

War Machines: Instrumentality and Empire in Early Modern Spanish Drama

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In an age characterized by a fascination with novelty, what David Castillo has called a “culture of curiosity,” innovative machines paradoxically carried Spain toward modernization at a time of theological resistance to change (Castillo 37). Since the era of Feijóo, at least, critical assessments of pre-Enlightenment Spain have emphasized the nation’s cultural “atraso,” deeply rooted in Counter-Reformation Catholicism. But this portrait of a historically backward and epistemologically retrograde Spain is only a small part of a larger picture. It is a commonplace assumption that Spain failed to embrace the emerging knowledge and technologies of the early modern period that culminated in the so-called Scientific Revolution while the rest of Europe surged forward toward the Enlightenment.¹ However, the historical and cultural record shows that early modern Spanish attitudes toward scientific and technological advancement were much more complex and were fraught with the inconsistencies and tensions we might expect of a society that strove to achieve political and military advantage through technological innovation while promoting a conservative theology that found the metaphysical implications of scientific progress to be heretical (López Piñero 17-23).

Spain found itself intermittently in the vanguard of scientific advancement throughout the sixteenth century, precisely during its period of imperial expansion, often

promoting the exchange of new ideas in ways that might seem surprisingly progressive. During the last quarter of the sixteenth century, for example, Salamanca was the only European university to admit the teaching of Copernican cosmology, although by century's end, Counter-Reformation theology would reverse this innovation (López Piñero 18). Despite its deference to dogmatic Catholicism and reactionary embrace of scholasticism in the face of rising empiricism in Europe, Spain remained in the forefront of technologies it found useful in pursuing its imperial and political interests. Spain was competitive in the development of artillery, navigational technologies, and the related field of cosmography, which sought to develop a comprehensive knowledge of the world through the methodical study of astronomy and geography, with emphasis on the practical application of new scientific advancements (Navarro Brotons 14-15; Domínguez 145-46).² Several treatises on navigation date from this era, including Pedro de Medina's widely translated and reprinted *Arte de navegar* (1545, 1563) and Martín Cortés's *Breve compendio de la sphaera* (1551), both of which were considered so cutting-edge that England, Spain's growing imperial rival, used them for decades before developing its own navigational treatises.³

Early modern Spain excelled in the production of firearms and war engines. As historian Kenneth Chase explains, during the sixteenth century Europe may have surpassed Asia in firearm technology (7; 60-61); advances in Spain helped lead the way (Bunch 131). A century earlier, the efficient production of more powerful gunpowder had made possible the development of small arms that could be carried in battle, including the arquebus. By the 1540s, Spanish arms makers were manufacturing the first muskets. These large battle guns required two people to mount and fire, but they broke new ground in the

development of smaller, more portable arms and prompted the elimination of armor, which was ineffective against the musket on the field of battle (Chase 61). The allied victory at Lepanto in 1571 was partially due to the superior firepower of the European forces, whose fleet employed cannons, harquebuses, and muskets against Turkish swords.

Spanish superiority in the development of artillery and navigation technology was a practical response to the necessities of building an empire. Of the Spanish attitude toward the development of technology José Cepeda Adán writes,

Sobre la marcha, por supuesto, y paralelamente al despliegue de las ideas, iba dando respuestas prácticas a los problemas técnicos que se le presentaban en la navegación, en el beneficio de metales, en las artes de la guerra, en el dominio de la distancia y el espacio, en el urbanismo. Es decir, estaba en la primera línea de lo que las necesidades de los tiempos exigían en la vida material con resultados tangibles y útiles (37-38).

Contrary to narratives that portray Spain as hopelessly backward, lagging behind the rest of Europe in embracing the new scientific ideas circulating in early modern Europe, Spanish material culture was highly technological and encouraged experimentation and innovation in the development of practical applications of new scientific ideas, as long as they were useful in supporting Spanish military and political hegemony.

Furthermore, the rise of mechanics was accompanied by a reordering of thinking during this period, and this new way of thinking was itself mechanical. Steven Shapin identifies four aspects of this reordering: the mechanization of nature (through the development of useful technology), the depersonalization of knowledge (which is the growing separation of subject and object and the rise of “objectivity”), the mechanization of

knowledge itself (through the creation of rules and methods to regulate the production of knowledge), and the use of the resulting knowledge to achieve moral, social, and political ends (Shapin 13), what Jessica Wolfe also refers to as "instrumentality" or the application of mechanized knowledge and methods to social and political realms (Wolfe 1). Early modern culture was fascinated with machinery and began to understand the world as a clockwork universe in which the careful, methodical, application of human ingenuity could solve problems and achieve both public and private goals. Here it is interesting to note the multiple meanings of Spanish words like *ingenio* and *industria*, which initially referred to activities of the human imagination but came to refer also to engines and mechanization.

