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The Invention of Printing.

Illustrated.

By

Theo. L. De Vinne.

The Invention of Printing.

THORWALDSEN'S STATUE OF JOHN GUTENBERG. ♠

THE

INVENTION OF PRINTING.

A Collection of Facts and Opinions

DESCRIPTIVE OF

EARLY PRINTS AND PLAYING CARDS, THE BLOCK-BOOKS OF THE FIFTEENTH CENTURY, THE LEGEND OF LOURENS JANSZOON COSTER, OF HAARLEM, AND THE WORK OF JOHN GUTENBERG AND HIS ASSOCIATES.

Illustrated

WITH FAC-SIMILES OF EARLY TYPES AND WOOD-CUTS.

BY

THEO. L. DE VINNE.

> * Hereby tongues are knowne, knowledge groweth, judgment encreaseth, books are dispersed, the Scripture is seene, the doctors be read, stories be opened, times compared, truth discerned, falshood detected, and with finger pointed, and all, as I said, through the benefit of Printing. *Fox's Acts and Monuments.*

NEW-YORK:
FRANCIS HART & CO. 12 & 14 COLLEGE PLACE.
1876.

TO

DAVID WOLFE BRUCE,

IN ACKNOWLEDGMENT

OF INSTRUCTION ABOUT TYPES, NOT TO BE HAD BY READING, OF ASSISTANCE IN STUDIES, NOT TO BE FOUND IN PUBLIC LIBRARIES, OF COMPANIONSHIP MORE PLEASANT THAN BOOKS,

THIS WORK IS DEDICATED

BY HIS FRIEND,

THEO. L. DE VINNE.

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PREFACE.

THE Invention of Printing has always been recognized by educated men as a subject of importance: there is no mechanical art, nor are there any of the fine arts, about whose early history so many books have been written. The subject is as mysterious as it is inviting. There is an unusual degree of obscurity about the origin of the first printed books and the lives and works of the early printers. There are records and traditions which cannot be reconciled of at least three distinct inventions of printing. Its early history is entangled with a controversy about rival inventors which has lasted for more than three centuries, and is not yet fully determined.

In the management of this controversy, a subject intrinsically attractive has been made repulsive. The history of the invention of printing has been written to please national pride. German authors assert the claims of Gutenberg, and discredit traditions about Coster. Dutch authors insist on the priority of Coster, and charge Gutenberg with stealing the invention. Partisans on each side say that their opponents have perverted the records and suppressed the truth. The quarrel has spread. English and French authors, who had no national prejudices to gratify, and who should have considered the question without passion, have wrangled over the subject with all the bitterness of Germans or Hollanders. In this, as in other quarrels, there are amusing features, but to the general reader the controversy seems unfortunate and is certainly wearisome.

It is a greater misfortune that all the early chronicles of printing were written in a dead language. Wolf's collection of Typographic Monuments*, which includes nearly every paper of value written before 1740, is in Latin; the valuable books of Meerman, Maittaire, and Schoepflin are also in Latin. To the general reader these are sealed books: to the student, who seeks exact knowledge of the*

methods of the first printers, they are tiresome books. Written for the information of librarians rather than of printers, it is but proper that these books should devote the largest space to a review of the controversy or to a description of early editions; but it is strange that they should so imperfectly describe the construction and appearance of early types and the usages of the early printers. The mechanical features of typography were, apparently, neglected as of little importance, and beneath the dignity of history.

A failure to present accurate illustrations of early printing is not the fault of modern authorities. Many of them are full of fac-similes bearing the marks of minute and conscientious care; but they are in foreign languages, and are seldom found in our largest American libraries. There are, it is true, a few books in English on early printing which have accurate fac-similes; but high prices and limited editions put them out of the reach of the ordinary book-buyer. They were written by and for librarians only.

Valuable as all these books are, they disappoint the printer. Some of them, though presenting fac-similes in profusion, are not accompanied with proper explanations in the text: others are devoted to one branch only of early printing, such as block-books, or the printed work of one nation only. Two of them are untrustworthy as authorities. Neither from one book, nor from all the books, can a printer get a clear description of the mechanical development of typography. This incompleteness was frankly acknowledged by Dr. Dibdin, when he said that there was no work in the English language which deserved to be considered as a complete general history of printing. This was an old complaint. Nearly a hundred years before, Prosper Marchand had said that the history of printing, voluminous as it then seemed, was but history in fragments.

The first attempt to supply this great deficiency was made by August Bernard, in the disquisition published at Paris, in the year 1853, under the title, De l'origine et des debuts de l'imprimerie en Europe. *His was the first book in which the printed work attributed to Coster and Gutenberg was critically examined from a typographic point of view. To readers who were not content with the vague descriptions of*

popular books of typography, the explanations of Bernard were of peculiar value. I had reason to think that a translation of the history of this eminent printer would be received by American printers with some measure of the favor which the original had met with in Europe. Impressed with this belief I began the work.

I found it necessary to consult many of Bernard's authorities. My admiration of the superior method and forcible style of Bernard, an admiration still unabated, was increased by the reading of the new books; but the esteem in which I hold his valuable work does not prevent the regret that, in his entire neglect of the block-books, he should have overlooked the most significant feature of early printing. The fac-similes of early prints, subsequently shown in The Infancy of Book Printing *of Weigel and in* The Typographic Monuments *of Holtrop, convinced me that the earliest practice of typography had its beginning in a still earlier practice of printing from blocks, and that a description of block-books should precede a description of the invention of types.*

Since these books were written, all the old theories about the origin of typography have been examined with increased interest, and discussed with superior critical ability, by many eminent European scholars. Discoveries of great importance have been made; old facts have been set forth in new lights; traditions accepted as truthful history for three hundred years have been demolished. Of the many able men who have been engaged in this task of separating truth from fiction, no one has done more efficient service than Dr. A. Van der Linde of The Hague, whose papers on the traditions of typography are masterpieces of acute and scholarly criticism. His researches and reasoning convinced me that it would be unwise to offer a translation of any previously published book as a fair exponent of modern knowledge about early typography. The newly discovered facts were opposed to early teachings; there could be no sewing of the new cloth on the old garment. I was led away from my first purpose of translation, and, almost unconsciously, began to collect the materials for the present volume.

Until recently, the invention of printing has been regarded as a

subject belonging almost entirely to bibliographers. The opinions of type-founders and printers who had examined old books have been set aside as of no value, whenever they were opposed to favorite theories or legends. This partial treatment of the subject is no longer approved: a new school of criticism invites experts to examine the books, and pays respect to their conclusions. It claims that the internal evidences of old books are of higher authority than legends, and that these evidences are conclusive, not to be ignored nor accommodated to the statements of the early chroniclers. European critics do not hesitate to say that the confusing and contradictory descriptions of the origin of printing are largely due to the improper deference heretofore paid to the statements of men who tried to describe processes which they did not understand. They say, also, that too little attention has been paid to the types and mechanics of early printing. Criticisms of this character led me to indulge the hope that I might find gleanings of value in the old field, and that it would be practicable to present them, with the newly discovered facts, in a form which would be acceptable to the printer and the general reader. In this belief, and for this purpose, this book was written.

I would not have begun this work, if I had not felt assured that a thorough revision of the subject was needed. The books and papers on typography which are most popular, and are still accepted as authoritative by the ordinary reader, repeat legends which have recently been proved untrue; they narrate, as established facts of history, methods of printing which are not only incorrect but impossible. It is time that the results of the more recent researches should be published in the English language. But I offer them only as the compiler of accredited facts: I have no original discoveries to announce, no speculative theories to uphold. Nor shall I invade the proper field of librarians and bibliographers. I propose to describe old types, prints and books as they are seen by a printer, and with reference to the needs of printers and the general reader, avoiding, as far as I can, all controversies about matters which are of interest to book-collectors only. The historical part of the record will be devoted chiefly to the printed work of the first half of the fifteenth century. It

will begin with descriptions of the earliest forms of printing, as shown in image prints, playing cards and block-books; it will end with the establishment of typography in Germany.

Believing that a verbal description of old books and prints, without pictorial illustrations, would be unsatisfactory, I have provided many fac-similes of early printing. No part of this work will more fully repay examination than its illustrations, which have been carefully selected from approved authorities, or from originals. Reproduced by the new process of photo-engraving, they are accurate copies of the originals, even when of reduced size. As they are printed with the descriptive text by the same method of typographic presswork, it is believed that they will more clearly illustrate the subject than lithographed fac-similes on straggling leaves.

