

Article



The Genealogy of an Image, or, What Does Literature (Not) Have To Do with the History of Computing? : Tracing the Sources and Reception of Gulliver's "Knowledge Engine"

Johannah Rodgers

School of Arts & Sciences, The City University of New York, 300 Jay St, Brooklyn, NY 11201, USA; JRodgers@CityTech.cuny.edu

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Abstract: The illustration of the "knowledge engine" included in early editions of *Gulliver's Travels* is an engraving of a sketch from the notebook of Lemuel Gulliver. In other words, it is a purely fictional object. Yet, Swift's fictional invention and its graphic representations have become part of the documented historical lineage of computing machines. Furthermore, one of Swift's purposes for inventing the "knowledge engine" was to satirize the scientific and technical cultures that now claim it as part of their history. As one piece of the elaborate discursive and material code of *Gulliver's Travels*, "the knowledge engine," its sources, and its reception offer some unique insights into the relationships that exist amongst factual and fictional narratives, scientific and humanistic discourse, words and images, and print and digital technologies. Although numerous scientific and philosophical texts have been cited as possible sources informing Swift's satirical invention, this article considers a lesser known one, John Peter's 1677 pamphlet *Artificial Versifying, or the Schoolboy's Recreation*, which is itself a print-based textual machine for generating lines of Latin hexameter verse.

Keywords: computational poetics; Jonathan Swift; Gulliver's Travels; history of computing; book history; cultural and media studies; book illustration; history of writing instruction

"I am aware that the statements contained in this Letter may perhaps be viewed as something more than Utopian, and that the philosophers of Laputa may be called up to dispute my claim to originality. Should such be the case, I hope the resemblance will be found to adhere to the nature of the subject rather than to the manner in which it has been treated."

-Charles Babbage (1822, "Letter To Sir Humphry Davy")

"In the 'Voyage to Laputa,' there is a description of a machine for the evolving of science automatically. 'By this contrivance, the most ignorant person, at a reasonable charge, and with little bodily labor might write books in philosophy, poetry, politics, law, mathematics, and theology without the least assistance from genius or study.""

---Charles Sanders Peirce (1887, "Logical Machines")

"In 1726 Jonathan Swift published a description of a wonderful machine, made of equal parts of irony, sarcasm, and mockery, that would automatically write books on all the arts and sciences without the least assistance from genius or study."

—Eric A. Weiss (1985, "Jonathan Swift's Computing Invention")

As graphic image, the illustration of what has come to be known as the "knowledge engine" included in early editions of Gulliver's Travels is an engraving of a sketch from the notebook of Lemuel Gulliver (Figure 1). In other words, it is a purely fictional construct. Yet, this fictional invention and its graphic representations have been referenced in scientific and technical articles throughout the 19th and 20th centuries. In fact, so widespread is the notion that the "knowledge engine" is a significant and possibly "originary" source in the history of computing and artificial intelligence that this fiction now has its own Wikipedia page, which documents it as "possibly the earliest known reference to a device in any way resembling a modern computer" (Figure 2). That the Wikipedia page presents the digital image of a print engraving of the "knowledge engine" in such a way as to suggest some association between it and a semiconductor promises only to propel the never ending satire of *Gulliver's Travels* by further advancing discursive structures connecting the invention to the history of computing devices (Figure 3). Frequently referenced by commentators and critics, who have pointed to the possible connections between it and a range of sources related to the search for a universal or philosophical language, including Raymon Llull and his commentators, John Wilkins, Athanasius Kirchner, and Gottfried Leibniz, the "knowledge engine" was connected by the Swift scholar John Chalker in 1967 to a much lesser known source, John Peter's (1677) pamphlet entitled Artificial Versifying, or the Schoolboy's *Recreation* ¹(Figure 4).

> <u>Travels Into Several Remote Nations</u> by Lemuel Gulliver (Benjamin Motte, 1726)

74 A V O Y A G E in common their feveral Collections.

H E affured me, that this Invention had employed all his Thoughts from his Youth, that he had employed the whole Vocabulary into his Frame, and made the ftricteft Computation of the general Proportion there is in the Book between the Numbers of Particles, Nouns, and Verbs, and other Parts of Speech.

