving devices and timekeepers. The machines themselves confirm the link between the *jawārī* they represent and bonded labor, specifically domestic slavery. This is signified through the functions they replicate, such as the serving of liquids, and through the positions of the figures, which are often placed at the threshold, as though coming in and out of a house—a level of visibility that was often associated with *jawārī*'s enslaved status.

Predominantly feminized in both historical and historiographical sources, household slavery was a common practice in many parts of the premodern Middle East, present in both courtly and nonelite contexts and across various communities, Muslim and non-Muslim alike.<sup>1</sup> Although a lot of scholarly attention has been given to elite female slaves who sometimes gained access to wealth, prestige, and power, the largest proportion of enslaved women was likely employed for domestic and sexual labor in more anonymous, urban settings, including the homes of merchants, scholars, and artisans.<sup>2</sup> Given that foreignness was one of the main criteria for enslavement, most of these women, like their male counterparts, were brought from the peripheries of the Islamic world—mainly through war in early Islam, then also through trade—though some were also born within its confines.<sup>3</sup> As a result of their presence in urban and courtly milieus, *jawārī* permeated a broad representational repertoire, a phenomenon that has yet to receive full consideration. They appeared in sources not often studied in relation to slavery, including the mechanical treatises and literary accounts this essay explores. The circulation of *jawārī* as a motif in so many genres fortified, in turn, some of the perceptions and rules that regulated *jawārī*'s roles, including the expectation that female slaves were and ought to be more visible than free women due to their status as commodities and due to their activities, such as serving as their owners' proxies.

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1. On domestic slavery in the medieval Middle East in general, see Jan Hinrich Hagedorn, *Domestic Slavery in Syria and Egypt, 1200–1500* (Bonn: Bonn University Press, 2020); Shaun E. Marmon, "Domestic Slavery in the Mamluk Empire: A Preliminary Sketch," in *Slavery in the Islamic Middle East*, ed. Shaun E. Marmon, 1–23 (Princeton, NJ: M. Wiener, 1999). For documents of the slave trade, see the deeds of sale of slaves published in Yusuf Ragib, *Actes de vente d'esclaves et d'animaux d'Égypte médiévale*, vol. 1 (Cairo: Institut français d'archéologie orientale, 2006).

2. On enslaved women in particular, see Craig Perry, "Slavery and Agency in the Middle Ages," in *The Cambridge World History of Slavery, AD 500–AD 1420*, ed. Craig Perry, David Eltis, Stanley Engerman, and David Richardson, 240–67 (Cambridge: Cambridge University Press, 2021), esp. 245–53; Khalil 'Athamina, "How Did Islam Contribute to Change the Legal Status of Women: The Case of the *Jawārī*, or the Female Slaves," *Al-Qanṭara* 28 (2007): 383–408; S. D. Goitein, "Slaves and Slave Girls in the Cairo Geniza Records," *Arabica* 9 (1962): 1–20; Matthew Gordon and Kathryn Hain, eds., *Concubines and Courtesans: Women and Slavery in Islamic History* (Oxford: Oxford University Press, 2017); Elizabeth Urban, *Conquered Populations in Early Islam* (Edinburgh: Edinburgh University Press, 2020).

3. For an overview of the slave trade and its ideological justifications in medieval Islam, see Craig Perry, "Historicizing Slavery in the Medieval Islamic World," *International Journal of Middle East Studies* 49, no. 1 (2017): 133–38; Hannah Barker, *That Most Precious Merchandise: The Mediterranean Trade in Black Sea Slaves, 1260–1500* (Philadelphia: University of Pennsylvania Press, 2019).

The automated *jāriya* was a rather frequent motif, evident in poetic, narrative, and technical writings, yet it has garnered only limited attention. There has been, in fact, little research conducted on gender and slavery in the field of medieval Islamic technology studies. Generally, the technical and the social have been kept separate. Social historians of the medieval Middle East have mostly ignored the mechanical arts. Meanwhile, specialists in Islamic science and technology have mainly looked at machines as universal, proto-robotic forms, free of social and political issues. Another common assumption, especially among historians of Islamic art, is that figurative machines were wondrous, courtly luxuries, reflective of a patron's glory but with no implications for broader social categories. The split between technology and society is due to a host of reasons, including the prevailing view that technical artifacts are passive, neutral means, belonging to the sphere of capability, not the realm of social relations. But automated *jawārī*, I argue, pose a serious challenge to the utilitarian approach, refocusing attention from sheer mechanism and innocuous wonder to technology's politics.

Given the lack of research on gender, slavery, and technology in medieval Islam, this essay cannot be comprehensive; rather, its goal is to lay some ground for future research by defining a corpus, discussing its contours, and raising historiographical and conceptual issues. First, I address some of the reasons for the paucity of studies on automated *jawārī*. Special emphasis will be given to entrenched, yet inconspicuous, misconceptions that are not specific to Middle Eastern studies, such as the utilitarian definition of technology, or what I call functionalism: the discourse that approaches technical objects as a transparent means to an end, framing them as predictable, compliant objects. By projecting servility onto technology, functionalism relies on and reproduces a slippage between slave and machine. As feminist and Black studies have shown, the notion of equipment as a useful, efficient extension of human activity, though seemingly universal and benevolent, evinces a position of mastery, especially in its desire for dutiful service. By adding to the technical a representational level that centers the body of the enslaved, automated *jawārī*, in a way, unsettle the myth of technical neutrality, bringing to the fore the gender and class dynamics that functionalism has served to repress.

Second, I provide an overview of the main types of automated *jawārī* I have found so far, based on Arabic treatises on the mechanical arts and their manuscripts, which span the thirteenth and fourteenth centuries. Two categories stand out: the automated *jāriya*, acting as a liquid dispenser, and the timekeeping *jāriya*, often seen throwing pellets from her mouth as a way of marking the passage of the hours. In some cases, the mechanical *jāriya* crosses a threshold, suggesting mobility across various social spheres. These performances of visibility and serviceability enhance some of the norms that were used to represent and control enslaved women in medieval Islam; as such, they highlight *jawārī*'s availability and fungibility. Yet the hypothesis that the automata were objectifying, framing the *jāriya* as the object of a subject's viewpoint, remains tied to utilitarian understandings of technology; it may be just as fraught as the functionalist attitude, for it partakes in the same dyads of subject and object, master and slave.

To begin to render automated *jawārī* with any complexity requires that we step away from modern assumptions about both technology and objectification, especially if they imply a subject's domination over a fungible, servile object. A focus on automated *jawārī* alone, severed from other discursive genres, would, moreover, reinforce the modern disciplinary boundaries that have separated technology and politics in Islamic studies. Looking at a wider archive through a critical, comparative approach in fact reveals a cross-genre link between *jawārī* and instrumentality, here defined as the quality of serving as an instrument (*āla*) in a process of carrying and transmitting. Notably, *jawārī* appeared in mystical stories as divinely inspired intercessors, delivering mystical guidance to a male Ṣūfī aspirant. Like the engineer's machines, these narratives were the product of a male, patriarchal viewpoint, oscillating between subjugating and valorizing effects. This perspective, however, should not be confused with the modern, dichotomous form of objectification that opposes subject and object. Rather, the quality of being an instrument may point to a mixed, or vectorizing, process, framing *jawārī* as vehicles—more than objects—of instrumentality.

### Unlearning Functionalism

There are many possible explanations for the absence of gender-sensitive approaches to Islamicate technology, one of the most conspicuous being the profession's own gendered dynamics. What concerns me here, however, is not so much the scarcity of research on mechanical *jawārī* per se, or even the biases of previous scholarship. It would have been disingenuous to expect anything else, for until feminist technology studies, which emerged only in the 1980s, the anthropology and history of technology had largely been unaware of gender, within and beyond Islamic studies.<sup>4</sup> Rather, I would like to draw attention to some of the fundamental misconceptions that may continue to preserve uncritical, patriarchal representations, albeit in less discernable—and thus more insidious—forms. These include functionalism, the theory of the utilitarian machine that correlates form and function, means and ends in a direct, predictable way. The focus on mechanism has prevented scholars from analyzing technical objects as representations that may shed light on social and intellectual history. While seemingly harmless, functionalism is also at risk of reinforcing the dualisms of slave and master, body and mind, other and self, female and male, as feminist and Black studies have demonstrated.

To begin with, a general reason for the rarity of discourse on the social and political dimensions of self-moving machines (*ḥiyal* or *ālāt mutaḥarrika* in Arabic) in medieval Islam, despite the fact that many represented lowly workers, is the assumption that technical treatises yield little insight into societal matters.<sup>5</sup> This rests upon the larger belief that tools, instruments, and machines are practical, universal objects, unaffected by political change, having developed progressively, from the flint to the computer—a point I return

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4. On the historical split between feminist studies and technology history, see Francesca Bray, "Gender and Technology," *Annual Review of Anthropology* 36 (2007): 37–53.

5. For a recent corrective and an exploration of slavery and automation in thirteenth-century Anatolia, see Lamia Balafrej, "Automated Slaves, Ambivalent Images, and Noneffective Machines in al-Jazarī's Compendium of the Mechanical Arts, 1206," *21: Inquiries into Art, History, and the Visual* 3, no. 4 (2022): 737–74.

to below.<sup>6</sup> Another reason for the dearth of critical analysis is the rhetoric of the golden age, the widespread impression that the premodern period constituted the peak of Islamic civilization.<sup>7</sup> An aura has been attached to Islamicate automata, through the invocation of awe, pleasure, and innovation, framing instruments and machines as evidence of medieval Islam's cultural and scientific efflorescence.<sup>8</sup> To the extent to which there is any mention of politics, animated statues—trees filled with mechanical birds, monumental water clocks, automated guards, and metal armies—have been interpreted as spectacles of princely power, including for diplomatic purposes.<sup>9</sup> This view, again, defines automata as exceptional, exclusive artifacts, crystallizing the (male) patron's authority, with few implications for broader social groups.

