

# 'In the Beginning was the Word'

## A very special acquisition

Pam Pryde

Johann Gensfleisch (known as Johann Gutenberg after Gutenberghof, the house in which his family lived) was born in Mainz, most likely between 1394 and 1400, of patrician parents. Nothing is known about his early life, but at some stage he mastered Latin, as well as the trades of working with gold and precious stones, and die-casting. All of these skills were to prove useful as he realised his dream of producing books using individual, re-usable metal letters.

Political life in Mainz in the 1400s was unsettled, with the craftsmen's guilds rising up on several occasions against the patrician-dominated system and seizing control of the town. In 1428 such an uprising resulted in many patrician families, including the Gutenbergs, being banished from the city. Johann settled in Strasbourg (famous for the quality of its artisans' work), choosing to remain there even after the guilds allowed exiles to return home. On the death of his mother in 1433 however, Gutenberg found that, because of his decision to remain in Strasbourg, his share of her estate had been impounded. With his income cut off, Gutenberg was forced to earn a living.

As a skilled goldsmith, Gutenberg was much sought after, but his wages did not cover his living expenses

as well as those incurred by his experiments. So Gutenberg agreed to teach (for a fee) Andres Dritzehen and his business partner Hans Riffe to cut and polish precious stones. A tempting business opportunity then arose: every seven years a great pilgrimage was made to the sacred relics at Aix-la-Chapelle, and one was planned for the following year (1438). Dritzehen and Riffe persuaded Gutenberg that it would be a lucrative business to make and sell to the pilgrims small handheld mirrors. These were not mere souvenirs; believers were convinced that through such mirrors they could retain the miraculous power of the relics. After capturing the image, the mirror was carefully wrapped and kept until needed to heal a sick family member or animal. Gutenberg agreed to make the mirrors, which were framed in metal, but unfortunately for the business partners this turned out to be a short-lived enterprise when they realised they had miscalculated, and the pilgrimage was to take place a year later than they had thought! Nevertheless, a partnership had been formed between the three men (and one other, a Herr Heilmann) and in exchange for money to develop his printing experiment, Gutenberg let them into his confidence.

By this time Gutenberg was developing the idea of using brass punches with letters engraved in reverse, which could be hammered into a bar of soft lead to create a mould, or matrix. (Brass punches bearing single letters had long been used to stamp the title or author's name on the covers of books bound in leather.) Molten lead was then poured into the matrix, and left to harden before the moulded letter was knocked out. But the resulting types were still far from satisfactory. Lead by itself was too soft to stand repeated use in a press, so the partners experimented until they found an alloy that suited their needs. As well, an adjustable mould was needed to accommodate letters of differing widths. A further challenge emerged: the types needed to be exactly the same height. If there was any difference at all, the lower types would not print.

Of all Gutenberg's experiments, the adjustable mould was possibly the most significant invention. This was made of two L-shaped pieces of metal, of exactly the same height; when the short side of one L was put against the long side of the other, it made a rectangular opening of exactly the right height, which could be made larger or smaller depending on the letter being cast. Each type could

now be cast uniformly. The problem of slight variation in height remained only when the mould was over-filled; Gutenberg added a small shoulder to the mould so that the liquid lead could come up only so far, leaving a small overflow jet, which was easily broken off when the mould was opened and the type dropped out. Any rough portion remaining was smoothed off, leaving the types perfectly uniform in height.

Presses were common in several industries in Gutenberg's day: wine-making, printing textiles, binding books and making paper. Gutenberg needed to adapt the press for his requirements. In particular he needed a press with a frame of some sort to keep the paper separate from the inked type until a solid weight was lowered onto the paper using a screw mechanism to bring the paper and type together. This was quite a different process from woodblock printing, where paper was laid carefully onto the inked woodblock and the image transferred by burnishing with a wooden tool over the whole surface of the paper. Metal type also required a much heavier, oilier ink than the water-based ink used for woodblocks, so that the ink would stick to the metal. Gutenberg modified the ink used by artists of the day, in which the colours were