Consequently, cultural artifacts of this period evidence an artistic interest in machines that might be termed an aesthetic of instrumentality. The plastic arts, literature, and theatre of this period represent images of machines that underscore an awareness of burgeoning modernity and its instrumental worldview. The frequent artistic representations of machines, and the way they encourage people to look at them, assimilate them, and attempt to understand them, constitute a system for exchanging ideas about a modern culture in development, expressing a sense of wonder about the ingenious inventions that were a hallmark of the time, and also promoting an awareness of achievement in the successful harnessing of natural forces to serve human needs. Machines are foregrounded in literary works like *Don Quijote* (whose protagonist not only fights windmills, fulling mills, water mills, and mechanical contraptions, but also rails against the “endemoniados instrumentos de la artillería” [448]) and in many examples of Spanish poetry, where they represent images of stability, order, and precision in a

variety of social contexts (Heiple). And in the burgeoning entertainment industry of the age, machines themselves were used to create theatrical illusion in dramatic performance, delighting audiences with mechanized special effects or *tramoyas*.

Indeed, early modern European culture drew multiple parallels between mechanics and theatrical spectacle, portraying ingenious devices and technology as a kind of visual “theatre” to be viewed, contemplated, and assimilated into the public consciousness. The genre of pictorial machine-books known as the *theatrum mechanorum*, or theatre of machines, enjoyed widespread circulation throughout Europe, as evidenced by reprints and multilingual editions, including translations in Spanish. This genre flourished at the end of the sixteenth century with the works of Jacques Besson's *Théâtre des instrumens mathématiques et mechaniques* (1569, with reprints in 1578, 1579, and 1594), Agostino Ramelli's *Diverse e artificiose macchine* (1588), Vittorio Zonca's *Nuovo teatro de machine et edificii* (1607), and *Los veintiún libros de los ingenios y de las máquinas de Juanelo* (ca.1580), attributed to Philip II's engineer Juanelo Turriano.⁴ These books juxtaposed detailed pictures of ingenious machines and their constituent parts with prose descriptions to guide the reader in their appreciation. These illustrated treatises on technology described not only existing instruments, such as mills, pumps, and dredges, but also designs for original devices, ranging from the practical to the purely imaginative.

On the practical end of the scale, Ramelli's detailed diagrams of windmills and their working parts, labeled with letters, are considered the earliest illustrations of these ubiquitous machines (Image 1). On the more imaginative end of the scale, Ramelli's original design for a revolving lectern or book wheel, another testament to Renaissance ingenuity, similarly draws associations between mechanics and the creative

imagination in conceiving of such original instrumentation (Image 2).

Ramelli's inventions, of both the practical and imaginative type, strive to accomplish difficult tasks with ease and inspire a sense of wonder or *asombro* in his public. They represent technology as a visual, artistic spectacle to be viewed and appreciated, requiring the active participation of the reader, whose gaze is trained and directed by the labeled images in what Kenneth J. Knoespel has called a hermeneutics of technology (122). The *theatrum mechanorum* is an aesthetic manifestation of a theoretical and practical interest in machines and the effects of mechanization. These treatises have in common a celebration of human ingenuity, of triumph over the natural world through mechanization, and of accomplishing difficult tasks with ease (a concept closely related to the Renaissance court culture of *sprezzatura*). Indeed, the inherent theatricality of these "theatres of machines" culminates later in the seventeenth century in Georg Böckler's *Theatrum machinarum novum* (1662), whose title page depicts Archimedes and a personified Mechanics opening a theatrical curtain to reveal the visual spectacle of modern machinery improving the life of a village (Image 3).

A genre of illustrated military treatises complements the *theatrum mechanorum* throughout the sixteenth century, including Agricola's *De re metallica* (1546), Biringuccio's *De la pirotechnia* (1540), and Spanish reprints of Cornazzano's *De re militari* titled *De arte militar* (1550). Of these, Roberto Valturio's *De re militari* (1472) was the first to be printed by mechanical press, and it enjoyed renewed popularity through multiple editions in the sixteenth century. Valturio details a wide array of military inventions, including tower fortifications, hoists and levers, catapults, cannons, and armored ships. It also includes fanciful

designs, such as this cannon laden war machine in the form of a dragon (Image 4).

