



the machine and the cloud

PETER HARRINGTON
LONDON

Frieze Masters

Gloucester Green, Regent's Park, London

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L O N D O N

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AN EXHIBITION DISPLAYED AT

Frieze Masters

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the machine and the cloud



In his 1962 book *The Gutenberg Galaxy: The Making of Typographical Man*, Marshall McLuhan argued that the printing press wrought a profound change in human consciousness, especially as it occurred at about the same time as the emergence of perspective in art. Some of the unexpected consequences of this decisive moment, according to McLuhan, were the creation of nationalism, dualism, the dominance of rationalism, a drive towards homogeneity and repeatability in culture, and alienation of individuals.

These are large claims, but we do not have to accept them in their entirety to agree with McLuhan's general point that the invention of the printing press was one of the most significant technological advances ever to affect human consciousness. What had previously been held in the nebulous collective memory of oral and scribal culture was captured by mechanical means, reified in black ink on a white page.

Now, with the invention of computing, we seem to have reached another crucial turning point. The sophistication of our machines has grown to the point that data is no longer held on the printed page, but is migrating to the cloud. What will the unexpected consequences of this decisive moment prove to be?

Our exhibition is an exploration of some of these themes, taking us from Gutenberg to Google, from Acts to Apple. From a leaf of the first complete printed book, to a brochure for the most iconic of personal computers, along the way we encounter books showing mechanical marvels both real and imaginary, battles between man and machine, the impact of mechanization on thought, politics and art, and harbingers in print of the coming computer age.

We are immensely grateful to Sir Norman Rosenthal, who conceived and curated this exhibition.

Adam Douglas
Senior specialist, Peter Harrington

nothing new

(GUTENBERG, Johann, c.1400–1468.)
Single leaf from the Bible. [Mainz: Johann
Gutenberg and Johannes Fust, about 1455]

The first complete book printed by a mechanical process from movable type was the Bible printed by Johannes Gutenberg in Mainz, in present-day Germany. The first finished copies were probably available in 1455.

The invention of printing did not emerge *ex nihilo*; it involved a combination of available technologies. Printing already existed in the form of woodcuts and blockbooks with carved lines of text. The codex format, a book with folded and sewn sheets, had been popular since Roman times and was strongly associated with the spread of Christianity. Paper had been manufactured in Europe since the middle of the twelfth century. The mechanism of the printing press was adapted from machines used in pressing olives and grapes. The engraving skills needed to cut metal types had long been shared among metal-workers, goldsmiths and coin-makers.

Gutenberg did not want his invention to startle with its newness. His typeface resembled contemporary Gothic bookhands, and contained many variants to break up its uniformity. The *mise-en-page*, with two columns of justified text, was designed to resemble existing manuscripts. The proportions of the text area in relation to the untrimmed page conformed loosely to the golden ratio familiar from antiquity. Gutenberg had tried and failed to print the initial capitals in red, so it was left to specialist scribes, rubricators, to highlight the text in colours by hand and to supply page headings, just as they would have decorated a manuscript.

Nor was the text a new work. Gutenberg did not of course print the Bible in the vernacular, but in the traditional Vulgate text, the late fourth-century Latin translation of Jerome, which was affirmed about the same time at the Council of Trent as the authorized version of the Catholic Church.

Thus, one of the most revolutionary technological changes in human history appeared in the guise of the nothing new.

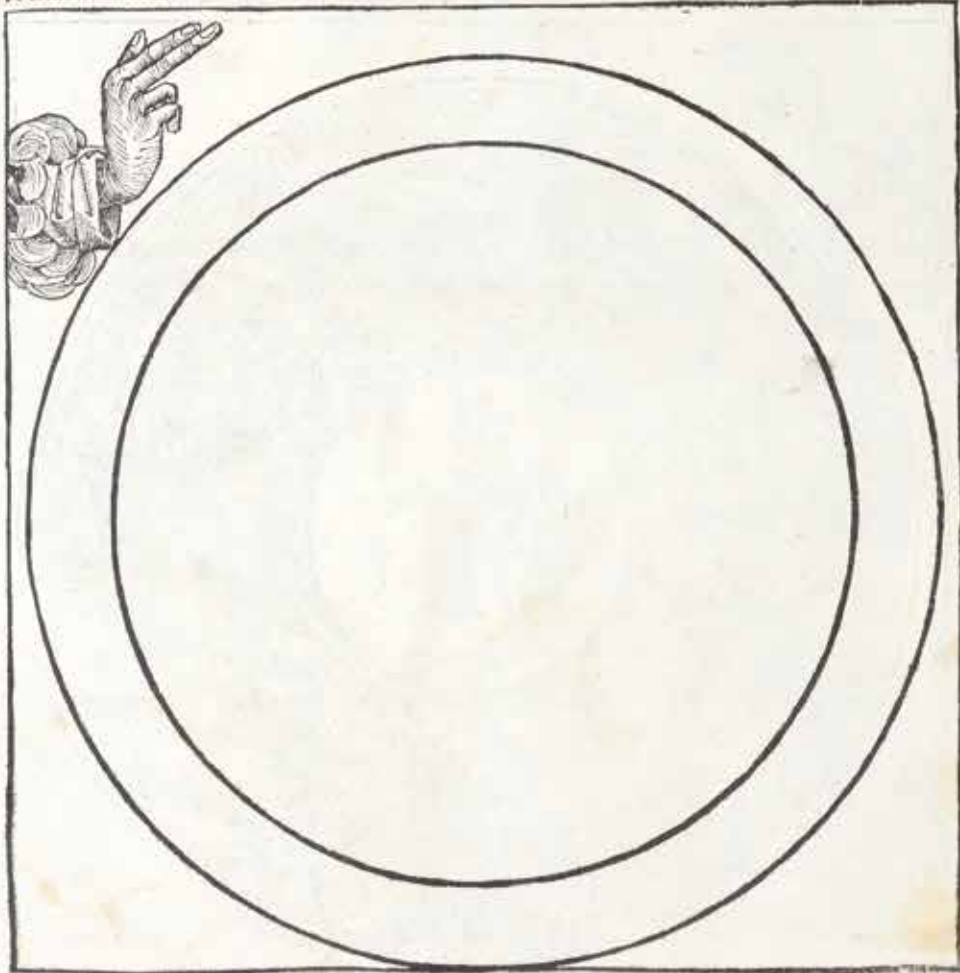
autem te: permittite michi loqui ad populum. Et cum ille promississet: paulus stans in gradibus annuit manu ad plebem: et magno silentio facto allocutus est lingua hebraea dicens. **XXII**

Qui fratres et patres: audite quā ad vos nūc reddo rationē. Cū audissent autē quia hebraea lingua loquitur ad illos: magis prestiterunt silentium. Et dixit. Ego sū vir iudeus natus iharsa alitie: nutritus autē in ista ciuitate secus pedes gamaliel-ecudici iuxta veritatē paterne legis: emulator legis sicut et vos omnes estis hodie: q̄ hāc viam persecutus sum usq; ad mortem: alligans et tradens in custodias viros ac mulieres: sicut princeps sacerdotū michi testimonium reddidit et omnes maiores natū: a quibus et ep̄las accipies ad fratres damascū peregrebam ut adducerem inde vindictos in iherusalē ut punirent. Factū est autē eunte me et appropinquāte damasco media die subito de celo circumfulsit me lux copiosa: et decedens in terram audiui vocem dicentem michi. Saul le saule: quid me persequeris? Ego autē respondi. Quis es dñe? Dixitq; ad me. Ego sum ihesus nazarenus: quē tu persequeris. Et qui mecum erant lumen quodē viderūt: vocem autē non audierūt nisi qui loquebāt mecum. Et dixi. Quid facis dñe? Dñs autē dixit ad me. Surge vade damascū: et ibi tibi dicetur de omnibus q̄ te oportet facere. Et cū nō viderem p̄ claritate luminis illius: ad manū dedudus a comitibus: veni damascū. Ananias autē quidam vir scdm̄ legem testimonium habēs ab omnibus colitantibus iudeis: veniens ad me et stans dixit michi. Saul frater respice. Et ego eadē hora respexi in eū.

At ille dixit. Deus patrum nostrorum preordinauit te ut cognosceres voluntatem eius: ut videres visum et audires vocem ex ore eius: quia etis testis illius ad omnes homines eorum que vidisti et audisti. Et nunc quid moraris? Resurge et baptisare: et ablue peccata tua in uocato nomine ipsius. Factū est autē reuertenti michi in iherlīm et oranti in templo: fieri me in stupore mentis: et videre illū dicentem michi. Festina et exi velociter ex iherlīm: quoniam nō recipiēs testimonium tuū de me. Et ego dixi. Domine: ipsi sciunt quia ego etiam cōcludens in carcere: et cedens per synagogas eos q̄ credebant in te. Et cū fundretur sanguis stephani testis tui ego stabā et cōsentiebā: et custodiebā vestimenta interficiētiū illū. Et dixit ad me. Vade: quoniam ego in nationes longe mittā te. Audiebāt autē eū usq; ad hoc verbum: et leuaueūt vocem suā dicentes. Tolle de terra huiusmodi. Non enim fas ē cum viuere. Conferantibus autē eis et proicientibus vestimenta sua et puluerem instantibus in aciem: iussit tribunus induci eū in castra et flagellis cedi et torqueri eū: ut sciret propter quā causā sic acclamarent ei. Et cū astinxisset eum loris: dixit astanti sibi centurioni paulus. Si hominem romanū et iudicatum licet vobis flagellare? Quo audito centurio accessit ad tribunum: et nūciauit ei dicens. Quid adurus es? Hic enim homo ciuis romanus est. Accedens autē tribunus dixit illi. Dic michi si tu romanus es. At ille dixit. Etiam. Et respondit tribunus. Ego infra summa ciuitatem hāc consecutus sum. Et paulus ait. Ego autē et natus sū. Proinus ego discesserūt ab illo qui cum torturi erāt. Tribunus quoq; timuit

De opere prime diei.

Quoniam deus fiat lux. Et facta est lux. Et vidit deus lucem quod esset bona. Et dimisit lucem a tenebris. Appellavitque lucem diem. Et tenebras noctem. Factusque est vespere et mane dies unus. Moyses mirum artum suum divina non humana industria totius nature secretis apte conveniens in suo libro ostendit. quod omnem totius creaturam et eloquentiam et ingenium superat. Quod si enim deus. qui est vera lux. lucemque diligens. omnia in luce faciens. Unde facta est lux rectissime inchoavit. Que tribus diebus usque ad quartam (in qua luminaria formata sunt) creavit suo diem naturale pegit. Et tunc nobilissimum corporum spirituali creature finitimum atque optimum. sua pulchritudines maxime conicans. Cum prout minimum totius mundi spatium repleat. Ideo lux sola est. quam mundus totus bonus et pulcher est per imaginem vmbrosantis similitudo. Statim tractate spiritum aquas illas et per quadam subiectum iussu dei artificis exorta est lux decus et splendor: ut nubes lucida superiores mundi partes sua claritate illuminans. ut in diluculo fieri solet: per modum solis agitata: superius emisperium: et vicissim inferius illuminans. Et postea dimisit: ut tenebre et lux diversa emisperia vendicaret. Appellavit lucem diem a claritate quam purgat tenebras: tenebras a nocendo noctem. ne oculi viderent. Secundum hanc prout dimensionem diem fecit et noctem. quam spatia et orbis temporum perpetuos ac volubiles quos vocamus annos alterna per vices successionem efficiat. Sic factum est dies unus: qui fuit per dies seculi: non per dies omnium ideo non per hunc vnde notat est. Et sic eo die fecit deus materiam informem. Angelos. Celum. lucem. terram. aquam et aerem etc. Spiritusque terre binas partes duas inter se diversasque constituit. scilicet orientes occidentesque. Ex quibus oriens deo accendit. quia ipse luminis fons et illustrator est rex. Et quod omni nos faciat ad vitam sempiternam. Occidens autem perturbare illi prout mentis ascribit. quod lumen abscondat. quod tenebras spiritum inducat. Et quod homines faciat occidere et interire perire. Nam sic lux orientis est. In luce autem vite ratio versatur. sic occidens tenebre sunt. In tenebris autem mors et interitus principium. Deinde alteras partes eadem ratione dimensus est: meridiem ac septentrionem: quam partes illas duabus societate iungit. Ea est quam sol calore flagrantior prout est et coheret orienti. Et illa quam frigidioribus et perpetuo gelu torquet. eiusdem est autem extremus occasus. Nam sic orientis sunt luminis tenebre: ita frigus calori. Et igitur calor luminis est primus: sic meridiem orienti: ut frigus tenebris. ita plaga septentrionis occasus. Nec omnia opus quarte diei vberius manifestabit.



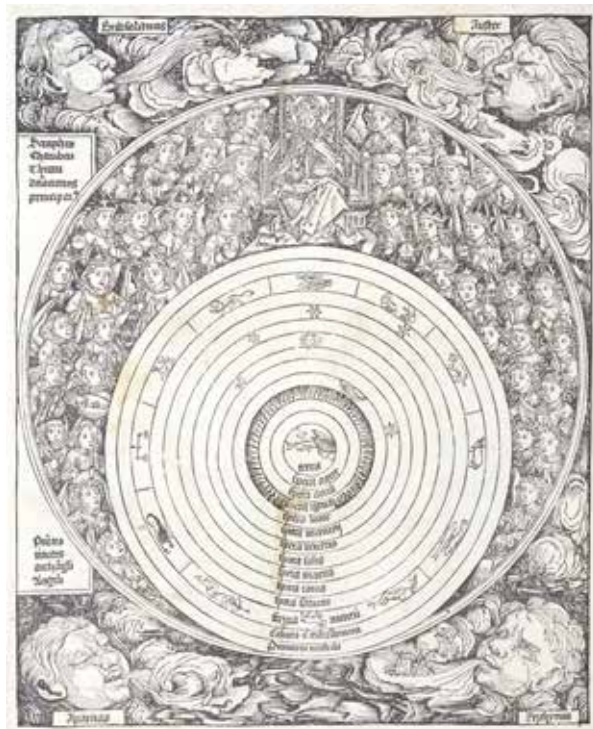
order from the void

SCHEDER, Hartmann (1440–1514). *Liber chronicarum*. Nuremberg: Anton Koberger, 12 July 1493

The Nuremberg Chronicle is one of the most fully illustrated texts of the fifteenth century. Written by Hartmann Schedel with woodcut illustrations by the Michael Wolgemut workshop, including the young apprentice Albrecht Dürer, it is a masterpiece of complex design.

Published in 1493, the book chronicles the entire history of the world. To render the Creation in graphic form, the woodcuts visualize the cosmos as a sequence of concentric circles ultimately enclosing the central circle of the earth itself, surrounded by the other three elements (water, air, and fire), continuing with circles representing the known planets, and the fixed stars and crystalline heavens. The emergence of order from chaos, of matter from nothingness, is conceived within an orbital pattern. The first woodcut shows the void encompassed within a simple geometric form.

This was the generalized and Christianized world-view at the time, reconciling the Platonic theory of the four elements with Ptolemaic cosmography. The harmony of the spheres, the mystical sound these circles were supposed to make as they rotated, was a pervasive metaphysical notion, influencing scholars of cosmology, mathematics, music, and religion.