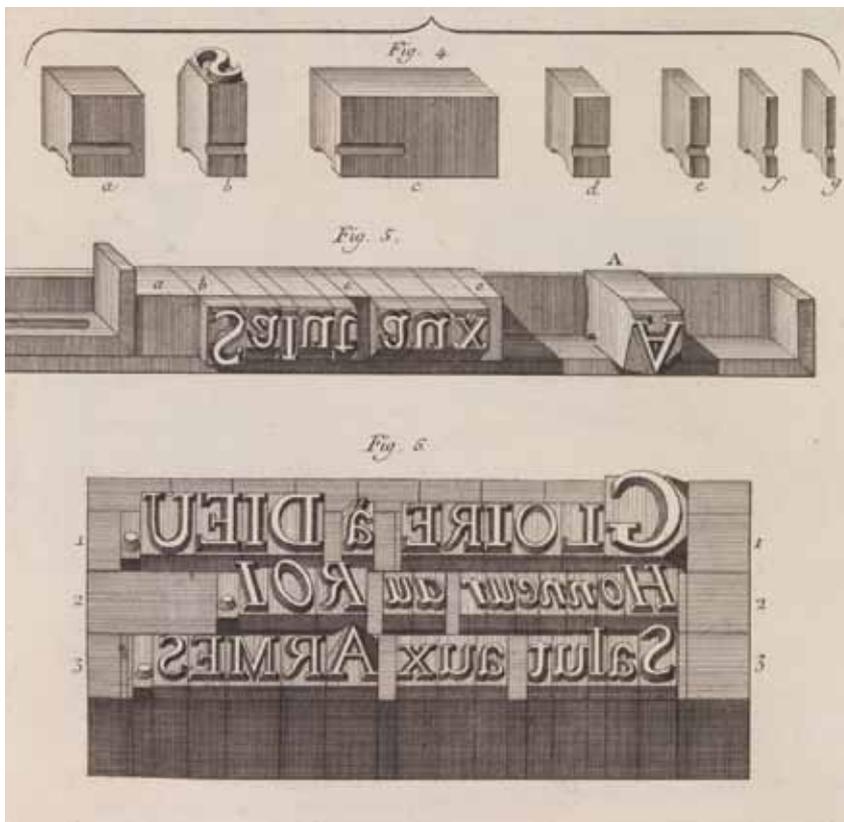
mixed with boiled linseed oil or varnish. The use of paper rather than parchment was quite radical, but Gutenberg was determined that his invention would be largely paper-based, as it was much cheaper and easier to work with than parchment.

A large wooden case divided into many sections was constructed to hold the individual metal types, and a handheld metal stick was designed, in which to build up words and sentences. As the stick filled, the lines of type were transferred to the bed of the press and secured. When the page of type was complete, dampened paper was attached to the frame and positioned directly above the type. The type was inked using a leather ball filled with horsehair, the screw on the press was turned, and a trial proof was printed. After checking for and correcting errors, printing began. Once the print run was completed, the type was cleaned and distributed into the case, and another page was built up. It is likely that Gutenberg, while still in Strasbourg, used a copy of Aelius Donatus' *Ars minor*, a very common Latin grammar, as a model to practise printing; some 24 early printed editions of this work have been identified, which suggests that Gutenberg was refining the process of printing with movable type.

Towards the end of 1441 the Bishop of Strasbourg, impressed with the potential of Gutenberg's invention, loaned him money to print an edition of the Bible. But lack of finances still dogged Gutenberg, and he returned to Mainz where he hoped to access his share of the family estate. Unfortunately this did not eventuate, so he returned to Strasbourg, only to find his business partners had moved on and his precious press had been dismantled. Gutenberg returned again to Mainz and managed to persuade a relative to finance the building of a new press in his home, Gutenberghof. A project as large as printing an edition of the Bible required significant additional funding, and it was not until 1449 or 1450 that Johann Fust offered to find the resources needed. Fust was by trade a goldsmith, a merchant and a money-lender—and a seller of manuscript books to university towns. It is possible that Fust had known Gutenberg since his return to Mainz, and he may even have been the dealer Gutenberg used to sell his Donatus grammars; if so, Fust soon realised the commercial potential of Gutenberg's invention.