Valturio's imaginative machine expresses a consciousness of technology being caught between eras. It not only celebrates the modern age and the ingenuity of its new war machines, but also contemplates the past in the form of the dragon, associated with fantastic chivalric lore from the story of St. George through medieval tradition. Biringuccio's well-known treatise *De la pirotechnia* is comparable in this regard (Image 5).⁵

This illustration shows modern war technology defeating the knight, as horsemen flee from the powerful, impersonal devices that would render them obsolete. The widespread circulation of the *theatrum mechanorum* and war machine books documents not only a cultural fascination with machinery, but also an understanding that such devices were new and potentially life-changing. Technological imagery in the early modern period is self-conscious, representing through visual arts an opposition between modernity and the past that is intrinsically nostalgic.

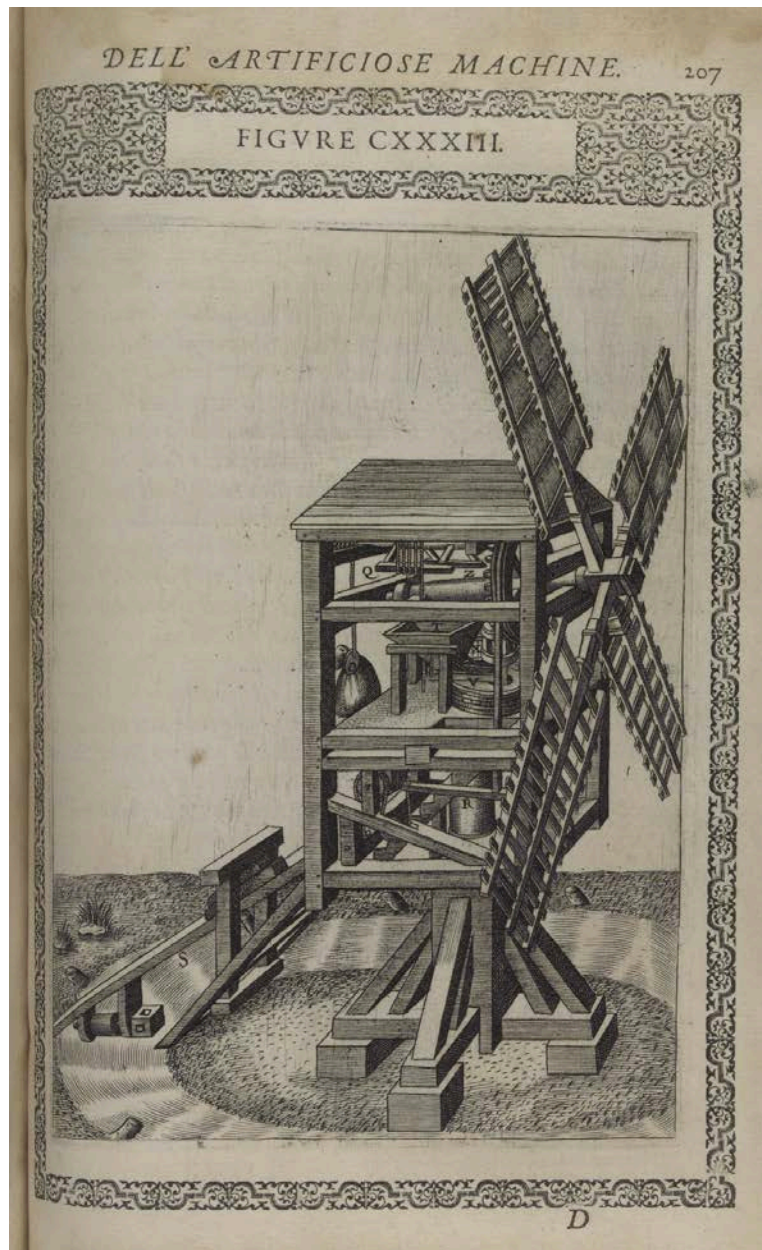


Image 1: Ramelli Windmill

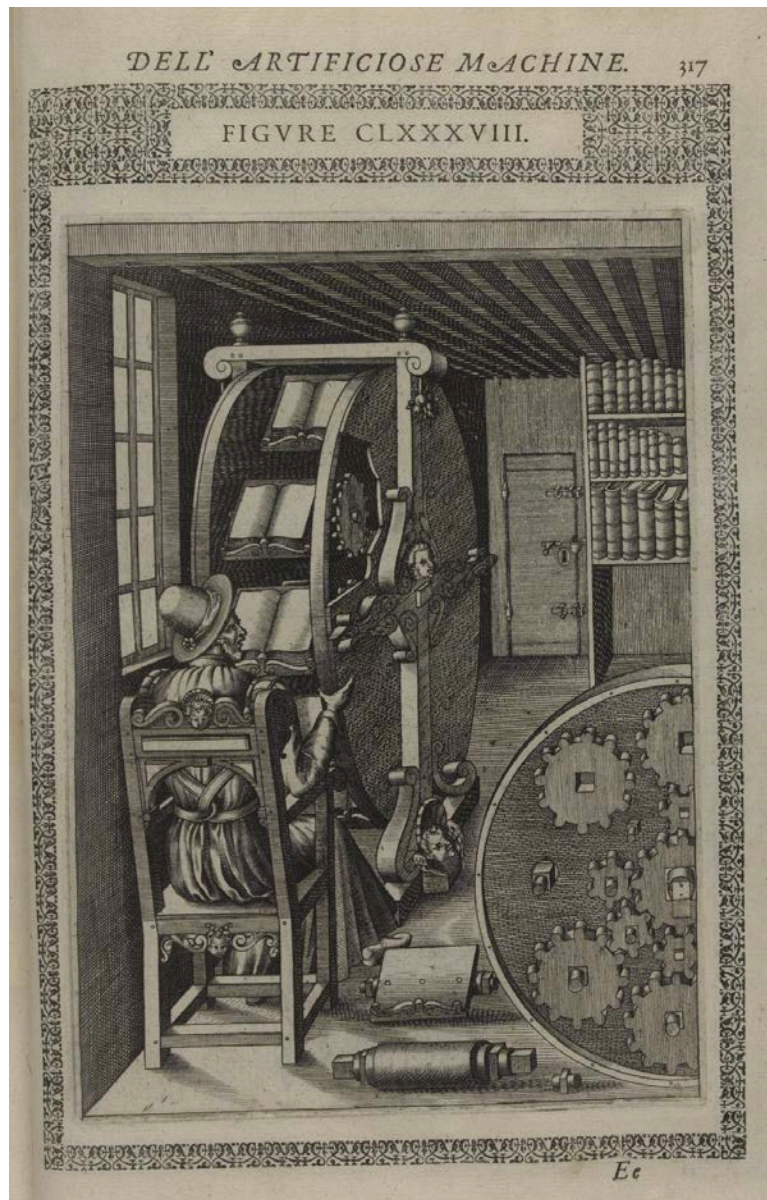


Image 2: Ramelli Book Wheel



Image 3: Bockler

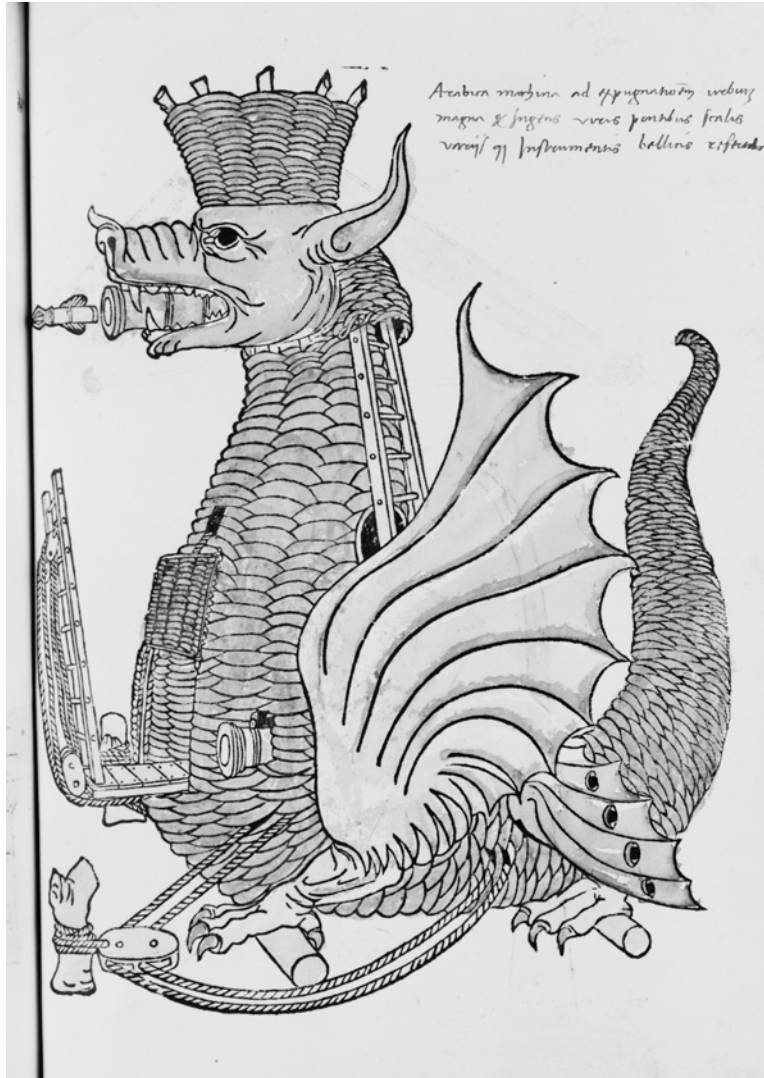


Image 4: Valturio



Image 5: Biringuccio

The *theatrum mechanorum* demonstrates that there is a performative relationship between Renaissance attitudes toward machinery and the problematization of how best to accomplish difficult goals. Machine images come to serve metaphorically as indicators of an instrumental view of human agency. This early modern aesthetic of instrumentality is forward-looking and emphasizes step-by-step approaches to achieving goals (including social and political goals) in a determined, orderly fashion, evidencing the mechanization of knowledge and rise of method identified by Shapin as a part of the reordering of early modern thought. The expectation that success is brought about