I made my humbleft Acknowledgment to this illuftrious Perfon for his great Communicativenefs, and promifed if ever I had the good Fortune to return to my Native Country, that I would do him Juftice, as the fole Inventer of this wonderful Machine; the Form and Contrivance of which I defired leave to delineate upon Paper as in the Figure here annexed. I told him, although it were the Cuftom of our Learned in *Europe* to fteal Inventions from each other, who had thereby at leaft



Figure 1. Illustration of "the Engine" from Book 3 of the second edition of Jonathan Swift's *Travels Into Several Remote Nations by Lemuel Gulliver* (Benjamin Motte, 1726) (Swift 1726).

¹ See Scott (1814), Koch (1996), Knowlson (1975), Cornelius (1965), and Swift (1978). For a discussion of the relationships amongst the characters included in the graphic depiction of the "knowledge engine" and their significance in relation to conceptions of China, Chinese writing, the Far East, and the search for "representational legitimacy" in the long 18th century, see David Porter's (1993) discussion in *Ideographia* (p. 24) and Lydia Liu's (2011) discussion in *The Freudian Robot* (p. 40).

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Main page Contents Featured content Current events Random article Donate to Wikipedia Wikipedia store Interaction Heip About Wikipedia Community portal Recent changes Contact page Tools What links here Related changes Upload file Special pages Permanent link Page information	The Engine From Wikipedia, the free encyclopedia The Engine is a fictional device described in <i>Gulliver's Travels</i> by Jonathan reference to a device in any way resembling a modern computer. ^[11] It is a c It is found at the Academy of Projectors in Lagado and is described thus by " Every one knew how laborious the usual method is of attaining to contrivance, the most ignorant person, at a reasonable charge, and books in philosophy, poetry, politics, laws, mathematics, and theolog genius or study." He then led me to the frame, about the sides, wher twenty feet square, placed in the middle of the room. The superfices about the bigness of a die, but some larger than others. They were a bits of wood were covered, on every square, with paper pasted on th the words of their language, in their several moods, tenses, and dec professor then desired me "to observe; for he was going to set his ee command, took each of them hold of an iron handle, whereof there w frame; and giving them a sudden turn, the whole disposition of the w commanded six-and-thirty of the lads, to read the several lines softly where they found three or four words together that might make part remaining boys, who were scribes. This work was repeated three or was so contrived, that the words shifted into new places, as the square is a contrived, that the words shifted into new places, as the square is a so contrived.	n Swift in 1726. It is possi levice that generates perr y Swift: o arts and sciences; where with a little bodily labour, i y, without the least assist eof all his pupils stood in was composed of severa all linked together by slenc herm; and on these papers lensions; but without any ngine at work." The pupils vere forty fixed round the vords was entirely change t, as they appeared upon 1 of a sentence, they dictat four times, and at every th are bits of wood moved up	bly the nutation pas, bly might ance franks. I bits der win were order. ., at hi edges d. He the fra ed to t urn, th oside	e earliest know ons of word s write from .t was of wood, res. These written all The s s of the then mre; and the four the engine down." ^[2]	Wn ets.	and the second s

Figure 2. Screenshot of The Engine. *Wikipedia: The Free Encyclopedia*. San Francisco: Wikimedia Foundation, Inc. 12 May 2016.