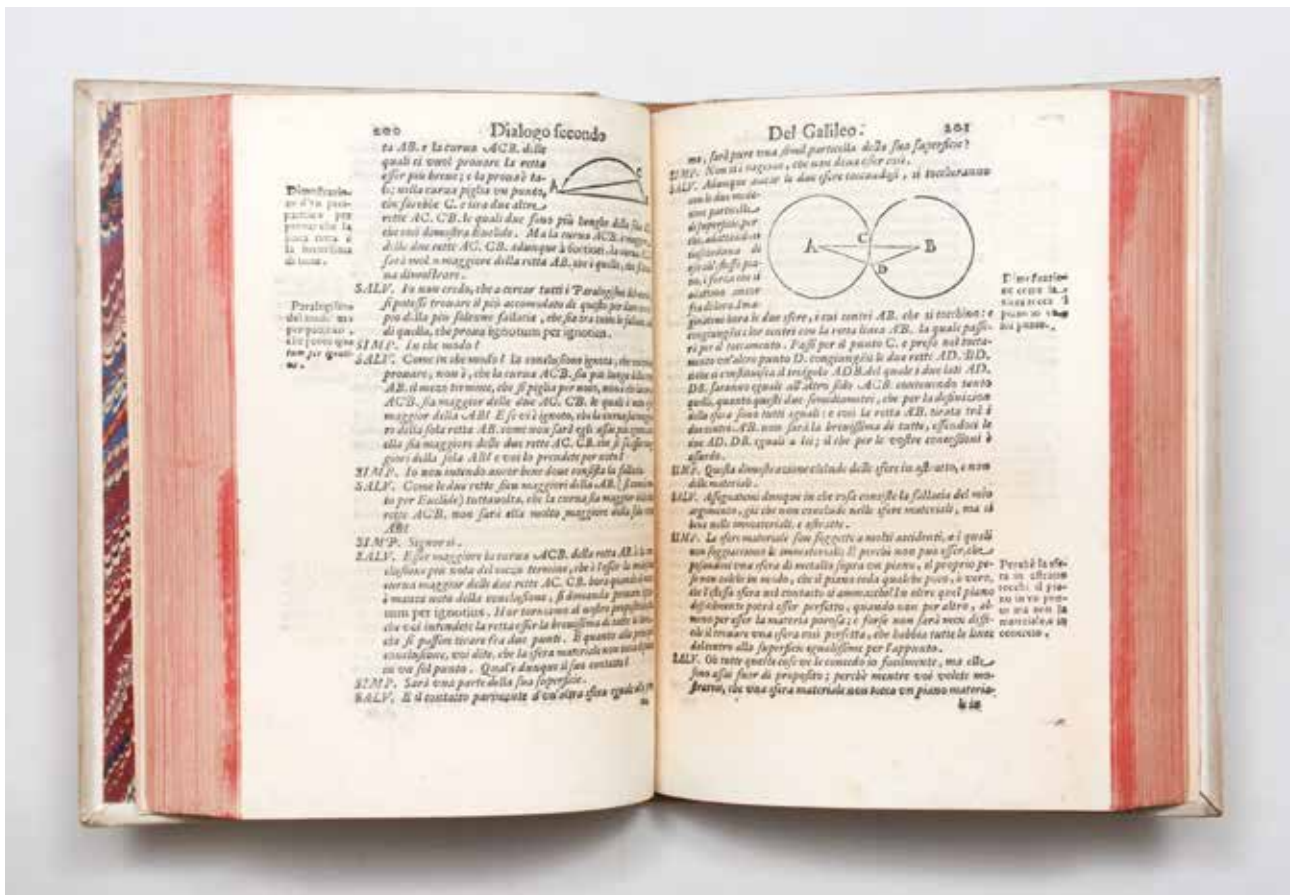


When Copernicus questioned the traditional ordering of the planets, in his book *De revolutionibus orbium coelestium* (On the Revolutions of the Celestial Spheres), published just before his death in 1543, he did not abandon the traditional concentric visualization; he simply moved the Sun to its centre.

GALILEI, Galileo (1564–1642). *Dialogo*.
Florence: Giovanni Batista Landini, 1632

Galileo's book in support of the heliocentric theory, *Dialogo sopra i due massimi sistemi del mondo* (Dialogue Concerning the Two Chief World Systems), published in 1632, has only a few rudimentary diagrams. The most elaborate illustration in the book is the opening engraved frontispiece of three scholars meeting. Galileo invites the reader to treat cosmology as an everyday matter to be settled in conversation.

He writes his text in the vernacular, the identities of the three speakers laid out on the page in the manner of a play. Adopting the register of low comedy, Galileo puts the traditionalist arguments against the Copernican position into the mouth of his character Simplicio, or "simpleton". The pope, whose views these were, did not find the joke amusing.





machine books

The dreams of early modern technologists were expressed in a number of machine books, elaborately illustrated books dating from the Renaissance. Some were descriptive in nature, accurately presenting current technological practices and artefacts. They rendered accessible to a general readership what had hitherto been hidden, known only to those inducted into the secrets of a particular technology through the medieval guild system.

AGRICOLA, Georgius (1494–1555). *De re metallica*, libri XII. Basel: Hieronymus Froben and Nicolaus Bischoff, March 1556

Agricola's book, *De re metallica* (*On the Nature of Metals*), was published in 1556. The author was a German physician and chemist, who had spent several years in Bohemia and Saxony, studying minerals and mining techniques. Extracting valuable metals from rocks was the practical expression of the ancient dream of alchemy.

The book is copiously illustrated with woodcuts, detailing such occult operations as fire-setting underground. The dwarfish, hooded figures of the German miners in these sixteenth-century woodcuts find later echoes in Wagner's Ring cycle and in Tolkein's *The Hobbit*.





Verum si riuus tantam aquarum copiam, quanta machinam proximè
 explicatā uersare potest, non suppeditat, quod uel natura loci fit, uel æstiuo
 n tempore

RAMELLI, Agostino (1531–c.1610). *Le diverse et artificiose machine.* Paris: the author, 1588

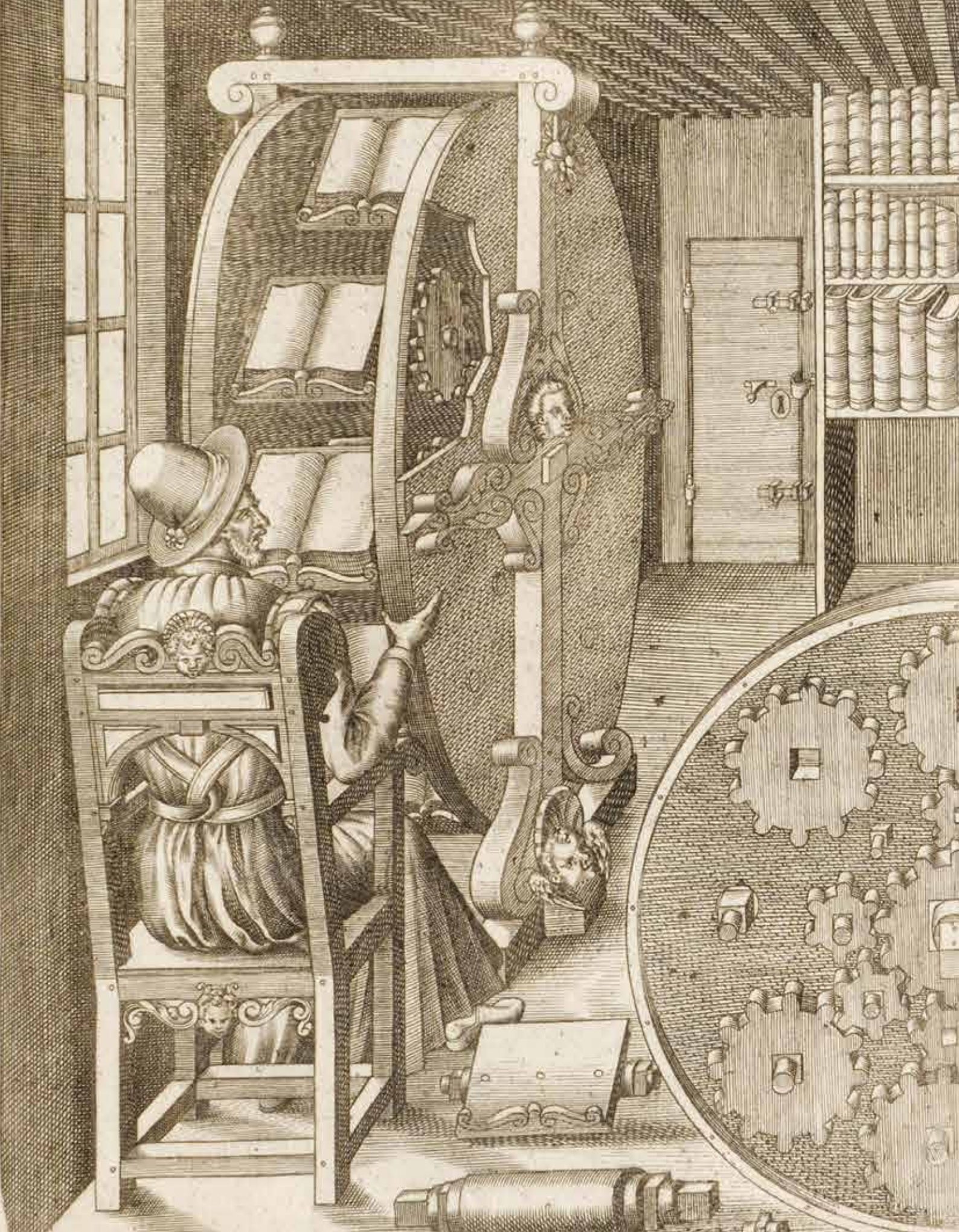
In 1588 an Italian military engineer, Agostino Ramelli, published *Le diverse et artificiose machine*, a book that presented technology as a spectacle for the enjoyment and instruction of the reading audience. The majority of the devices that Ramelli pictured were ordinary enough—110 water pumps, 20 grain mills, 14 military screwjacks for breaking down doors or forcing iron grates, 10 cranes, and so on—but each design was different, fantastically elaborate, and pushed hard against the constraints of the possible. Some of Ramelli's novel mechanisms were later incorporated into practical devices; others remain unused.

As Eugene S. Ferguson, Ramelli's modern editor, wrote: "Ramelli was answering questions that had never been asked, solving problems that nobody but he, or perhaps another technologist, would have posed."

One of the most fantastical designs is Ramelli's book wheel, which has been called the world's first information retrieval system. Ramelli proposed using epicyclic gearing, a technology previously only used in astronomical clocks, to keep the shelves at the same angle as they rotated.

As an elaborate solution to a relatively minor problem—that of reading heavy folios without moving from one's chair—it might be thought that Ramelli's design would remain confined to the pages of his book. However, several working versions were built in the sixteenth and seventeenth centuries, fourteen examples of which still exist. These cumbersome book wheels brought the early modern world tantalisingly close to the dream of being able to consult any text from any printed book from the comfort of one's own chair.





tilting at windmills

CERVANTES, Miguel de (1547–1616). *El ingenioso hidalgo Don Quixote de la Mancha*. Madrid: Don Joaquín Ibarra, 1780



At this point they came in sight of thirty or forty windmills that there are on that plain, and as soon as Don Quixote saw them he said to his squire,

“Fortune is arranging matters for us better than we could have shaped our desires ourselves, for look there, friend Sancho Panza, where thirty or more monstrous giants present themselves, all of whom I mean to engage in battle and slay, and with whose spoils we shall begin to make our fortunes; for this is righteous warfare, and it is God’s good service to sweep so evil a breed from off the face of the earth.”

“What giants?” said Sancho Panza.

“Those thou seest there,” answered his master, “with the long arms, and some have them nearly two leagues long.”

“Look, your worship,” said Sancho; “what we see there are not giants but windmills, and what seem to be their arms are the sails that turned by the wind make the millstone go.”

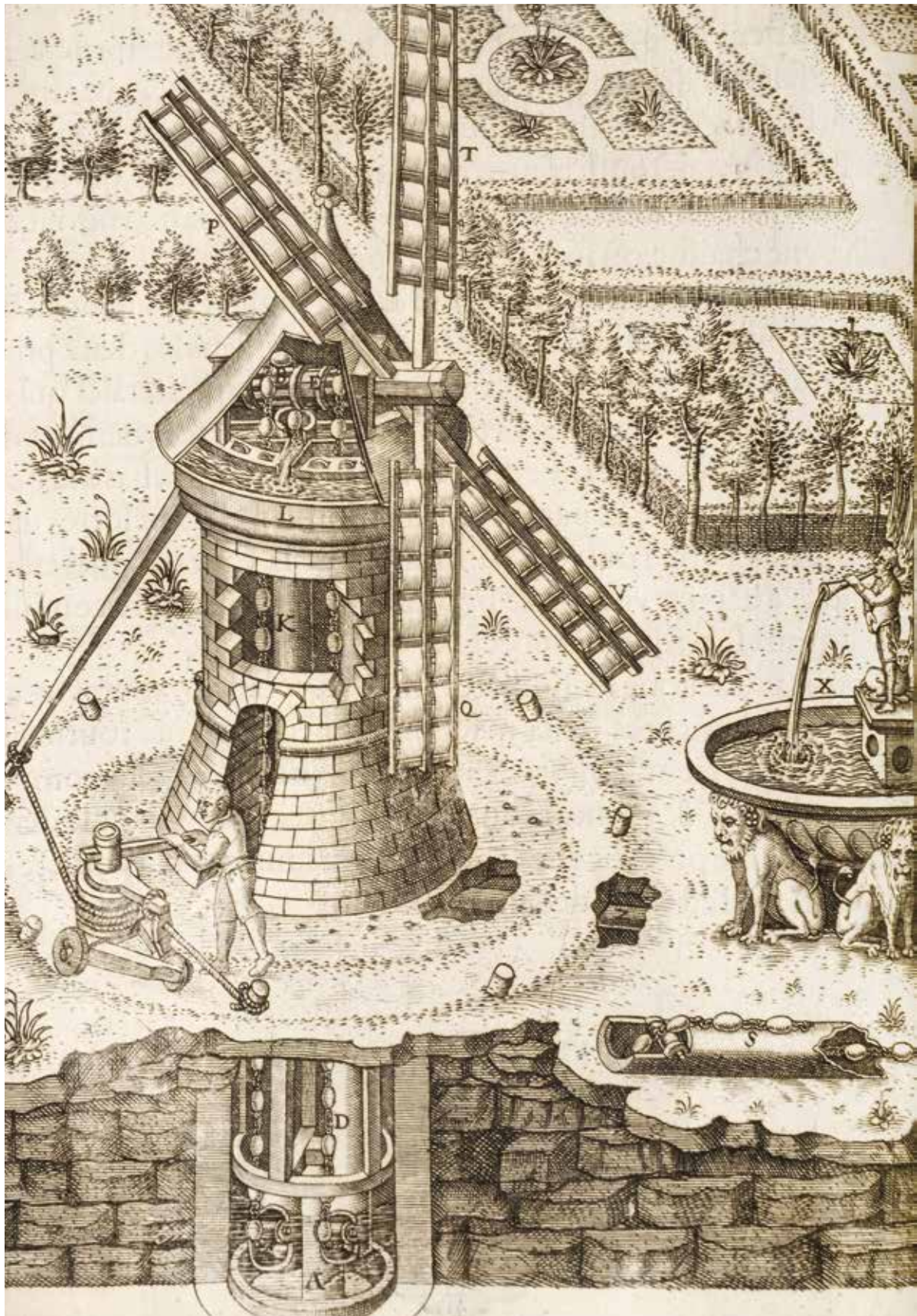
“It is easy to see,” replied Don Quixote, “that thou art not used to this business of adventures; those are giants; and if thou art afraid, away with thee out of this and betake thyself to prayer while I engage them in fierce and unequal combat.”

Part I, Chapter VIII. Of the good fortune which the valiant Don Quixote had in the terrible and undreamt-of adventure of the windmills, with other occurrences worthy to be fitly recorded (John Ormsby trans.)

The episode, the most famous in the book, sets the “ingenious” knight, his perception clouded with chivalric notions, in conflict with the giant machines going about their quotidian task of grinding flour for bread.