through ingenuity and the careful application of method was a hallmark of emerging scientific discourse in this period, and a related instrumental view of human agency is reflected aesthetically in early modern cultural production.

How, then, are war machines and instrumentality represented in the theatre of early modern Spain? Many Golden Age plays are set against the backdrop of war, which reflects a cultural preoccupation during the time of Spain's military intervention in Europe and the Americas. Interestingly, relatively few *comedias* actually depict the artillery and war machines that enabled Spanish hegemony. One practical reason may be the difficulty in constructing large machinery or using cannons and guns on the stage. Even when guns are depicted in Golden Age plays, more often than not they are off-stage sound effects (the phrase "dispara una pieza" recurs in several war dramas), or denoted by one or two characters carrying pistols as unused stage props. Further, the temporal and geographical "distancing" common in many *comedias* sets these plays in the past, sometimes before the advent of artillery. Therefore, the sword becomes the stage prop that most frequently denotes war. Instead of literally representing war machines in battle, then, the *comedia* represents war as an instrumental process or method. The theatrical representation of war participates in the early modern aesthetic of instrumentality, representing war as a means of achieving political ends in an age in which problems could be solved through the efficient application of method.

I have chosen to discuss in this context two dramas from the late sixteenth century, a period of political and economic turmoil and social introspection that coincided with the rise of mechanics. *La Numancia*, by Cervantes, was performed a decade after Lepanto, in the mid 1580s, when economic and political crises prompted the Spanish public to question the limits of its