Exceptionalism has had detrimental effects. Broadly, the “golden age” narrative has hindered critical engagements with the Islamic past while equating modern Islam with decline, thus playing into orientalist, colonial views. For a long time, it also buttressed the Eurocentric tendencies of Islamic technology studies. Indeed, the idea of medieval Islam's superiority justified its study as a bridge between the ancient world and Europe's so-called Renaissance.<sup>10</sup> As a result, especially in technical and scientific studies, scholarly attention went to medieval Arabic sources insofar as they provided a mirror for understanding Western culture, either by preserving ancient Hellenistic thought or by anticipating early modern European developments or both.<sup>11</sup> The search for continuities with Western

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6. Though generally focused on mechanism and practical function more than on such political issues as gender and labor, surveys of tools and machines in medieval Islam have played an essential role in defining an archive for the study of technical and mechanical objects; see Francis Maddison and Emilie Savage-Smith, *Science, Tools and Magic*, part 1: *Body and Spirit, Mapping the Universe* (London: Nour Foundation with Azimuth Editions and Oxford University Press, 1997); David A. King, *Islamic Astronomical Instruments* (London: Variorum Reprints, 1987); Siegfried Zielinski and Peter Weibel, eds., *Allah's Automata: Artifacts of the Arab-Islamic Renaissance (800–1200)* (Ostfildern: Hatje Cantz, 2015). Surveys directed at the wider public include Aḥmad Yūsuf al-Ḥasan and Donald Hill, *Islamic Technology: An Illustrated History* (New York: Cambridge University Press, 1986).

7. For more references on the “golden age” discourse and its impact, notably on the study of slavery in Islamic art history, see Lamia Balafrej, “Domestic Slavery, Skin Color, and Image Dialectic in Thirteenth-Century Arabic Manuscripts,” *Art History* 44, no. 5 (2021): 1012–36, at 1014–15.

8. Laura Lee Schmidt has analyzed this celebratory discourse in “**Islamic Automata in the Absence of Wonder**” (SM thesis, Massachusetts Institute of Technology, 2010). For an overview of the medieval Islamic imaginary of the automaton, see Anna Caiozzo, “Entre prouesse technique, cosmologie et magie: L'automate dans l'imaginaire de l'Orient médiéval,” in *La fabrique du corps humain: La machine modèle du vivant*, ed. Véronique Adam and Anna Caiozzo (Grenoble: MSH-Alpes, 2010), 43–79. For a transhistorical approach to Islamicate automata, one also shaped by media studies, see Zielinski and Weibel, *Allah's Automata*.

9. T. M. P. Duggan, “Diplomatic Shock and Awe: Moving, Sometimes Speaking, Islamic Sculptures,” *Al-Masāq* 21 (2009): 229–67; Joel Pattison, “A Golden Tree in the ‘Garden of Pages’: The Genoese Embassy to Morocco of 1292,” *Journal of Medieval Worlds* 1, no. 4 (2019): 1–9; Nahid Norozi, “The ‘Metal Army’ of Alexander in the War against Indian King Porus in Three Persian Alexander Books (Tenth-Fourteenth Centuries),” *Iranian Studies* 52 (2019): 903–22.

10. For a nuanced account of this narrative, see George Saliba, *Islamic Science and the Making of the European Renaissance* (Cambridge, MA: MIT Press, 2007).

11. This is true for other aspects of Islamic culture, including the study of the sciences; see Ahmed Ragab, “Making History: Identity, Progress and the Modern-Science Archive,” *Journal of Early Modern History* 21

technology may explain the lack of interest in automata's figurative aspects, as opposed to their inner workings, for although the latter echoed ancient mechanisms, the former, particularly in their insistence on humble figures, must have seemed peculiar to modern, positivist scholars while also running counter to celebratory accounts of technology. This is not to say that animated figures of slaves were unique to medieval Arabic treatises (they could be found in sources from the Mediterranean to China) or that they did not anticipate modern technology (they do foreshadow aspects of robotics, including its conceptual linkage to slavery).<sup>12</sup> Rather, it is to suggest the possible role of Eurocentric, modernist biases—including congratulatory, teleological views of technology as neutral, efficient, and progress-driven—in obscuring automata's social dimensions, in particular their link to forced labor.

The scarcity of attention to automated *jawārī* may also have to do with the historiography of gender and slavery in medieval Islam, given its spotty engagement with mundane forms of slavery, as well as its emphasis on literary and normative sources, as opposed to more oblique forms of representation. Scholarly disinterest also appears through such elusive yet ingrained practices as translation habits, which tend to minimize the roles of nonelite, ordinary female slaves and servants. In English translations of Arabic treatises of the mechanical arts, *jāriya* tends to be rendered as “maiden” and “slave-girl”; because they foreground young age, both terms are infantilizing.<sup>13</sup> Surely, *jāriya* could designate a young woman, but this was not its only meaning, especially in texts that often provided no clues as to the *jāriya*'s age. One could retort that “slave-girl” translates historical slaveholders' propensity to employ euphemistic, juvenilizing language for slaves—this phenomenon is well known for *ghulām* or “boy” and also applied to *jāriya*.<sup>14</sup> But this carries the risk of strengthening the owner's perspective.<sup>15</sup> Moreover, translating *jāriya* as “maiden” and “girl” may be sexualizing, as both terms imply unmarried standing and thus sexual availability. In addition, these terms romanticize the function of service while downplaying the *jāriya*'s possible status as a slave. As scholars of Arabic literature have pinpointed, such mistranslations testify to the subtle, sometimes unthought, mechanisms by which

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(2017): 433–44. A similar point—about the selective, Eurocentric approach to medieval Arabic sources—is made about al-Andalus in Maribel Fierro, “The ‘Bestsellers’ of al-Andalus,” in *Artistic and Cultural Dialogues in the Late Medieval Mediterranean*, ed. María Marcos Cobaleda, 31–56 (Cham: Palgrave-MacMillan, 2021), at 32–33.

12. On automated slaves and subalterns in the medieval mechanical arts, see Balafrej, “Automated Slaves.”

13. To translate *jāriya*, Donald Hill used “slave-girl” in his 1974 translation of Ibn al-Razzāz al-Jazarī's 1206 treatise *al-Jāmi' bayn al-'ilm wa-l-'amal al-nāfi' fi šinā'at al-ḥiyal*; Ahmed Ragad employed “maiden” in his 2008 translation of Ibn Khalaf al-Murādī's eleventh-century manual *Kitāb al-Asrār fi natā'ij al-afkār*. Full references to these books and their translations will be given in this essay's second section.

14. Both *ghulām* and *jāriya* were preferred, respectively, to the less ambivalent *'abd* and *ama*, which tended to be used more as metaphors, for example to express one's humility. On the euphemistic use of *ghulām*, see Goitein, “Slaves and Slave Girls,” 2. About the figurative use of *mamlūka* or *'abda* in, for example, legal petitions, see Geoffrey Khan, “A Petition to the Fāṭimid Caliph al-'Āmir,” *Journal of the Royal Asiatic Society of Great Britain and Ireland* 122, no. 1 (1990): 44–54.

15. Shaun E. Marmon, “Intersections of Gender, Sex, and Slavery: Female Sexual Slavery,” in Perry et al., *Cambridge World History of Slavery*, 185–213, at 202 n. 27.

translators, editors, and commentators have effaced, exoticized, or oversimplified issues of gender.<sup>16</sup>

As mentioned earlier, more than with sexist, patronizing language, my concern is with broader, seemingly objective conceptions of technology that may perpetuate a masculinist perspective, even as they seem ungendered; such conceptions, it turns out, may be tied to the institution and ideology of slavery, a relationship that makes the critique of functionalism even more relevant to this essay. One common yet misleading belief has framed technology in a utilitarian fashion, with an emphasis on operation, function, and usability, in ways that reinscribe both heteropatriarchy and the master's viewpoint, specifically the desire for obedient, machine-like workers. This could also be dubbed a positivist approach, considering that it represents technical artifacts as neutral, self-evident aids, external to the body and to the social realm. The result has been an uncoupling of fields between the technical and the social, through an emphasis on inner mechanism and practical use.<sup>17</sup> This approach is by no means limited to Islamic technology studies and conveys a widespread, Promethean notion of the machine as efficient, useful, and civilizing.<sup>18</sup> Progress is a corollary idea, a view of the history of technology as a steady, gradual process of complexification, leading to ever more sophisticated devices and systems.<sup>19</sup>

But far from being apolitical, utilitarian definitions of tools and machines as predictable, unresisting, and as prostheses, expanding human action may actually betray a position of superiority, if not a language of mastery. Louis Chude-Sokei has pointed out the “sedimented racism of seemingly lifeless objects,” how the rhetoric of the inert tool has worked hand in hand in the modern period with colonial expansion, racial dominance, and the Atlantic slave trade, dehumanizing colonized and enslaved populations as “instruments of production,” in Aimé Césaire's phrase.<sup>20</sup> Bruno Latour repeatedly made a similar point, for example when he observed that the National Rifle Association's approach to guns as passive tools was imbued with an illusion of control and with the supposition, contingent on the ideology of slavery, that the role of machines had been “rehearsed for centuries by obedient human servants.”<sup>21</sup> Today the search for the subservient tool continues to inform the making of

16. Rachel Schine, “[Translating Race in the Islamic Studies Classroom](#),” *Al-Uṣūr al-Wuṣṭā* 30 (2022): 320–83; Zayde Antrim, “[Qamarayn: The Erotics of Sameness in the 1001 Nights](#),” *Al-Uṣūr al-Wuṣṭā* 28 (2020): 1–44, at 24–28; Christine Chism, “Lost Worlds: Encyclopaedism and Riddles in the Tale of Tawaddud/Theodor,” in *Bestsellers and Masterpieces: The Changing Medieval Canon*, ed. H. Blurton and D. F. Reynolds, 234–61 (Manchester: Manchester University Press, 2022), at 235–36.