In trying to make plain whatever may be obscure about the mechanics of printing, I have thought proper to begin the explanation with a description of its different methods. An introduction of this nature is not an unwarrantable digression. It is important that the reader should have an understanding of the radical differences between typography and xylography on the one side, and lithographic and copper-plate printing on the other, as well as some knowledge of the construction and uses of the more common tools of type-founders.

I do not propose to give any extended quotations in foreign languages. Wherever an approved translation in English has been found, it has been substituted for the original text; where translations have not been approved, they have been made anew. Writing for the general reader, I have assumed that he would prefer, as I do, in every book to be read and not studied, a version in English rather than the original text. Believing that the frequent citation of authorities, especially in instances where the facts are undisputed, or where the books are inaccessible, is an annoyance, I have refrained from the presentation of foot-notes which refer to books only. I have, in a few cases, deviated from this course where the matters stated were of a character which seemed to require the specification of authority.

One of the greatest impediments I encountered when about to begin the compilation of this work was the difficulty of access to books of

authority. I do not mention this in disparagement of the management of our public libraries, for I know that old books are liable to injury in the hands of the merely curious, and that librarians have little encouragement to collect scarce books on typography. To prove that there is small inquiry for treatises of this character, it is enough to say that I have had to cut open the leaves of valuable books after their rest for many years on the shelves of one of the largest libraries of this city. But if these books were ever so abundant, the proper restrictions placed on their use were a hindrance to one whose chief opportunity for consulting them is at night.

Here I am pleased to acknowledge my indebtedness to Mr. David Wolfe Bruce. He has not only accompanied and aided me in repeated examinations of his very valuable collection of fifteenth century books, but has lent me all the books I desired, and has freely given me unlimited time for their study. This collection—replete with all the books of authority I needed, with specimens of types, wood-cuts, and curiosities of type-founding, which illustrate the growth of printing from its infancy—was more admirably adapted to my needs than that of any library on this Continent. Deprived of Mr. Bruce's generous assistance, my work would have been greatly restricted in its scope, and shorn of its best features of illustration.

I began this work intending to describe only the mechanical development of early printing, but I could not keep the matter strictly within this limit. Hedged in this narrow space, the story would be but half told. The true origin of typography is not in types, nor in block-books nor image prints. These were consequences, not causes. The condition of society at the close of the middle ages; the growth of commerce and manufactures; the enlarged sense of personal liberty; the brawls of ecclesiastics in high station, and their unworthy behavior; the revolt of the people against the authority of church and state; the neglect of duty by the self-elected teachers of the people in their monopoly of books and knowledge; the barrenness of the education then given in the schools; the eagerness of all people for the mental diversion offered in the new game of playing cards; the unsatisfied religious appetite which hungered for image prints and

devotional books; the facilities for self-education afforded by the introduction of paper,—these were among the influences which produced the invention of printing. They are causes which cannot be overlooked. My inability to describe them with the fullness which they deserve would not justify their total neglect. I have devoted more space to them than is customary in treatises on early printing, but I have to admit, with regret, that they have been too curtly treated. I have done but little more than record a few of the more noticeable facts—enough, perhaps, to show that the state of education and society, in its relation to the invention of printing, deserves a more extended description than it has hitherto received. If I can succeed in awakening the attention of printers, and those who look on a knowledge of printing as a proper accomplishment of the scholar, to the nature and extent of these influences, to the curiosities of literature hidden in apparently dry books of bibliography, and to the value of the lesson of patient industry and fixed purpose taught by the life of John Gutenberg, the object of this book will have been accomplished.

I

The Different Methods of Printing.

Impression is used in many Arts . . . Printing implies the use of Ink and Paper . . . Four Methods of Printing . . . Steel-plate or Copper-plate, the artistic method . . . Lithography, the scientific method . . . Typography, the useful method . . . Xylography, the primitive method . . . Illustrations of Copper-plate and Lithographic Printing Surfaces . . . Process of Copper-plate Printing . . . Its Merits and its Defects . . . Process of Lithographic Printing . . . Its Advantages and Limitations . . . Theory of Typography, with Illustrations of the Face and Body of Types . . . Superiority of Movable Types over Engraved Letters . . . Stereotype . . . Superiority of the Typographic Method in its Presses and its Process of Inking . . . Xylography . . . Period when each Method was Introduced . . . A Meaning in their almost Simultaneous Introduction.

Printing, the act, art, or practice of impressing letters, characters, or figures on paper, cloth, or other material; the business of a printer; typography.
Typography, the art of printing, or the operation of impressing letters and words on forms of types. *Webster.*
Printing, the business of a printer; the art or process of impressing letters or words; typography; the process of staining linen with figures.
Typography, the art of printing. *Worcester.*
Print, to press, mark, stamp or infix letters, characters, forms, or figures. *Richardson.*

THESE definitions of printing are based on its derivation from the Latin, *premo*, to press, and on the supposition that its most characteristic feature is impression. From a technical point of view, the definitions are incomplete; for printing and typography are made synonymous, while many leading, but totally different, methods of impressing letters, characters and figures, are not even noticed. Impression is employed in the manufacture of calico, paper-hangings, oilcloth, figured crockery, and in many other arts which have no connection with each other. Under right conditions, the action or the impress of light makes a photograph. Under different conditions, the pressure of the breath makes hollow glassware. Moulding, coining, stamping and embossing are other methods of impression; but the men

who practise these methods are not known as printers. The word printing has acquired a conventional meaning not entirely warranted by its derivation. It means much more than impression. It is commonly understood as a process in which paper and ink are employed in conjunction with impression.

Printing and typography are not strictly synonymous, as may be inferred from the definitions. Typography, although the most useful, is not the only form of printing. Printing on paper with ink is done by four methods. Each method is, practically, a separate art, distinct from its rivals in its theory, its process, and its application. These methods are:

Steel-plate or Copper-plate printing, in which the subject is printed from an etching or engraving below the surface of a plate of steel or of copper.

Lithography, in which the subject is printed from a transferred engraving on the surface of a prepared stone.

Typography, in which the subject is printed from a combination of movable metal types cast in high relief.

Xylography, in which the subject is printed from a design engraved on a block of wood in high relief.

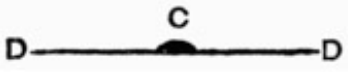
The distinct nature of the substances in use for printing surfaces by the four methods should be enough to teach us that the methods are entirely different. But the manner in which the letters, designs or figures of each method are put on the respective printing surfaces will show the differences more noticeably. In typographic and xylographic work, the matter to be printed is cast or cut in high relief, or *above* the surface; in lithographic work, it is put *on* the smooth surface of the stone, in relief so slight that it is almost level with the surface; in steel and copper-plate, it is cut *below* the surface which receives the impression. The illustration on the next page shows, but in an exaggerated form, the appearance of a single line, cut across, or in a vertical direction, when it has been prepared for printing by each of the different methods. It will be seen that the line prepared for printing by the typographic or xylographic method can be inked with facility, and that, when compared with a similar line in lithographic or copper-

plate work, it presents but a small surface and a slighter resistance to impression.

Typography or Xylography.

A. Elevated line; the only part of a typographic or of a xylographic surface which receives the ink and impression.

B. The shoulder of the type, or the field of the block; it receives neither ink nor impression.



Lithography.

C. Transferred surface line; the only part of the surface which receives ink and repels moisture.

D. The surface of the stone, that imbibes moisture and repels greasy ink; it receives the full force of impression in every part.

Copper-plate or Steel-plate. ♠

E. The line printed, which is engraved below the surface of the plate, and is filled with ink.

F. The smooth face of the plate, which makes no mark on the paper, but which receives the full force of impression.

The process of copper-plate printing begins with heating the plate, and rolling it with ink, until the incised lines have been filled. The face of the plate is then wiped clean, care being taken that the ink in the incised lines is not removed. A moistened sheet of paper is then laid on the plate, and an impression is taken by forcing it under the cylinder of a rolling press. Under this pressure, the paper is forced in the sunken lines filled with ink, and the ink sticks to the paper.