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WIKIPEDIA The Free Encyclopedia Main page Contents Featured content Current events Random article Donate to Wikipedia Wikipedia atore Interaction Help About Wikipedia	Electronic c From Wikipedia, the free e An electronic circuit is and diodes, connected b and wires allows various performed, and data car Circuits can be construct to create interconnection solder the components t interconnections are for arsenide. ^[2]	Incuit ncyclopedia composed of individual electronic components, such as resistors, trar y conductive wires or traces through which electric current can flow. T simple and complex operations to be performed: signals can be amp be moved from one place to another. ^[1] ed of discrete components connected by individual pleces of wire, bu s by photolithographic techniques on a laminated substrate (a printed these interconnections to create a finished circuit. In an integrated c ned on the same substrate, typically a semiconductor such as silicon	nsistors The col lified, o t today I circuit ircuit o or (les	s, cap mbina compu v it is r t boar r IC, t s com	acitors, induc tion of compu- tations can b nuch more ca d or PCB) an the componen monly) galliu	tors onents be bommon d ths and m	KIS S		
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Figure 3. Screenshot of Electronic Circuit. *Wikipedia: The Free Encyclopedia.* San Francisco: Wikimedia Foundation, Inc. 12 May 2016.



John Peter's Artificial Versifying (John Sims, 1677)

Figure 4. Title page from John Peter's Artificial Versifying (John Sims, 1677).

Made up of a brief introduction and detailed instructions for using its enclosed tables, each of which is comprised of a variable number of letters and blank spaces, Peter's pamphlet is itself a tool for the generation of lines of Latin hexameter verse (Figure 5). Advertised by Peter and his publisher John Sims as a publication that will allow anyone of the "meanest capacity" to assemble verses in Latin, the rules of Peter's game are as follows: To begin, readers are instructed to select "six of the nine figures called digits" from 1–9. Using the figures 4,6,7,1,8,2 as an example (Figure 6), Peter explains how these, when applied to the tables, will result in the verse line, "Tristia fata tibi producunt sidera prava", which he does not translate for the reader, but that can be translated as "sad fate will produce perverse stars", (Google Translate, 19 May 2016 3:55 p.m. EDT) or, alternately, as, "sad fate brings to light crooked stars" (Figure 7).



Six Versifying Tables from John Peter's <u>Artificial Versifying</u> (John Sims, 1677)

Figure 5. The Six Versifying Tables from John Peter's Artificial Versifying (John Sims, 1677).



Figure 6. One example of John Peter's versifying tables in use. Applying the six digits 4, 6, 7, 1, 8, 2 to the six tables according to Peter's guidelines, a user can generate six Latin words that will form one line of hexameter verse (*Artificial Versifying*, John Sims, 1677).



Figure 7. The resulting Latin verse line based on the application of the six digits 4, 6, 7, 1, 8, 2 (*Artificial Versifying*, John Sims, 1677).

Describing each one of the figures as "so many respective keyes to the six tables" in his introduction, Peter offers a further analogy between the musical performer and his instrument and between a "carpenter, glasier, or brick layer" and his rule to illustrate the numerous advantages that have resulted from the application of scientific knowledge via tools used even by those who do not understand the theories through which such tools operate. He then concludes his introduction by suggesting that "the Latinist and the poet" have heretofore internalized the set of compositional tools that Peter is now making available to even those who cannot read or write.

In proposing that verse composition is a kind of advanced calculation that some have mastered but that all could have access to via a tool, such as his, which, like other tools and instruments, allow those who are "altogether ignorant of arithmetick, and of all literature" to perform tasks reliant upon a knowledge of both, Peter is offering proof of how written messages can be made to function instrumentally, even by those who have no understanding of their significance or rationale. Thus, in suggesting that reading and writing practices may exist in some relation to computation and to the tools and technologies with which computational acts are materialized, shared, and distributed, Peter's tables are an early exploration of the potential performances enabled through the separation of a rhetorical act (the making of meaning) from the rhetorical context to which it is attached (the rationale for the making of meaning).

