

Navigating the Hybrid Book

by Suzanne Karr Schmidt

POP-UP BOOKS THROUGH the Ages, the Newberry Library's winter 2023 exhibition, will reveal the long history of the most interactive forms of printmaking. Slated for February 10 through June 10, the show will focus on the changing applications of paper engineering techniques used in movable books from the fifteenth century to the present. One of the most ambitious examples of this technology is the volvelle, which dates to at least as early as c. 1250 AD. The calculating dials of the volvelle relate to printing, fold-out sheets, and to the book structure as a whole in complex and interesting ways.

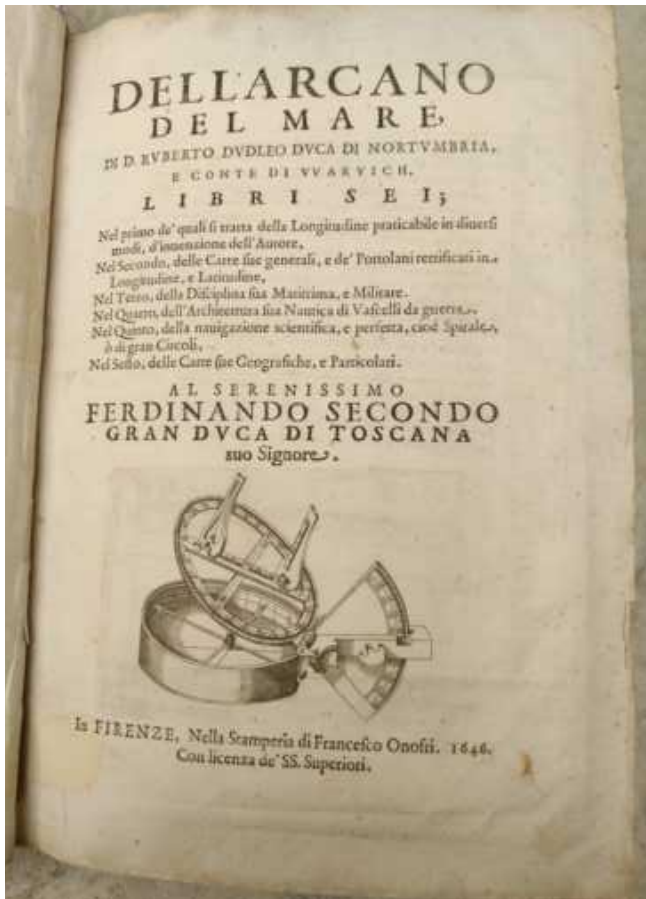
While calendar-designers and cartographers had been toying with manuscript and printed volvelles and liftable flaps throughout the fifteenth and sixteenth centuries, one of the most extensive and impressive books featuring movable dials appeared in the seventeenth century. Illegitimate British nobleman, privateer, and possible pirate Robert Dudley (1574–1649) spent the 1590s exploring the West Indies and South America. By the 1600s, he had hatched an ambitious scheme to influence his Medici patrons to support his claim to an elusive family birthright back in England, and to secure a post at the Florentine court. The result of his efforts to impress, Dudley's *Dell'Arcano del mare* (*Mysteries of the Sea*) was a six-part, four-volume, oversized folio atlas and ship-building manual, with some two hundred engraved fold-out maps, and a plethora of multi-layered, rotating volvelle dials and other movable instruments that were used for navigation and astronomical readings. It was finally published in 1646, not in Latin, but in vernacular Italian with a dedication to the current Grand Duke of Tuscany, Ferdinando II. A second

printing, with fewer maps, was published in 1661, after Dudley's death.

Effectively an atlas, but one with bibliographical complications, the *Arcano's* many maps and interactive instruments on fold-out sheets required 5,000 pounds of copper in the form of plates for the engraved illustrations, to say nothing of the hundreds of letterpress-printed pages. The paper for this project would also have been a substantial investment, and sheets on such a large scale must have been difficult to acquire in sufficient quantities. It took at least twelve years for the dedicated Florentine artist Antonio Francesco Lucini (1610–after 1661) to engrave all the plates. Lucini signed most of the engravings with a monogram which generally appears in the corners of the base sheet, using the other corners for all the different sequences for maps, illustrations, and instruments.



Sir Robert Dudley, Map, vol. 3, *Dell'arcano del mare* (Florence: Francesco Onofri, 1646), 111.