17. On the history of this split in the anthropology of technology, see Tim Ingold, “Eight Themes in the Anthropology of Technology,” *Social Analysis* 41, no. 1 (1997): 106–38.

18. John M. Staudenmaier, *Technology's Storytellers: Reweaving the Human Fabric* (Cambridge, MA: MIT Press, 1985).

19. Technological progress was also foundational to colonialism; see Michael Adas, *Machines as the Measure of Men* (Ithaca, NY: Cornell University Press, 1989).

20. Louis Chude-Sokei, *The Sound of Culture: Diaspora and Black Technopoetics* (Middletown, CT: Wesleyan University Press, 2016), 82, 38. I thank Kodwo Eshun, Amanda Trager, and Erik Moskowitz for discussing this work with me.

21. Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge, MA: Harvard University Press, 1999), at 192–93, 207–8.

technology, including algorithms, as exemplified by software such as Apple's Siri, whose female gendered voice serves to highlight the algorithm's function as a compliant personal assistant.<sup>22</sup>

The idea of technical objects as reincarnations of slaves is perhaps nowhere more obvious than in the imaginary of the robot. The very word "robot," in fact, was coined in 1923 from the Czech word for "slave" or "serf" (*robot*) in Karel Čapek's play *R.U.R.* (*Rossum's Universal Robots*). The first robots, moreover, literally represented slaves. One example is the 1930 mechanical slave designed by the Westinghouse Electric Company to perform domestic tasks. Named Rastus and shaped as a Black man, the Westinghouse robot bears witness to the centrality of both race and slavery to modern automation in the United States, as Chude-Sokei has shown.<sup>23</sup> The link between robotics and slavery was diffused among the general public as well. A 1957 article published in *Mechanix Illustrated*, an American consumer magazine, compared robots to "push-button servants," bluntly announcing to its readers that by 1965 they would "have personal slaves again."<sup>24</sup>

Functionalism may also bespeak heteropatriarchal worldviews. There is a vast literature on how the utilitarian machine intersects with the perception of the woman's body as a reproductive tool and, more generally, with the gendered dichotomy that opposes passive, sustaining matter—the feminine—and active, rational form—the masculine.<sup>25</sup> The machine's status of practical prosthesis overlaps with patriarchal models of representation because it relies on a teleology of form and function that has also shaped biological essentialism, the idea that gender difference is determined by the form of sexual organs. As a mode of organization of production relations, the gender system that correlates biological form and social function intensified in modern times, when it was imposed on colonized populations, consolidating global colonial capitalism, as María Lugones has argued. For Lugones, heteropatriarchy is not an ahistorical, transcultural force, but was propelled by what she calls "the modern/colonial gender system," a Western, hegemonic model that naturalized racial, gender, and sexual differences as hierarchical divisions while mapping these differences onto the split of physical and intellectual labor.<sup>26</sup>

22. Thao Phan, "The Materiality of the Digital and the Gendered Voice of Siri," *Transformations* 49 (2017): 23–33.

23. On Čapek's play, Westinghouse's robot, and the entanglement of slavery, racism, and robotics, see Chude-Sokei, *Sound of Culture*, esp. chapter 1. Also see Ruha Benjamin, *Race after Technology: Abolitionist Tools for the New Jim Code* (Medford, MA: Polity Press, 2019), esp. chapter 1.

24. O. O. Binder, "You'll Own 'Slaves' by 1965," *Mechanix Illustrated*, January 1957, 62–65. For recent, critical takes on automation's false promises, see Luke Munn, *Automation Is a Myth* (Stanford, CA: Stanford University Press, 2022); Jason Resnikoff, "The Myth of Black Obsolescence," *International Labor and Working-Class History* 102 (2022): 124–45.

25. For recent summaries of heteronormative conceptions of the machine, with forays into how the machinic can also perturb heteropatriarchy, see Neda Atanasoski and Kalindi Vora, *Surrogate Humanity: Race, Robots, and the Politics of Technological Futures* (Durham, NC: Duke University Press, 2019); Jack Halberstam, "Automating Gender: Postmodern Feminism in the Age of the Intelligent Machine," *Feminist Studies* 17, no. 3 (1991): 439–60; Luciana Parisi, *Abstract Sex: Philosophy, Bio-Technology and the Mutations of Desire* (London: Continuum, 2004), 7–13.

26. María Lugones, "Heterosexualism and the Colonial/Modern Gender System," *Hypatia* 22, no. 1 (2007):



A critical approach to Islamicate technology, in sum, must abandon, or at least suspend, the rhetoric of the golden age as well as any seemingly utilitarian, apolitical understanding of technology, for both come laden with ideological biases—such as the teleology of Western scientific supremacy and the search for technological mastery—that have been connected to the institution of slavery and patriarchal norms. Attending to the intertwinement of technology and slavery is a particularly urgent, and rather obvious, necessity in the case of automated *jawārī*, given their literal conflation of female body, enslaved labor, and mechanized motion. Characterized as enslaved women, these self-moving devices challenge the paradigm of the useful, practical machine through figurative representation by drawing attention to its possible link to slavery. At the same time, it would not be entirely accurate to consider these machines simply as early robots, anticipating the mechanical slaves that were produced under colonial modernity and racial capitalism, for this would erase their historical specificities, including the question of whether the concept of technology—a modern invention, loaded with problematic assumptions—can be applied to premodern examples. This is, then, this essay’s challenge: pinpointing the politics of automated *jawārī* while raising the question of how to historicize both technology and its objectifying effects.

### Automated *Jawārī*

Across all of the medieval Arabic treatises I was able to consult, the only female figures represented in both texts and images are *jawārī*. Combined with aspects of posture and action, the systematic use of the term *jāriya* points to enslaved status. In other words, medieval automata foregrounded unfree, rather than free, women. In some instances, the *jāriya* was, in fact, the only human figure represented, often placed at the center of a singular, free-standing water clock. Two main types of automated *jawārī* can be distinguished in both technical and literary sources, sometimes accompanied with images: one appears in relation to timekeepers and the other in the form of liquid-dispensing devices.<sup>27</sup> Because the technical literature has been comparatively neglected in relation to social history, especially forced labor, I focus here on treatises on the mechanical arts—their earliest surviving manuscripts, which date to the thirteenth and fourteenth centuries—with sporadic references to literary texts.<sup>28</sup>

The first category of automated *jawārī* relates to horology. In most cases, a statue shaped as a *jāriya* encased a mechanism for discharging weights, one that was commonly associated with clocks. Typically, a weight would move through a figurative effigy and

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186–209.

27. To my knowledge, there has been only a handful of scholarly mentions of automated *jawārī*, all based on historiographical and poetic sources, rather than technical ones; see D. S. Rice, “A Drawing of the Fatimid Period,” *Bulletin of the School of Oriental and African Studies* 21 (1958): 31–39, at 37; Marius Canard, “Quelques aspects de la vie sociale en Syrie et Jazīra au dixième siècle d’après les poètes de la cour Ḥamdanide,” in *Arabic and Islamic Studies in Honour of Hamilton A. R. Gibb*, ed. G. Makdisi, 168–90 (Leiden: Brill, 1965), at 185.

28. A descriptive list of the medieval Arabic engineering manuals that have survived is provided in Donald Hill, “Arabic Mechanical Engineering: Survey of the Historical Sources,” *Arabic Sciences and Philosophy* 1 (1991): 167–86.

come out of its mouth; dropping in a container, it marked the passage of the hours through both animation and sound. The figures represented on such devices included animals, often birds, like the two ball-releasing falcons of the monumental twelfth-century clock (no longer extant) of the Great Mosque of Damascus and the crows that feature in the timekeepers of the influential treatise of Pseudo-Archimedes, likely a medieval combination of short works in Greek, Persian, and Arabic.<sup>29</sup> Equally common was the motif of the ball-throwing *jāriya*. An example from Malta was described by the cosmographer Zakariyyā<sup>3</sup> al-Qazwīnī (ca. 1203–83) in his *Āthār al-bilād wa-akhbār al-‘ibād* (Monuments of the lands and historical traditions about their peoples) as a “female slave (*jāriya*) that throws pellets (*al-ṣanj*).”<sup>30</sup> Because Roger II, the twelfth-century Norman king of Sicily, had just been in Malta when he commissioned a water clock for his palace in Palermo, Michele Amari suggested that the Sicilian clock, too, may have represented a female figure, ejecting balls from her mouth whenever an hour had passed.<sup>31</sup>

More examples can be found in an eleventh-century Andalusian treatise, *Kitāb al-Asrār fī natā’ij al-afkār* (The book of secrets in the results of ideas), by Ibn Khalaf al-Murādī.<sup>32</sup> A third of al-Murādī’s contrivances involve one or two female personages characterized as *jāriya* in the text, and five of these devices are water clocks. In three timepieces, the *jāriya* throws a pebble (*ḥaṣāt*).<sup>33</sup> As is often the case with al-Murādī’s machines, the first such specimen stages a little scene. At the top of the hour, an astrolabe holder (*ṣāhib al-aṣṭrulāb*) turns his head toward the *jāriya*, whose jaws then open, dropping a weight. The next example boasts a more complex choreography, involving a third, mediating statue. Animation is again triggered by the motion of an astrolabe holder, who turns his head toward the generic statue (*timthāl*), which is standing next to a plate. The latter moves toward the female figure, and as soon as she ejects a pebble, he collects it with his hand, then brings it back to the plate. The third timekeeping device is the simplest of all three: when an hour has elapsed, a *jāriya* comes out of a door, expelling a pebble from her mouth.