Copper-plate printing is, in all points, the reverse of typographic printing. The engraved lines, cut below the surface, are filled with ink in a compact body, and not in a thin film, liable to spread under pressure, as it may on a type or on a wood-cut; the ink from a copper-plate is pressed in such a way that it re-appears on the paper in a low relief—it is not squeezed on and flatted out, but stands up with sharper line and shows a greater depth of color. The slenderness of the incised lines, the fineness and hardness of the metal, and the peculiar method by which the ink is laid on the plate and fixed to the paper, give to prints from engravings on steel or on copper a sharpness of line, a brilliancy of color, a delicacy of tone, and a receding in perspective, which have always won for this branch of printing the preference of artists. Yet it is a slow and expensive process. A steel-plate engraver may be engaged for many months upon a large plate, from which but forty perfect impressions can be taken in a day. On ordinary work on a large plate, three hundred impressions per day is the average performance of a copper-plate press.

Steel and copper-plate printing is largely used for bank-notes, portraits, fine book illustrations, revenue and postage stamps, and sometimes for commercial formularies, but it is in every way unfitted for the printing of books. It has not been much improved since its invention. Steel plates may be duplicated by means of electrotyping, or by the process of transfer to soft steel, but these duplicates cannot be made so cheaply as typographic stereotype plates, nor so promptly as transfers by lithography. The inking and cleansing of the plate, always dirty and disagreeable work, has hitherto been done only by hand. All the manipulations of copper-plate work are slow and difficult: they present many obstacles to the use of labor-saving machinery.

In lithography the design to be printed, which may be engraved on stone or copper, or written with pen on paper, is transferred by a greasy ink upon the smooth surface of a stone of peculiar fineness and firmness. This stone, which is found in its best state only in Bavaria, where the art was invented, is a variety of slate, which faithfully responds in printing to the slightest touch of a graver or a crayon, and permits the use of fine shades and tints which cannot be produced on wood or on copper. The transferred lines of the design cling to and dry upon the surface of the stone, which is then subjected to the action of a weak acid, which hardens the ink in the transferred lines, while it slightly etches and lowers the surface where it is unprotected. The process of printing begins by dampening the stone with a moist sponge, the water in which is absorbed by the unprotected face of the stone, while it is repelled by the hard greasy matter in the transferred lines. The inking roller is then applied to the stone with a contrary result; the moistened surface repels the greasy ink, but the transferred lines attract and retain it. When an impression on paper is taken, the only part of the paper which receives ink is that part which touches the transferred lines. The theory of lithography is based upon the repulsion between grease and water. Lithographic printing is chemical printing.

Surface Exposed to Impression by the Copper-plate Method.
The entire surface of the plate is covered with ink until the white lines are filled. The surface around the figures is wiped clean before the impression is taken.

Surface Inked and Exposed to Impression by the Typographic Method.

Surface Exposed to Impression by the Lithographic Method.
This surface is rolled twice: once with water, which is absorbed only by the surface here shown in dull black tint; once with ink, which is retained only on the figures.

Lithography is the most scientific and the most flexible of all methods of printing. It can imitate fairly, and it often reproduces with accuracy, a line engraving on steel, a drawing in crayon, the manuscript of a penman, or the painting in oil of an artist. By the aid of photography, it can repeat, in an enlarged or diminished size, any

kind of printed work. It has many advantages over copper-plate and xylography. For some kinds of work, like autograph letters and rude diagrams, engraving is unnecessary; the design may be written with oily ink on paper, and can then be transferred direct from the written copy to a stone without the aid of a graver. The transferring process is another peculiarity of this art which allows the lithographer to duplicate small designs with greater facility and economy than a similar duplication could be effected by the stereotyper of types. These advantages are counterbalanced by one great defect: lithography is not a quick method of printing. The usual performance of the lithographic hand press when applied to ordinary work, is about four hundred impressions per day; on the steam press, the performance is about five thousand impressions per day.

The arts of lithography and copper-plate are useful and beautiful methods of printing, but they do not make books and newspapers.[1] The necessity which compels them to make a new engraving for every new subject restricts them almost exclusively to the field of art and ornament. If no other method of printing were known, encyclopedias and newspapers would be impossibilities. “The art preservative of all arts” is not the art of lithography nor of copper-plate.

This distinction rightfully belongs to Typography only. The theory upon which this method is based is that of the independence of each character, and of the mutual dependence of all its characters. Every character is a separate and movable type, so made that it can be arranged with others in an endless variety of combinations. The types used for this page are used for other pages in this book; they can be re-arranged for use in the printing of many other books or pamphlets; they cease to serve only when they are worn out. All other methods of printing require, at the outset, the engraving on one piece of wood or metal of all the letters or parts of a design, which, when once combined, cannot be separated; they can be applied only to the object for which they were first made.

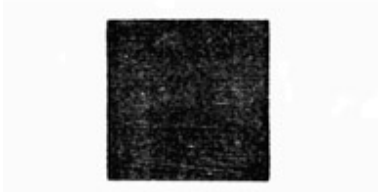
Typography is most successful when it is applied to the letters of the alphabet. It fails totally when applied to maps, or to any kind of printed work requiring irregularly varying lines. It is only partially

successful in the representation of combined ornaments and the characters of music. Its true field is in the representation of words and thoughts, and here it is supreme. There is no other method of printing which can do this work so perfectly.

Typography has a great advantage over other branches of printing in the cheapness of its materials. Type-metal is cheaper by weight than copper or steel, or the finer quality of lithographic stone: by measurement, it is cheaper than the box-wood used by engravers. Types are cheaper than engraved letters. A pound of the types by which this page is printed contains about 320 pieces of metal, the cost of which is but 48 cents. Types are made of many forms or faces, but they are always of uniform height, and are always truly square as to body, so that they can be fitted to each other with precision, and can be interchanged with facility.

The expense of combining types in words is trivial, as compared with the cost of engraving for lithographic or for copper-plate printing. An employing printer's price for the composition of a page like this would be, at the high rates of New-York city, $1.10. The engraving of such a page, by any method, would cost at least three times as much as the types and their composition. If never so carefully done, the engraved letters would not be so uniform, nor so satisfactory to the general reader, as the types. The engraved letters would cost more, but they could be used only for the work for which they were made. In typographic printing, there is no such restriction as to use, and no such loss of labor. It is only the labor of composition which need be lost; the types remain, but little more worn, or little less perfect, than when they were first put in use.

Letter H, from a type of Canon body.



Em, or full square of Canon body.

Face of the letter as it appears on the body.

The Face of a Large Type, showing the manner in which the Letter is placed on the Body.[2] ♠

The labor of composition is not always lost. A page of movable types can be used for a mould, from which can be made a stereotype plate of immovable letters. Stereotyping is a cheap process. A plate of this page of type can be had for about one-half the cost of the composition. The stereotype plate has all the advantages pertaining to an engraving on a lithographic stone, and it is more durable and portable.

Typography has a marked advantage in the greater ease with which printing types are inked. In the copper-plate process, the plate must be first blackened over the entire surface, and then cleansed with even greater care, before an impression can be taken. This labor cannot be intrusted to machinery, but must be done by a practised workman. The inking of a lithographic stone is as difficult: the stone must be moistened before the inking roller can be applied. This double operation of inking and cleansing, or of inking and moistening, is required for every impression. The inking of types is done by a much simpler method; one passage, to and fro, of a gang of rollers over the surface is sufficient to coat them with ink. The types need no previous nor after application.

Side view of Canon body. | Small-pica body. | Agate body. | Diamond body. | View of body inclined to show the face.

Bodies of Types.

The impression by which typographic surfaces are printed is comparatively slight. The sunken lines of a copper plate or the transferred lines of a lithographic stone can be reproduced on paper only by means of violent impression, which is obtained by forcing the plate or the stone under an iron cylinder or scraper. Only a part of the surface is printed, but the entire surface must receive impression, which is, of necessity, gradually applied. A direct vertical pressure, at

the same instant, over every part of the surface, would crush the stone or flatten the plate. In printing types of ordinary form, the area of impression surface is exactly the reverse of that of the lithographic stone or the copper plate. It is only the part which is printed that receives the ink and the impression. This printed part is the raised surface, which is rarely ever more than one-sixth of the area occupied by the types, and is often less than one-twelfth. The resistance to impression of types as compared with stones or plates is, at least, in the proportion of one to six.