Fust's initial loan of 800 gulden financed the equipment Gutenberg needed to print a Bible; the equipment would serve as security against the loan.

*Imprimerie en lettres, l'opération de la casse* (detail showing examples of type and spacers set for printing), engraving (plate I, opposite p. 12 of section 'Imprimerie en caractères', vol. 7), in Denis Diderot and Jean Le Rond d'Alembert, *Encyclopédie, ou, dictionnaire raisonné des sciences, des arts et des métiers*, 3rd edition, 17 vols, Livorno: l'Imprimerie des Editeurs, 1770–76. Special Collections, Baillieu Library, University of Melbourne



A workshop was rented and a new, smaller typeface was developed so that more words could fit onto the page. Punches were engraved, matrices were struck and types were cast. In all, some 290 different types were used: 47 capital letters and 243 lower-case letters, including punctuation marks. Four presses

were installed (later increased to six), and hired workmen were taught to mix the melted metals and to cast type. Others were taught how to sort the type into the many-sectioned cases, to set the type in compositors' sticks, to grind and mix inks to the right consistency and to dampen the imported Italian paper ready for

printing. To keep six compositors occupied, around 46,000 types would have been cast.

Printed in Latin, the page size of the Bible—42 centimetres by 32 centimetres—is typical of the finest manuscript Bibles from the best scriptoria. However, as careful as Gutenberg had been in his preparation, once printing started changes were still made to the layout. Pages 1 to 9 have 40 lines of text per page—as do the first seven pages of 1 Samuel. Page 10 has 41 lines to the page, and from then on we find 42-line pages. The first few copies off the press had red-printed headings at the start of each book, but this was soon abandoned and spaces left for the rubricators. One page was printed at a time, with two pages printed on each side of the sheet, making four pages to the sheet.

Most of the pages were printed so that when five sheets were placed together and folded in the middle they made a gathering of 20 pages. For the sheets to be in the correct order, pages 1 and 20 needed to be printed on one side of the sheet, and pages 2 and 19 on the other side; the next sheet would have pages 3 and 18 on one side, and pages 4 and 17 on the other, and so on. Each copy comprised some 641 leaves; there are no catchwords, title page or

Leaf from [*Biblia Latina*] (42-line Bible), ink on paper, 39.0 x 29.0 cm, Mainz: Johann Gutenberg, c. 1454–55. Purchased 2011 with assistance from the Ivy May Pendlebury Bequest, Special Collections, Baillieu Library, University of Melbourne

colophon to assist with collation, and no information as to the date or the place it was printed, or the printer.

After the sheets had dried, they were laid out on a long table, collated and folded into gatherings. This was how the completed book was sold to a client, who would then take the pile of gatherings to his own bookbinder to have them bound. The bound book was next taken to a rubricator—or ‘red ink’ man—who lettered in the chapter headings and selected large capital letters in red or blue ink, and made pen strokes in red through each capital letter. If the owner was wealthy, he might then send his book to an illuminator who would add initial letters and marginal decorations in gold and colours. To assist the rubricator in his task, Gutenberg provided a printed list of rubrics or chapter headings.

There are 12 known vellum copies of the 42-line Bible in existence today and 37 copies on paper—although only around 20 of these are complete. It is thought that around 30 to 35 copies were originally printed on vellum, and 145 to 150 copies were printed on paper.

Gutenberg and Fust’s choice of the Bible as their first major printing project is an interesting one. It was perhaps influenced by the monastic reform that occurred in

1451 under the papal legate Nicholas of Cues, who stressed the need for Benedictine monasteries to have a well-translated and edited Bible in their libraries. Other texts, such as a missal (mass-book) or a psalter (with its psalms of praise, thanksgiving and lamentation) may have been a financially more sensible option, as every church required one. But these required a range of font sizes, and were much more complex projects.