Two other water clocks in al-Murādī’s treatise contain *jawārī*, but the figures materialize in pairs, and they do not emit weights.<sup>34</sup> In one device, the gates open at every hour,

29. For the Damascus clock, see Finbarr Barry Flood, *The Great Mosque of Damascus: Studies on the Makings of an Umayyad Visual Culture* (Leiden: Brill, 2001), chapter 4. On the identification of “Archimedes” as “Pseudo-Archimedes,” see Donald Hill, “The Pseudo-Archimedes Treatise,” in his *Arabic Water-Clocks*, 15–35 (Aleppo: Institute for the History of Arabic Science, 1981). For an English translation of the Pseudo-Archimedes, see Donald Hill, *Kitāb Arshimīdas fī ‘amal al-binkamāt* (London: Turner & Devereux, 1976).

30. Zakariyyā<sup>3</sup> b. Muḥammad al-Qazwīnī, *Āthār al-bilād wa-akhbār al-‘ibād* (Beirut: Dār Ṣādir, 1960), 557.

31. Michele Amari, *Le epigrafe arabiche di Sicilia, trascritte, tradotte e illustrate* (Palermo: L. Pedone-Lauriel, 1971), 29–39.

32. An Arabic edition and English translation, together with a facsimile of the only surviving manuscript, can be found in Ibn Khalaf al-Murādī, *Kitāb al-Asrār fī natā’ij al-afkār* (Milan: Leonardo3, 2018); the publication consists of three unnumbered volumes.

33. Devices 10, 11, and 20.

34. Devices 12 and 13.

revealing two female characters (*jāriyatān*); as soon as they start moving forward, a Black man (*aswad*) with a knife emerges between them. In the other water clock, the two *jawārī* come out of the open entryway, this time accompanied by two snakes (*ḥayyatān*) throwing pebbles, while an astrolabe holder stands near them. *Jawārī* thus appear in water clocks even when they do not house the ball-releasing feature. This is known from literary sources as well. One example is the fourteenth-century Zayyanid clock at Tlemcen (Tilimsān) in modern Algeria that included a *jāriya*: every hour, the *jāriya* would emerge from a door with a piece of paper in her hand, presenting the number of the hours in versified form.<sup>35</sup>

A *jāriya* also turns up in a short, unpublished treatise that was likely related to the Pseudo-Archimedes and that describes a water clock.<sup>36</sup> Interestingly enough, although the text does not seem to mention a female personage, a diagram places a figure labeled *jāriya* in the center of the device, surrounded by three birds, each containing a ball-dropping mechanism (see Fig. 1). From the drawing, one may infer that the *jāriya* acted as an axle (described as a rotating plate in the manuscript, to the best of my understanding); she was placed at the center of a tangle of strings (sing. *khayṭ*), each passing over a pulley (*bakra*) that also connected to the head of a bird as well as to the mechanism, seen at the top, that released the pebbles (*banādiq*). Whatever the *jāriya*'s exact function, this example attests to the diffused, consistent association of *jawārī* with horological devices within and beyond the textual record and across the medieval Islamicate Mediterranean, from Muslim Spain to Malta to North Africa and the Middle East.

The second type of automated *jawārī* consists of serving devices, as shown by at least two treatises. One is Ibn al-Razzāz al-Jazarī's famous manual *al-Jāmi' bayn al-ʿilm wa-l-ʿamal al-nāfi' fi šināʿat al-ḥiyal* (A compendium on the theory and useful practice for the fabrication of machines), completed in 1206 in Artuqid Anatolia.<sup>37</sup> As I have discussed elsewhere, with its emphasis on automated slaves the compendium conveyed the scope and importance of courtly slavery under Artuqid rule while echoing a transregional, courtly imaginary of automated servants.<sup>38</sup> Most of the mechanical attendants are free-standing, android-like male figures, but one exception is a wine-serving device representing a woman whom the text refers to as a *jāriya*.<sup>39</sup> The machine consists of a cupboard with the statue of a *jāriya* inside it and a wine reservoir at the top (Fig. 2). Through a tipping bucket and a trough, wine flows from the reservoir into the glass the *jāriya* holds. As soon as the vessel fills up, the figure, who is mounted on wheels, rolls out of the cupboard, presenting wine to the royal patron.

35. Flood, *Great Mosque*, 135–37.

36. Oxford, Bodleian Library, MS Marsh 699, fols. 11v–13.

37. For the Arabic edition, see Ibn al-Razzāz al-Jazarī, *al-Jāmi' bayn al-ʿilm wa-l-ʿamal al-nāfi' fi šināʿat al-ḥiyal*, ed. Aḥmad Yūsuf al-Ḥasan (Aleppo: Institute for the History of Arabic Science, 1979). For an English translation, see Ibn al-Razzāz al-Jazarī, *The Book of Knowledge of Ingenious Mechanical Devices*, trans. Donald Hill (Dordrecht: Reidel, 1974). For both text and images, I have relied on the earliest known manuscript copy, dated 1206 (Istanbul, Topkapı Palace Library, MS Ahmet III 3472).

38. Balafrej, “Automated Slaves.”

39. Al-Jazarī, *Book of Knowledge*, 125–26.

The second manual is the Arabic Philo, an Arabic translation of the *Pneumatics* of Philo of Byzantium that also contains medieval additions, including two chapters—numbered thirty and thirty-six—with *jawārī*.<sup>40</sup> Most of the artifacts featured in the work are jars, cups, washstands, and water-lifting machines devoid of figurative motifs, which makes the devices with enslaved women further stand out. This was noted in the early twentieth century by Bernard Carra de Vaux, who suggested that chapter 30 might have been directly inspired by al-Jazari’s treatise, a point recently repeated by Sylvia Berryman.<sup>41</sup> Chapter 30 presents an anthropomorphic wine-serving machine characterized as a *jāriya* and represented with a jug in her right hand (Fig. 3).<sup>42</sup> There is a split reservoir inside the figure’s chest, with water in one half and wine in the other; tubes connect both parts to the jug, while air pipes link the top of the reservoir to the left arm. As soon as one places a cup on the left palm, the hand descends, pushing air into the wine container and thus wine into the ewer. As the hand comes down further, opening up the air pipe of the water container, wine is replaced by water.

Chapter 36 of the Arabic Philo features a vessel for ablutions with a figure in the middle that is called a *jāriya* in the text.<sup>43</sup> In all three surviving medieval copies, the diagram follows a similar pattern: we see a crescent-shaped basin placed on top of a water reservoir with two embedded containers, the figure of the *jāriya* floating in the inner vessel.<sup>44</sup> Water trickles down from the basin into the container, prompting the *jāriya* to rise with the level of the water and to come out of the vessel, pushing the lid. When the main container fills up, water is dispensed through the faucet at the bottom; as it subsides, the figure moves downward. Although the *jāriya* does not itself perform any action, functioning rather as a float, as in chapter 30 its inclusion here in a liquid-serving device was likely premised on *jawārī*’s association with housework.

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40. At least three medieval manuscripts of the Arabic Philo have survived: Oxford, Bodleian Library, MS Marsh 669, and Istanbul, Süleymaniye Library, MSS Ayasofya 3713 and 2755. For an Arabic edition, accompanied by a French translation, see Philo of Byzantium, *Le livre des appareils pneumatiques et machines hydrauliques par Philon de Byzance*, ed. and trans. Bernard Carra de Vaux (Paris: Klincksieck, 1902). I follow Carra de Vaux’s numbering of the chapters. For an English translation, see Frank D. Prager, *Philo of Byzantium, Pneumatica: The First Treatise on Experimental Physics, Western Version and Eastern Version* (Wiesbaden: Reichert, 1974).

41. Bernard Carra de Vaux, “*Les pneumatiques de Philon de Byzance*,” *Notices et extraits des manuscrits de la Bibliothèque nationale* 39 (1903): 27–229, at 35; Sylvia Berryman, *The Mechanical Hypothesis in Ancient Greek Natural Philosophy* (Cambridge: Cambridge University Press, 2013), 162–63. Various chapters refer to a mosque, ablutions, and a minaret (respectively, chapters 63, 53, and 58), confirming that the book’s last two thirds were a mix of medieval Islamic influences.

42. Prager, *Philo*, 176–77 (English translation); Philo of Byzantium, *Le livre des appareils pneumatiques*, 51–52 (Arabic edition), 135–37 (French translation). The chapter is illustrated in Oxford, Bodleian Library, MS Marsh 669, fols. 29v–30.

43. Prager, *Philo*, 189–90 (English translation); Philo of Byzantium, *Le livre des appareils pneumatiques*, 61 (Arabic edition), 147–48 (French translation). The chapter is illustrated in Oxford, Bodleian Library, MS Marsh 669, fol. 37v; Istanbul, Süleymaniye Library, MS Ayasofya 3713, fol. 46v.