In the title of his book Cervantes calls his hero *el ingenioso hidalgo* (the ingenious knight). At the time of composition, the primary meaning of *ingenio* in Spanish was a natural force of the understanding, with a wide range of applications, from intellectual endeavours to inventions and trickeries. There was also a recognised etymological connection with the word *ingeniero* (engineer). One contemporary Spanish dictionary defines *ingenio* as any machine that has been skilfully invented. *Ingenio* could also stand for any product of our understanding that enables us to accomplish tasks that would be difficult to undertake by force. Thus a windmill was *ingenio*.

By tilting at windmills, Don Quixote attempts to apply force against ingenuity. The combat proves, as he foresaw, unequal; his attempted machine-breaking is futile. His high-flown knightly sentiments collide with everyday mechanical reality.



like clockwork

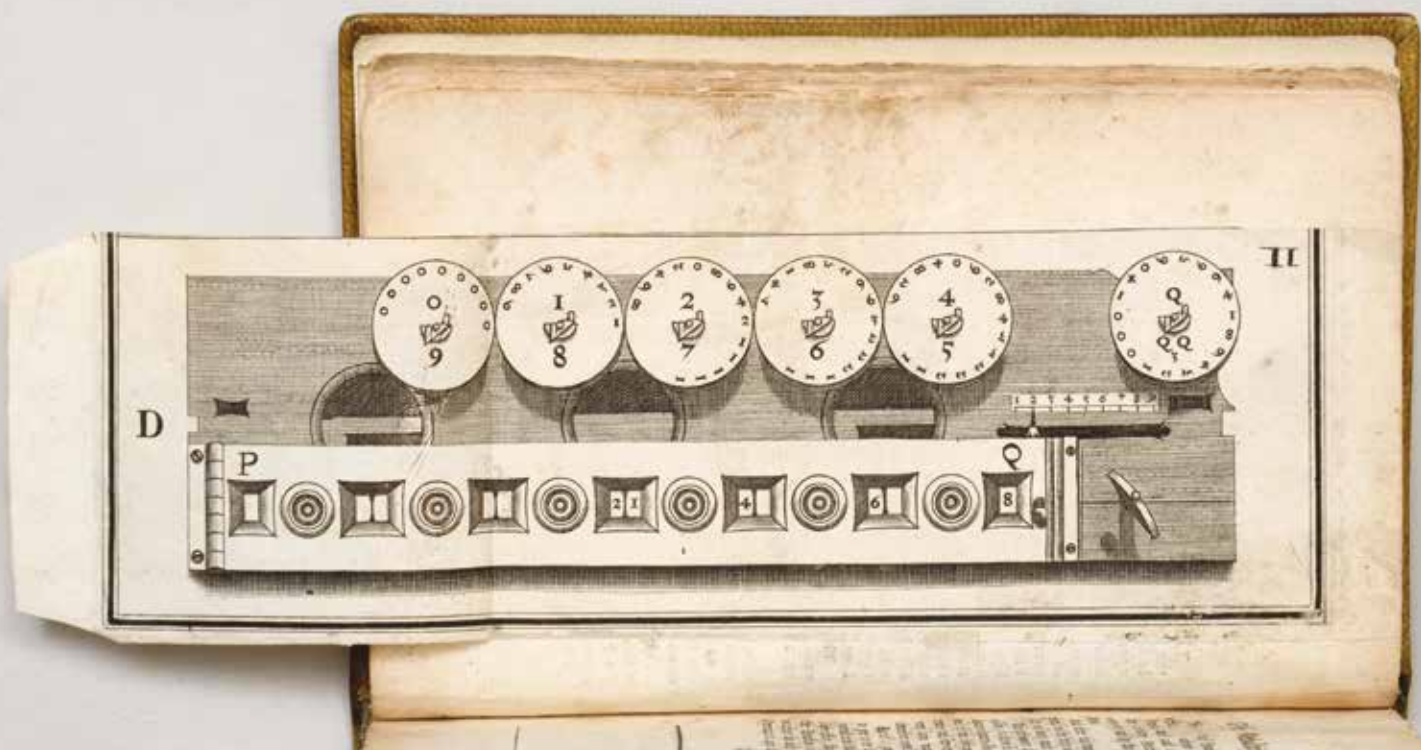
Many powerful tools to aid arithmetic calculations were invented in the seventeenth century, such as Napier's bones, logarithmic tables, and the slide rule, but these were manually operated, not truly mechanical. Inspired by the precision mechanisms of contemporary clockwork, a few visionary European inventors sought to produce automatic calculating machines.

Blaise Pascal was the only inventor in that century who succeeded in producing a working mechanical calculator. His Pascaline, invented in 1642, incorporated a sophisticated carry mechanism. In 1652 Pascal presented an example of his calculator to Queen Christina of Sweden, a noted patron of the sciences. A year later the British polymath Samuel Morland was chosen to accompany a British diplomatic mission to the Swedish court. He must have seen Pascal's machine and decided to apply his own ingenuity to the task.

MORLAND, Sir Samuel (1625–1695). *The description and use of two arithmetick instruments.* London: printed, and are to be sold by Moses Pitt, 1673

Morland's book is the first book in English on the calculator, and the first separate work on the subject after Napier's *Rabdologiae* (1617). Nothing more would be published in English until Babbage. The book may also be considered the first comprehensive book in computer literature, as Pascal published nothing about his own machine other than an 18-page pamphlet in 1644.





The first of Morland's two machines was a pocket calculator, capable of adding up to one million, either in decimals or pounds, shillings, and pence. The second was a multiplication machine, based on the principle of Napier's bones, but with the digits from Napier's rods inscribed on rotating discs. Neither device had an automatic or mechanical carry mechanism.

The delicate engravings in the book demonstrate the complexity and beauty of Morland's designs, but they do not aspire to reproduce the mechanism with rotating paper discs. It would take an experienced maker of mathematical instruments to realise them in silver and brass. The book advertises that the instruments may be ordered from Humphrey Adamson, the skilled London clock- and instrument-maker.

Morland's calculating machines proved popular and were still for sale in London as late as 1710, but the lack of a carry mechanism rendered them impractical. Samuel Pepys, whom Morland had taught at Cambridge, noted in his diary for 1667–8 that "the machine of Morland is very pretty, but not very useful".

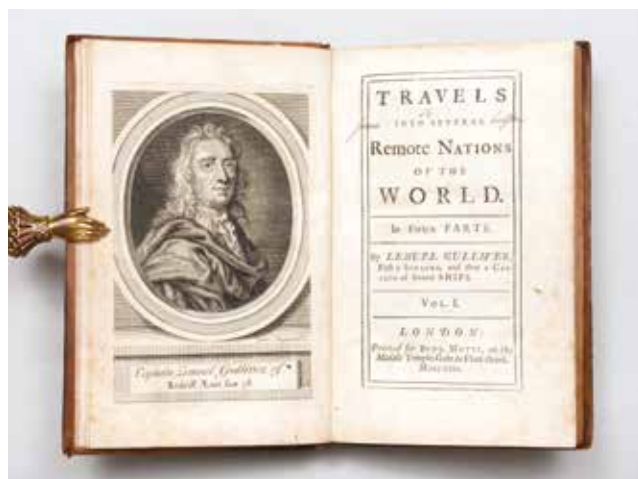
the flying island

[SWIFT, Jonathan, 1667–1745.] *Travels into Several Remote Nations of the World . . . By Lemuel Gulliver.* London: Benjamin Motte, 1726

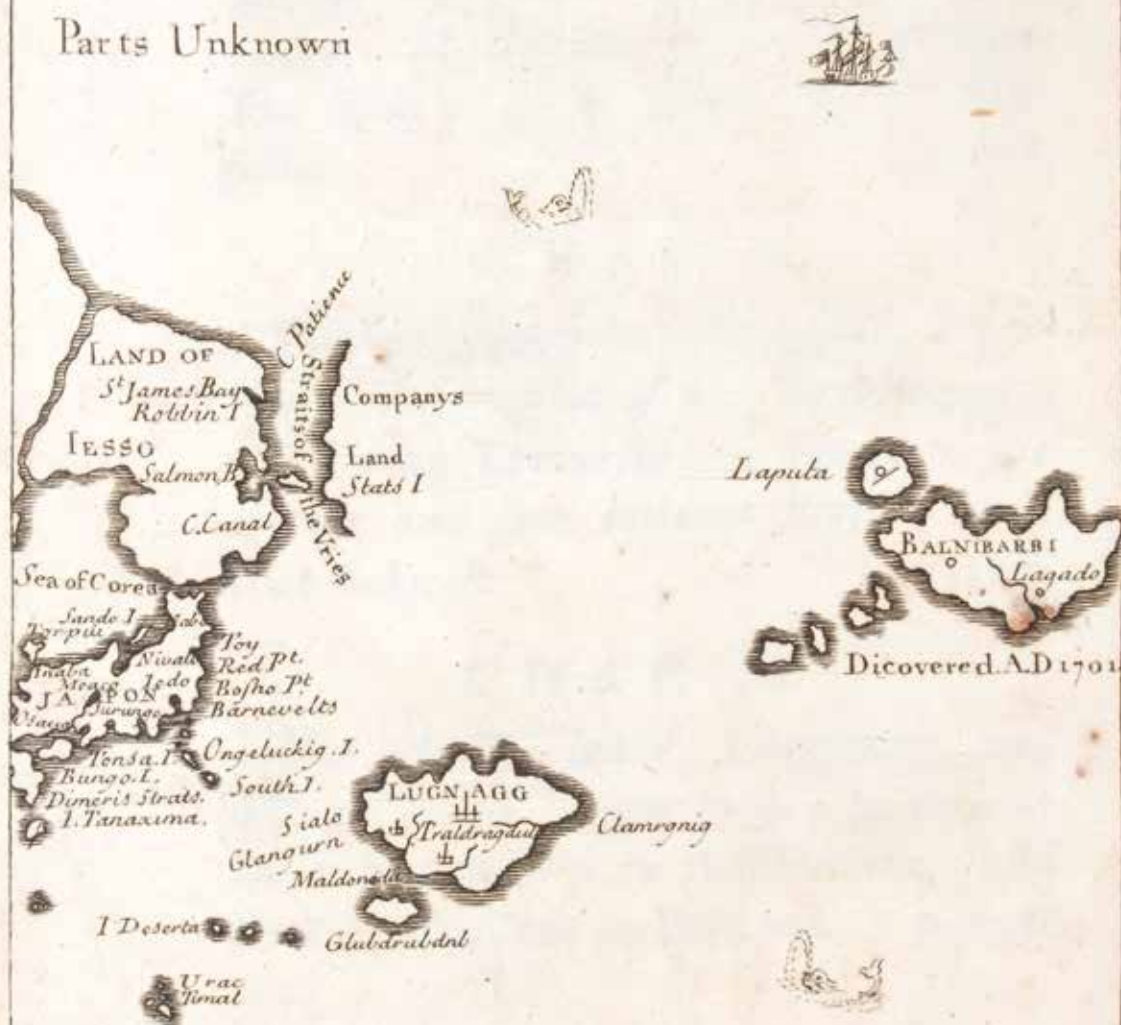
Jonathan Swift's *Travels into Several Remote Nations of the World*, known from the first as *Gulliver's Travels* (1726), has several satirical targets in view. The first two books, narrating Gulliver's visits to Lilliput and Brobdingnag, memorably portray the pettiness and grossness of human nature, while also poking fun at the exaggerations of contemporary travel writers, widely considered as notorious liars.

In the less well-known third book, the *Voyage to Laputa*, Swift takes aim at the pretensions of the new science. Laputa is a flying island, kept aloft by manipulation of a lodestone, with a Leviathan-like capacity to sink and crush the inhabitants of Balnibarbi, the land over which it floats. The Laputians are interested only in mathematics, music, and astronomy, but they are not the only ones with their heads in the clouds. The inhabitants of earth-bound Balnibarbi entertain all sorts of unnatural mechanical projects, such as to how extract sunlight from cucumbers, many of which Swift drew from real scientific experiments reported in the *Philosophical Transactions* of the Royal Society of London.

As with the other three voyages, Swift related his fictional geography to real places by prefacing each book with a map copied from the popular cartographer Herman Moll, yet subtly altered and as full of sly, satiric distortions as his text. The map to the *Voyage to Laputa* demonstrates a key limitation of conventional cartography and two-dimensional mapping. Laputa is not represented superimposed over the larger landmass, but north of Balnibarbi's northern coastline.



Parts Unknown



the political machine



HOBBS, Thomas (1588–1679). *Leviathan*. London: for Andrew Crooke, 1651

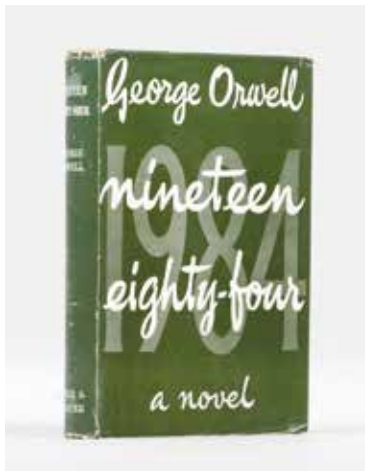
The political theorist Thomas Hobbes published *Leviathan, or the Matter, Form and Power of a Commonwealth, Ecclesiastical and Civil* in 1651. The book asks the question where political authority derives. Hobbes eschewed the older theocratic view of government, which claimed that the king derived his authority directly from God.

Hobbes's book is the first full exposition and defence of social contract theory, the view that the moral and political obligations of citizens are dependent upon a contract or agreement among themselves to form the society in which they live. Citizens willingly surrender personal autonomy in return for protection from the savagery of nature in the raw.

The frontispiece visualizes Hobbes's argument. The ruler Leviathan's authority, his very corporeality, is made up of the participation of all his subjects. But Hobbes was no kind of democrat. Once natural rights are ceded and Leviathan is created, Hobbes argued, there is no legal way to challenge its sovereignty. So Leviathan looms gigantically over the land he governs, brandishing his sword and sceptre as weapons.

In George Orwell's dystopian novel, *Nineteen Eighty-Four* (1949), the unease implicit in that image has turned to terror. Leviathan is now the chummily demotic Big Brother. The populace is distracted by fake news, perpetual war, and hatred of foreigners, while remaining under constant mechanical surveillance.

ORWELL, George (1903–1950). *Nineteen Eighty-Four*. London: Secker & Warburg, 1949



HUXLEY, Aldous (1894–1963). *Brave New World*. London: Chatto & Windus, 1932



Aldous Huxley's *Brave New World* (1931) is often paired and contrasted with Orwell's book as an equally prescient but complementary forecast of how life has turned out to be. Where Orwell's future world is one of austerity and fear, Huxley foresees a populace controlled by enforced happiness, kept amused with consumerism, mass entertainment and drugs, while genetic engineering locks social inequality into the system.

man as industrial palace

BABBAGE, Charles (1791–1871). *On the Economy of Machinery and Manufactures.* London: Charles Knight, 1832



First published in 1832, *On the Economy of Machinery and Manufactures* was the most successful lifetime publication of the computer pioneer Charles Babbage. The book ran to four editions between 1832 and 1835 and was translated into six European languages. The work is an encyclopaedic record of craft, manufacturing, and industrial processes, as well as an analysis of the domestic organization of factories. It firmly established Babbage as a leading authority of the industrial movement.