Several years passed, and Fust, seeing no return on his investment, loaned Gutenberg a further 800 gulden to see the project to completion. This time the loan was for the ‘work of their common profit’ or for the ‘work of the books’. By mid-1453 Gutenberg was ready to print, and in March 1455 the Bishop of Siena reported that while in Frankfurt he saw sections of the work (although not a complete Bible), and glowingly described its features. He stated that between 158 and 180 copies had been completed, and that there were ready buyers even before the volumes were finished. A copy of the 42-line Bible, housed in the Bibliothèque Nationale in Paris, notes that Heinrich Cremer, vicar of St Stephen’s at Mainz, finished rubricating and binding the book on 24 August 1456, a task that would have taken some months to

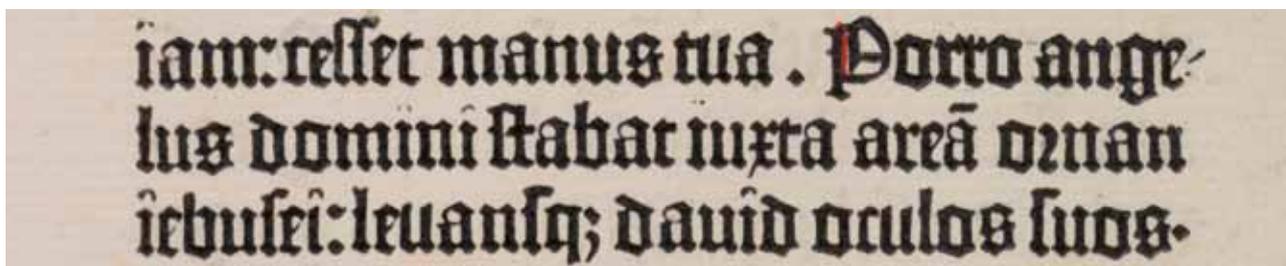
complete. Based on these pieces of evidence we can deduce that printing was finished in mid- to late 1455.

Around the same time Fust demanded back his capital at compound interest. He claimed that Gutenberg had misappropriated funds from their joint venture and used them for his own projects, and he decided to sue. The court ruled against Gutenberg, who was by now in his mid- to late fifties. The falling-out could have been over a commission to print papal indulgences in 1454 and 1455.<sup>1</sup> During the time of the crusades it was customary for all participants to receive a plenary indulgence; the participant paid for the document, presented it to a confessor and made a confession, after which forgiveness from sins would be officially pronounced. The indulgences of 1454 and 1455 were issued to raise money for a war against the Turks following the capture of Constantinople. Of the two indulgences printed, the 31-line version used the same type in its display line as that found in Gutenberg’s *Donatus*, which was stored at Gutenberg’s home, along with the press used for that publication. Thus it is likely that Gutenberg had indeed misappropriated funds, by diverting some of the money on loan from

et regem maacha cum populo eius. Qui cum venissent castrametati sunt e regione medaba. Filij quoque ammon congregati de urbibus suis venerunt ad bellum. Quod cum audisset dauid: misit ioab et omnem exercitum virorum fortium. Egrediique filij ammon: direxerunt aciem iuxta portam civitatis. Reges autem qui ad auxilium eius venerant separatim in agro steterunt. Igitur ioab intelligens bellum esse aduerso et post tempus contra se fieri: elegit viros fortissimos de universo israhel et petegit contra sirum. Reliquam autem partem populi dedit sub manu abisai fratris sui: et petegunt contra filios ammon. Dixitque. Si vicerit me sirus auxilio eris michi: si autem superaverint te filij ammon ero tibi in presidium. Confortare et agamus viriliter pro populo nostro et pro urbibus dei nostri. Dominus autem quod in conspectu suo bonum est faciat. Petegit ergo ioab et populus qui cum eo erat contra sirum ad presidium: et fugavit eos. Porro filij ammon videntes quod fugisset sirus: ipsi quoque fugerunt abisai fratrem eius: et ingressi sunt civitatem. Reversusque est etiam ioab in iherusalem. Videns autem sirus quod cecidisset coram israhel: misit nuncios et adduxit sirum qui erat transiunium. Sophat autem princeps militie adadezer erat dux eorum. Quod cum annuntiatum esset dauid: congregavit universum israhel: et transiit iordanem: reversitque in eos et direxit eum aduerso aciem illis contra pugnantibus. Fugit autem sirus israhel. Et interfecit dauid de suis septem milia eorum et quadraginta milia pedum: et sophat egerat principem. Videntes autem sui adadezer se ab israhel esse superatos: transfugerunt ad dauid et seruerunt ei. Noluitque ultra