As relief plates or types are more quickly coated with ink, and need less impression than lithographic stones or copper plates, the typographic process is, consequently, better fitted to receive the help of labor-saving machinery. The daily performance of the typographic hand press on plain work has been, almost from its earliest employment, about fifteen hundred impressions, which is about four times greater than that of the hand lithographic press. By the use of steam and of improved machinery, this inequality is put almost beyond comparison. The typographic single-cylinder type-printing machine can print fifteen hundred impressions in an hour, and the new newspaper perfecting press can print fifteen thousand perfect sheets in an hour.

The feature which gives to typography its precedence in usefulness over all other branches of the graphic arts is not so much its superior adaptation to impression as its superior facility for combining letters. Its merit is in the mobility of its types and their construction for combination. Printing is Typography. The printing which disseminates knowledge is not the art that makes prints or pictures; it is, as Bernard has defined it, “the art that makes books.” The definition is not scientifically exact, but it gives a clear idea of the great breadth of the art. In its perfect adaptation to this great object, the broad generalization of the definition in the dictionaries may be justified. The method of printing which is most useful may rightfully claim the generic name.

Xylography is the scientific word for the art of making engravings on a single block of wood, in high relief, for use on the typographic

printing press. A xylographic block may be an engraving of letters only, of pictures only, or of both letters and pictures, but in all cases the engraving is fixed on the block. The fixedness of the design on the block is the great feature which separates xylography[3] from typography. The printing surfaces of the two methods are alike. Types and xylographic engravings are printed together, by the same process, and on the same press.

Printing with ink, not as an experiment, but as a practical business, is comparatively a modern art. Lithography, the most recent method, was discovered by Alois Senefelder, an actor of Munich, in 1798. Unlike other methods of printing, it was, in every detail, an entirely original invention.

The introduction of copper-plate printing is attributed to Maso Finiguerra, a goldsmith of Florence, who is supposed to have made his first print about the year 1452. It cannot be proved that Finiguerra was the inventor, for prints by this method were made in Germany as early as 1446. [anc27]

The period of the invention of typography may be placed between the years 1438 and 1450. There have been many claimants for the honor of the invention. Each of the following fifteen cities or towns—Augsburg, Basle, Bologna, Dordrecht, Feltre, Florence, Haarlem, Lubeck, Mentz, Nuremberg, Rome, Russemburg, Strasburg, Schelestadt and Venice—has been specified by as many different authors as the true birthplace of typography. The names of the alleged inventors are, Castaldi, Coster, Fust, Gensfleisch, Gresmund, Gutenberg, Hahn, Mentel, Jenson, Regiomontanus, Schœffer, Pannartz and Sweinheym, and Louis de Vaelbaeske. The evidences in favor of each claimant have been fully examined, and the more foolish pretensions have been so completely suppressed that it is unnecessary to review them. The limits of the controversy have been greatly contracted: but four of the alleged inventors of types, Castaldi, Coster, Gutenberg and Schœffer, have living defenders. The legend of an invention of types by Castaldi, of Feltre, has never been accepted beyond Italy, and barely deserves respectful consideration. The evidences in favor of Schœffer are more plausible, but they are not

admitted by the writers who have carefully investigated the documents upon which this pretension is based. The real controversy is between Lourens Coster of Haarlem and John Gutenberg of Mentz.

There is no record, nor even any tradition, concerning an invention of xylography. It is admitted by all authorities, that xylographic prints were made during the first quarter of the fifteenth century, and that xylographic books were in use before typography was introduced.

Three of the four methods of printing here named were invented or developed within a period of fifty years. If the statements of some historians could be accepted, this period should be contracted to thirty years. There is no disagreement, however, as to the order of their introduction. Xylography, the rudest method, was the first in use; typography, a more useful method, soon followed; copper-plate printing, the artistic method, was the proper culmination. The order of invention was that of progressive development from an imperfect to a perfect method.

The introduction of three distinct methods of printing, by different persons and in different places, but during the same period, shows that a general need of books or of printed matter had given a strong impulse to the inventive spirit of the fifteenth century. It may also be inferred that the inventors of printing had been benefited, in some way, by recent improvements or developments in the mechanical processes of which printing is composed.

II

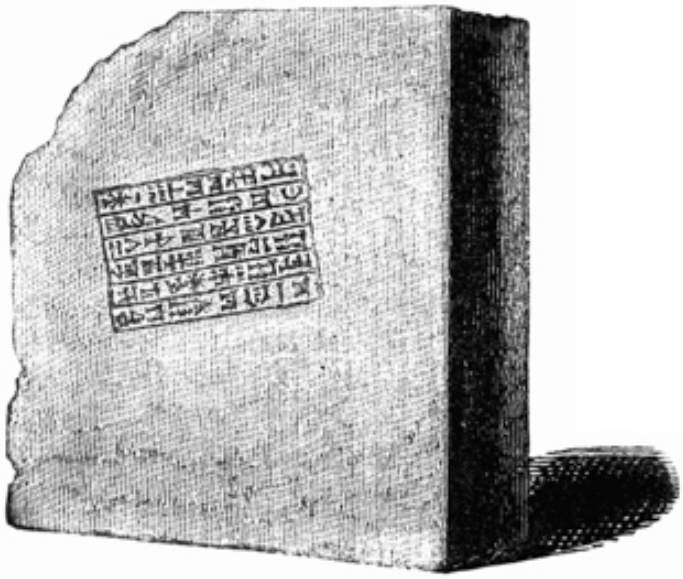
Antique Methods of Impression and their Failure.

Transfer of Form by Impression one of the Oldest Arts . . . The Stamped Bricks of Assyria and Egypt . . . Assyrian Cylinders of Clay . . . Greek Maps . . . Roman Theories about Combinations of Letters . . . Roman Stamps . . . The Brands and Stamps of the Middle Ages . . . English Brands . . . Stamping is not Printing . . . Ink then used was Unsuitable for Printing . . . Printing Waited for Discovery of Ink and Paper . . . Romans did not Need Printing . . . Printing Depends on a multitude of Readers . . . Readers were few in the Dark Ages . . . Invention of Printing was Not purely Mechanical . . . Printing needs many Supports . . . Telegraph . . . Schools . . . Libraries . . . Expresses . . . Post-Offices . . . A Premature Invention would have been Fruitless.

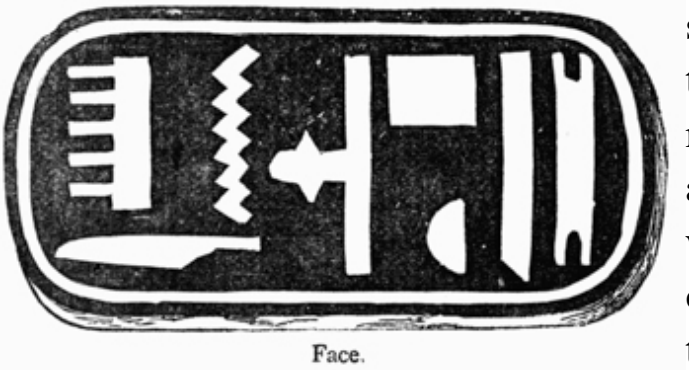
The stamps of the ancients, and the impressions from the seals of metal, found in deeds and conbeyances of the lower ages, probe nothing more than that mankind walked for many centuries upon the borders of the two great inbentions of typography and chalcography, without habing the luck to discober either of them, and appear neither to habe had any influence on the origin of these arts, nor to merit any place in their history. *Lanzi.*

SOME notice of the material and moral elements needed for the development of typography should precede a description of the work of the early printers. We shall form incorrect notions about the invention of printing unless we know something about the state of the arts of paper-making, ink-making and engraving at the beginning of the fifteenth century. We should also know something about the books and the book-makers of the middle ages. Nor will it be out of place to review the mechanical processes which have been used, almost from the beginning, for the preservation of written language. The review will show us what elements the inventor of typography found at his hand ready for use; what he combined from the inventions of others, and what he invented anew.