44. For an example, see Balafrej, “Automated Slaves,” 763.



Fig. 1. Clock with birds and a *jāriya*. Folio from an anonymous Arabic treatise, ca. 1300–1500, ink on paper, 29 cm × 18 cm. Oxford: Bodleian Library (MS Marsh 669, fol. 13).



Fig. 2. Automated *jārīya*. Folio from a copy of *al-Jāmi' bayn al-‘ilm wa-l-‘amal al-nāfi' fi šinā'at al-ḥiyal* of Ibn al-Razzāz al-Jazarī, probably Āmid (modern-day Diyarbakır), 1206, ink and opaque watercolor on paper, 33 cm × 24 cm. Istanbul: Topkapı Palace Library (MS Ahmet III 3472, fol. 113v).

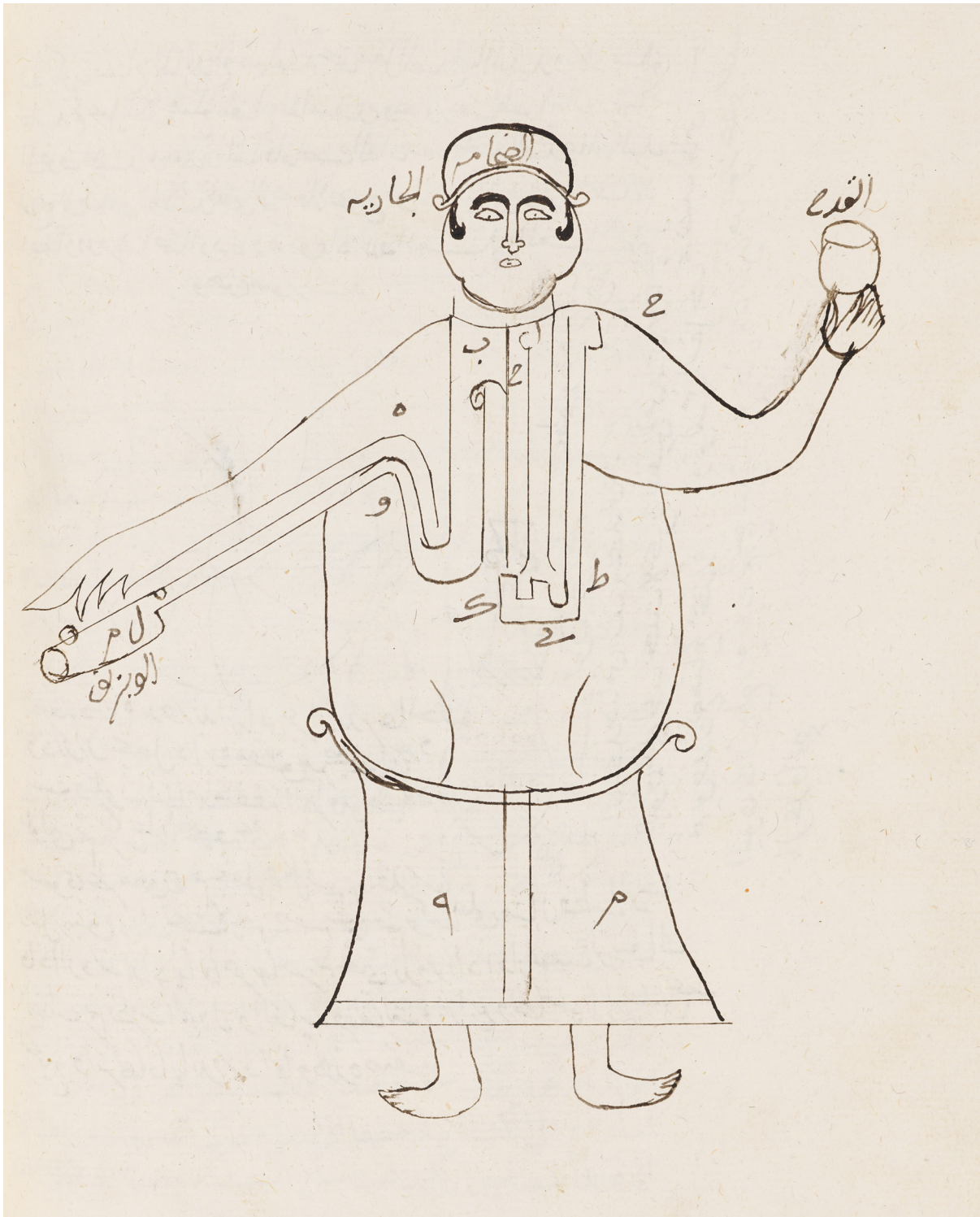


Fig. 3. Automated *jārīya*. Folio from an anthology of mechanical works containing an Arabic translation of the *Pneumatics of Philo of Byzantium*, ca. 1300–1500, ink on paper, 29 cm × 18 cm. Oxford: Bodleian Library (MS Marsh 669, fol. 29v).

The motif of the automated female slave, then, circulated rather broadly, from al-Andalus to Anatolia, within and beyond courtly settings—though likely always among learned, intellectual circles. This is testified to by the manuscripts themselves, as well their images, which show significant variations in terms of function, style, and level of artistry. In the case of the medieval Arabic Philo (Fig. 3) or the short, anonymous treatise that describes a water clock (Fig. 1), the copies examined do not stem from princely patronage but must have been made for scholars and practitioners; in addition to their lack of colophons and dedications, they are not illuminated and their illustrations are linear, explanatory drawings, simpler in appearance than the painterly images one usually finds in royal manuscripts (Fig. 2). Textual representations, moreover, suggest both restricted and public contexts of display, especially for the water clocks. While some of the devices, such as al-Jazarī’s wine-dispensing automaton, were designed for personal, princely consumption, others, such as the water clocks, were likely destined for a wider audience.<sup>45</sup> This was probably also the case with al-Murādī’s contrivances. Owing to their sheer size, and given their use of waterwheels as primary movers, it is possible that they were meant, or at least imagined, for a public space, like the Damascus water clock, which was conceived for the mosque’s gate. They also resonated, in scale and mechanism, with the kind of public, monumental hydraulic works described in Andalusian sources, such as the clepsydras that were erected in eleventh-century Toledo by the Tagus river.<sup>46</sup>

Across these contexts, the link between the female figures these devices represented and domestic slavery must have been evident. It is most obviously signified through the sources’ insistence on the word *jāriya*—consistently used in all of the texts and images I have perused—as well as the devices’ functions, which mimic service work.<sup>47</sup> The machines, moreover, do not simply feature enslaved women, nor do they necessarily reflect historical realities. While echoing female slavery’s presence in medieval Islam, as representations the automata instill and enforce a system of relations, particularly when it comes to intersections of gender, class, labor, and visibility. Here, these intersections are rendered through *jawārī*’s visibility both as representation’s referents and in the story world the machines fashion. The very fact that *jawārī*, rather than free women, were chosen as a motif conveys a normative link between visibility, femininity, and enslaved status. This link is heightened within some of the machines’ narratives, notably by the female figures’ occasional movement through a door—as in three of al-Murādī’s specimens and the Zayyanid clock.

45. The circumstances of its composition are unknown; the text has survived in only one codex, completed in 1266, presumably at the court of Alfonso X in Toledo (Florence, Biblioteca Medicea Laurenziana, MS Orientale 152). On this manuscript, including the long-debated question of its authorship, see Julio Samsó, *Las ciencias de los antiguos en al-Ándalus* (Madrid: MAPFRE, 1992), 249–57; Donald Hill, “An Andalusian Treatise of the 5th/11th Century,” in *Arabic Water-Clocks*, 36–46; Juan Vernet, “Texto árabe de la corte de Alfonso X el Sabio X,” *Al-Andalus: Revista de las Escuelas de estudios árabes de Madrid y Granada* 43, no. 2 (1978): 405–33.

46. Donald Hill, “The Toledo Water-Clocks of c. 1075,” *History of Technology* 16 (1994): 62–71.

47. This lexical consistency is striking, since many other words would have been possible—such as *fatāt* for a young woman, *imra’a* and the plural *nīsā’* for adult women, or *ama*, *’abda*, or *mamlūka* for female slaves. But it also makes sense, given the widespread preference for euphemistic language among slaveholders, as exemplified by the frequent use of such denominations as *jāriya* and *ghulām* that could be understood as young woman or young man (see, for example, Marmon, “Intersections of Gender,” 202).



The association of female slavery with visibility was not incidental: it appears in a number of literary, legal, and medical sources. *Jawārī*'s mobility was an integral part of their unfreedom in edifying anecdotes of *adab* or belles lettres, as Nadia Maria El-Cheikh has shown.<sup>48</sup> Baber Johansen has argued that female slaves, unlike free women, were not necessarily subjected to gendered forms of social distance in Sunni Islamic law; their exemption was connected to their activities, which required that they leave the house, putting them “in everybody’s reach and touch.”<sup>49</sup> More recently, Omar Anchassi has focused on sartorial distinctions between free and unfree women in Islamic law, showing that female slaves’ visibility—including the fact that generally they did not have to wear a veil—was linked to their status as property.<sup>50</sup>

*Jawārī*'s exposure to the public was described in the most brutal way in the medically oriented genre of slave-buying advice manuals, which provided instructions for the display and inspection of the enslaved at the market.<sup>51</sup> The inspection, a process of profanation known as *ibtidāl*, worked not only to detect injury or disease but also to humiliate the enslaved and to mark their distinction from the free, whose bodies, unlike the slaves’, were protected by the principle of *ḥurma* or inviolability, as Hannah Barker has noted.<sup>52</sup> Further, the presupposition that *jawārī* had greater access to a variety of social spaces may have supported the sexual dimension of possession, which was seen as a male privilege—the term *jāriya*, in fact, was openly associated with sexual exploitation.<sup>53</sup> The link between *jawārī* and visibility, then, was neither benign nor peripheral, and it did not simply reflect a practical or a social reality; rather, it was more likely a potent cultural perception, one that facilitated *jawārī*'s commodification and exploitation.