furiam auxilium prebere filiis ammon. **XX**  
**F**actum est autem post anni circulum eo tempore quo solent reges ad bella procedere congregavit ioab exercitum et robur militie: et castravit castram filiorum ammon. Petegitque et obsedit rabba. Porro dauid manebat in iherusalem quando ioab percussit rabba et destruxit eam. Tulit autem dauid coronam melchon de capite eius et inuenit in ea auri pondus talentum et preciosissimas gemas: fecitque sibi inde diademam. Manubias quoque urbis plurimas tulit: populum autem qui erat in ea eduxit et fecit super eos tribulas et rehas et ferrata carpenta transire: ita ut disscarentur et conticerent. Sic fecit dauid cunctis urbibus filiorum ammon: et reversus est cum omni populo suo in iherusalem. Post hec initum est bellum in gazer aduersum philisteos: in quo percussit sobochai usathites saphai de genere raphaim et humiliavit eos. Aliud quoque bellum gestum est aduersus philisteos: in quo percussit adodatus filius salus bethleemites fratrem goliath gethi: cuius hasta lignum quasi liciatorum regentium. Sed et aliud bellum accidit in geth: in quo fuit homo longissimus senos habens digitos id est simul viginti quatuor: qui et ipse de raphaim fuerat rex generatus. Hic blasphemavit israhel: et percussit eum ionathan filius samae filius dauid. Hii sunt filij rapha in geth: qui ceciderunt in manu dauid et eorumque.

**C**onfurrexit autem sathan **XXI** contra israhel: et incitavit dauid ut numeraret israhel. Dixitque dauid ad ioab et ad principes populi. Ite et numerate israhel a beelabee usque dau: et afferte michi numerum ut sciam. Responditque ioab. Augere dominus populum



Fust to the manufacture of types for the indulgence printed at Gutenberg's house. It is possible, however, that Fust knew about this commission from the beginning but only realised how potentially lucrative it was once work was under way, then insisting the partnership be involved.

It is of note that the typefaces used in the body of the indulgences are from different hands—the second was most likely that of Peter Schoeffer (born c. 1420–30), Fust's protégé (and later son-in-law), who had learnt the art of printing from Gutenberg.<sup>2</sup> After the court's ruling, Fust took over the workshop with Schoeffer as his manager.

The Bible was quickly followed by a psalter of 143 leaves, suggesting that this project was well under way by the time the Bible was finished printing. It is a superb example of the potential that printing had to offer, in three colours throughout, the decorative capitals being

exquisitely printed in red and blue. Unlike the Bible, the psalter contained a colophon, which read that it was 'fashioned by an ingenious invention of printing and stamping without any driving of the pen' by Johann Fust, a citizen of Mainz, and Peter Schoeffer, of Gernsheim, in the year 1457. No acknowledgement of Gutenberg was included. The founts used were different from that used in the 42-line Bible, and had most likely been designed by Gutenberg prior to the partnership ending. If so, the plan may have been to recoup Fust's investment by completing and selling the Bible before concentrating on the psalter. The latter was a work found in every church, so a market was assured—and no doubt its sales contributed to the success of the new business.