own imperial ambitions. *El nuevo mundo descubierto por Cristóbal Colón*, by Lope de Vega, was composed a decade later, around the centenary of the Columbian expeditions, and likewise treats Spanish hegemony with thought-provoking ambivalence. My intention here is not to provide a comprehensive literary analysis of both plays; instead I will highlight certain elements that suggest a context of instrumentality. These two plays offer distinct but complementary messages about war, imperial success, and utopian possibilities, while demonstrating that yet another level of instrumentality lies in the nature of theatrical performance itself.

Numancia begins with a visual representation of the Roman army onstage; for a reading public the first stage direction indicates that the Romans are armed “a lo antiguo, sin arcabuces” (64). Cervantes sets the scene by describing the absence of modern war machines, distancing his play from his audience’s contemporary associations with war. Throughout the play, most arms references are to swords, which the Romans brandish as a double signifier of their military superiority and the play’s pre-modern setting. The development of war machines dates to the classical period, of course, and the Romans were known for siege engines, catapults, battering rams, and other devices that gave them a tactical advantage over their adversaries. Interestingly, Cervantes does not mention these archetypal Roman inventions. Instead, he juxtaposes the “armas” (100, 124, 402) and “fuertes brazos” (414) of the Romans with the “manos” (166, 624) of the Numantinos, who end the siege with their own hands at the conclusion of the play.