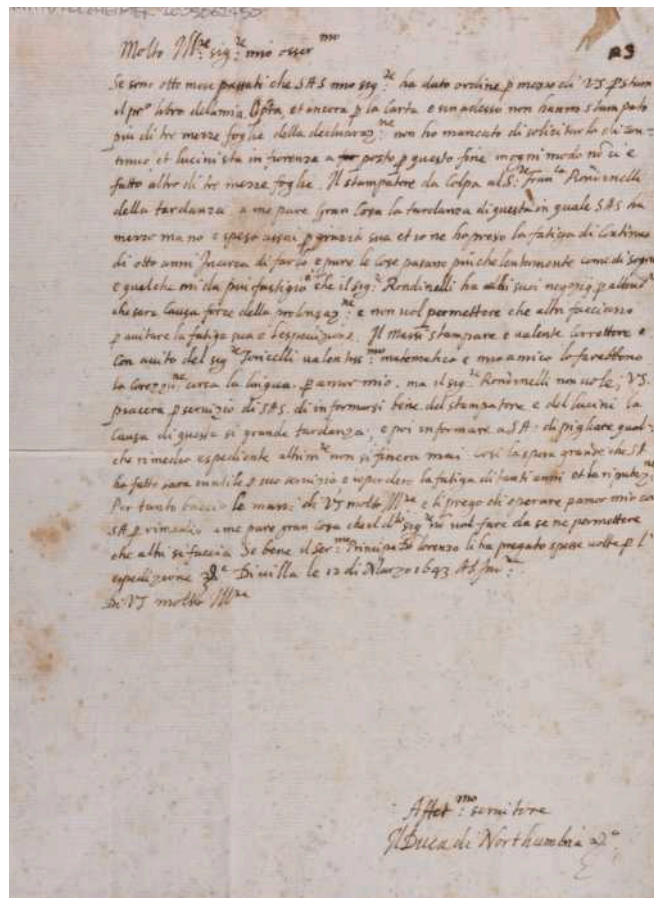
Sir Robert Dudley, Title Page, vol. 1, *Dell'arcano del mare* (Florence: Francesco Onofri, 1646), Title Page.

The smallest volume of Robert Dudley's masterpiece will be on view at the Newberry's exhibition, but even this sub-section of the publication (which comprises books I and II) is impressively thick and copiously illustrated. Books like Dudley's not only encompassed an enormous amount of knowledge, but also aimed to dazzle viewers with their over-the-top opulence. As an explorer, privateer, ship-builder, and tireless author, Dudley had many simultaneous careers, and seems to have wanted to include them all at once in this, his life's work.

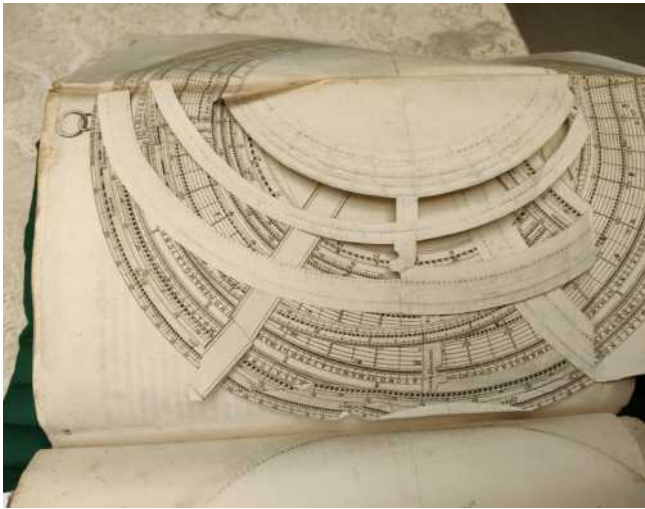
Dudley's imagination could barely be contained within the book boards. Directly following the title page of the first volume, he attached one of the longest and thinnest extant foldouts, measuring a whopping 22 x 72.7 cm (8 7/8 x 28 in). The engraved facsimile certificate or pedigree aimed to bolster his claim to legitimacy. This flourish was as calculated as it was lengthy, as Sir Robert Dudley was the unrecognized son of Queen Elizabeth I's favorite, also named Sir Robert Dudley. The engraving replicates a document given by a relation of the Medici family, Holy Roman Emperor Ferdinand II, who granted Dudley his grandfather's title of Duke of Northumbria in 1620. Still, his father's titles and his long-sought legitimacy would always remain elusive. Some copies of the *Arcano* bind this narrow engraving modestly into the gutter at the fold between the two engraved sheets, but the

Newberry's extends out of the book block to the right, as if to proclaim Dudley's improved social standing at high decibels. Dudley appended the Dukedom to his signature henceforth, including on the title page of the *Arcano* and in personal correspondence.