Gender and class-based hierarchies were clearly at play in the dynamic the automata built between themselves and their users. A few of them were explicitly described in relation to male, royal patrons (though this does not mean that women or lower groups were absent from the audience), including Zayyanid, Norman, and Artuqid ones, suggesting that the *jawārī* of such artistic and mechanical representations were symptomatic of these patrons’ taste and needs. Automated *jawārī* enhanced their users’ power position by materializing and reiterating some of the norms that were associated with female domestic slavery,

48. Nadia Maria El-Cheikh, “Women’s History: A Study of al-Tanukhi,” in *Writing the Feminine: Women in Arab Sources*, ed. Randi Deguilhem and Manuela Marín, 129–48 (London: I. B. Tauris, 2002).

49. Baber Johansen, “The Valorization of the Human Body in Muslim Sunni Law,” *Princeton Papers in Near Eastern Studies* 4 (1996): 71–112, at 79–80.

50. Omar Anchassi, “Status Distinctions and Sartorial Difference: Slavery, Sexual Ethics, and the Social Logic of Veiling in Islamic Law,” *Islamic Law and Society* 28 (2021): 125–55.

51. A well-known example is Ibn Buṭlān, “Risāla jāmi‘a li-funūn nāfi‘a fī shirā al-raḥīq wa-taqlīb al-‘abīd,” in *Nawādir al-makhṭūṭāt*, ed. ‘Abd al-Salām Muḥammad Hārūn, 1:351–89 (Cairo: Maṭba‘at Lajnat al-Ta’līf wa-l-Tarjama wa-l-Nashr, 1951). On the genre and for more references, see Hagedorn, *Domestic Slavery*, 61–78; Barker, *That Most Precious Merchandise*, 4; idem, “Purchasing a Slave in Fourteenth-Century Cairo: Ibn al-Akfānī’s *Book of Observation and Inspection in the Examination of Slaves*,” *Mamlūk Studies Review* 19 (2016): 1–24.

52. Barker, “Purchasing a Slave,” 2–3.

53. Marmon, “Intersections of Sex”; Antonella Gherseti, “The Representation of Slave Girls in a Physiognomic Text of the Fourteenth Century,” *Mamlūk Studies Review* 21 (2018): 21–45.

including hypervisibility, as seen earlier. Across the foregoing treatises, in addition to visibility, enslaved womanhood is associated with containment and serviceability through the representation of the female body as vessel and vector, as in the liquid-dispensing device and the ball-throwing *jāriya*. There may also be an expectation that female housework should be disciplined and regimented, given the connection drawn between animated *jawārī* and the labor of keeping time. As liquid dispensers and clocks, the figurative machines, therefore, did not so much engage historical realities as project codes and expectations, the conventions that made *jawārī* culturally intelligible.

Power imbalance characterizes the machines' diegetic level as well, especially when the *jāriya* accompanies a male figure of higher rank, such as the astrolabe holder in al-Murādī's water clocks. The man carrying the astrolabe is endowed with the capacity to look, since he turns his head, the very gesture that sets the whole machinery into motion. The use of the astrolabe further implies that he can measure and analyze time, not simply channel it. By contrast, the *jāriya* does not embody any kind of analytical skill. These representations, then, may have had a disparaging, essentializing effect, framing women as physical, inferior entities. This view is found in a wide array of sources. Much has been written about the legal perspective in particular—about how certain normative texts frame wifhood as slavery and household chores as mindless, menial labor, primarily fit for such inferior agents as women and slaves.<sup>54</sup> There is also evidence that this thinking was directly applied to automata: the tenth-century poet al-Mutanabbī, for example, described a mechanical *jāriya* as “a body devoid of a soul” (*jāriya mā li-jismihā rūh*).<sup>55</sup>

Yet the thesis of the reifying, patriarchal machine is not completely satisfying, especially if objectification is understood as the unidirectional, terminal transformation of subject into object (in the representational order), for example through the male gaze. In that sense, the idea of the automaton as objectifying amplifies, more than challenges, functionalism's ideological principles, with its assumption of a dominating subject governing a body of servile, useful objects. Though it may seem intuitive and transhistorical, this reading remains quite specific to colonial modernity, which intensified the dual search for humanless technology and disposable labor, and it is tied to the rise of the modern subject, as noted again in this essay's conclusion. Fear of the machine as repressive and belittling, moreover, has been shown to act as the reversed double of techno-utopianism. As Chude-Sokei has indicated, the rhetoric of the threatening, malevolent machine might indeed manifest an anxiety of reversal and replacement that underlies modern slavery and colonialism, repeating a white fear of the rebellious slave.<sup>56</sup>

To say that automata represented *jawārī* as objects—that is, as physical, passive entities produced by another's viewpoint—is to enhance a conception of technical equipment as subservient, one of functionalism's underlying assumptions. We must therefore consider

54. Marion Holmes Katz, *Wives and Work: Islamic Law and Ethics before Modernity* (New York: Columbia University Press, 2022); Kecia Ali, *Marriage and Slavery in Early Islam* (Cambridge, MA: Harvard University Press, 2010); Leila Ahmed, *Women and Gender in Islam* (New Haven, CT: Yale University Press, 1992).

55. Al-Mutanabbī, *Sharḥ dīwān al-Mutanabbī*, ed. 'Abd al-Raḥmān al-Barqūqī, vol. 1 (Cairo: Maṭba'at al-Sa'āda, [1938]), 380.

56. Chude-Sokei, *Sound of Culture*, esp. chapter 1.

broadening our notions of both technology and objectification beyond the double conflating discourse of obedient tool and machine-like worker. This is not to suggest that automated *jawārī* were not objectifying, in the loose sense that they were stereotyping and dehumanizing, notably through their emphasis on visibility, acquiescence, and usability. Rather, the goal is to clear a space for expanding our interpretive, conceptual possibilities beyond the decidedly modern, polar opposition of subject and object.

### Before and Beyond Technology

My working argument is that the aforementioned automata depicted *jawārī* not so much as objects or even tools but as “instrumental”—that is, as toollike but also as active, dynamic entities constituting the ground for, rather than an object of, instrumentality. I came to this understanding by enlarging the corpus of analysis to encompass portrayals of enslaved women beyond the technical artifacts that usually qualify as “Islamic technology.” Given the link between utilitarianism and the binaries of master and slave, user and tool, I also had to step away from the subject-object hierarchy, the relation whereby the object exists mainly in so far as it is the result of a subject’s perspective—an issue I address further in the conclusion.

A major reason for opening up the discussion to other genres is that in the period under consideration, technology had not yet fully emerged as its own field of inquiry. Undeniably, though the word itself did not exist, in its triple meaning as a branch of knowledge, a sphere of activity that applies such knowledge for practical reasons, and the results of such application, such as machinery and tools, technology did have premodern antecedents, including *ḥiyāl*. Still, the term “technology” can be misleading, for it mainly refers to self-contained, external artifacts; it is also enmeshed with functionalism, given the common assumption of technology’s usefulness and practicality. The scope of medieval technology was wider. *Ḥiyāl*, for example, which literally means ruses or stratagems, included mechanical contrivances but also fictions and subterfuges in legal and political domains.<sup>57</sup> Scholars such as Tim Ingold have argued that technology is, in fact, a distinctly modern concept. The emergence of “technology,” a term not used before the seventeenth century, marked a shift from *techne*—understood as skilled labor, in Arabic *ṣināʿa*—to an extension of the machinic to various forms of life and existence, including the universe, which began to be seen as a vast machine whose rational principles could be understood scientifically.<sup>58</sup>

To avoid all of these connotations, I turn to the Arabic word for instrument, *āla*, as it proves more capacious and more porous than today’s notion of technology and thus allows us to consider a wider, cross-genre archive beyond the automaton that literally equates servant and machine. For one, *āla* commonly applied to both automata and nonmechanized forms of equipment. *Ālāt* encompassed self-moving devices as well as the tools used in a craft, such as the scalpel in medicine and the lute in music. Moreover, bodily parts and organs, too, could be defined as tools and instruments; the lung, for example, enables the

57. Donald Hill, “Ḥiyāl,” in *Encyclopaedia of Islam*, 2nd ed., ed. P. Bearman et al. (Leiden: Brill Online).

58. Ingold, “Eight Themes,” 130–31. On *ṣināʿa*, see Adam Mestyan, “Arabic Lexicography and European Aesthetics: The Origins of *Fann*,” *Muqarnas* 28 (2011): 69–100.

action of breathing by serving as a vector for air.<sup>59</sup> *Āla* cuts across the distinctions of machine and tool, artifice and body. Instrumentality—the quality of serving as an instrument in processes of making, carrying, and transmitting—could be shared among man-made and natural entities; at least, it entailed no definitive distinction, let alone opposition, between intending subject and intended object. This also suggests that instrumentality could surface outside of the mechanical arts as a form of technological thinking, associating *jawārī* with technical tasks such as the acts of serving and carrying.