The Numantinos do, however, have a strong fortified wall, which enables them to sustain their defense for several years. Cervantes here represents the historical reality that before the advent of firepower, siege warfare often favored the

defensive position. The invention of firearms would reverse this power relationship, giving the offensive forces the ability to win siege battles until the resulting race for defensive arms would level the playing field in Cervantes's own time (Chase 62). In the pre-modern setting of this play, the Romans dig trenches designed to starve the Numantinos into submission, but the trenches also prevent the Romans from using weapons to storm the city's walls. As Teógenes says at the opening of the second act: "El ancho foso nos estorba el medio / de probar con las armas la ventura" (557-58). The Roman military advantage in this play, then, is not tactical, but strategic, representing war itself as an instrumental process, a method, as a means to an end, both for Rome (through its conquest of Hispania) and personally for Cipión (to achieve fame at all costs). Cervantes's play portrays the institutional victory of Rome as a personal defeat for Cipión, who is deprived of his desired fame by the hands of the indigenous people he attempts to conquer.

Rather than depicting war engines on stage, Cervantes represents Rome itself as a war machine, as a dispassionate, monolithic, almost mechanical force driving relentlessly toward victory, despite the more humane proposals of singular battle and peace treaties that emanate from the Numantino camp. In opposition to the Numantinos' ideal of "justa batalla" (1202), Rome is repeatedly characterized as a cruel and its weapons as "espadas homicidas" (2037) and "espadas pérfidas" (2103). While Romans are associated with technical superiority, they are characterized in the play as morally weak or "flojos" (85-88). In comparison to the sympathetic Numantinos, they are portrayed as a dehumanized, collective military force designed to accomplish its goals with mechanized efficiency. The word "máquina" in this period, of course, denotes not only machinery, but also machinations and strategies employed to achieve certain

ends. Cervantes uses the word this way in many of his literary works, and it also pertains to the instrumental context of the Roman war machine in *Numancia*. But what instruments are available to the Numantinos? Lacking sufficient weapons and strength to fight the Romans, the Numantinos must avail themselves of the only instruments they have, their *industria* (to strategize a way of preventing a complete Roman victory) and their own hands (to carry out their plan). In *Numancia*, war as military conquest is the instrument of hegemonic, imperial power, whose goal is to subjugate an indigenous population. It is a means to an end achieved through technological advancement but also through strategy. While the Numantinos cannot compete on the tactical level of weaponry, the instrumental application of strategy does level the playing field and allows them to eke out a moral, if not tactical, victory. While war itself is represented instrumentally as a means of achieving political ends, the moral context of *how* war is executed determines its perceived legitimacy.⁶

Just as Cervantes juxtaposes the Roman military conquest with *Numancia*'s moral victory, he likewise challenges the unquestioned acceptance of Spanish imperial hegemony. Evoking sympathy for the Numantinos as they face the cruel realities of imperial conquest, Cervantes employs allegorical figures to draw parallels to his own age, in which Spain itself is an empire on the brink of decadence. The personified Duero places the image of Roman weaponry—the “aguda espada”—into the hands of the Spanish empire, who must use it justly to earn the title “España amada:”

¡Qué envidia, qué temor, España amada,
te tendrán mil naciones extranjeras,
en quien tú reñirás tu aguda espada
y tenderás triunfando tus banderas (521-24)

At the end of the play, Fama addresses the audience directly, charging the contemporary “hijos de tales padres herederos” (2436) to enact a happy ending for the play in their own time: “demos feliz remate a nuestra historia” (2448). Cervantes understood the participatory nature of performance and effectively utilized theatrical time and space to propose an interactive referendum on the values of the emergent Spanish nation. This exemplifies what theatre scholar Jill Dolan has called “the utopian performative,” the idea of theatrical performance as a participatory forum in which social and political ideals can be affirmed in shared space and time, encouraging the audience to envision a better future (457).