Engraving must be regarded as the first process in every method of printing. The impression of engraved forms on metal and wax, for the purpose of making coins and seals, is of great antiquity, having been



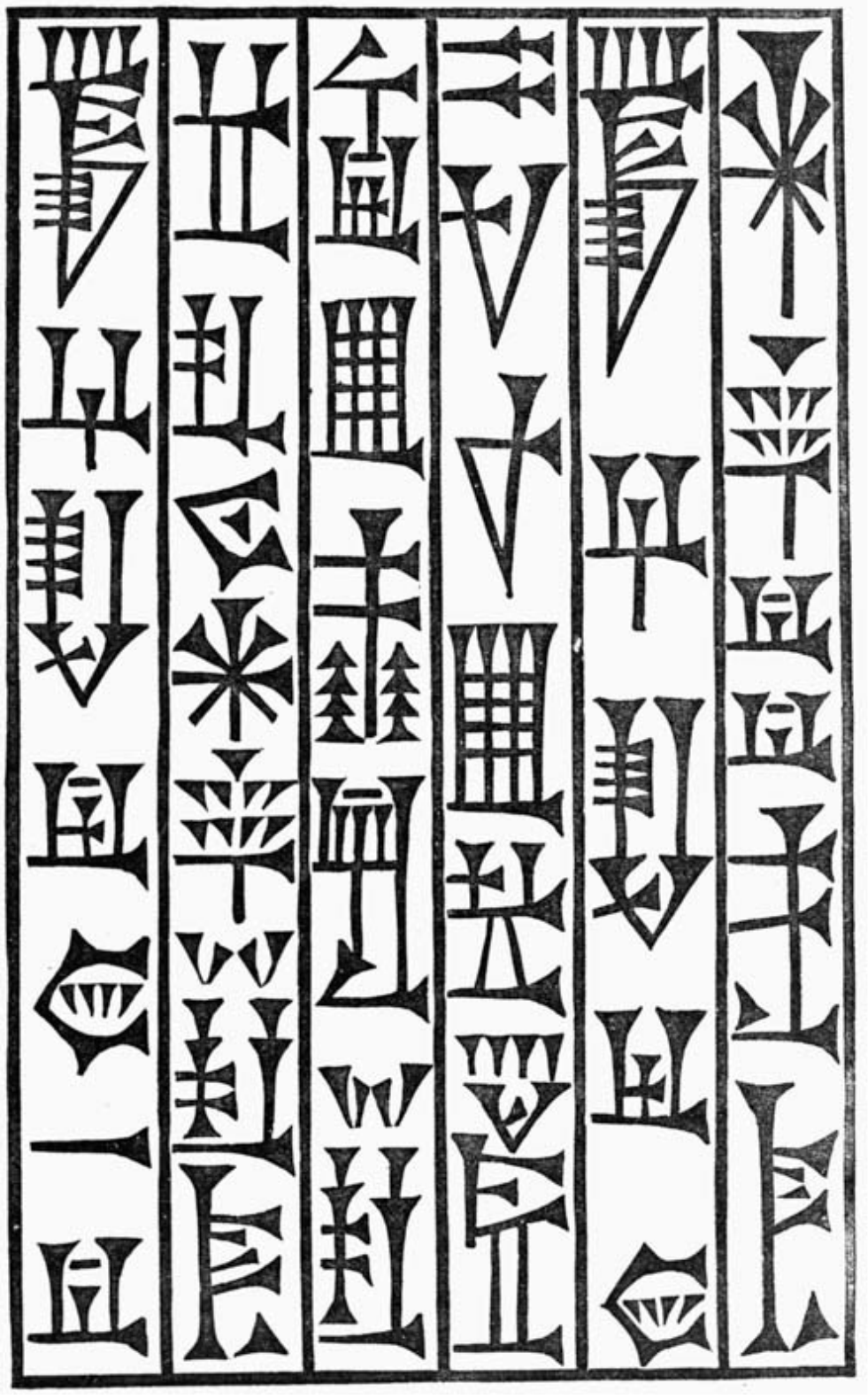
A Stamped Brick from the Ruins of Babylon.
[From Hansard.]



An Egyptian Stamp for Impressing Bricks.
[From Jackson.]

practised more than three thousand years ago, and, by some people, with a skill which cannot now be surpassed. There are old Egyptian seals with faces of such minute delicacy that the fineness of the workmanship can be fully perceived only by the aid of a magnifying glass. There are coins of Macedonia which are stamped in a relief as bold as that of the best pieces of modern mints. In Babylonia and Assyria, engraved forms were printed or stamped on clay specially prepared for this purpose. In the ruins of the ancient edifices of these primeval nations there is scarcely a stone or a kiln-burnt brick without an inscription or a stamp upon it. The inscriptions on stone appear to have been cut with a chisel, after the usual method of stone-cutters; but the stamps on the bricks were made from engravings on wood, or by the separate impressions of some pointed instrument. The preceding illustration is that of a stamped brick taken many years ago from the ruins of ancient Babylon. When in perfect condition, it was thirteen inches square and three inches thick. The inscription, which is in the cuneiform or arrow-headed character, is irregularly placed on the surface, but the letters or words are arranged in parallel rows, and are

obviously made to be read from top to bottom. The characters of this inscription were not cut upon the brick, nor were they separately impressed. That they were made on the plastic clay by the sudden pressure of a xylographic block, is seen by the oblique position of the square inscription on the brick,[4] in the nicety of the engraving and its uniform depth, in the bulging up of the clay on the side, where it was forced outward and upward by the impression. In old Egypt, bricks were impressed by the same method of stamping, but not to such an extent as they were in old Assyria. The cuts annexed represent the face and back of an old Egyptian stamp discovered in a tomb of Thebes. The stamp is five inches long, two and one-quarter inches broad, and half an inch thick, and is fitted to an arched handle. The characters are engraved below the surface of the wood, so that an impression taken from the stamp on the clay would show the engraved characters in relief. The inscription on the stamp has been translated, *Amenoph, beloved of truth*. Amenoph is supposed, by some authorities, to have been the king of Egypt at the period of the exodus of the Israelites.



Fac-simile of the Impression on the Brick. ♠
[From Hansard.]

The characters on the Egyptian and Babylonian bricks are much more neatly executed than would seem necessary for inscriptions on so common a material as clay. But they are really coarse, when compared with the inscriptions upon the small cylinders of clay which

were used by the Assyrians for the preservation of their public documents. Layard mentions a small six-sided Assyrian cylinder that contains sixty lines of minute characters which could be read only by the aid of a magnifying glass. Antiquaries are not yet perfectly agreed as to the method by which the cylinders were made. Layard, who says that the Babylonian bricks were stamped, thinks that the inscriptions on the cylinders were cut on the clay. But there are many cylinders which show the clearest indications of impression.

It is probable that they were made by both methods. The clay was prepared for writing as well as for stamping. Ezekiel, who prophesied by the river Chebar in Assyria, was commanded to take a tile, and portray upon it the city of Jerusalem. The Chaldean priests informed Callisthenes that they kept their astronomical observations on tiles that were subsequently baked in the furnace. Four large piles of tablets of unburned clay were found by Layard in the library or hall of records of Assurbanipal. Some of the tablets are the grammars and primers of the language; some are records of agreements to sell property or slaves; some are filled with astronomical or astrological predictions. On one of them was inscribed the Assyrian version of the deluge. The cylinders contained the memorials which were then considered as of most value, such as the proclamations of the king, or the laws of the empire. In the museum of the East India Company is the fragment of a clay cylinder which contains a portion of the decrees or annals of Nebuchadnezzar. For perpetuating records of this nature, the cylinders were admirably adapted. They were convenient for reference, and their legibility, after so long an exposure, shows that they were perfectly durable.

We do not know by what considerations Assyrian rulers were governed when about to choose between engraving or writing on clay; but it is not unreasonable to assume that the inscription was written or cut on the clay, when one copy only of a record was wanted; if numerous copies were wanted, a die or an engraving on wood was manufactured, from which these copies were moulded. No surer method of securing exact copies of an original could have been devised among a people that did not use ink and paper. These

cylinders are examples of printing in its most elementary form.

An Assyrian Cylinder. ♠
[From Hansard.]

The accompanying illustration, copied from Hansard's *Typographia* , represents an Assyrian cylinder which presents the same indications of impression which have been noticed upon the bricks. This cylinder, which is seven inches wide at each end, was so

thoroughly baked in a furnace that it is partially vitrified. [anc34] Around its largest circumference is a ragged and bulging line, about a quarter of an inch wide, which seems to have been made by the imperfect meeting of two moulding stamps. If the inscription had been cut on the clay, this defect would not appear; the vertical lines would have been connected, and the ragged white line would have been made smooth.