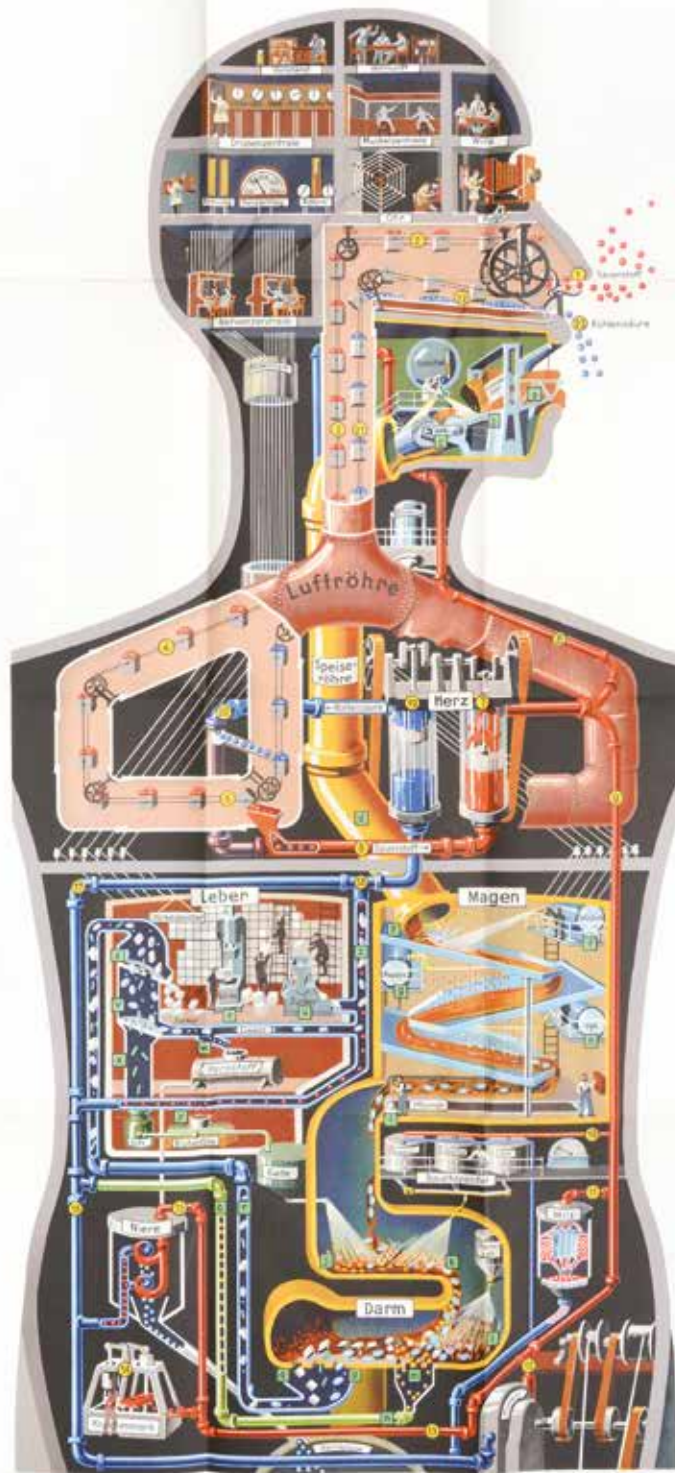
Babbage had made his tour of factories in Britain and Europe hoping to find a factory capable of the precision work needed to construct his calculating machines. The contemporary factory provided an organizational model for Babbage's analytical engine, as his usage of "store" and "mill" as names for its distinct parts indicates. The factory was for him an enormous machine made up of human components, each working at a specific task. (One task, in contemporary usage, was that of a "computer", a human worker who compiled and checked mathematical tables.)

The Babbage principle, as it came to be known, disintegrated the factory process into its simplest components, with the advantage "That the master manufacturer, by dividing the work to be executed into different processes, each requiring different degrees of skill or of force, can purchase exactly that precise quantity of both which is necessary for each process; whereas if the whole work were executed by one workman, that person must possess sufficient skill to perform the most difficult and sufficient strength to execute the most laborious of the operations into which the art is divided."

Close examination of factory work at the microcosmic level lent Babbage prophetic powers. He advocated the decimalization of currency, foresaw the role of tidal power as an energy source, and predicted the exhaustion of coal reserves. Babbage's work long pre-dated the time-and-motion studies of Frederick Winslow Taylor and the mass production methods of Henry Ford.

Many reports on the factory system followed in the 1830s and 1840s, of which Friedrich Engels's *Condition of the Working Class in England* (1845) is one of the most notable.

Der Mensch als Industriepalast



Aus Kahn, DAS LEBEN DES MENSCHEN/Franckh'sche Verlagshandlung, Stuttgart/

Fritz Kahn (1888–1968), a German gynaecologist, was arguably one of the most successful popular science writers internationally during the mid-20th century. He is regarded as a pioneer of infographics.

His illustrated textbook *Das Leben des Menschen* (1922–23) was his best known publication, integrating nature and the human body inextricably with new technologies, reflecting the rapid industrialisation and technocratisation of Weimar Germany, and the Bauhaus and Dada movements.

“The poster showed the human body as an assembly line in an industrialised workspace, packed with technology and populated, according to the division of labour, by anonymous workers and white-collar members of the modern society. The image did not simply compare the body to an industrial plant metaphorically – it directly represented every organ and bodily system with a technical analogue topographically proportionate in size and location.”

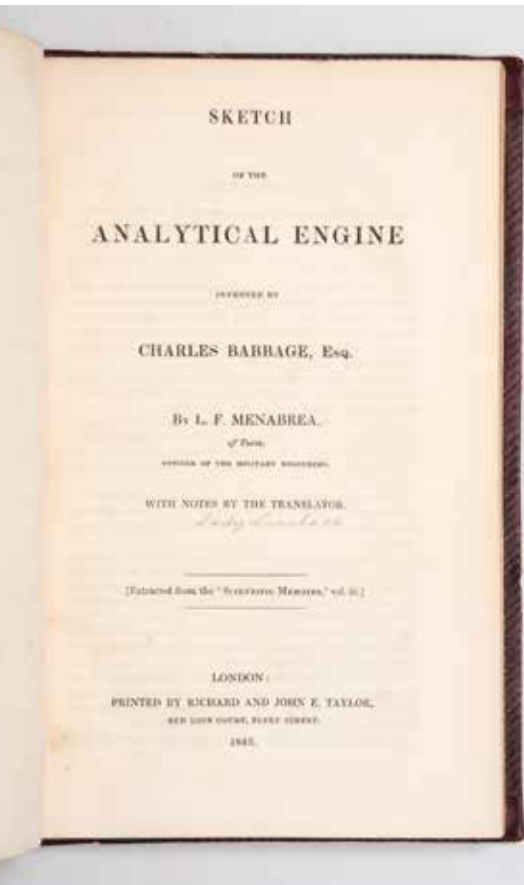
Cornelius Borck

KAHN, Fritz (1888–1968). *Der Mensch als Industriepalast.* Stuttgart: Franckh'sche Verlagshandlung, [1926]

the cogwheel brain

The most sophisticated mechanical device of the nineteenth century was the analytic engine invented by Charles Babbage.

To be constructed of iron and brass and powered by steam, Babbage’s analytical engine anticipated the modern digital computer. Programmable using punched cards, a technology adopted from the Jacquard loom, the engine had a “store” where numbers and intermediate results could be held, and a separate “mill” where the arithmetic processing was performed. It performed the four arithmetical functions and could be programmed to perform these in any sequence. It was also capable of conditional branching, looping (iteration), microprogramming, parallel processing, latching, polling, pulse-shaping, and other techniques not reinvented until the late twentieth century. It produced data in a variety of outputs including hard-copy printout, punched cards, plotted graphs, and even moulds to make stereotypes.



Number of Operations.	Variables noted upon.	Variables receiving results.	Indication of change in the value on any Variable.
1	$\times V_2 \times V_4$	V_6, V_8, V_9	$V_2 = V_2$ $V_4 = V_4$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
2	$- V_4 = V_4$	V_6, V_8, V_9	$V_4 = V_4$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
3	$+ V_4 + V_4$	V_6, V_8, V_9	$V_4 = V_4$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
4	$- V_4 - V_4$	V_6, V_8, V_9	$V_4 = V_4$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
5	$+ V_4 + V_4$	V_6, V_8, V_9	$V_4 = V_4$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
6	$- V_4 - V_4$	V_6, V_8, V_9	$V_4 = V_4$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
7	$+ V_4 + V_4$	V_6, V_8, V_9	$V_4 = V_4$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
8	$+ V_2 + V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
9	$- V_2 - V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
10	$\times V_2 \times V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
11	$+ V_2 + V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
12	$- V_2 - V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
13	$- V_2 - V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
14	$+ V_2 + V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
15	$- V_2 - V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
16	$\times V_2 \times V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
17	$- V_2 - V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
18	$+ V_2 + V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
19	$- V_2 - V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
20	$\times V_2 \times V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$
21	$\times V_2 \times V_2$	V_6, V_8, V_9	$V_2 = V_2$ $V_6 = V_6$ $V_8 = V_8$ $V_9 = V_9$ $= 2$

Babbage's engines were practically realisable, but for various reasons they were not constructed in full during his lifetime. Nor did Babbage ever publish anything like an operator's manual for his engines.

Following a visit by Babbage to Turin in 1840, the Italian engineer Luigi Menabrea (later prime minister of Italy) became interested and published his own paper on the analytical engine.

This was translated into English by Ada Augusta, countess of Lovelace, daughter of Lord Byron, a mathematical prodigy. Working in close collaboration with Babbage she added copious notes of her own, expanding her text to almost three times the length of Menabrea's original.

Her *Sketch of the Analytical Engine* was published in 1843. It remains the most lucid and mathematically adept contemporary account of Babbage's astonishing invention, and because of it she has been described as the first computer programmer.

(LOVELACE, Ada, 1815–1852.) MENABREA, Luigi Federico. Sketch of the Analytical Engine invented by Charles Babbage, Esq. London: printed by Richard and John E. Taylor, 1843

Diagram for the computation by the Engine of the Numbers of Bernoulli. See Note G. (pgs 722 et seq.)

Statement of Results.	Data.										Working Variables.				Result.
	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9	V_{10}	V_{11}	V_{12}	V_{13}	V_{14}	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	2	4	0	0	0	0	0	0	0	0	0	0	0	
	1	2	8												
-1	1	2	8	$2n$	$2n$	$2n$									
$+1$	1	2	8	$2n+1$											
-1	1	2	8	0	0										
$\frac{2n-1}{2}$	1	2	8												
$\frac{1}{2} \cdot \frac{2n-1}{2n+1} = A_2$	1	2	8												
$-1 (= B)$	1	2	8												
$+0 = 2$	1	2	8												
$= A_1$	1	2	8												
$-\frac{2n}{2} = B_1 A_1$	1	2	8												
$\frac{1}{2} \cdot \frac{2n-1}{2n+1} + B_1 \cdot \frac{2n}{2}$	1	2	8												
$-2 (= 2)$	1	2	8												
-1	1	2	8												
$-1 = 2$	1	2	8												
-1	1	2	8												
$\frac{2n-1}{2}$	1	2	8												
-2	1	2	8												
$+1 = 4$	1	2	8												
$-\frac{2}{4}$	1	2	8												
$\frac{2n-1}{2} \cdot \frac{2n-2}{4} = A_3$	1	2	8												
$\frac{2n-1}{2} \cdot \frac{2n-2}{4} - B_2 A_2$	1	2	8												

THE CROZIER AND THE PEN

— His grace phoned down twice this morning, Red Murray said gravely. They watched the knees, legs, boots vanish. Neck.

A telegram boy stepped in nimbly, threw an envelope on the counter and stepped off posthaste with a word.

— *Freeman!*

Mr Bloom said slowly:

— Well, he is one of our saviours also.

A meek smile accompanied him as he lifted the counterflap, as he passed in through the sidedoor and along the warm dark stairs and passage, along the now reverberating boards. But will he save the circulation? Thumping, thumping.

He pushed in the glass swingdoor and entered, stepping over strewn packing paper. Through a lane of clanking drums he made his way towards Nannetti's reading closet.

WITH UNFEIGNED REGRET IT IS WE ANNOUNCE THE DISSOLUTION OF A MOST RESPECTED DUBLIN BURGESS

Hynes here too: account of the funeral probably. Thumping thump. This morning the remains of the late Mr Patrick Dignam. Machines. Smash a man to atoms if they got him caught. Rule the world today. His machineries are pegging away too. Like these, got out of hand: fermenting. Working away, tearing away. And that old grey rat tearing to get in.

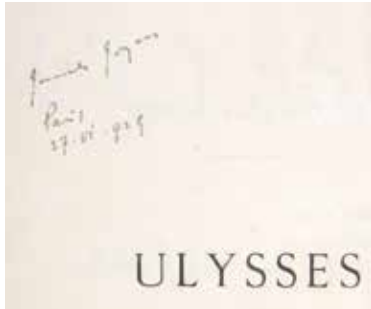
HOW A GREAT DAILY ORGAN IS TURNED OUT

Mr Bloom halted behind the foreman's spare body, admiring a glossy crown.

Strange he never saw his real country. Ireland my country. Member for Collegegreen. He boomed that workaday worker tack for all it was worth. It's the ads and side features sell a weekly not the stale news in the official gazette. Queen Anne is dead. Published by authority in the year one thousand and. Demesne situate in the townland of Rosenallis, barony of Tinnachinch. To all

the incertitude of the void

JOYCE, James (1882–1941). *Ulysses*. Paris: Shakespeare and Company, 1922



Jacques Derrida, in his 1984 essay “Two Words for Joyce”, describes *Ulysses* as a semiotic machine exceeding all existing and imaginable computers. James Joyce’s modernist text already surpasses, Derrida argues, any machine we could build to analyse it. Even this ideal machine could do no more than reconstruct the text it would seek to elucidate. Joyce promised the professors centuries of solving his puzzles. Derrida characterizes *Ulysses* as a work always resistant to the desire to understand it fully.

In the “Aeolus” episode of *Ulysses*, the narrative fragmented by thumping newspaper headlines, Leopold Bloom watches the printing machines in the newspaper offices. “Machines. Smash a man to atoms if they got him caught. Rule the world today.”

Joyce was particularly aware of the mechanical process involved in turning his text into a printed document. He had bitter experience of the physical interference of censors and printers in the publication of his early books. Publishing serially in journals had allowed him to revise his work endlessly, and to evolve the idea of the modern novel as a “work in progress”.

Ulysses was published, not by a regular publishing house, but by Sylvia Beach, the owner of an avant-garde bookshop in Paris, with whom Joyce was in regular contact. Beach entrusted the printing to Maurice Darantiere in Dijon, who set the first edition by hand in movable type, allowing Joyce to make insertions when the book was in proof. Newer technologies like linotype would not have allowed Joyce that freedom.

“Joyce believed in his perception that what we know as reality, like religious doctrine, is founded ‘on the incertitude of the void’—the void being the phenomenal diversity of human perceptions, points of view, *Weltanschauungen*, habits of expression, intentionalities, and idiolects. This intense relativism is unsustainable without a corresponding belief that the relativized order of experience overlies a spiritual unity accessible only through the multiplex channels of living language.”

Bruce Stewart, ODNB

the machine and the cloud





Duchamp started work on this portable miniature museum in 1935, before his move to New York in 1942. The box unfolds like a travelling salesman's display case or a puppeteer's toy theatre, to reveal 69 miniature replicas and printed reproductions of Duchamp's work to date.

Many different notions are in play here: a reversal of the usual temporal relationship between maquette and large-scale artwork, the commercialisation and commodification of art, the related concept of the multiple as a mass-produced commodity, a blurring of the boundary between original and reproduction, all infused with Duchamp's inimitable spirit of *blague*. In place of the expected printed book, the typical *catalogue raisonnée*, Duchamp offers a three-dimensional spectacle.