For Cervantes himself, war had been a way of life, which he understood thoroughly from technical, political, and philosophical perspectives. We have reason to believe that Cervantes also understood theatre as a vehicle for the communication of ideas. In the *Adjunta al Parnaso*, he justifies the redirection of his unperformed plays to a reading public “para que se vea de espacio lo que pasa a priesa, y se disimula, o no se entiende, cuando las representan,” acknowledging that there are important ideas in his dramas awaiting the attentive reader (*Poesías* 183). Not all theatre must be a theatre of ideas, but Cervantes’s words suggest that the dramatic form is conducive to the presentation of ideas, as a meeting of the minds in the shared space of theatrical performance, or, in the case of his unperformed plays, on the page. Thus, there is an instrumental aspect of theatrical performance itself. The interactive nature of performance allows people to come together in a shared space to contemplate ideas considered meaningful by the playwright and the audience, what Richard Schechner has termed the “gathering-performing-dispersing” moments of live theatrical performance (176).

In *El nuevo mundo descubierto por Cristóbal Colón*, Lope de Vega likewise utilizes the interactive theatrical medium to articulate a debate about the moral conduct of Spain's imperial goals. While the play offers an almost hagiographic treatment of Columbus in preparing the indigenous Americans for religious conversion, it also depicts the Spanish conquerors as violent and greedy, exploiting America for its mineral wealth, and establishing a thematic opposition of *Dios* and *Oro* that generates much of the play's dramatic tension. The story of Columbus, of course, historically showcases the successes of Spanish navigation as well as the development of firearms eventually used to subdue the indigenous population. Unlike *Numancia*, in which stage directions prescribe the absence of arquebuses, in *El Nuevo mundo* the arquebus is present as a sound effect *tramoya*, providing an immediately recognizable auditory reminder of Spanish military might. In Act Two, a stage direction reads "disparen dentro dos o tres arcabuzazos" (1447) and a second firing results in injury: "Al tirar disparen algunas escopetas, y caigan en tierra" (1842). The Spaniards' reliance on superior war technology is made clear when Columbus instructs his men, "Mientras que la gente llama, / saquemos las armas todas" (1711-12).



Image 6: DeBry

Modern war machines in this play, therefore, announce the arrival of the Spaniards, who enter brandishing not only their superior arms, but also a giant crucifix: “Huyan todos los indios, y entren Colón, y Bartolomé, Fray Buyl, Pinzón, Arana Terrazas; traiga el fraile una cruz grande verde” (1557, stage direction). Columbus plants the cross in the ground as a beacon of divine enlightenment:

Padre, dadme aquesa cruz,

que aquí la quiero poner,
 que este el farol ha de ser
 que dé al mundo nueva luz. (1571-74).

The cross proves to be an even more potent instrument of conquest than firearms, frightening the indigenous characters nearly as much as the previous gunshots, as indicated by another stage direction: *Entran los indios espantados y llegan a la cruz* (1742), and ultimately functioning as the vehicle for indigenous conversion and the expulsion of demonic forces from the New World (2778-2813). While the indigenous characters arm themselves with “arcos” (1243, 2221), “flechas” (1353), and “mazas” (2792, stage direction) the Spanish easily subdue their adversaries with swords, firearms, and, more importantly, the cross, all of which are effectively depicted in Theodor DeBry’s engraving from the same period, *Columbus Landing at Guanahani* (1594) (Image 6).

Like *Numancia*, *El nuevo mundo* dramatizes an empire conquering an indigenous population. This play likewise questions the morality of the conquering force, while reaffirming the legitimacy of conquest as an imperial tool, at least in terms of its evangelizing mission. Also like *Numancia*, *El nuevo mundo* depicts a leader who rises above the problematic morality of his forces. In Lope’s play, however, Columbus succeeds in achieving his personal goals, which are inseparable from the Spanish crown’s missionary objectives. While criticizing the greed and violence of the conquest, the public debate over which unfolded during the decades before the composition of this play, Lope elevates Columbus precisely because of his instrumentality. Columbus is represented throughout this work as the Christopherens, or instrument of Christ, who prepares the indigenous population of the Americas for conversion and spreads universal Christianity. King Ferdinand acknowledges this

at the end of the play, localizing in Columbus's name the undeniable presence of Christ as well as the destiny of Spanish colonization:

Cristóbal, vuestro apellido
os da alabanza, Colón,
que autor de tal redención
algo de Cristo ha tenido. (2870-2873).