This method of printing in clay was rude and imperfect, but, to some extent, it did the work of modern typography. Writings were published at small expense, and records were preserved for ages without the aid of ink or paper. The modern printer may wonder that this skill in printing was not developed. The engraving that was used to impress clay could have been coated with ink and stamped on parchment. Simple as this application of the engraving may appear, it was never made. So far from receiving any improvement, the art of printing in clay gradually fell into disuse. It has been neglected for more than twenty-five centuries on the soil where it probably originated. For Layard tells us that an Assyrian six-sided cylinder was used as a candlestick by a reputable Turcoman family living in the village where it was found. A hole in the centre of one of the ends received the tallow candle. There is a practical irony in this base application of what may have been a praise of "the great king," which has never been surpassed by Solomon or Shakspeare in their reflections on the vanity of human greatness.

Engraving was used by the ancient Greeks in a manner which should have suggested the feasibility of printing with ink. Some of the maps of the Athenians were engraved on smooth metal plates, with lines cut below the surface, after the method of copper-plate printers, from which impressions on vellum, or even on papyrus, could have been taken. But, so far as we know, the impressions were not taken: for every new map there was a new engraving.

The Assyrian method of engraving stamps for impressing clay was practised by the old Roman potters, who marked their manufactures with the names of the owners or with the contents of the vessel. The potters clearly understood the value of movable types. On some of

their lamps of clay, the inscriptions were made by impressing, consecutively, the type of each letter. These types must have been movable, and, in appearance, somewhat like the punches or the model letters of type-founders.

There were some men in ancient Rome who had a clear perception of the ease with which engraved letters could be combined. Cicero, in an argument against the hypothesis of logical results from illogical causes, has intimated that it would be absurd to look for an intelligible sentence from a careless mixing up of the engraved letters of the alphabet.[5] The phrase by which he describes the assembled letters, *formæ literarum*, was used by the early printers to describe types. His argument implies, conversely, that if proper care were exercised, it would be easy to arrange the letters in readable sentences. But the speculation of Cicero did not go beyond the idea of combination. It does not appear that he thought that the letters could be used for printing.

Quintilian had speculations about engraved letters. He recommended to teachers the use of a thin stencil plate of wood, on which should be cut the letters that a boy might be required to copy when learning to write. The boy who traced the characters with his writing implement would have his hand guided and formed by the outlines of the perforated letters. The curt manner in which stencil plates are noticed should lead us to think that they were then in common use. We can see that stencils of this nature could have been used, at least as an aid, in the mechanical manufacture of books; but it is not probable that they were so used.

We have some evidences that the old Romans practised, at least experimentally, the art of printing with ink. The British Museum has a stamp with letters engraved in relief, that was found near Rome, and which seems to have been made for the purpose of printing the signature of its owner. The stamp is a brass plate, about two inches long and not quite one inch wide. A brass ring is attached to the back of the plate which may have been used as a socket for the finger, or as

a support when it was suspended from a chain or girdle. On the face of the stamp are engraved two lines of capital letters, huddled together in the usual style of all old Roman inscriptions, cut the reverse way, as it would now be done for printing, and enclosed by a border line. An impression taken from this stamp would produce the letters in the accompanying illustration, which may be translated, *the signature of Cecilius Hermias*. Of Cecilius Hermias we know nothing. He may have been a civic official who used this stamp to exempt himself from the trouble of writing, or a citizen who tried to hide his inability to write.

If this stamp should be impressed in wax, the impression would produce letters sunk below the surface of the wax in a manner that is unlike the impressions of seals. The raised surface on the wax would be rough where it should be flat and smooth. This peculiarity is significant. As this rough field unfitted it for a neat impression on any plastic surface, the stamp should have been used for printing with ink.

An Old Roman Stamp.
[From Jackson.]

The accompanying illustration is that of a brass printing stamp in the British Museum, which is preserved as a specimen of old Roman workmanship.[6] The letters were cut in relief, in reverse order, and with a rough counter or field. This roughness proves that it could not have been used to impress wax.

Brass stamps of similar construction and of undetermined age have been frequently found in France and Italy. All of them are of small size, and contain names of persons only.

Roman Stamps. ♠
[From Jackson.]

The illustrations annexed, of two engraved brass stamps of eccentric shapes, were also copied from the originals in the British Museum. As the letters are roughly sunk in the metal, and are not fitted for stamping in wax, it is supposed that the stamps were made for impression with ink. They are regarded as Roman antiquities, of undoubted authenticity, but the meaning of the inscriptions, the special purposes for which they were made, and the period in which they were employed, are unknown. The difficulty connected with the proper fixing of ink upon these stamps of brass, of which a subsequent notice will be made, is one of many causes which prevented the development of this experimental form of printing.

A favorite method of making impressions was that of branding. Virgil, in the third book of the Georgics, tells us of its application to cattle. The old laws of many European states tell us of its application to human beings. The cruel practice was kept up long after the invention of typography. During the reign of Edward VI, of England (1547–1553), it was enacted that, “whosoever, man or woman, not being lame or impotent, nor so aged or diseased that he or she could not work, should be convicted of loitering or idle wandering by the highwayside, or in the streets, like a servant wanting a master, or a

beggar, he or she was to be marked with a hot iron upon the breast with the letter V [for vagabond], and adjudged to the person bringing him or her before a justice, to be his slave for two years; and if such adjudged slave should run away, he or she, upon being taken and convicted, was to be marked upon the forehead, or upon the ball of the cheek, with the letter S [for slave], and adjudged to be the said master's slave forever."

With these evidences before us of long continued practice in various methods of engraving and stamping, and of a fair knowledge of some of the advantages of movable letters, the question may be asked, Why did the world have to wait so long for the invention of typography? This question is based on the assumption, that the civilization of antiquity was capable of making and preserving the invention which was missed through accident or neglect. Here is a grave error. The elements of an invention are like those of a chemical mixture. All the constituents but one may be there, exact in quantity and quality, but, for the lack of that one, the mixing of the whole in a new form cannot be accomplished. Failure in one point is entire failure.

The ancients failed in many points. They were destitute of several materials which we regard as indispensable in the practice of printing. They had no ink suitable for the work. Pliny and Dioscorides have given the formulas for the writing ink that was used by Greek and Roman scribes during the first century. Pliny says that the ink of book-writers was made of soot, charcoal and gum. He does not say what fluid was used to mix these materials, but he does allude to an occasional use of acid, to give the ink encaustic property and to make it bite in the papyrus. Dioscorides is more specific as to the quantities. He says that one ounce of gum should be mixed with three ounces of soot. Another formula is, one-half pound of smoke-black made from burned resin, one-half ounce each of copperas and ox-glue. Dioscorides further says that the latter mixture "is a good application in cases of gangrene, and is useful in scalds, if a little thickened, and employed as a salve." From this crude recipe one may form a correct opinion of the quality of the scientific knowledge then applied to medicine and the mechanical arts.

These mixtures, which are more like liquid shoe blacking than writing fluid, were used, with immaterial modifications, by the scribes of the dark ages. Useful as they may have been for their methods of writing, they could not have been applied to the inking of a metal surface engraved in relief. If the brass stamps described on a previous page had been brushed over never so carefully with these watery inks, the metal surface would not be covered with a smooth film of color. The ink would collect in spots and blotches. When stamped on paper or vellum, the ink thereupon impressed would be of irregular blackness, illegible in spots, and easily effaced. Writing ink, thickened with gum, has but a feeble encaustic property. It will not be absorbed, unless it is laid on in little pools, and unless the writing surface is scratched by a pen to aid the desired absorption. The flat impression of a smooth metal stamp could not make a fluid or a gummy ink penetrate below the writing surface. It was, no doubt, by reason of the inferior appearance of impressions of this nature that the brass stamps described on a previous page found so limited a use.