The central upright display is given to a miniature version of Duchamp's large glass painting, *The Bride Stripped Bare by Her Bachelors, Even* (1915–23), an enigmatic work that resembles a mechanical diagram and was designed to function like an allegorical machine. In early versions the figures were car engine parts, but in the realised (though never completed) version, the bride has emanating from her what Duchamp called her blossoming—a form something like a cartoon thought cloud.

DUCHAMP, Marcel (1887–1968). *The Bride Stripped Bare by Her Bachelors, Even* (detail). Paris: Marcel Duchamp, 1958





DUCHAMP, Marcel (1887–1968). *La Boite-en-Valise* (The Box in a Suitcase). Paris: Marcel Duchamp, 1958

rise of the robots

CAPEK, Karel (1890–1938). R.U.R. Rossum's Universal Robots. Prague: Vydalo Aventinum, 1920



HARBOU, Thea von (1888–1954). Metropolis. Berlin: August Scherl, 1926



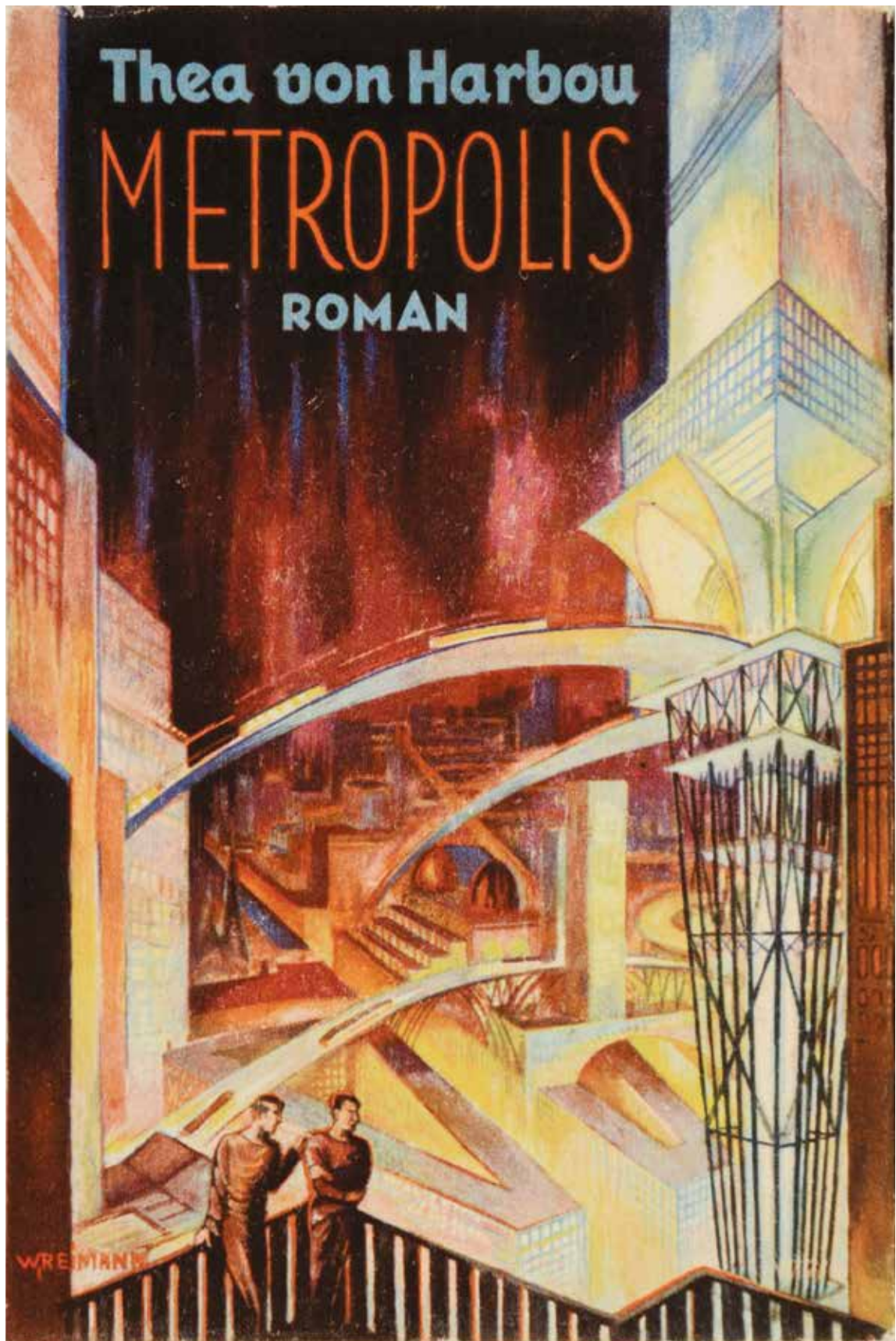
The word “robot”, from the Czech *robota* meaning “forced labourer” or “drudge”, was first used in Čapek’s dystopian science-fiction drama. The play premiered in Prague on 25 January 1921 and was quickly followed by stagings in New York (1922) and London (1923).

Rossum’s robots are artificial people, living flesh and blood creatures rather than mechanical creations, closer to the modern idea of androids or replicants, though the early stage versions dressed them with mechanical features. They seem happy to work for humans at first, but a robot rebellion leads to the extinction of the human race.

German director Fritz Lang’s silent film *Metropolis* is the most memorable cultural representation of a robot from that era. A classic both of German Expressionism and of science fiction, it remains the most expensive silent film ever made, costing approximately 5 million Reichsmark. In the future, in the city of Metropolis, wealthy industrialists and business magnates and their favoured employees rule the world from high-rise towers, while underground-dwelling workers toil to operate the great machines that power the city.

The *Maschinenmensch* (“machine-person”), a metallic automaton shaped like a woman, is played by German actress Brigitte Helm in both its robot form and human incarnation.

Based on the original screenplay written by Lang and his wife Thea von Harbou in 1924, the novelization was published before the release of the film version on 10 January 1927. The first thousand copies have a dust jacket design by Walter Reimann (1887–1936), the German Expressionist painter who worked on the set designs for the film, and previously on *Das Cabinet des Dr. Caligari* (1920). Later issues use an image from the film.



machines of war

A writer who followed Babbage in making surveys of industrial conditions in the nineteenth century was Jan Gotlib Bloch (1836–1902). Born into a poor Jewish family in the Kingdom of Poland, Bloch made a fortune investing in railway development in Russia. He published comprehensive works on Russia's finances, industry, and agriculture, grounded in statistical data and historical material.

By 1873 Bloch was married to the niece of the richest financier in Poland, owned his own bank, and was president of the Warsaw Stock Exchange. But the outbreak of the Russo-Turkish War in 1877, Bloch's contacts with the war ministry during railway construction, and his participation in the special committee preparing Warsaw for siege all concentrated his mind on the likely consequences of warfare among the advanced industrial nations.



In 1893 and 1894 Bloch published *The Future of War in Its Technical, Economic, and Political Relations* as a serial in the periodical *Biblioteka Warszawska*; he subsequently published the extended version as a book in Polish, Russian, French, German, and Dutch.

Aware of the potency of technological change, Bloch foresaw with uncanny accuracy the nature of modern warfare as it would eventually unfold in 1914. Bloch realised that the new machinery of war, such as smokeless gunpowder, improved rifle design, and Maxim guns, would render manoeuvres over open ground, such as bayonet and cavalry charges, obsolete. War between the great powers would be a war of entrenchment, without rapid attacks and decisive victories. He calculated that soldiers in trenches would enjoy a fourfold advantage over infantry advancing across open ground.

The resultant stalemate would force industrial societies to commit armies numbering in the millions. Such a war would become a duel of industrial might, a matter of total economic attrition. Severe economic and social dislocations would result in the imminent risk of famine, disease, the “break-up of the whole social organization” and revolutions from below.

BLOCH, Jan Gotlib (1836–1901). *Der Krieg.* Berlin: Puttkammer & Mühlbrecht, 1898



machines of war take flight

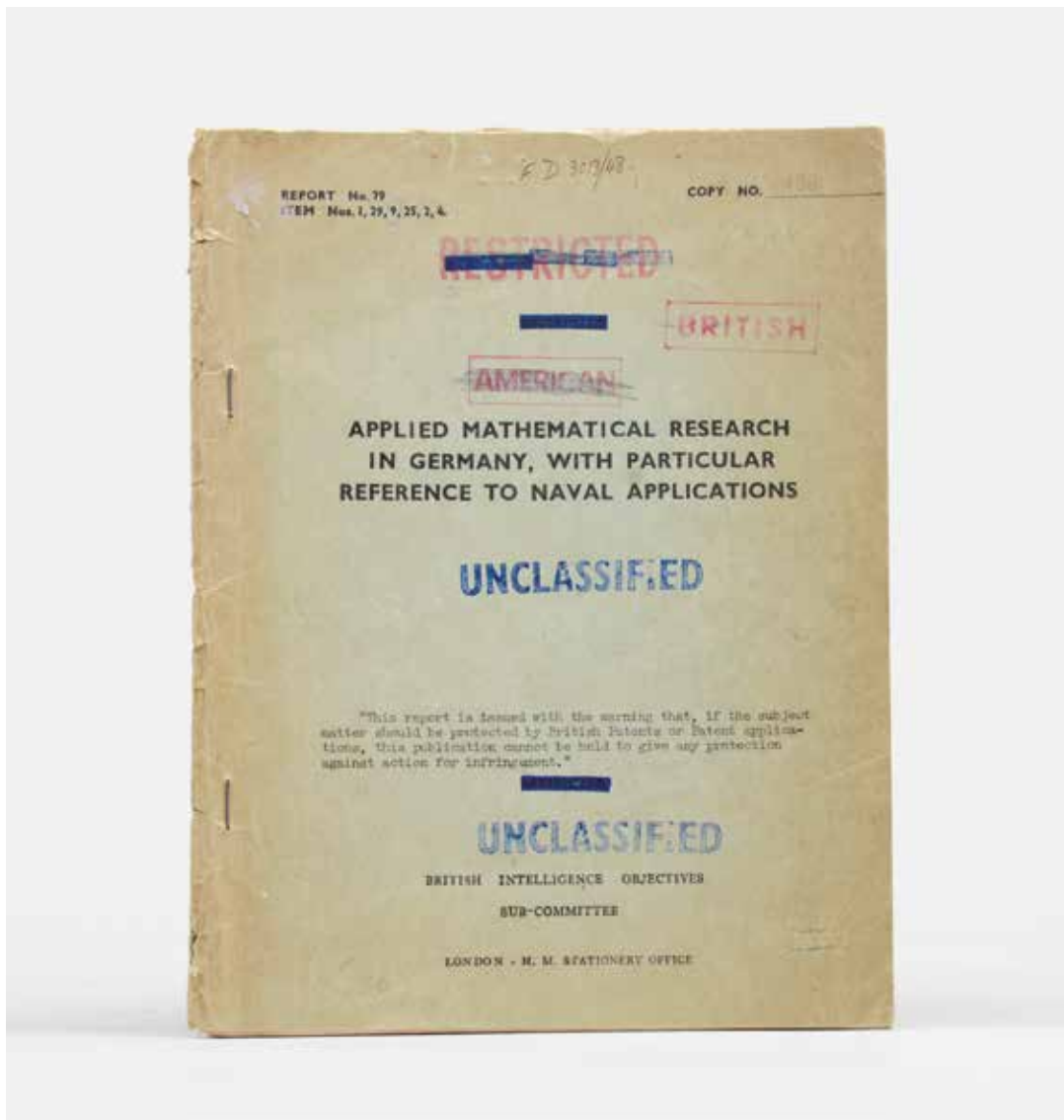
Technology played a greater role in the conduct of the Second World War than in any other war in history, and had a critical role in its final outcome. The development of aviation in particular prevented the war becoming bogged down in the territorial stalemate that had characterised the First World War.

Rocketry was used effectively for the first time, notably in the shape of the German V-1 automatic aircraft, the forerunner of the modern cruise missile. The calculations necessary to compute aerodynamic corrections to the wings of the radio-controlled V-1 flying bombs were made by computing machines built for the German government by the civil engineer, inventor and computer pioneer Konrad Zuse (1910–1995).

Zuse's achievements were all the more remarkable in that he completed his work entirely independently of other leading computer scientists and mathematicians of his day, working in near-total intellectual isolation. His greatest achievement was the world's first programmable computer—the functional program-controlled Turing-complete Z3, which became operational in May 1941.

As the war in Europe was drawing to a close, the Allies planned to find out as much information as possible about the work of German scientists and mathematicians, particularly those engaged in rocketry and atomic weapons. A six-strong team of mathematicians was sent to Germany in





summer 1945 under the leadership of the British mathematician John Todd (1911–2007), who finished his distinguished career at Caltech, after doing pioneering work in numerical analysis and playing a key role in the development of some of the first large computers.

(ROCKETRY.) TODD, John (1911–2007), & others. Applied Mathematical Research in Germany, with particular Reference to Naval Applications. London: H.M. Stationer's Office, (1945)

Zuse had been working on his latest computer, the Z4, since 1944, but Allied bombing had forced him to pack up and evacuate the partly completed machine from Berlin to Göttingen in February 1945. Pages 63–4 here give a brief account of Zuse's machines. On its completion in 1945 the Z4 became the world's first commercial digital computer.

After the war, the technical abilities and personnel involved in the German rocketry programme would be co-opted by the Americans for their own space programme.

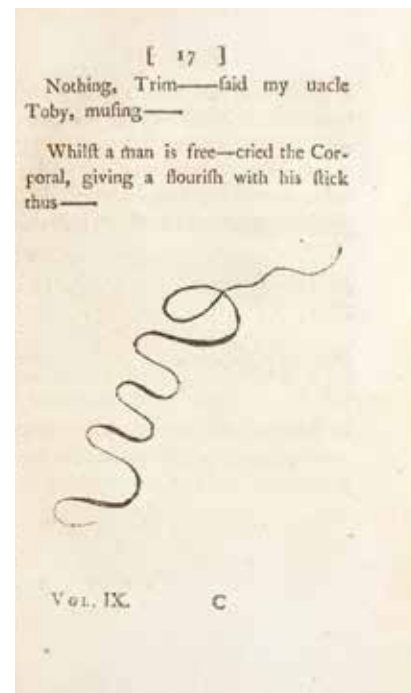
the paradox of autobiography

[STERNE, Laurence, 1713–1768.] *The Life and Opinions of Tristram Shandy, Gentleman*. York & London: R. and J. Dodsley, T. Becket and P. A. Dehondt, 1760–67

Tristram Shandy is one of the most striking novels of the eighteenth century. As a physical object, it is famous for the typographical and presentational devices Sterne uses to toy with the reader—a torn-out chapter, a black page mourning the death of Parson Yorick, wiggles that illustrate the meandering progress of Tristram's narrative or the flourish of Trim's stick, a blank page for the reader to paint the Widow Wadman in as stimulating a pose as his imagination will allow, the hand-marbled paper appearing unexpectedly in the middle of a volume serving as a "motley emblem" of Tristram's work, and so on.

Textually, too, *Tristram Shandy* is disorderly, radically undermining the traditional novel by disrupting the usual linear progression of events with digressions, retrograde movement, and "stoppages". The typical features of the eighteenth-century novel are all present, but perversely rearranged, so for instance the Preface to the book appears in the middle of Volume 3.

The narrator realises early on that his irregular procedure causes a major problem in telling his own life story. "I declare I have been at it these six weeks, making all the speed I possibly could—and am not yet born" (I: 14,65). Recounting the details of Tristram's life while it still going on suggests the hopelessness of ever catching up with that life in real time.



XXXVIII.

ings,—call for pen
 paper ready to your
 hand, Sir, paint her so
 as like your mistress
 unlike your wife as
 little as you—his all
 but your own fancy



Tristram Shandy was a favourite book of the philosopher Bertrand Russell, but he regarded Sterne's joke about the neverending book as a paradox that could be resolved by introducing the concept of infinity. If Tristram lived forever, Russell argued, he must logically have time enough to finish his book.