Gutenberg remained in Mainz after the partnership ended, but it is unclear what occupied his time. A 36-line Bible was printed between 1458 and 1460, using the large early

fount he had designed in Strasbourg. The paper used comes from paper mills around Bamberg, and nearly all surviving copies are to be found in or around that town, suggesting that this may have been a commission by the prince-bishop there, a patron of the arts. A new workshop was set up in Bamberg for the project, probably by Gutenberg or one of his assistants, using type made from Gutenberg's matrices. After the Bible was finished, the presses were sold to Albrecht Pfister, secretary to the prince-bishop; Pfister recognised the potential of this new invention, and went on to print a series of small popular works, mostly in German, with woodcut illustrations.

In Germany, political unrest between papal adherents and conciliar reformists was growing. Mainz supported the reformists, and the papal forces launched a full-scale attack on that city on 28 October 1462. The following day, the papal victor, Archbishop Adolf von Nassau,

exiled his opponent's supporters, including Gutenberg, giving their homes and possessions to his own supporters. Gutenberg retreated to Eltville where his niece lived,<sup>3</sup> while the printers he had employed each went their own way, spreading the influence of the new invention through Europe. It is likely that at this time Nicolas Jenson joined Gutenberg at Eltville,<sup>4</sup> helping him establish a small workshop there. In 1465 Archbishop von Nassau bestowed an annuity on Gutenberg, which allowed him to return to Mainz and live comfortably for the last three years of his life.

Gutenberg's invention, widely regarded as the most important event of the modern period, remained essentially unchanged for the next 350 years. The iron hand-press, developed around 1800, was the only material improvement until the introduction of steam power. Western civilisation remains deeply indebted to Gutenberg; his invention revolutionised human communication, and played an essential role in the advent of the Renaissance, the Reformation, the scientific revolution and the Age of Enlightenment.

A leaf of Gutenberg's Bible was acquired in 2011 by the University of Melbourne (illustrated on page 33

and opposite). It comes from an incomplete copy, which was at one time owned by Princess Maria Elizabeth Augusta von Sulzback of Bulgaria (1721–1794). Later it was at the Mannheim Hofbibliothek then at the Staatsbibliothek in Munich, from where it was sold as a duplicate in 1832 to Baron Curzon of Zouche. The Bible remained in the Baron's family until it was sold by Sotheby's to Joseph Sabin, a book dealer, who sold it on to New York dealer Gabriel Wells. At that time the volume was missing 53 of a possible 641 leaves. In 1921 Wells broke up the bulk of the Bible for sale as individual leaves, each housed in a Stikeman & Co. black or dark blue goat-skin binding and accompanied by an essay by Philadelphia collector, A. Edward Newton, entitled 'A noble fragment'. Wells also sold certain sections as 'complete and perfect chapters': the Gospel of St John, Timothy 1 and 2, the Book of Daniel and the Book of Genesis. The leaf purchased for the Baillieu Library comes from 1 Chronicles, Chapters 19 (incomplete), 20 and 21 (incomplete). The purchase was made with the generous assistance of the Ivy May Pendlebury Bequest, and was recently displayed in the Baillieu Library exhibition *Adventure and art: The fine press book from 1450 to 2011*.

Pam Pryde is Curator of Special Collections in the Baillieu Library, University of Melbourne. She has long had an interest in the techniques involved in the hand-printed book.

For further information about Baillieu Library Special Collections see [www.lib.unimelb.edu.au/collections/special/](http://www.lib.unimelb.edu.au/collections/special/).

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- 1 Albert Kapr, *Johann Gutenberg: The man and his invention* (translated by Douglas Martin), Hants: Scolar Press, 1996, pp. 188–97.
  - 2 Kapr, *Johann Gutenberg*, p. 193. Baillieu Library Special Collections also has a Vulgate Bible [*Biblia Latina*] printed by Peter Schoeffer in Mainz in 1472.
  - 3 Gutenberg was restricted in his movements outside the protection of Mainz, as he could be arrested at any time for failing to pay interest on a loan he had raised in Strasbourg in 1442.
  - 4 Jenson, an engraver in the royal mint, went on to create the Roman fount, and also produced some of the most beautiful printed works of the 15th century.