The beautifully panelled Scriptorium conveys the atmosphere of a heated living room in the 15th century. The examples of calligraphy from the Middle Ages which are on display, bear witness to the skill of the monks and scribes. An ink horn from the Merovingian period is the showpiece of this section. From time to time demonstrations of calligraphy and illumination are held. Letters, stamps, sealing wax and writing utensils can be bought at a stand.
In the 15th century, the era of book printing began in Europe, and the printed word has accompanied handwriting up to the present day. The small room next to the Scriptorium shows the printing techniques before Gutenberg in comparison to Gutenberg’s invention and the evolution of the printed book. Concerning book layout, the manuscript tradition continues even after Gutenberg. Slowly, typography emerges. A diorama illustrates the importance of Basel as a centre of printing.

In the workshop facing the mill pond the visitor is shown the equipment required for the technique developed by Johannes Gutenberg. The original letters were cut by hand out of steel (punch cutting). With these a negative mould was made by pressing or imprinting a matrix which formed the mould for casting. The matrix had to be adjusted to obtain the necessary high precision. The finished matrices were kept in a special cupboard. Screw-presses for imprinting matrices are also on show as well as other methods of producing matrices. Hand casting of single letters with the hand casting device according to the Gutenberg technique is demonstrated. The hand casting device consists of two precision parts of metal forming the two side halves of the mould which are covered with wood so that the instrument can be used in spite of the heat during casting. The copper matrix with the negative imprint of the letter is inserted as the bottom of the mould. A wire catch holds the matrix firm.
The type caster pours the molten letter metal (an alloy of ca. 70–80% lead, 12–27% antimony and 2–10% tin, heated to about 300°C) with a ladle into the open end of the mould, allows it to cool briefly and then opens the device with a slight tap. The unrefined letter falls out and is ready for further processing. A type caster was able to produce up to 2000 single letters, depending on their size, in one working day.

Types are divided into groups according to the historical order of their invention, e.g. Gothic, Roman, Grotesque, etc. Within each group type families (type names) are differentiated. A type family is comprised of several weights (fine, light-face, normal, half-dark, bold, extra bold), widths (very narrow, normal, wide, extra wide) and positions (roman, italic) as well as different sizes (bodies). The relevant accents and punctuation marks also belong to each kind of type. Each type has a signature (notch) to help the setter to differentiate between the letters.

All parts of a script which should not appear on the paper when printed are filled in with blank material (similar to the letters, but without a letter design). These include justification (spaces between words), quadrats (spaces at the end of a line), interlinear spaces, reglets and sticks (line spacing).

The casting pump, the casting machine worked by a handle as well as the complete casting machine which is mounted in front of a large picture of the Haas Type Foundry (1935) show the development of type founding up to the present day. With the last machine, it is possible to cast up to 30,000 finished letters in one working day. Instruments to work on the unfinished letters and auxiliary material are as much a part of the inventory of a type foundry as the workbench of the divider where the finished letters are divided into different ranges according to language, and the type store.
At the end of the 19th century, two methods of mechanical typesetting combined with type-casting were developed, using the well-known mechanical steering devices (rod/gear and punch board): Linotype and Monotype.

The Linotype machine, invented in the USA in 1886 by the German Ottmar Mergenthaler, calls up matrices via a typewriter keyboard and puts them together to form a line. This line of matrices is cast as a block and shoved onto the galley. Corrections can only be done by recasting the whole line. This is not the case with the Monotype machine, constructed in 1897 by an American, Lanston. Via a pneumatic key which is similar in construction to a typewriter keyboard, the setting signal is recorded on a punchtape. This punchtape is fitted into the actual setting/casting unit where the letters are cast one by one from a mobile matrix plate and shoved together to form lines on the galley. Here, correction is possible by exchanging individual incorrect letters. Different casting units were constructed for small and large types.

The keyboard of the Typograph setting/casting machine calls up matrices which are fixed on wires to form a line which is cast similar to the Linotype method. It is nicknamed 'Setting machine of the poor'. The Ludlow typograph is constructed mainly for casting lines of larger types for titles. Hand or machine setting of lead type has had to give way almost everywhere first to phototypesetting and subsequently to digital typesetting which, controlled by processing computers, produces finished printing material including illustrations and page-making at unbelievable speeds. The development of such systems continues at such a speed that machines considered modern only a short term ago, such as the Diatype phototypesetting machine of 1954 or the text processing units of the 1970s are today already regarded as antiques.
Stereotypy, invented in 1829, is the production of printing moulds for picture or text casting. Board matrices are produced from original typesettings or woodcuts and then serve as a mould for lead duplicates (flat or cylindrical). Rotary presses use cylindrical stereotypes which enable very quick printing. A model (scale 1:5) of a double rotary press with integrated sheet folding and collecting unit, built in 1923, performs the simultaneous printing of 16 pages of a newspaper and shows the big leap from manual printing to industrialisation.