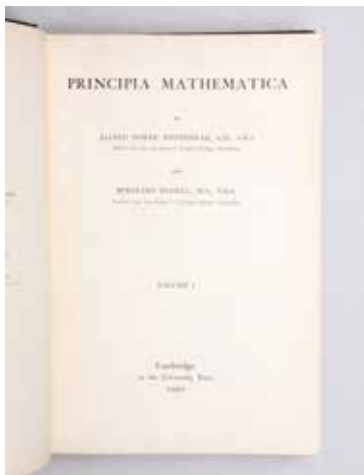
When Russell first tried to understand the concept of infinity in logical terms, he came across what seemed to be a fundamental inconsistency: a paradox of self-reference ("Russell's Paradox") about whether the set of all sets that do not contain themselves in fact contains itself.

To resolve this, Russell introduced his theory of types, which tries to distinguish between sets, sets of sets, etc. by considering them to be of different "types", and then restricts how they can be combined.

In part, this was the background to *Principia mathematica*, the massive work of logic and mathematics he co-wrote with his old tutor, Alfred North Whitehead, published in three volumes between 1911 and 1913.

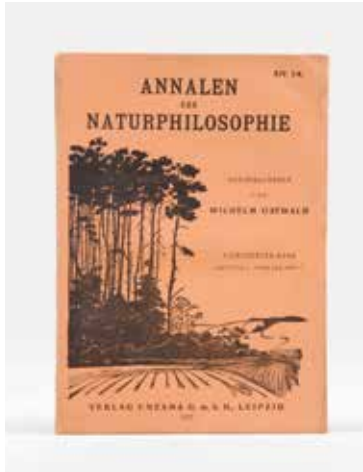
Devoted to showing how the truths of mathematics could be derived from logic, the book uses a notation for mathematics that aimed to transcend the imprecision of human language, with the result that the book contains page after page of what looks more like machine code. Russell estimated years later that perhaps only six people had ever read the entire book.

WHITEHEAD, Alfred North (1861–1947), & Bertrand Russell (1872–1970). *Principia mathematica*. Cambridge: at the University Press, 1910–12–13



*54.42. $\vdash :: \alpha \in 2 . \supset : \beta \subset \alpha . \supset ! \beta . \beta \neq \alpha . \equiv . \beta \in t''\alpha$
Dem.
 $\vdash . *54.4 . \supset \vdash :: \alpha = t'x \cup t'y . \supset :$
 $\beta \subset \alpha . \supset ! \beta . \equiv : \beta = \Lambda . \vee . \beta = t'x . \vee . \beta = t'y . \vee . \beta = \alpha : \supset ! \beta :$
 $[*24.53.56.*51.161] \equiv : \beta = t'x . \vee . \beta = t'y . \vee . \beta = \alpha \quad (1)$
 $\vdash . *54.25 . \text{Transp.} . *52.22 . \supset \vdash : x \neq y . \supset . t'x \cup t'y \neq t'x . t'x \cup t'y \neq t'y :$
 $[*13.12] \supset \vdash : \alpha = t'x \cup t'y . x \neq y . \supset . \alpha \neq t'x . \alpha \neq t'y \quad (2)$
 $\vdash . (1) . (2) . \supset \vdash :: \alpha = t'x \cup t'y . x \neq y . \supset :$
 $\beta \subset \alpha . \supset ! \beta . \beta \neq \alpha . \equiv : \beta = t'x . \vee . \beta = t'y :$
 $[*51.235] \equiv : (\exists x) . z \in \alpha . \beta = t'z :$
 $[*37.6] \equiv : \beta \in t''\alpha \quad (3)$
 $\vdash . (3) . *11.11.35 . *54.101 . \supset \vdash . \text{Prop}$
 *54.43. $\vdash :: \alpha , \beta \in 1 . \supset : \alpha \cap \beta = \Lambda . \equiv . \alpha \cup \beta \in 2$
Dem.
 $\vdash . *54.26 . \supset \vdash :: \alpha = t'x . \beta = t'y . \supset : \alpha \cup \beta \in 2 . \equiv . x \neq y .$
 $[*51.231] \equiv . t'x \cap t'y = \Lambda .$
 $[*13.12] \equiv . \alpha \cap \beta = \Lambda \quad (1)$
 $\vdash . (1) . *11.11.35 . \supset$
 $\vdash : (\exists x, y) . \alpha = t'x . \beta = t'y . \supset : \alpha \cup \beta \in 2 . \equiv . \alpha \cap \beta = \Lambda \quad (2)$
 $\vdash . (2) . *11.54 . *52.1 . \supset \vdash . \text{Prop}$
 From this proposition it will follow, when arithmetical addition has been defined, that $1 + 1 = 2$.

WITTGENSTEIN, Ludwig (1889–1951).
Logisch-philosophische Abhandlung. Leipzig: Unesma G.m.b.H., 1921



Bertrand Russell also ushered into print the first published version of *Tractatus logico-philosophicus*, the first of only two full-length works published in his lifetime by the philosopher Ludwig Wittgenstein. The work was first published in German in Wilhelm Ostwald's journal *Annalen der Naturphilosophie* (1921), before being translated into English and published in parallel text the following year under its familiar yet puzzling title, a deliberate echo of Spinoza.

The work is a treatise on representation in general and propositional representation in particular, with specific concern for the nature of logic. It is written in a cool, austere style, each sentence (or proposition) being sequentially numbered, beginning with “The world is everything which is the case” and ending, famously, with “Whereof one cannot speak, thereof one must be silent”. It is virtually incomprehensible without familiarity with the logic and philosophy of Frege and Russell, but the brevity of each proposition and the sequential numbering invite the reader to believe it can be conquered line by line.

Wittgenstein's propositions aspire to be truth statements, each a single statement about the world that can be true or false. Wittgenstein uses language and our relationship to the world in a mechanical way, as if it were like computer software.

- 1 Die Welt ist alles, was der Fall ist. *)
- 1.1 Die Welt ist die Gesamtheit der Tatsachen, nicht der Dinge.
- 1.11 Die Welt ist durch die Tatsachen bestimmt und dadurch, daß es alle Tatsachen sind.
- 1.12 Denn, die Gesamtheit der Tatsachen bestimmt, was der Fall ist und auch, was alles nicht der Fall ist.
- 1.13 Die Tatsachen im logischen Raum sind die Welt.
- 1.2 Die Welt zerfällt in Tatsachen.
- 1.21 Eines kann der Fall sein oder nicht der Fall sein und alles übrige gleich bleiben.

from laboratory to saleroom

One of the earliest stored-program computers was the Manchester Mark 1, developed at the Victoria University of Manchester. Work began in August 1948, and the first version was operational by April 1949. The machine's successful operation was widely reported in the British press, which used the phrase "electronic brain" in describing it.

Some of the anxieties aroused by the advent of a mechanical brain were expressed by Sir Geoffrey Jefferson, professor of neurosurgery at the University of Manchester, in his Lister Oration, on 9 June 1949:

Not until a machine can write a sonnet or compose a concerto because of thoughts and emotions felt, and not by the chance fall of symbols, could we agree that machine equals brain—that is, not only write it but know that it had written it. No machine could feel pleasure at its success, grief when its valves fuse, be warmed by flattery, be made miserable by its mistakes, be charmed by sex, be angry or miserable when it cannot get what it wants.

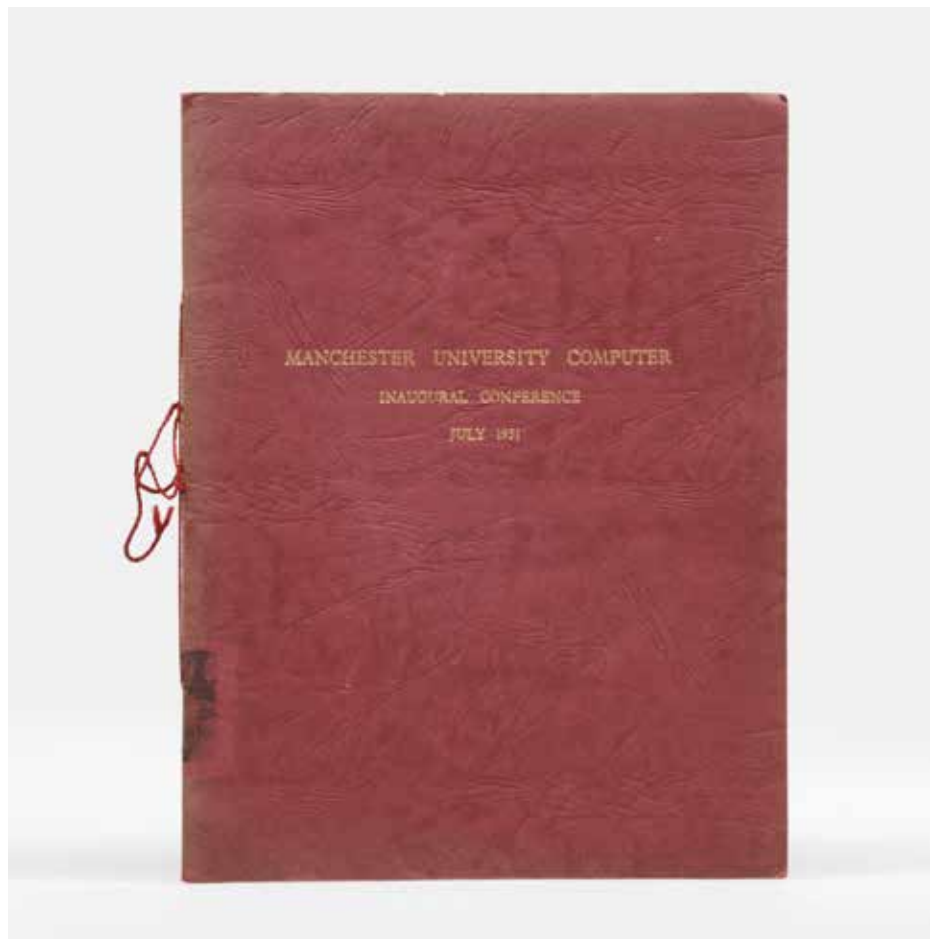
The Manchester Mark 1 served as the prototype for the Ferranti Mark 1, also known as the Manchester Electronic Computer in its sales literature, which was the world's first commercially available general-purpose electronic computer. (Zuse's Z4 was electro-mechanical not electronic.)

The transition from laboratory to saleroom was marked by a conference held at Manchester in July 1951, at which the computer's abilities were demonstrated and a number of invited speakers led discussion groups. The list of speakers and delegates reads like a Who's Who of computing pioneers, including Alan Turing, Max Newman, E. A. Newman, Cicely M. Popplewell, Maurice Wilkes, Mike Woodger, and Bertram Bowden, later Baron Bowden of Chesterfield.

(TURING, Alan, 1912–1954, & others.)
Manchester University Computer – Inaugural Conference – July 1951. Manchester:
Printed by Tillotsons (Bolton) Ltd, 1951







(TURING, Alan, 1912–1954, & others.)
Manchester University Computer – Inaugural Conference – July 1951. Manchester:
Printed by Tillotsons (Bolton) Ltd, 1951

Commercial brochure introducing Apple's
Macintosh personal computer. Apple Computer, Inc., 1984

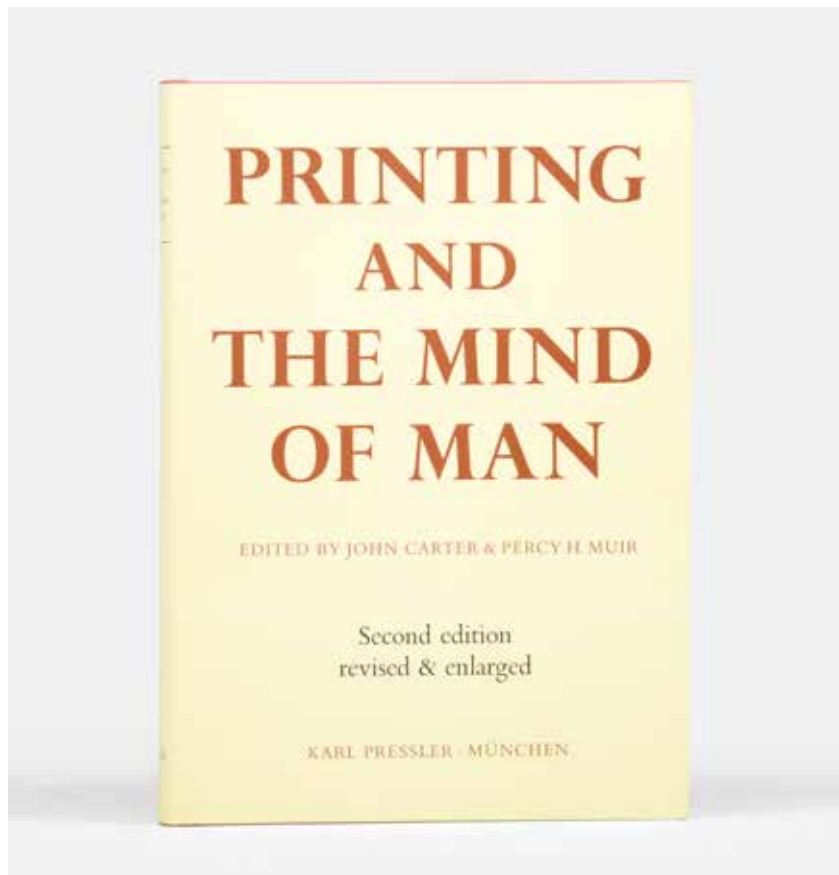
Dressed in academic robes, the Ferranti Mark 1 brochure did not have its intended commercial effect. Only one computer was sold after the Manchester conference, the Atomic Energy Research Establishment placing an order with Ferranti for delivery in autumn 1952. A change of British government led to that contract being cancelled and the computer was eventually sold to the University of Toronto at a knockdown price. The next generation model, known as the Ferranti Mark 1*, was more successful: at least seven of the improved machines were delivered between 1953 and 1957.

By contrast the original Macintosh, the first personal computer to be sold without a programming language, debuted in a now-famous television commercial directed by Ridley Scott that aired during the Super Bowl on 22 January 1984.

Heavily referencing Orwell's dystopian world of *Nineteen Eighty-Four*, the TV commercial positioned Apple as the brave lone competitor against the Big Brother of IBM. The computer went on sale two days later, and approximately 50,000 machines were sold in the first three months.



Of the 235 million
people in America,
only a fraction
can use a computer.



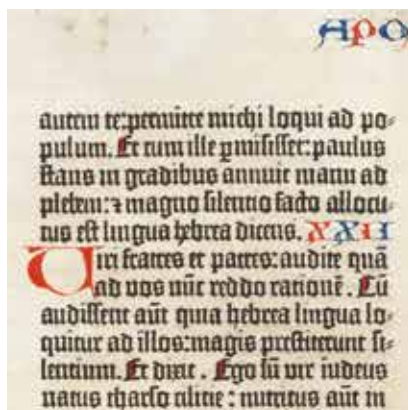
CARTER, John (1905–1975), & Percy H. Muir. *Printing and the Mind of Man*. Munich: Karl Pressler, 1983

In assembling this exhibition, we have occasionally retraced the footsteps of a well-known survey of the Gutenberg era, *Printing and the Mind of Man*, an exhibition mounted in 1963 at the eleventh International Printing Machinery and Allied Trades Exhibition (IPEX) in London, and expanded to a book first published in 1967. With exhibits loaned by such book-collecting luminaries as John Maynard Keynes and Ian Fleming, PMM remains a stimulating guide to landmarks in the history of the printed book. We have copies of the revised and enlarged second edition of 1983 for sale, priced £75.



catalogue and price list

order by date of publication



PAGES 4-5

(GUTENBERG, Johann.) Single leaf from the New Testament, Acts 22 to 23. [Mainz: Johann Gutenberg and Johannes Fust, about 1455]

CONTENTS: Single paper leaf, giving Paul's account of his conversion on the road to Damascus. Royal folio (390 × 285 mm), mounted and framed in a double-glass wooden frame by Mickelson's.