The Newberry's first edition (1646) of the *Arcano del Mare* is bound in three volumes of different sizes, none of which fit the contents particularly well, although the largest only requires the maps to be folded in by a few inches on the right. Dudley filled the work with so many oversized maps and volvelles that the two smaller bindings overflow with easily creased printed paper, to the detriment of the functioning of their contents. Consider the difficulty of volvelle-planning, a process that required thinking in three dimensions. Why did Dudley design so many, or for that matter, include them at all? His maps of unknown parts of the globe unquestionably offered new knowledge, if most urgently when they were first created. Though requiring large copper plates and sheets of paper, the maps usually only folded out once from the book block, most elegantly if the crease were aligned with a join between sheets. But in contrast, every layer, dial, and movable index of a volvelle required a separate copper plate, and the resulting parts had to be cut out and sewn together, either by the publisher or the bookbinder. Some were engraved on the verso of a same-size plate, or more minute parts could



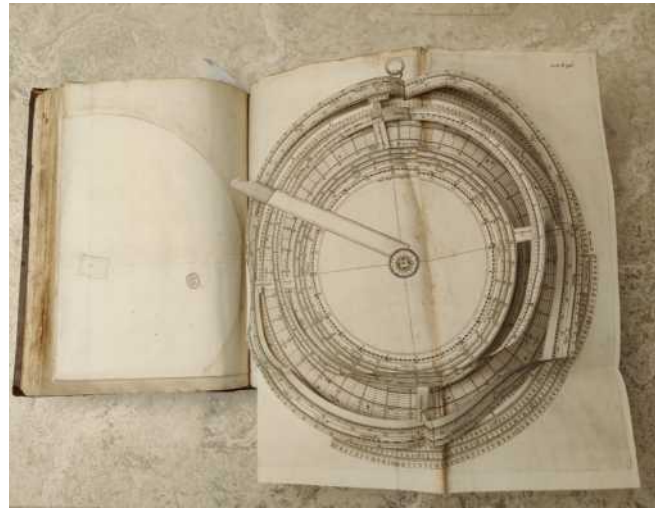
Sir Robert Dudley to Benedetto Guerrini, March 12, 1643.



Sir Robert Dudley, Volvelle 16, Folded, vol. 1, *Dell'arcano del mare* (Florence: Francesco Onofri, 1646).

be ganged up to save paper, but the complexity of different image types still required several sets of plate numbers in the book.

Since books were sold in the early modern period in sheets, to be bound later, what were the odds the completed book would always be assembled correctly? Without directions in the text for construction, it seems highly unlikely that these chaotic cutouts would be successfully bound without some help from Dudley and his printers. Indeed, it seems that most copies have the dials assembled correctly, by being sewn together and reinforced with similar thread. Perhaps the assembly of the volvelles was completed before sale, but the author could not control the shape of the final book. The size, structure, and decorations of the binding would be determined by the new owner, and clearly, not every bookbinder knew how to frame a working volvelle. As a result, the tiniest of the three Newberry volumes doubles the fold-out sheets into themselves so many times that some volvelles



Sir Robert Dudley, Volvelle 16, vol. 1, *Dell'arcano del mare* (Florence: Francesco Onofri, 1646).

are rendered nearly unusable! The lacy-looking dial depicted above (which will be on display in the exhibition, and deals with the calculation of lunar nodes) has been rendered insubstantial by a multiplicity of cut-out sections, making it particularly vulnerable to damage. The engraving measures almost 40 x 40 cm (15 ¾ x 15 ¾ in), bypassing the book block by about a quarter of the sheet at the bottom and at the right. The dial takes up nearly all of the sheet, showing only an economically small margin outside the platemark.

Much of Dudley's *Arcano* text was already extant in manuscript form from around 1610, so why did it take until 1646 to appear in print? Could it have been due to the volvelles? A letter in Dudley's own hand, also owned by the Newberry, holds some clues. Dudley laments the paper shortages and editorial woes still facing him in 1643, when the letter was written. He pleads with his patron to let his mathematician friend, Evangelista Torricelli, edit the manuscript, and gripes over how long the artist (Lucini) is taking. The book finally



Sir Robert Dudley, Pedigree, vol. 1, *Dell'arcano del mare* (Florence: Francesco Onofri, 1646).

appeared in 1646–47 when Dudley was in his 70s, and some of his innovative maps had become outdated. It must have been a very expensive publication as well, given its size. Still, there was a 1661 posthumous version that was expanded further, so the expense of the edition and the potential obsolescence of the maps was not enough to curtail demand. Some examples of Dudley's *Arcano*, like the one at Harvard's Houghton Library (accessible at t.co/2YOYktNOqy), are admittedly better behaved than the Newberry's, and are entirely bound with extended margins so that all the components lie flat, but where is the inventive fun in that?! To see the messiest folding job of all in its multi-layer, immovable mayhem, you'll have to wait until the exhibition opens at the Newberry in February!

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