Typewriters and office equipment

The typewriter has a long history, which began with machines for the blind. Several examples of early constructions remind one of the time when they were the only modern office machine. Among others, the Velograph which functioned according to the daisy wheel principle and was the first typewriter developed and patented in Switzerland, is on display. Nowadays, the type bar of the mechanical and first electric typewriters has made way for the letter ball and the daisy wheel. Mechanical calculators, copying machines and addressographs were added to the list of office equipment. Today, together with the typewriter they have almost all been pushed aside by the personal computer.
Wilhelm Haas

As an unique exhibit, the treasures of the historical collection of the Haas Type Foundry, one of the oldest in the world (founded in Basel in 1580), are shown. Apart from examples of the work of type casters from all eras, there are also personal documents and portraits, casting notes (instructions for the type caster as to the number of letters to be cast per order), original packs of matrices and examples of early picture reproduction techniques (galvano blocks, lead cuts).

The Haas press, reconstructed according to the exhibited original plan of 1772, built by Wilhelm Haas the Elder, is the first printing press in the world constructed with the most important parts made of iron. This machine encouraged Lord Stanhope to develop his famous press consisting entirely of iron.

In contrast to this press is the replica of a 16th century print shop with composing desk, lettercases and wooden press, which really illustrates the technical step forward that was made during the Haas period.

Another invention of the ingenious Wilhelm Haas the Elder was typometry, a system of map setting by the typographic method. This system made it possible, in contrast to copperplate, to make regular alterations to the map and to produce the same map in several language versions without considerable additional work. Standardisation of auxiliary material required for setting (lines, spaces, reglets, etc.) is also attributed to Wilhelm Haas the Elder. Wilhelm Haas the Younger was one of the early publishers of books in Yiddish.
Type shelves are typical of the composition room. The lead letters are kept in wooden type cases with 130 compartments (for the German language) in an exactly defined position. The setter places the type case on the sloping upper part of the shelf. The manuscript is fixed on a wooden or metal rod (copy holder) and attached to the type case at a comfortable reading distance. The setter stands in front of the shelf, with the setting stick in his left hand, takes the individual letters out of the case with his right hand and sets them one after the other into the setting stick to form a complete line with the necessary spacing filled in to form a correct column width.

A series of lines is placed on the galley until the number of lines required for a column is completed. To ensure that the column will hold well, he puts on a reglet before the first and after the last line and ties the column with a galley cord. A galley proof is printed on the hand press for the corrector to read and mark any mistakes with special correcting signs. As soon as the setter has corrected the mistakes he makes up the text columns complete with titles, page numbers, figures and their titles, etc. to a finished composition.
In the print shop the composition is locked with quoins in the chase to form the printing block. A well-locked block can be lifted into the printing press without any individual types becoming loose or falling out. Now the printing run can begin. When printing is completed, the printing ink has to be removed (washed) from the letters. Then they are put back in the correct compartments of the type case and are ready to be used again.

In the printing department machines and devices from the 19th century show the different methods of printing texts and pictures, namely letterpress (relief) printing, copperplate (intaglio) printing and lithography.

In the visitor's print shop, every visitor has the opportunity to compose his name and using a roller press or a Boston platen press to print it (or an illustration) on the paper made previously in the paper mill.
This technique which was used by Gutenberg starts by using balls, an inkpad or a roller to ink the protruding surfaces of the letters in a set or on a woodcut with black or coloured printing ink. The sheet of paper which is to be printed is moistened and laid on the cover of the printing press and protected with a mask from soiling at the sides. Prior to this, any unevenness in the typeset is adjusted. The cover is closed, with the clamped sheet of paper over the inked type and slid under the platen on the mobile type bed of the press. By pulling a handle, the screw or the toggle lever of the press is set in motion and exerts pressure on the platen and the sheet lying underneath. The sheet is pressed against the coloured type and the printing ink is transferred. After this the sheet is removed from the press and dried. Depending on the size of a set or a press it may be possible to print several pages on one sheet. It is the bookbinder’s job to fold, bind and cut such sheets correctly.