BINDING: Disbound from, and offered with, A Noble Fragment: Being a Leaf of the Gutenberg Bible, with a bibliographical essay by A. Edward Newton. New York: Gabriel Wells, 1921. Dark blue morocco gilt, by Stikeman and Co.

PROVENANCE: Maria Elisabeth Augusta von Sulzbach (1721-1794), wife of Carl Theodore, Electoral Prince of the Palatinate, subsequently Electoral Prince of Bavaria; Mannheim, Hofbibliothek; Munich, Royal Library (their duplicate sale, 1832, sold for 350 guilders); Robert Curzon, Baron Zouche (1810-1873, and by descent until sold); Sotheby's 9 November 1920, lot 70, to Joseph Sabin; sold by him to Gabriel Wells, who broke up the copy, dispersing it in single leaves and in larger fragments.

CONDITION: Single tiny wormhole mildly affecting one letter, minor scratch along centre of leaf breaking through slightly, a few trivial soiling marks; portfolio spine lightly rubbed, endpapers a little chipped, lightly browned in places.

LITERATURE: *Printing and the Mind of Man* 1; BMC I, 17 (IC.55); BSB-Ink. B-408; Chalmers *Disbound and Dispersed* 18; CIBN B-361; DeRicci/Mayence 53 (=78); GW 4201; Hain *3031; Needham P18; Goff B-526.

£97,500

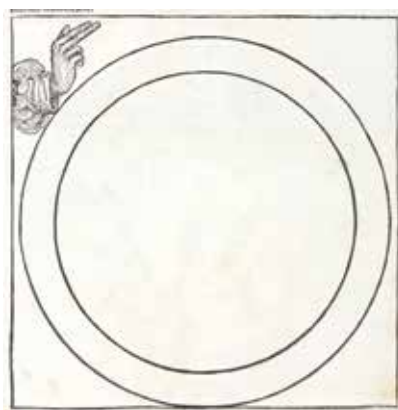
[127602]

PAGES 6-7

SCHADEL, Hartmann. *Liber chronicarum*. Nuremberg: Anton Koberger, 12 July 1493

EDITION: First edition.

CONTENTS: 325 leaves (of 326; without final blank). 63 lines plus headline, Gothic letter, xylographic title-page, 645 woodcut illustrations by Pleydenwurf and Wohlgenuth repeated to a total of 1,809, some full-page, others double-page, including a dou-



ble-page map of the world and double-page map of Europe.

BINDING: Imperial folio (444 × 310 mm). Contemporary German dyed-brown pigskin blind-tooled in a panel design with three frames filled with floral and scrollwork roll-tools, central panel with floral stamps; edges sprinkled blue, neatly mounted on later boards. Housed in a brown quarter morocco solander box by the Chelsea Bindery.

PROVENANCE: With the inscription on title of Johan Divil dated 1547 recording its gift from the estate of Herwart? of the canons of St Blasius in Brunschweig; small library stamp with crown and phrase "Karl Pro-Pr" on title; posthumous bookplate of noted American bibliophile Robert S. Pirie laid in.

CONDITION: Some contemporary marginalia or captions identifying cities. Later spine worn, head and foot of spine chipped, corners mended; clean marginal tears mended in leaves 12, 56, & 291, small marginal smudges and spots, light browning within text block in leaves 172-182, 217, 250, dampstain in lower outer corner of last 16 leaves, a few tiny mends at lower edge of last leaf; overall, a very good copy.

LITERATURE: HC 14508*; BMC II 437; Klebs 889.1; Polain(B) 3469; Goff 5307.

£87,500

[108472]

PAGES 10-11

AGRICOLA, Georgius. *De re metallica, libri XII*. Basel: Hieronymus Froben and Nicolaus Bischoff, March 1556

EDITION: First edition.

CONTENTS: Complete with blank leaf [alpha]6. Woodcut title device, repeated on Bb6v, 2 woodcut plates (edges folded in), woodcut illustrations and diagrams in the text, white-on-black initials. Roman, Greek, and gothic types.

BINDING: Folio (317 × 219 mm) in sixes. Seventeenth-century calf, skilfully rebaked with original spine laid down, relined, spine gilt in compartments, red morocco label, double gilt rules. Housed in a dark brown cloth flat-back box by the Chelsea Bindery.



CONDITION: Binding rubbed and with light scoring, early manuscript notes at head of title; an excellent copy, clean and well-margined, of an important book not uncommonly found in poor state.

LITERATURE: Adams A-349; Brunet I, 113; Dibner *Heralds* 88; Duveen pp.4-5; Grolier Science 2b; Hoover 17; Norman 20; *Printing and the Mind of Man* 79.

£45,000

[80925]

PAGES 12-13, 15

RAMELLI, Agostino. *Le diverse et artificiose machine*. Paris: the author, 1588

EDITION: First edition.

CONTENTS: Engraved title within architectural frame, engraved portrait of the author on verso, title and portrait by Léonard Gaultier, 194 engravings, of which 174 full-page and 20 double-page (numbered to 195, numbers 148-9 a single double-page plate), three signed with the monogram "JG", text and engravings printed within borders of typographic floral ornaments, 4-line historiated and 2-line floriated initials, woodcut tailpieces and corner ornaments. Text in French and Italian, in roman and italic types respectively.

BINDING: Folio (307 × 206 mm). Contemporary French mottled calf, spine gilt in compartments between raised bands, lettered in second compart-





ment, sides ruled in blind. Housed in a burgundy cloth flat-back case.

PROVENANCE: Early nineteenth-century armorial bookplate of George Gostling.

CONDITION: Some restoration to headcaps and joints, a few chips to board edges, a little occasional pale dampstaining and browning, pale stains on 2F1-2, overall a very good copy.

LITERATURE: Adams R-52; Brunet IV:1095; Dibner, *Heralds* 173; Harvard/Mortimer French 452; Norman 1777; Riccardi I:341.

£20,000

[41729]

PAGES 8-9

GALILEI, Galileo. *Dialogo.* Florence: Giovanni Batista Landini, 1632

EDITION: First edition.

CONTENTS: Etched frontispiece by Stefano della Bella in a good dark impression, with printed slip pasted into p. 92, printer's woodcut device on title, 31 woodcut text illustrations and diagrams, floriated woodcut initials, head- and tailpieces made up of printer's ornaments, errata leaf Ff6, without final blank as often.

BINDING: Quarto (215 × 184 mm). Nineteenth-century vellum over thick pasteboards, green morocco spine label, marbled endpapers, red edges. Custom green cloth folding case, green morocco label.

PROVENANCE: Antonio Maria Fabbrini, member of Florence's Accademia from 1642 to 1696, listed in the 1652 register of salaried employees at the Medici Ducal Court as "pagatore di casa" (manuscript monogram in lower margin of etched title, inscription on verso "Libro all'Illmo Anto. Maria Fabbrini prestatto all'Abate Jacopo Giacomini" giving the book to) – the abbot Jacopo Giacomini – The Hightons (bookplate) – sold Sotheby's New York, 27 April 1984, lot 613. The bibliographer Gilbert R. Redgrave discussed a copy of the *Dialogo* in his possession that he believed to be a presentation copy from Galileo to Fabbrini. Redgrave makes no reference to an inscription to Giacomini, though does note the presence of Fabbrini's monogram in the same location as in the present copy. It is uncertain



if they are the same copy, or if there was a second copy once owned by Fabbrini.

CONDITION: Manuscript addition of letter H to diagram on M8v (p. 192), old descriptions of other copies mounted on endleaves. Vellum a little dusty, joints skilfully restored, a fresh, wide-margined copy.

LITERATURE: Cinti 89; Dibner 8; Grolier/Horblit 18C; Norman 1:858; *Printing and the Mind of Man* 128; Riccardi 1:511. See Redgrave, "Inscriptions in Books" in: *Transactions of the Bibliographical Society* 4, London 1898, pp. 40-41. See also for Fabbrini's relationship to the Medici Miscellanea Medicea III, ed. Beatrice Biagoli, Gabriella Cibeï, Veronica Vestri, Florence, 2014, p. 326).

£97,500

[126918]

PAGES 20-21

HOBBS, Thomas. *Leviathan.* London: for Andrew Crooke, 1651

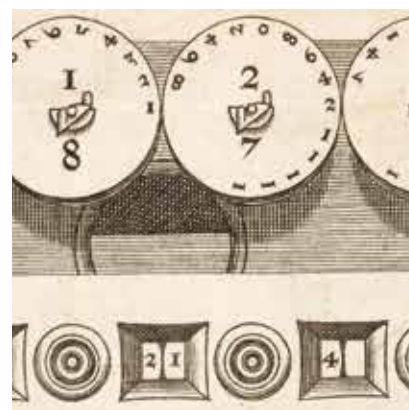
EDITION: First edition, with all the points to distinguish it from the two later printings also dated 1651.

CONTENTS: Ornament of winged head on title page, engraved frontispiece and folding printed table.

BINDING: Folio (276 × 173 mm). Contemporary calf, rebaked to style, red morocco spine label, raised bands, covers ruled in blind with floral cornerpieces, renewed flyleaves, original binder's blanks retained.

PROVENANCE: Contemporary gift inscription to original front binder's blank: "Johannis Lilly mi finit Ex dono Johannis Henshaw Armigiri Ao Dni 1654" with the neat inscription "Ex dono Johannis Henshaw" underneath, alongside a further small signature; John Lilly's large ornate signature also on the rear binder's blank.

CONDITION: Small ink shelfmark at head of title page. Extremities refurbished, discreet repair to head of title page with very minor stain on verso, light creasing in centre of initial pages, final preliminary leaf (The Introduction) tipped onto a stub, tiny paper flaw to pp. 47/48 with loss of 2 characters, small burn hole to pp. 79/80 touching 2 letters, small hole to pp. 319/320 affecting 5 characters, and



another to pp. 357/358 with loss of 4 letters; short split and a small rust hole to folding plate not affecting text, some light foxing and soiling to contents, short tear to final binder's blank repaired. Overall a very good copy, with pleasing evidence of contemporary ownership and with the frontispiece, often faded at the head, in a good impression.

LITERATURE: Macdonald & Hargreaves 42; *Printing and the Mind of Man* 138; Wing H2246; ESTC R17253.

£27,500

[124776]

PAGES 16-17

MORLAND, Sir Samuel. *The description and use of two arithmetick instruments.* London: printed, and are to be sold by Moses Pitt, 1673

EDITION: First edition.

CONTENTS: Frontispiece portrait of the author, with added title page [A2] dated 1672; collates A-F⁸ (-F8) G⁸ (-G8) A-B⁸ *⁸. With 6 engraved plates printed on versos of first A2-6 and 4 folding engraved plates pasted to the versos of A8 and B1-3, folding letterpress table bound between G2 and G3, tables in the text.

BINDING: Small octavo (143 × 90 mm). Modern period-style sheep by Bernard Middleton, double gilt rules, red morocco spine label, marbled endpapers. Housed in a brown cloth flat-back box.

PROVENANCE: From the library of French mathematician Michel Chasles (1793-1880), with the original front wrapper of his binding bound in at the front, with "S. Morland 1673" on the recto in Chasles's hand and his bookplate on the verso, above a note of acquisition in another hand "acheté a la vente Chasles samedi 9 juillet 1881".

CONDITION: Occasional browning and spotting, old repaired tear on B4 affecting a few letters but not the sense.

LITERATURE: *Origins of Cyberspace* 9 (lacking F8); Taylor 358; Wing M2777.

£20,000

[63951]



PAGES 18–19

[SWIFT, Jonathan.] *Travels into Several Remote Nations of the World . . . By Lemuel Gulliver. London: Benjamin Motte, 1726*

EDITION: First edition, Teerink's A edition with all the necessary points to distinguish it from the two later printings issued the same year.

CONTENTS: Engraved frontispiece portrait of Gulliver in first state, 4 maps and 2 plans.

BINDING: 2 volumes, octavo (196 × 121 mm). Original trade binding of unlettered panelled calf, spines with volume numbers in gilt, gilt edge-roll, edges speckled red. Housed in a brown quarter morocco solander box and chemise by the Chelsea Bindery.

PROVENANCE: Faint contemporary ownership signature of James Grafton to title pages. From the library of the Irish judge William O'Brien (1832–1899); thence by bequest to the Jesuit Community at Milltown Park.

CONDITION: Later paper labels removed from second compartments with slight surface loss of leather, a little rubbing and scuffing to edges, front hinge of vol. II cracked but holding, very faint dampstain to upper outer corners throughout, occasional mark or spot of foxing to contents, vol. II with shallow chip to bottom of first two blanks. An excellent set in an unrestored trade binding, rare thus.

LITERATURE: Ashley VI, p. 28; Grolier *English* 42; Rothschild 2104; Teerink 289; *Printing and the Mind of Man* 185.

£150,000 [120147]

PAGES 38–39

[STERNE, Laurence.] *The Life and Opinions of Tristram Shandy, Gentleman. York & London: R. and J. Dodsley, T. Becket and P. A. Dehondt, 1760–67*

EDITION: First edition.

BINDING: 9 volumes bound in five, octavo (151 × 92 mm). Contemporary speckled calf, red morocco labels, spines numbered in gilt direct, red speckled edges.

CONTENTS: Engraved plate by Ravanet after Hogarth at beginning of vol. III, as called for. Signed by



the author as usual in vols. V, VII, and IX to protect against piracy.

PROVENANCE: Bookplates of the Whig politician Hon. Lionel Damer (1748–1807), American collector Ralph Heyward Isham (1890–1955), and Hobart F. Cole. Isham is notable for his reassembling of James Boswell's papers.

CONDITION: Cropped contemporary notation vol. I p. 1. Skilful repairs to spine of vol. I–II, a few light restorations elsewhere, light wear to spine ends, offset from plate and bookplates, some page corners lightly creased, a notably handsome copy.

LITERATURE: Rothschild 1970.

£25,000 [128447]

PAGE 14

CERVANTES, Miguel de. *El ingenioso hidalgo Don Quixote de la Mancha. Madrid: Don Joaquin Ibarra, 1780*

EDITION: First printing of the celebrated Ibarra edition.

CONTENTS: 4 engraved title pages, portrait of Cervantes, and 31 plates after Carnicero, Barranco, Brunette, Del Castillo, Ferro and Gil, engraved by Ballester, Barcelon, Fabregat, Gil, Mol, Muntaner, Salvador y Carmona and Selam, folding engraved map, engraved ornamental initials and head- and tailpieces.



BINDING: 4 volumes, quarto (300 × 217 mm). Early nineteenth-century red straight-grain morocco, spines gilt lettered and ruled (black morocco banding between the five double raised bands), gilt octagonal motif in three compartments, three-line gilt border on sides, all edges gilt, gilt turn-ins with "five bar-and-rossette" pattern, marbled endpapers.

PROVENANCE: From the library of William Williams of Tregullow (1791–1870), High Sheriff of Cornwall, with his simple armorial bookplates; elaborate armorial bookplates of Etta Mary Arnold Clark (1861–1952).

CONDITION: Just a little wear or rubbing to extremities, spines with single small wormhole at head or foot of joints, a few minor abrasions, touch of foxing or dust-marking in places, otherwise an excellent set.