In terms of the reception of Peter's pamphlet, Richard Steele's (1726) reference to it in a 1711 *Spectator* article dedicated, ostensibly, to satirizing the invention is significant not only because its inclusion in the magazine suggests that Swift would have been aware of the pamphlet but also in light of the terms used to describe and interpret it. In the brief notice that forms part of the magazine's ongoing coverage of "projectors", or "mad" inventors, Steele describes Peter's project as a kind of "poetical logarithm", and in doing so connects it to the work of the 17th century Scottish mathematician John Napier (1614), who, with the publication of his 1614 *Logarithmorum Canonis Descriptio*, is the first to apply the term "logarithm" to the computational tables published in the book, and who is listed on the book's title page as both the author of the book and the inventor of its contents (Figure 8). The epigraph on the pamphlet's title page "Arithmeticae ignarum hic ingrediatur", "Let those ignorant of arithmetic enter here", a play on the (in)famous epigraph attributed to Pythagoras, "Nemo arithmeticae ignarum

hic ingrediatur" (Let none ignorant of arithmetic enter here) connect it to the history of educational textbook publishing, as does the later use of its tables, which are reprinted and referred to as a pedagogic tool in 18th and 19th century math and language textbooks (Bailey 1721; Lowe 1749). The pamphlet's publicity, its later two editions, and its pedagogic applications may help to explain how it came to be used as the "software" for an actual writing machine, the Eureka, constructed by John Clark and exhibited in London in 1845 (Figure 9).



John Napier's Mirifici Logarithmorum Canonis Descriptio, 1614

Figure 8. Title page from John Napier's Logarithmorum Canonis Descriptio (Andrea Hart, 1614).

John Clark's Latin Versifying Machine The Eureka (1845)



Figure 9. John Clark's Latin versifying machine, The Eureka (**top**) and an entry ticket (**below**) to the machine's exhibition at the Egyptian Hall, Piccadilly (Alfred Gillett Trust).

While all print satire relies on the tensions existing between ideas and their material presentation, Swift's entire project in the work entitled Travels into Several Remote Nations by Lemuel Gulliver originated in part as a satire of "the book" as material and socio-economic phenomenon. A novel that is in its entirety "regulated by an inclusive fiction of the text" (Castle 1993, p. 59), Gulliver's Travels is also dedicated, particularly in the third part, to satirizing a number of scientific inventions and the roles of printers and the press in verifying and securing ownership of them (Nicolson and Mohler 1937a; Lund 1983; Lynall 2012; Smith 1990; Kiernan 1971; Ehrenpreis 1957, 1989). In fact, in the scene in which the details of the "wonderful machine" are recorded, Gulliver functions both as draughtsman and publisher promising to not only document the invention accurately but to secure the professor's ownership of it should he ever have the opportunity to share his graphic description with others. In this context, it is then all the more noteworthy that the contrivance that Swift created to satirize instrumentalist approaches to knowledge production is received as "knowledge engine" at least in part because of the publishing technologies and book trade practices of his time and ours (Bullard and McLaverty 2013; Karian 2014). For, as was the case with the other graphic elements, the author's frontispiece and four maps, also included in the early editions of the novel, it now appears that Swift's publisher, Benjamin Motte, played a significant role in overseeing their design and production.² Fixed by a graphic image and functioning as a metonym for Swift's entire project in the third part of the novel, the "knowledge engine" reveals the unique tensions that have always existed amongst Swift's elaborate, original "code" that is the verbal text of the third part of Gulliver's Travels; the numerous scientific, cultural, and political sources being satirized; and the printing and publishing technologies that contributed to the production of the first edition of the material book and that continue to enable the text's remediation and distribution.

Conflicts of Interest: The author declares no conflict of interest.

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² That Swift and his friends—Pope, Ford, Gay, and Arbuthnot—engaged in various acts of satirical forgery is well known, making it seem all the more likely that they may have been involved in the creation of the fictional maps modeled to resemble those of the famous map maker Herman Moll or the inclusion of a portrait of a fictional character as authorial frontispiece (Bracher 1944; Didicher 1997). However, whether or not Swift was involved with the design and production of the four maps and one "diagram" included in the first edition of the book is still, despite almost a century of scholarly attention, an issue yet to be resolved through documentary evidence (Williams 1925; Hubbard 1922; Halsbland 1985; Sena 1990). What we do know from Swift's correspondence is that he was consulted by his publisher regarding the illustrations for the 1747 edition and that he authorized the inclusion of the maps and diagram in the 1735 Faulkner edition (Barchas 2003; Swift 1912a, 1912b, 1912c, 1912d).

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