One type of narrative in which *jawārī* appear as instrumental figures concerns mystical, *Ṣūfī* history. It usually consists of a providential, instructive encounter between a male *Ṣūfī* aspirant and an enslaved woman who is referred to as a *jāriya*. Examples turn up in *Kitāb Muthīr al-‘azm al-sākin ilā ashraf al-amākin* (A book inciting firm resolution for [visiting] the noblest of places), a treatise on the *hajj*, the Muslim pilgrimage to Mecca, by ‘Abd al-Raḥmān Ibn al-Jawzī (ca. 1116–1200), who was an influential and prolific historian, judge, and preacher in Baghdad.<sup>60</sup> In one passage, Sarī al-Saqaṭī, a ninth-century *Ṣūfī* saint of Baghdad, recounts his encounter with a *jāriya ḥabashiyya* (Abyssinian or Ethiopian slave) while on his way to Mecca via Kufa, Iraq.<sup>61</sup> The figure’s enslaved status is later confirmed by her self-identification as *‘abda*, an unequivocal word for a female slave. Near Kufa, Sarī al-Saqaṭī learns from the *jāriya* that she, too, is headed for the *hajj*. He warns her that the journey is long, to which she responds that distance is relative—that for the Lover (an allegorical concept for the seeker of divine wisdom, the object of the quest being the Beloved, who stands for God), the destination is actually near. Once at the Ka‘ba, al-Saqaṭī finds the *jāriya* there already, performing the *ṭawāf* (the anticlockwise, ritualistic circumambulation of the Ka‘ba); she calls him out for being surprised, adding that her vulnerability is precisely what allowed her to move so fast, carried by divine strength.

The passage that immediately follows in Ibn al-Jawzī’s *Muthīr al-‘azm* features another *Ṣūfī* saint, al-Shiblī (861–946). Here, too, the narrative emphasis is on the mystic’s encounter with a *jāriya ḥabashiyya*, in this case in the countryside.<sup>62</sup> Ibn al-Jawzī’s insistence on the ethnic characterization of *ḥabashiyya* racializes the *jawārī*’s enslaved status while possibly confirming the historical predominance of domestic workers from Nubia (*al-Nūba*), East Africa (*al-Zanj*), and Ethiopia (*al-Ḥabash*) in the medieval Middle East, as attested by such documents of the slave trade as deeds of sale and by the literary evidence of slave-

59. On bodily organs as tools and instruments, see, for example, these tenth-century Arabic sources: Abū Zakariyyā Yaḥyā Ibn ‘Adī, “Fī ithbāt ṭabī‘at al-mumkin,” ed. Carl Ehrig-Eggert, *Zeitschrift für Geschichte der arabischen-islamischen Wissenschaften* 5 (1989): 63–97 [Arabic], at 70; Ikhwān al-Ṣafā, “On the Practical Crafts,” *On Composition and the Arts*, epistles 6–8 of *Epistles of the Brethren of Purity*, ed. and trans. Nader El-Bizri and Godefroid de Callataÿ (Oxford: Oxford University Press, 2018), esp. chapter 6.

60. For a biography of Ibn al-Jawzī and a list of his books, see Carl Brockelmann, *History of the Arabic Written Tradition*, trans. Joep Lameer, vol. 1 (Leiden: Brill, 2016), 579–85. On this particular book, also see Joseph de Somogyi, “Ibn al-Jawzī’s Handbook on the Makkān Pilgrimage,” *Journal of the Royal Asiatic Society* 70, no. 4 (1938): 541–46.

61. ‘Abd al-Raḥmān Ibn al-Jawzī, *Kitāb Muthīr al-‘azm al-sākin ilā ashraf al-amākin*, ed. Marzūq ‘Alī Ibrāhīm, vol. 2 (Giza: Dār al-Rāya, 1990), 194–95.

62. *Ibid.*, 195.

buying manuals.<sup>63</sup> A dialogue ensues, wherein al-Shiblī asks the *jāriya* questions about her trajectory's starting point, destination, and motivation, to which she invariably responds: the Beloved (*al-ḥabīb*). This makes her a Ṣūfī seeker and an enlightened teacher for the saint, whom she instructs about the necessity of silence while on the spiritual path, the reason being the ineffability of the divine, the impossibility of describing God before the quest is finished.

A similar storyline—a Ṣūfī encounters an inspired *jāriya*—can be found in *Tarjumān al-ashwāq* (Interpreter of desires) by the famous Andalusī scholar and mystic Ibn ʿArabī (1165–1240). The Ṣūfī narrator recounts his meeting with Qurrat al-ʿAyn, a *jāriya* from *al-Rūm* (meaning she was either Greek or Anatolian or both).<sup>64</sup> While at the Kaʿba, the poet utters a set of verses, when a *jāriya* appears, confronting him with a critical reading: she objects to his rational bent, pointing out the limits of skepticism for any true understanding of the divine.<sup>65</sup> In addition to her characterization as *jāriya*, Qurrat al-ʿAyn's name, too, may point to slave status, since it was sometimes given to unfree women.<sup>66</sup> The reality of the slave trade may be further indicated by her *rūmī* origin.<sup>67</sup> This gives Qurrat al-ʿAyn an ambivalent position, that of an inspired servant, simultaneously female slave and transmitter of instruction.

Like the engineer's prototypes, these stories were authored by elite male individuals; they may have functioned also to underscore male superiority. Take, for example, Ibn al-Jawzī. This prolific scholar also wrote a book on Ṣūfī saints, *Ṣifat al-ṣafwa* (Characteristics of the elite), in which he included a number of female mystics, relying and expanding on earlier accounts, notably the biographical book that Abū ʿAbd al-Raḥmān al-Sulamī (d. 1021) devoted to early female mystics, *Dhikr al-niswa al-mutaʿabbidāt al-ṣūfiyyāt* (Memorial of pious Ṣūfī women).<sup>68</sup> Portrayals of Ṣūfī women were rather scarce, and they were less detailed than those of Ṣūfī men, a process of discursive marginalization that aimed to center normative, androcentric Sufism. Aisha Geissinger has also emphasized “the centrality of the gaze of the pious free elite Sunni Muslim male” in Ibn al-Jawzī's biographies, showing that the male gaze both foregrounded and diminished female Ṣūfis and ultimately downplayed

63. Goitein, “Slaves and Slave Girls,” 8; Craig Perry, “The Daily Life of Slaves and the Global Reach of Slavery in Medieval Egypt, 969–1250 CE” (PhD diss., Emory University, 2014), 39–41. On the ethnic categories of Nubians, East Africans, and Ethiopians, see Hagedorn, *Domestic Slavery*, 98–107; for deeds of sale that use them, see Ragib, *Actes de vente d'esclaves*.

64. Ibn ʿArabī, *Tarjumān al-ashwāq*, trans. Reynold Nicholson (London: Royal Asiatic Society, 1911), 14.

65. For an analysis of the Ṣūfī tenor of the *jāriya*'s criticism, see Saʿdiyya Shaikh, *Ṣūfī Narratives of Intimacy: Ibn ʿArabī, Gender, and Sexuality* (Chapel Hill: University of North Carolina Press, 2012), chapter 2; Pablo Beneito, “Qurrat al-ʿAyn, the Maiden of the Kaʿba: On the Themenophany Inspiring Ibn ʿArabī's *Tarjumān*,” *Religions* 12 (2021): 23–40.

66. For an example, see Ibn al-Sāʿī, *Consorts of the Caliphs: Women and the Court of Baghdad*, trans. Shawkat M. Toorawa et al. (New York: New York University Press, 2015), 57.

67. On Black Sea slaves, see Barker, *That Most Precious Merchandise*; Felicia Roşu, ed., *Slavery in the Black Sea Region, c. 900–1900: Forms of Unfreedom at the Intersection between Christianity and Islam* (Leiden: Brill, 2021).

68. Rkia Cornell, *Early Sufi Women: Dhikr an-niswa al-mutaʿabbidāt aṣ ṣūfiyyāt* (Louisville: Fons Vitae, 1999).

their authority.<sup>69</sup> Given his tendency to uphold the social, moral, and spiritual domination of male religious figures, Ibn al-Jawzī's inclusion of *jawārī* in his book on pilgrimage, then, should not be taken as a celebration of female mysticism but rather as a narrative strategy, designed to facilitate and dramatize the male protagonist's initiation and transformation.

The depiction of *jawārī* as vectors of transmission (in the sense that they served as messengers, delivering spiritual insight and acting as a link between earthly and otherworldly domains) was neither liberatory nor redeeming; rather, it may have been congruent with societal views of enslaved labor. There is evidence, indeed, that enslaved domestic servants, both male and female, were expected to work as connectors and transmitters. Using the documents of the Cairo Geniza, Craig Perry has pointed out the mediating role of the *ghulām*, the *jāriya*'s male equivalent, likening him to a factotum or business agent.<sup>70</sup> A similar function was attributed to enslaved female servants. This was shown by Eve Krakowski, who noted *jawārī*'s place in the life of freeborn Jewish women of medieval Egypt as their owners' proxies, linking the domestic and public worlds.<sup>71</sup> Geniza documents can further speak to the *jāriya*'s position as a sort of factotum in Egypt between the eleventh and thirteenth centuries. *Jawārī* were often dehumanized as nameless commodities in dowry lists, legal dispute documents, and in the deeds recording their sale.<sup>72</sup> But other instances yield more detailed descriptions of their duties. One note, for example, requests its addressee to send five dinars with a *jāriya*.<sup>73</sup> Another one directs its recipient to send a *jāriya* as a messenger.<sup>74</sup> Meanwhile, a legal fragment indicates that a *jāriya* may have had to make her female owner's funeral arrangements after the latter's death.<sup>75</sup> None of these sources give us access to *jawārī*'s actual quotidian experiences, but they convey a variegated understanding of *jawārī*'s authorized responsibilities, with an emphasis on mediatory functions.