Lope, himself a priest, is able to criticize Spanish greed and violence as inhumane aspects of the conquest by opposing them to Columbus as a force for the greater good. Columbus, whose arrival in this play is described as bringing peace, not war (“Que estos huéspedes no son / de guerra, sino de paz” [1891-92]) represents a post-Lascasian concern for the welfare of Spain's new subjects, projected retroactively onto the historical figure who opened the conquest. Juxtaposing *Dios* and *Oro*, Lope invites his audience to contemplate how Spain conducts its empire, showing through theatrical images that war and conquest may be legitimate instruments of empire, but how those instruments are used matters. Lope, like Cervantes, views theatrical performance as playing an instrumental, even empowering, role in encouraging the audience to think about their nation's future direction.

To conclude, then, these two plays from the late sixteenth century reflect a cultural fascination with machinery and instrumentality frequently represented in the visual, literary, and dramatic arts of the time. Often juxtaposed to traditional values of church and state, war machines come to stand for an almost mechanized process of empire building and hegemonic preservation during changing times. War is the instrument of empire, but the legitimate use of this instrument requires careful, deliberate, moral choice. The literal and figurative representation of war machines show Spain to be straddling imperial success

and failure, in plays that lead the theatrical audience to contemplate choices and solutions through the collaborative atmosphere of live performance.

Notes

¹ For a concise summary of the scholarly debate on the nomenclature of the so-called Scientific Revolution, see Shapin. Recent scholarship has questioned the binarism (and the related Foucauldian conception of changing epistemes) inherent in this term, finding instead consistent evidence of disagreement, contradictions, and multilateral thinking in the early modern period (Westman and Lindberg xviii).

² The development of sixteenth-century Spanish cosmography is indebted to Peter Apian's *Cosmographia* (Antwerp, 1539), which was frequently translated into Spanish from the 1540s to the end of the century. A 1575 Spanish translation augments Apian's geographical consideration of the Old World with the inclusion of excerpts from López de Gómara's *Historia general*, evidencing Spain's imperial project. The Newberry Library holds a copy of this hybrid volume (catalog number Ayer 7.A7 1575).

³ The publication of English translations of Medina and Cortés corresponds to England's rise as an imperial power in the 1580s and 1590s, displacing Spain. Early English editions of Medina's treatise date to 1581, while translations of Cortés were published in 1584 and 1596. All three may be found in the Folger Shakespeare Library, among other archives (Folger catalog numbers STC 17771, STC 5801, and STC 5803, respectively).

⁴ Besson's work is considered the first of the genre in its mature form and a Spanish translation of 1602 establishes its circulation in Spain. Nicolás García Tapia persuasively argues that *Los veintiún libros de los ingenios y de las máquinas*, usually attributed to Juanelo Turriano, was in fact authored by the Aragonese engineer Pedro Juan de Lastanosa (87).

⁵ The pictorial military treatises of Valturio and Biringuccio express an explicit indebtedness to obvious antecedents, such as Vitruvius Pollio's *De architectura*, and the Latin writer Vegetius, which also saw multiple reprints in the late sixteenth century.

⁶ The question of whether Cervantes evokes patriotism in his audience or suggests a more subversive message is a subject of critical debate. Willard F. King acknowledges that *Numancia* is a complex critique of "the legitimacy of the conquest of alien peoples by force of arms" (207). Carroll B. Johnson contends that the play invokes both positive and negative

visions of imperial Spain (315). Barbara A. Simerka contends that Cervantes's play questions the legitimacy of wars of imperialism in the time of Philip II's campaign in Flanders (61).

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Image 1: Ramelli Windmill

Lessing J. Rosenwald Collection, Library of Congress, TJ144.R3.
<<http://hdl.loc.gov/loc.rbc/rosenwald.1086.1>>

Image 2: Ramelli Book Wheel

Lessing J. Rosenwald Collection, Library of Congress, TJ144.R3.
<<http://hdl.loc.gov/loc.rbc/rosenwald.1086.1>>

Image 3: Böckler

Hoover Collection, Special Collections, Honnold/Mudd Library
of The Claremont Colleges. <
[http://libraries.claremont.edu/sc/images/bockler-fp-
lg.jpg](http://libraries.claremont.edu/sc/images/bockler-fp-lg.jpg)>

Image 4: Valturio

Rare Book and Special Collections Division, Library of
Congress, LC-USZ62-110292.
<<http://hdl.loc.gov/loc.rbc/rosenwald.0007.1>>

Image 5: Biringuccio

Rare Book and Special Collections Division, Library of
Congress, LC-USZ62-110303.
<<http://hdl.loc.gov/loc.pnp/cph.3c10303>>

Image 6: DeBry

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