The old wooden presses were replaced by the end of the 19th century with metal constructions (see the Wilhelm Haas Room). The principles of the screw or the toggle lever were soon dropped and mechanical or hydraulic machines were built in which the platen was no longer horizontal and automatic ink applicators to colour the types were installed (e.g. the Phoenix or Boston platen presses).
In addition to the platen presses there soon appeared the cylinder press which was developed from the copperplate press. The printing cylinder with the sheet of paper is rolled over the coloured type set. The first rapid press, constructed in 1812 by Koenig&Bauer, made rapid printing of large sheets possible as well and opened the door to the industrialisation of letterpress printing. In the print shop of the Museum, such a press equipped with the old manual feeding device is still working. A model (scale 1:5) built by Koenig&Bauer in 1906, demonstrates another kind of drive, the planet-wheel. In the print shop, the 'Windsbraut' rapid press using a pneumatic paper feeder, the name of which being derived from the hissing sound emitted during work is also used.

The text or picture to be printed is engraved or etched in a metal plate. The plate is blackened with printing ink and then wiped over. The printing ink stays in the engraved or etched areas. A moist sheet of paper is laid on the plate, and the plate and sheet are drawn in between the two cylinders of the copperplate press under high elastic pressure; in this way the printing ink is transferred to the paper.
Lithography

This printing technique which was invented by Alois Senefelder of Munich in 1797 is based on the principle of the repulsion of oil and water. A very finely pored limestone (lithographic stone; the best known is the Solnhofen stone) is polished and specially prepared on the surface. The picture or text to be printed is transferred to this surface in such a way that the printed area is ink-receptive and the blank area ink-repellent. After inking, an absorbent sheet of paper is placed on the stone and pulled under the crosspiece of the lithographic press; thus transferring the ink to the paper. This technique finds its sequel in offset printing which is the most widely used printing technique used today. The printing ink is applied indirectly by a prepared thin metal sheet or film mounted on a cylinder (corresponding to the lithographic stone) via a rubber cloth or rubber roller to the paper.

Embossing (raised printing)

The text or picture to be raised is engraved in a metal block which serves as a matrix. The previously printed paper is introduced into the special press and firmly pressed against the matrix. Thus the printing becomes embossed.
The bookbinder receives the printed sheets from the printer. In former times they were subjected to various time-consuming operations before the actual binding. The unsized paper mainly used in letterpress printing in those days had to be impregnated and glazed. The glazed sheets were then folded with the bone folder, several times depending on their size, and smoothed out. After the folding, came collation i.e. checking completeness and the correct order of all the sheets in a book. Finally, the sheets are stacked, straightened and pressed.

Before stitching, the book is provided with fly-leaves. It is then stitched with cords on the binder's press. Since the end of the 19th century, especially for cheap editions, the expensive stitching with cords has been replaced by wire stitching with metal clips which is done by machine.
After stitching, the back of the book is coated with glue. Then the fore-edge of the book is cut. Next the back of the book is rapped until the book has the required roundness. After pressing the book is trimmed with the aid of the plough and ploughing press. The edges can then be decorated by dyeing, marbling or gilding, which protects the cut edges. Finally, a headband is attached to the two cut edges of the back.

Now the two parts of the book cover are attached to the book block. In the Middle Ages and the Renaissance period the book cover was usually made of wood; later on board was used. The book cover is then covered with leather, parchment, linen or decorated paper. The gold printing on the back and the cover is carried out in the gilding cabinet.

During the 19th century, bookbinding was mechanised; today, it is an industrial, largely automated operation using the assembly line technique. Among the smaller bookbinding machines on show are a bookfolder, a cardboard cutter, a cutting press, a book-sewing machine, a wire-stitching machine and an embossing press.

The form of a book is shaped according to the writing material used. The cover is formed in order to ensure protection. The European book, the codex, was given covers differing in materials and styles. Eminent bookbinders have determined the style of their time. A choice of books show the evolution of styles. Decorated papers have always been used for fly-leaves and for book covers. A small selection of decorated papers shows the most important techniques and styles, drawing attention to the immense variety of colours and patterns.
In the exhibition, the old workplace of a bookbinder has been reconstructed. As an example, the operations of hand bookbinding are represented. Three small machines (sheet-folding machine, wire-stitching machine, embossing press) and photographs of a modern book assembly line illustrate the evolution of today’s industrial bookbinding.

On the site of genuine remains found in the upper floors, a part of the original paper-drying loft has been reconstructed. The elaborate installation allows a tight hanging of the sheets and has a self-regulating system for tending the ropes. The papermaker seldom opened the scuttles to avoid quick drying which could cause an irreparable undulating of the paper sheets.

(Access is granted on special-guided tours only)
The production of this guide was made possible through the sponsorship of the following persons and companies:

Dominik Fischer, Basel
Albert Gomm, Basel
Großimund AG, Reinach
Lithoteam AG, Ailschwil
Karl Meyer & Co AG, Ailschwil
Roger H. Struss, Basel
Peter F. Tschudin, Basel
Werner Druck AG, Basel

The paper has been provided by Sihl+Elka Papier AG, Thalwil