Like documentary sources, literary accounts can shed light on representations of daily life, though stories that feature mundane domestic activity outside of elite circles appear to be rare. One exception turns up in *Kitāb al-Mukhtār fī kashf al-asrār* (The book of the selected disclosure of secrets / The book of charlatans) by the thirteenth-century author 'Abd al-Raḥīm al-Jawbarī. The story tells of the narrator's encounter with a member of the Banū Sāsān—a Romani tribal confederation—in Konya, Anatolia, in 1219–20 and of his

69. Aisha Geissinger, "Female Figures, Marginality, and Qur'anic Exegesis in Ibn al-Jawzī's *Ṣifat al-Ṣafwa*," in *Islamic Interpretive Tradition and Gender Justice: Processes of Canonization, Subversion, and Change*, ed. Nevin Reda and Yasmin Amin, 151–78 (Montreal: McGill-Queen's University Press, 2020).

70. Perry, "Daily Life of Slaves," 12; also see Balafrej, "Domestic Slavery," 1020–21.

71. Eve Krakowski, *Coming of Age in Medieval Egypt: Female Adolescence, Jewish Law, and Ordinary Culture* (Princeton, NJ: Princeton University Press, 2017), 199–200.

72. On women-owned domestic slaves, see Perry, "Daily Life of Slaves," 95–98. Documents available online through the Princeton Geniza Project (PGP) include the following, held at Cambridge University Library: T-S NS J319 + T-S NS 190.108 + T-S NS 190.114, S. D. Goitein's unpublished edition; T-S NS 320.50c; T-S NS J449.

73. University of Manchester Library, JRL SERIES B 6116, available online through the PGP.

74. Cambridge University Library, Moss. II,127.2, available online through the PGP.

75. Cambridge University Library, Moss. VII,129.2, available online through the PGP.

interest in understanding the Banū Sāsān's success and talent in the arts of trickery.<sup>76</sup> At the Sāsānī's home, a *jāriya* appears a few times, carrying out a range of tasks; at dinner, she brings a jug of hot water with a washbasin, then food and drinks, before calling in another *jāriya*, more an entertainer than a servant, who plays an oud and then a harp. The next morning, the servant acts as the Sāsānī's helper, bringing the accessories he needs for his subterfuge at the mosque—rags, a garbage sack, and a headband—and then scattering dust all over him to make him look a pauper. While her patron gets ready, she helps the guest again, taking him to the bathhouse and offering him food, as well as perfumes, before he goes to attend the host's scam. Both this early thirteenth-century account and the scattered Geniza examples define the servant figure as a personal assistant, a manager, and an emissary while also confirming the common association of visibility and *jawārī*'s enslaved status.

The media operations that *jawārī* carried out in the foregoing representations involved the culling and sharing of information, which itself entailed spatial and technical literacy. These duties, which were essential to premodern service and communication, were not dissimilar to those of the *ghulām*-factotum who, as a messenger, functioned to connect people and places, sometimes across vast swaths of the world, as recorded in business letters.<sup>77</sup> This may explain *jawārī*'s inclusion in both technical and mystical writings as mediating, vectorial entities. This study's jump from the mechanical arts to spiritual literature, then, may illuminate a continuum across genres, revealing another, transversal convention for *jawārī*'s representability: not only as mobile and hypervisible but as signs of instrumentality, charged with mediatory functions—as transmitters and vehicles—that were both vital and coerced. Technical and mystical sources find another commonality in the way they hybridize high endeavors, whether technological experimentation or the pursuit of spiritual instruction, with lowly labor. The contrast may seem surprising, but it likely served to highlight the power of patron and saint while revealing the (potentially constitutive) enmeshment of slavery with certain cultural and scientific domains.<sup>78</sup>

### Instrumental *Jawārī*

Enslaved women or *jawārī* crisscrossed a variety of imaginaries, genres, and compositional forms, both verbal and visual, from al-Andalus to Anatolia and beyond. The presence of *jawārī* across such a range of discourses and locales reflects the importance of female domestic labor in medieval Islam. These representations also raise the question of their semantic, allegorical function, likely as a patriarchal maneuver, equating the female body, abstract or even forced action (either through mechanical or divinely inspired power), and

76. Jamāl al-Dīn 'Abd al-Raḥīm al-Jawbarī, *Kitāb al-Mukhtār fī kashf al-asrār*, ed. Manuela Dengler, trans. Humphrey Davies (New York: New York University Press, 2020), 104–13.

77. Balafrej, "Domestic Slavery," 1020–21.

78. As such, depictions of *jawārī* as instrumental may partake in the subaltern genealogy of modern media and technology. See Markus Krajewski, *The Server: A Media History from the Present to the Baroque*, trans. Ilinca Iurascu (New Haven, CT: Yale University Press, 2018), though Krajewski does not include non-Western history or Black studies. I thank Tung-Hui Hu for this reference.

timely, reliable service. Yet approaching these portrayals of unfree domestic labor uniquely through the trope of the objectifying machine is problematic, for it centers a distinction of subject and object that may not have been so relevant to the medieval context.

In order to circumvent the modern strictures of both technology and objectification, I have characterized the figure of the *jāriya*, as represented in the above corpus, as “instrumental,” in reference to the term *āla* (“instrument”) that has served to designate machines and instruments, including bodily organs. On the one hand, “instrumental” applies to something (like music) insofar as it is performed through an instrument or a tool, which implies the participation of a source of agency and volition that is usually perceived as superior. In this regard, the expression “instrumental *jāriya*” acknowledges the realities of enslavement and patriarchy, the fact that *jawārī*’s labor was produced under the patronage, often exploitative, of an owner.

On the other hand, “instrumental” can also be employed to say of an element that it is significant and pivotal, that it plays an essential role. Indeed, there is a difference between being instrumental and being useful; this is similar to the familiar distinction between instrument and tool, in Arabic between *āla* and *adāt*. In common parlance a tool is often thought of as a basic, disposable object. By contrast, an instrument usually stands for an elaborate, amplifying medium, as exemplified by musical or surgical instruments. Consequently, “instrumental” indicates a complex form of objectification, whether in *ālāt mutaḥarrika* that bridged forced labor and technical sophistication or in the spiritual encounters that posited *jawārī* as mediators of truth, not in command of their power yet acting as potent, inspired intercessors.

The notion of the “instrumental” troubles the prevalent understanding of objectification as an extreme, polarizing operation that transforms the world into a field of passive, inanimate things, as it implies a measure of activity, if not agency. As such, it also complicates the traditional view of domestic work as inconsequential—that is, as a form of repetitive, unremarkable labor, centered on the quotidian, unimportant tasks of housekeeping and mainly restricted to the alleged privacy of the home. Automata and other representations indeed heightened *jawārī*’s functions as narrative, spatial, and social connectors and as vectors for a range of substances, both material and abstract, including liquids, time, and knowledge. Unfree service appeared as dynamic and productive, with an intellectual component, and as a media practice that involved the gathering, processing, and transfer of information. This did not attenuate *jawārī*’s difficult conditions. Their visible, mediatory participation was likely a function of enslavement and an authorized discourse, partaking in gendered, class-based hierarchies.

In addition to the myth of technological neutrality, then, instrumental *jawārī* challenge the object-subject chasm by appearing less as the object of a subject’s perspective—though many were meant to benefit a powerful patron—than as a sign of instrumentality, as a vehicle for the capacity to carry and to channel. Again, this is not to say that these depictions were less dehumanizing. Rather, it is to try and envision the representational terms in which objectification operated before the emergence of the modern subject. In Western philosophy, the splitting of object and subject bespeaks a relationship of domination that is fixed and unilateral; the objectification of an entity indeed implies that the entity is placed



before a subject, as the framed object of its viewpoint—that is, as a graspable element of perception, inquiry, and use. The “I” or ego that experiences itself as subject of thought did not develop before the eighteenth century, when being was identified with the being of the individual, thinking subject, who experiences the world as the object’s other.<sup>79</sup> This also explains the link between the reflective subject and the quest for technological mastery. As Paul Ricoeur summarized, “the claim to master the existent as a whole, in technology, is only a consequence [. . .] of this emergence of man on the stage of his own representation.”<sup>80</sup>

In earlier periods, the subject had not yet become the source of all representation. In medieval philosophical parlance, the subject, in fact, was not the “I” but a substrate, as indicated by both the Latin *subjectum* and the Arabic *mawḍūʿ*, which signify “basis” or, more literally, “that which is posited”—a sort of ground, then, through which something comes to be, rather than ego or self.<sup>81</sup> The premodern subject, at least as conveyed by the words *subjectum* and *mawḍūʿ*, operated as a support in both a physical and a logical sense, respectively as a substrate for change in the world and as a support for predicates in a proposition.<sup>82</sup> This may indicate yet another possible interpretation of *jawārī*’s representations: not only as instrumental figures but as medieval subjects, one of the possible grounds from which mechanisms of transmission were materialized, replicated, and conceptualized.

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79. Though the emergence of the modern subject in Western philosophy is commonly attributed to Descartes, a number of philosophers have corrected this belief, showing that the modern subject was developed by later philosophers such as Kant; see, for example, Jean-Luc Marion, “Descartes hors sujet,” *Les études philosophiques* 88, no. 1 (2009): 51–62.

80. Paul Ricoeur, *The Conflict of Interpretations: Essays in Hermeneutics* (Evanston, IL: Northwestern University Press, 1974), 229.

81. *Ibid.*, 228–29.

82. Etienne Balibar, Barbara Cassin, and Alain de Libera, “Subject,” trans. David Macey, *Radical Philosophy* 138 (2006): 15–41.

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