£25,000 [116066]

PAGE 22

BABBAGE, Charles. *On the Economy of Machinery and Manufactures. London: Charles Knight, 1832*

EDITION: First edition, large paper copy for presentation, inscribed by the author on the front blank, "To Mr. Bartholemew [sic] with Mr Babbages Compliments".

BINDING: Octavo (222 × 140 mm). Original purple cloth rebacked and printed paper label to style. Housed in a black cloth flat-back box by the Chelsea Bindery.

CONDITION: Cloth a little mottled and rubbed, wear to the corners and edges skilfully repaired, faint spotting to endpapers and blanks, title perhaps washed, else clean, bright and untrimmed.

LITERATURE: Kress C3013; Goldsmiths 27346; Einaudi 223; Mattioli 158; William I, 198.e.

£12,500 [74487]



PAGES 24–25

(LOVELACE, Ada, trans.) MENABREA, Luigi Federico. *Sketch of the Analytical Engine invented by Charles Babbage, Esq. London: printed by Richard and John E. Taylor, 1843*

EDITION: First separate edition.

CONTENTS: pp. [1], 666–731, [1]. Folding table to the rear, “Diagram for the computation by the Engine of the Numbers of Bernoulli”, numerous tables to the text (one full-page, p. 711).

BINDING: Octavo (212 × 134 mm). Contemporary dark red morocco by Manderson of Brighton (binder’s ticket), rebacked to style, alternating floriate-and-scrollwork border within double-ruled frame to boards in blind, “LOVELACE” lettered in gilt to centre of front board, light brown endpapers, edges sprinkled red.

PROVENANCE: From the library of Ada Lovelace’s early tutor in mathematics, Dr William King of Brighton (1786–1865), with a page of meticulously compiled notes on Ada’s life in his hand to the flyleaf, and annotated by him on the title page to identify the anonymous translator of the work as “Lady Lovelace”.

CONDITION: Previous bookseller’s pencilled notes to front free endpaper verso; later typed slip laid in at front detailing provenance. Recornered, some shallow knocks and rubbing to extremities, a few scuffs and small patches of wear to boards such as to top of front board, gutters reinforced with cloth, contents toned and occasionally foxed, short closed tears and chips to the fore edge of the folding table. Overall a very good copy with a splendid association.

LITERATURE: Grolier, *Extraordinary Women in Science & Medicine*, p. 122; *Origins of Cyberspace* 61. See Johnston Birchall, *Co-op: The People’s Business* (Manchester University Press, 1994); Christopher Hollings, Ursula Martin & Adrian Rice, *Ada Lovelace: The Making of a Computer Scientist* (Bodleian Library, 2018); Christopher Hollings, Ursula Martin & Adrian Rice, “The early mathematical education of Ada Lovelace”, *BSHM Bulletin: Journal of the British Society for the History of Mathematics*, 2:3, pp. 221–34 (2017); Miranda Seymour, *In Byron’s Wake* (Simon and Schuster,



2018); Doron Swade, *The Cogwheel Brain* (Little, Brown, 2000); Betty Alexandra Toole, *Ada, the Enchantress of Numbers: Poetical Science* (Lovelace-Byron Collection, 1992); John Wilson, Antony Webster & Rachael Vorberg-Rugh, *Building Co-operation: A Business History of the Co-operative Group, 1863–2013* (Oxford University Press, 2013); Benjamin Woolley, *The Bride of Science: Romance, Reason and Byron’s Daughter* (Pan Macmillan, 2015).

£250,000

[127810]

PAGES 34–35

BLOCH, Jan Gotlib. *Der Krieg*. Berlin: Puttkammer & Mühlbrecht, 1898

EDITION: First edition in German, first published in Russian the year previously with a French translation issued the same year.

CONTENTS: Profusely illustrated throughout with plates, plans and diagrams, many of them folding, illustrations and tables to the text, many full-page.

BINDING: 6 volumes, quarto (250 × 174 mm). Contemporary black hard-grain half morocco, title gilt to spines, marbled sides, red edges.

CONDITION: Slightly rubbed at the extremities, some headcaps chipping, one gathering in Volume V sprung, light marginal browning, otherwise a very good set.

£5,500

[46965]

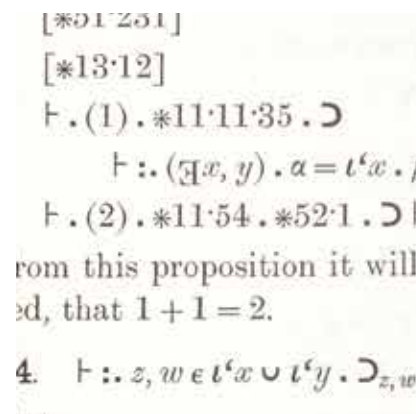
PAGE 40

WHITEHEAD, Alfred North, & Bertrand Russell. *Principia mathematica*. Cambridge: at the University Press, 1910–12–13

EDITION: First editions, with presentation slip from the authors laid in, one of only 500 possible sets complete in first edition throughout.

BINDING: 3 volumes, large octavo. Original dark blue cloth, spines lettered in gilt, cream endpapers. Housed in a dark blue quarter morocco solander box by the Chelsea Bindery.

CONDITION: Some trivial wear to spine ends and tips of vol. I, a little mottling and rubbing to gilt at foot of spines, remains of bookplate removal to



endpapers, front hinge of vol. I cracked but holding and small tear to rear hinge, internally fresh. A superb set.

LITERATURE: Blackwell & Ruja Ag.1a; Church, *Bibliography of Symbolic Logic*, 194.1–3 (one of a handful of works marked by Church as being “of especial interest or importance”); Martin 101.01–03; see Kneebone, *Mathematical Logic* (1963), p. 161ff.

£100,000

[114672]

PAGES 32

CAPEK, Karel. R.U.R. *Rossum’s Universal Robots*. Prague: Vydalo Aventinum, 1920

EDITION: First edition, first printing, cloth issue.

BINDING: Octavo. Original green cloth-backed marbled paper boards, spine lettered in gilt.

CONDITION: Spine lightly faded, head of spine, upper board edges, and a couple of tips slightly worn, a few faint marks to foot of spine and boards, small dark marks to endpapers from glue, occasional marginal pencil marks, else a near-fine, well-preserved copy.

£6,500

[126594]





PAGE 41

WITTGENSTEIN, Ludwig. *Logisch-philosophische Abhandlung.* Leipzig: Unesma G.m.b.H., 1921

EDITION: First edition, first issue.

BINDING: Octavo. Original orange pictorial paper wrappers, sewn as issued, spine and wrappers lettered in black. Housed in a black quarter morocco solander box with chemise by the Chelsea Bindery.

CONDITION: Wrappers toned and with very light wear to extremities, fore edges of first 4 leaves a little roughly opened, small marks to rear wrapper and rear endpapers, a very good copy.

LITERATURE: Fann p. 405; Ray Monk, *Ludwig Wittgenstein: The Duty of Genius* (1990).

£75,000

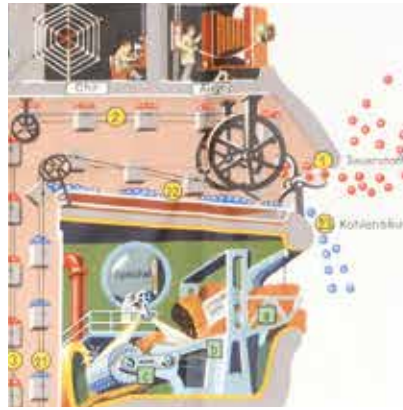
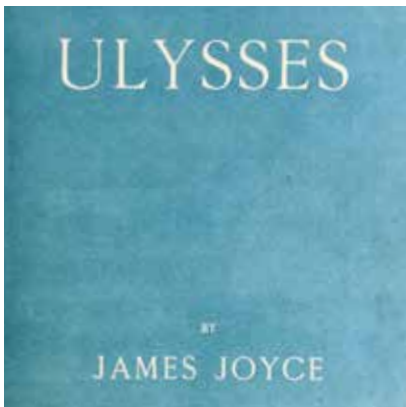
[117021]

PAGES 26–27

JOYCE, James. *Ulysses.* Paris: Shakespeare and Company, 1922

EDITION: First edition, large paper issue, one of 150 copies on verge d'Arches, this copy number 136.

BINDING: Quarto (259 × 202 mm). Contemporary purple sheep, dated 1922 in gilt at foot of front turn-in, marbled endpapers, top edge gilt, others uncut; original printed wrappers bound in.



PROVENANCE: One of three copies of this issue sent by Beach to James Whittall (1888–1954) on 28 March 1922. Whittall was a translator of French literature. Additionally signed and dated by the author on the half-title, "James Joyce, Paris, 27.vi.[1]929".

CONDITION: Sheep with small areas of wear, purple dye a little sunned and faded on front board, inscribed half-title slightly toned, an excellent copy.

LITERATURE: Slocum & Cahoon A17; Horowitz, *Census*, page 120; Zena Meadowson, "Joyce's Utopian Machine: The Anti-Tyrannical Mechanics of 'Ulysses'", *James Joyce Quarterly*, Vol. 48, No. 1 (Fall 2010), pp. 55–74..

£87,500

[108979]

PAGE 23

KAHN, Fritz. *Der Mensch als Industriepalast (Man as Industrial Palace).* Stuttgart: Franckh'sche Verlagshandlung, [1926]

EDITION: First printing.

CONTENT: Original chromolithograph poster (960 × 480 mm).

CONDITION: In fine condition, folded as usual, the colours bright and fresh.

LITERATURE: Cornelius Borck, "Living Ambiguity: Speculative Bodies of Science in Weimar Culture", in Alexei Kojevnikov (ed.), *Weimar Culture and Quantum Mechanics* (Imperial College Press, 2011).

£2,850

[125330]

PAGES 32–33

HARBOU, Thea von. *Metropolis.* Berlin: August Scherl, 1926

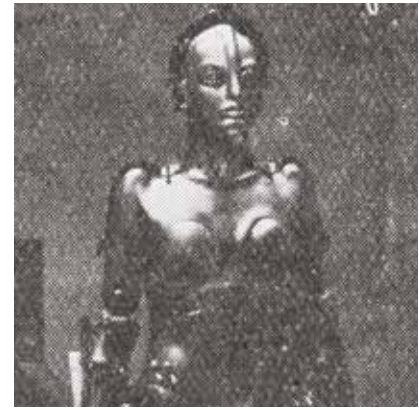
EDITION: First edition, first impression.

BINDING: Octavo. Original green cloth, spine lettered in gilt on red ground, front board lettered and ruled in gilt, top edge yellow. With the dust jacket.

CONDITION: Ownership ink stamp to rear paste-down. Spine slightly rolled and faded, boards a little rubbed and marked. An excellent copy in the dust jacket with spotting to spine and rear panel.

£8,750

[124278]



PAGE 21

HUXLEY, Aldous. *Brave New World.* London: Chatto & Windus, 1932

EDITION: First edition, signed limited issue, one of 314 copies specially bound and signed by the author. Octavo.

BINDING: Original yellow cloth, titles to spine gilt on blue ground, top edge gilt, others untrimmed. Housed in a custom quarter yellow morocco and marbled paper covered solander box.

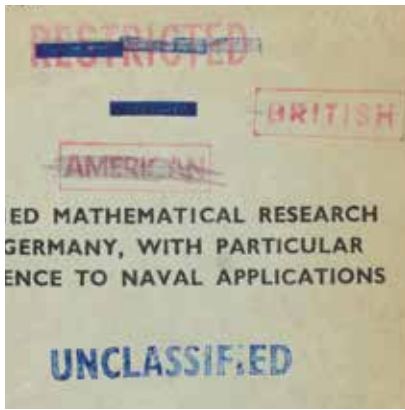
PROVENANCE: from the library of Oliver Brett, 3rd Viscount Esher (1881–1963), with his armorial bookplate. Brett's sister, Dorothy Eugénie Brett (1883–1977), was the model for Jenny, the deaf, continually sketching character in Huxley's first book, *Crome Yellow* (1921). Dorothy, who was partially deaf, associated with the Bloomsbury group during her studies at the Slade School of Art and was a frequent member of Lady Ottoline Morrell's gatherings at Garsington Manor, which were satirised by Huxley in the novel.

CONDITION: Spine a little darkened, internally bright; an excellent copy.

£5,750

[117329]





PAGES 36–37

(ROCKETRY.) TODD, John, & others. *Applied Mathematical Research in Germany, with Particular Reference to Naval Applications.* London: H.M. Stationer's Office, 1945

EDITION: First edition.

CONTENTS: pp. [iv], 65. Roneoed typescript, 2 early leaves bound out of sequence but complete.

BINDING: Folio (195 × 255 mm). Original wire-stitched printed wrappers, marked "Copy No. 438" and stamped "Restricted" in red, later stamped "Unclassified" in blue (with, however, one paragraph on p. 2 blacked out).

CONDITION: Covers discoloured towards edges, considerable fraying around spine, internally very good.

£7,500

[90437]

PAGE 21

ORWELL, George. *Nineteen Eighty-Four.* London: Secker & Warburg, 1949

EDITION: First edition, first impression.

BINDING: Octavo. Original green cloth, spine lettered in red, top edge red. With the green dust jacket. Housed in a custom green quarter morocco slipcase.



CONDITION: Spine very slightly faded; an excellent copy in the jacket with unusually bright spine, a little minor rubbing to extremities, a couple of shallow chips and nicks to spine ends and tips, small tape repairs to verso.

£5,750

[120304]

PAGES 42–44

(TURING, Alan, & others.) *Manchester University Computer – Inaugural Conference – July 1951. Manchester: Printed by Tillotsons (Bolton) Ltd, 1951*

EDITION: First edition.

CONTENTS: 40pp. Illustrations and diagrams in text. BINDING: Quarto (280 × 215 mm). Original moderate reddish brown textured card wrappers, cord-sewn with matching thread, title gilt to front panel. Housed in a black cloth box, red spine label.

PROVENANCE: One of the delegates, Dr Hans Joachim Dreyer of the Institut für Praktische Mathematik, Darmstadt, who was responsible for one of West Germany's pioneering computers, Darmstädter Elektronischer Rechenautomat (DERA), which became operational at Darmstadt in 1957. Given by him to the Institut, with their inkstamps and deaccession marks.

CONDITION: Wrappers lightly rubbed and a little sunned, neat red ink ticks next to titles in the contents leaf, remains very good.

£5,000

[125004]

PAGES 28–31 & COVER IMAGES

DUCHAMP, Marcel. *La Boite-en-Valise (The Box in a Suitcase).* Paris: Marcel Duchamp, 1958

EDITION: From the Series C issued in Paris in 1958, one of 30 unnumbered copies only assembled by Iliasz (Iliia Zdanevitch); usually unsigned, but this copy with three signed presentations from Duchamp, two dated 1958, to Art Buchwald.

CONTENTS: Folio (400 × 376 × 92 mm). 68 miniature replicas and colour reproductions of works by Marcel Duchamp inserted or placed loosely as issued in the original grey coarse-weave cloth box.



PROVENANCE: Inscribed by Duchamp for Art Buchwald (1925–2007), American humourist, journalist and satirist best known for his long-running syndicated column for the *Washington Post*, winner of the Pulitzer Prize in 1982.

LITERATURE: Schwarz 484.

£550,000

[128969]

PAGES 44–45

Commercial brochure introducing Apple's first Macintosh computer. Apple Computer, Inc., 1984

EDITION: First printing.

CONTENTS: 12 pp, including 2 folding leaves. Colour illustrated with photographs and diagrams throughout.

BINDING: Folio. Original pictorial card wrappers, wire-stitched.

CONDITION: Spine rubbed and corners very lightly bumped, overall an excellent copy.

On loan for the exhibition

PHOTOGRAPHY: Ruth Segarra

DESIGN: Nigel Bents