An unsuitable ink may seem but a trifling impediment to the development of printing, but if there had been no other, this would have been an insurmountable obstacle. The modern printer, who sees that the chief ingredients of printing ink are the well-known materials smoke-black and oil, may think that an ignorance of this mixture, or an inability to discover it, is ridiculous and inexcusable. Modern printing ink is but one of many inventions which could be named as illustrating the real simplicity of a long delayed improvement. Simple as it may seem, the mixing of color with oil was a great invention which wrought a revolution in the art of painting.

This invention, attributed by some authors to unknown Italian painters of the fourteenth century, and by others to Hubert Van Eyck of Holland, at or about the beginning of the fifteenth century, immediately preceded the invention of types. The early typographic printers, who could not use the ink of the copyists, succeeded only when they mixed their black with oil. After four centuries of experience in the use of printing ink made with oil, and after repeated experimentation with impracticable substitutes, it may be confidently

asserted that an invention of typography would have failed, if this use of oil had not been understood. The invention of types had to wait for the invention of ink.

Typography had to wait for the invention of paper, the only material that is mechanically adapted for printing, the only material that supplies the wants of the reader in his requirements for strength, cheapness, compactness and durability. Paper was known in civilized Europe for at least two centuries before typography was invented, but it was not produced in sufficient quantity nor of a proper quality until the beginning of the fifteenth century.

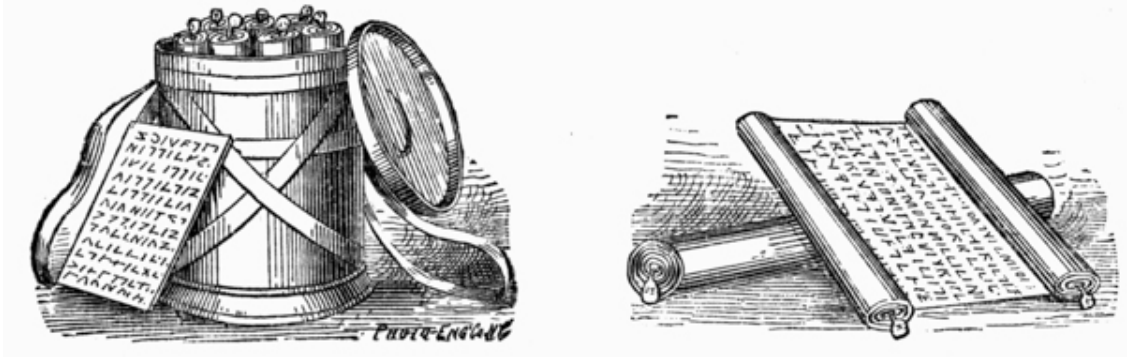
The old Romans had no substitute for paper that could have been devoted to printing or book-making. The papyrus which they used was so brittle that it could not be folded, creased and sewed like modern rag paper. It could not be bound up in books; it could not be rolled up, unsupported, like a sheet of parchment. It was secure only when it had been carefully wound around a wooden roller. The scribes of Rome and the book copyists of the middle ages preferred vellum. It was preferred by illuminators after printing had been invented. But vellum was never a favorite material among printers. In its dry state, it is harsh, and wears types; it is greasy, and resists ink; in its moistened state, it is flabby, treacherous and unmanageable. The early books on vellum are not so neatly printed as those on paper. But these faults were trivial as compared with the graver fault of inordinate price. When we consider that the skins of more than three hundred sheep were used in every copy of the first printed Bible, it is clear that typography would have been a failure if it had depended on a liberal supply of vellum. Even if the restricted size of vellum could have been conformed to, there were not enough sheep at the end of the fifteenth century to supply the demands of printing presses for a week.

If the idea of printing books from movable types had been entertained by an ancient Roman bookseller, or by a copyist, during the earlier part of the dark ages, it may be doubted whether he could have devised the mechanism that is needed in the making of types. For types that are accurate as to body, and economical as to cost, can be made by one method only. It is, in the highest degree, improbable, that

the scientific method of making types by mechanism could have been invented at an earlier date than the fifteenth century. There was mechanical skill enough for the production of any kind of ingenious hand work, but the spirit that prompted men to construct machines and labor-saving apparatus was deficient or but feebly exercised. There was no more of true science in mechanics than there was in chemistry. The construction of a suitable type-mould, with its appurtenances, during the dark ages, would have been as premature as an invention of the steam engine in the same period.

The civilization of ancient Rome did not require printing. If all the processes of typography had been revealed to its scholars the art would not have been used. The wants of readers and writers were abundantly supplied by the pen. Papyrus paper was cheap, and scribes were numerous; Rome had more booksellers than it needed, and books were made faster than they could be sold. The professional scribes were educated slaves, who, fed and clothed at nominal expense, and organized under the direction of wealthy publishers, were made so efficient in the production of books, that typography, in an open competition, could have offered few advantages.

Our knowledge of the Roman organization of labor in the field of book-making is not as precise as could be wished; but the frequent notices of books, copyists and publishers, made by many authors during the first century, teach us that books were plentiful. Horace, the elegant and fastidious man of letters, complained that his books were too common, and that they were sometimes found in the hands of vulgar snobs for whose entertainment they were not written. Martial, the jovial man of the world, boasted that his books of stinging epigrams were to be found in everybody’s hands or pockets. Books were read not only in the libraries, but at the baths, in the porticoes of houses, at private dinners and in mixed assemblies. The business of book-making was practised by too many people, and some were incompetent. Lucian, who had a keen perception of pretense in every form, ridicules the publishers as ignoramuses. Strabo, who probably wrote illegibly, says that the books of booksellers were incorrect.



Tablet with Waxed Surface. Scrinium or Case for Manuscripts.

Manuscript Roll, with Title on the Ticket. Papyrus Manuscript partially Unrolled.

Roman Scrinium, with Rolls of Papyrus. ♠

The prices of books made by slave labor were necessarily low. Martial says that his first book of epigrams was sold in plain binding for six sesterces, about twenty-four cents of American money; the same book in sumptuous binding was valued at five denarii, about eighty cents. He subsequently complained that his thirteenth book was sold for only four sesterces, about sixteen cents. He frankly admits that half of this sum was profit, but intimates, somewhat ungraciously, that the publisher Tryphon gave him too small a share. Of the merits of this old disagreement between the author and publisher, we have not enough of facts to justify an opinion. We learn that some publishers, like Tryphon and the brothers Sosii, acquired wealth, but there are many indications that publishing was then, as it is now, one of the most speculative kinds of business. One writer chuckles over the unkind fate that sent so many of the unsold books of rival authors from the warehouses of the publisher, to the shops of grocers and bakers, where they were used to wrap up pastry and spices; another writer says that the unsold stock of a bookseller was sometimes bought by butchers and trunk-makers.

The Romans not only had plenty of books but they had a manuscript daily newspaper, the *Acta Diurna*, which seems to have been a record of the proceedings of the senate. We do not know how it was written, nor how it was published, but it was frequently mentioned by contemporary writers as the regular official medium for transmitting intelligence. It was sent to subscribers in distant cities, and was, sometimes, read to an assembled army. Cicero mentions the *Acta* as a sheet in which he expected to find the city news and gossip about

marriages and divorces.

In the sixth century the business of book-making had fallen into hopeless decay. Ignorance pervaded all ranks of society.[7] The books that had been written were neglected, and the number of readers and scholars diminished with every succeeding generation.[8] The treasures of literature at Rome, Constantinople and Alexandria which were destroyed by fire or by barbaric invasion were not replaced. Books were so scarce at the close of the seventh century, that Pope Martin requested one of his bishops to supply them, if possible, from Germany. The ignorance of ecclesiastics in high station was alarming. During this century, and for centuries afterward, there were many bishops and archbishops of the church who could not sign their names. It was asserted at a council of the church held in the year 992, that scarcely a single person was to be found in Rome itself who knew the first element of letters. Hallam says, "To sum up the account of ignorance in a word, it was rare for a layman of any rank to know how to sign his name." Charlemagne could not write, and Frederic Barbarossa could not read; John, king of Bohemia, and Philip the Hardy, king of France, were ignorant of both accomplishments.[9] The graces of literature were tolerated only in the ranks of the clergy; the layman who preferred letters to arms was regarded as a man of mean spirit. When the crusaders took Constantinople, in 1204, they exposed to public ridicule the pens and inkstands that they found in the conquered city as the ignoble arms of a contemptible race of students.

During this period of intellectual darkness, which lasted from the fifth until the fifteenth century, a period sometimes described, and not improperly, as the dark ages, there was no need for any improvement in the old method of making books. The world was not then ready for typography. The invention waited for readers more than it did for types; the multitude of book-buyers upon which its success depended had to be created. Books were needed as well as readers. The treatises of the old Roman sophists and rhetoricians, the dialectics of Aristotle and the schoolmen, and the commentaries on ecclesiastical law of the fathers of the church, were the works which engrossed the attention of men of letters for many centuries before the invention of typography.

Useful as these books may have been to the small class of readers for whose benefit they were written, they were of no benefit to a people who required the elements of knowledge.

We may imagine the probable fate of a premature and unappreciated invention of typography by thinking of results that might have been and have not been accomplished by printing among a people who were not prepared to use it as it should be used. Printing has been practised in China for many centuries, but there can be no comparison between the fruits of printing in China and in Europe. The remarkable inefficiency of the Chinese method is the result not so much of clumsiness of the process, as of the perverseness of a people who are unable to improve it, and unwilling to accept the improvements of Europeans. The first printing press brought to the New World was set up in the City of Mexico about one hundred years before a printing office was established in Massachusetts. Books were printed in Constantinople, perhaps as early as 1490, certainly before types were thought of in Scotland. And now Scotland sends types and books to Turkey, and Boston sends printing paper and presses to Mexico. If the people of Turkey and Mexico are receiving benefits from printing, the benefits have been derived from the practice of the art abroad and not at home.

In making an estimate of the service that printing has done for the world, we frequently overlook the supports by which it has been upheld. It is a common belief that the diffusion of knowledge which was so clearly manifested in the fifteenth century was due to the invention of printing. This belief reverses the proper order, and substitutes the effect for the cause. It was the broader diffusion of knowledge that made smooth the way for the development of typography. In its infancy, the invention was indebted for its existence to improvements in liberal and mechanical arts; in its maturity, it is largely indebted for its success to discoveries in science, and to reforms in government.

The magnetic telegraph is the most recent discovery, and of the most importance, in its services to the daily newspaper press. The circulation of leading American daily newspapers has more than

trebled since the invention of the telegraph.

The free public schools of America have done much to promote the growth of printing. If the State did not offer free books and free education, a large portion of the people would grow up in ignorance. Every scholar in a public school becomes for life a reader, and to some extent, a purchaser of books. The value of the school-books manufactured in the United States annually, has been estimated at fifteen million dollars. Of Webster's Spelling-Book alone, thirty-five million copies have been sold, and a million copies are printed every year. If printing were deprived of the support it receives from public schools, there would at once follow a noticeable decrease in the production of printed matter, and a corresponding decrease in the number of readers and book-buyers.

To foster the tastes which have been cultivated by public schools and newspapers, some States have established public libraries in every school district. There are, also, a great many valuable libraries which have been established by voluntary association or by individual bequest. These libraries create books as well as readers.

Railroads, steamboats and package expresses are aids of as great importance. The New-York daily newspaper, printed early in the morning, is sold within a radius of three hundred miles before sunset of the same day. Newspapers now find hundreds of eager purchasers in places where they would not have found one in the days of stage-coaches. The benefits of cheap and quick transportation are also favorable to the sale of books. A bookseller's package, weighing one hundred pounds, will be carried from New York to St. Louis, on the Mississippi, within sixty-five hours, at an average expense of three dollars. When there was no railroad from St. Louis to San Francisco, the overland charges on one hundred pounds of books were one hundred dollars. The long delays and great expenses of stage-coach transportation would operate almost as a prohibition to the sale of periodicals and new books.

The greatest legislative aid that printing has received is through the facilities which are furnished by post-offices and mails. They create readers. Weekly newspapers are now sent, for one year, for twenty

cents, to subscribers in the most remote corner of the Union. Books are sent three thousand miles at the rate of one cent per ounce. The improvement of postal facilities has increased the number of readers and purchasers of newspapers to an amount unforeseen by the most sanguine projector.

All these aids are, comparatively, of recent introduction. The beginnings of the telegraph, the railroad and the express are within the memory of the men of the present generation. The systematic establishment of free schools and libraries is the work of the present century. Public mails and post-offices were introduced in 1530, but it is only within the past forty years that their management has been more liberal for the benefit of the people. It is by aids like these, and not by its intrinsic merits alone, that printing has received its recent development. It was for the want of these aids that printing languished for many years after its invention. One has but to consider the many supports printing has received to see that its premature invention would have been fruitless.

If, even now, when books and readers and literary tastes are as common as they were infrequent, it is necessary to the success of printing that there shall be schools and libraries, cheap and rapid methods of travel, generous postal facilities, a liberal government and a broad toleration of the greatest differences in opinion, what but failure could have been expected when the world was destitute of nearly all? Printing not only had to wait many centuries for improvements in mechanical appliances, without which it would have been worthless; it had to wait for a greater number of readers, for liberal governments, for instructive writers, for suitable books. It came at the proper time, not too soon, not too late. “Not the man, the age invents.”

successors. And it has been in use ever since, for there is no substitute.

INGREDIENTS OF PRINTING INK USED BY THE RIPOLI PRESS.

Ingredients.	*Tuscan Currency.*	*American Currency.*
Linseed Oil, bbl.	lir. 3 10 0	$3.17
Turpentine, lb.	4 0	.18
Pitch, Greek	4 0	.18
Pitch, Black	1 8	7 ½
Marcassite	3 0	.13 ½
Vermilion	5 0	.22 ¾
Rosin	3 0	.13 ½
Varnish, hard	8 0	.36
Varnish, liquid	12 0	.54
Nutgalls	4 0	.18
Vitriol	4 0	.18
Shellac	3 0	.13 ½

We have not been told how the ink was compounded. Our nearest approach to this knowledge is through the Cost Book of the Ripoli Press for 1481, which specifies and prices the materials. As no mention is made of smoke-black, we have to infer that pitch was burnt to make this black. Linseed oil, as the most bulky ingredient, very properly occupies the first place. The real value of nutgalls and vitriol is not so apparent: they were important ingredients in writing ink, and the Italian printer may have thought them indispensable in printing ink. Shellac and liquid varnish were used to give a glossy surface.

Printers soon discovered that printing was an art of too many details, and that the manufacture of printing ink was its most objectionable duty. There was risk of fire in the boiling of linseed oil; there was discomfort and dirt connected with the manipulation of the ingredients; and in inexpert hands there was waste and often entire failure. In all large cities, ink-making was set apart and practised as a distinct trade. As a necessary consequence, the quality deteriorated through the competition that followed. Moxon’s criticism of ink made in England in 1683 could be applied without any injustice to much of the ink of the fifteenth century.[403]

Reduced Fac-simile of a large Wood-cut, said to be of the Fifteenth Century. ♠
[From Jackson.]

Gutenberg, Schœffer, Zell, Mentel and many early printers of France and Italy neglected engraving on wood.[404] It may be that this neglect originated in the difficulties of printing types and wood-cuts together,[405] or in a despisal of the rude productions of the block-printers,[406] and in the intention of the typographers to make emphatic the superiority of their branch. Wood-cuts were freely used by typographers in the heart of Germany and in the Netherlands, the districts where we find the earliest notices of block-printing, but they are generally of a low order. Many of them are barbarous, as faulty in cutting as in drawing, and pleasing only to uncultivated tastes. It is probable that, about this time, many of the more skillful engravers and designers[407] abandoned the practice of xylography, attracted, no doubt, by the superior advantages offered by the newly invented art of copper-plate printing. The art of engraving on wood, although it afterward enlisted the services of artists like Durer and Holbein, could not compete with this formidable rival. It suffered a long eclipse, from which it did not emerge until the days of Bewick.

The quality of the paper in early books is as unequal as the printing.

In the *Bible of 36 lines*, the paper is thick and strong, of coarse fibre, yellowish, apparently made from sun-bleached flax; in the books of Schœffer, and of the later German printers, the paper is thinner, but dingy and harsh; in the books of the Venetian printers, it is often very thin, usually of smooth surface and a creamy white tint that seems to have been unchanged by time. Different qualities are often noticeable in the same book. There were many paper-mills from which the printers drew their supplies, and every mill made different qualities. Blades says that it was the practice to sort the paper before printing, separating the rough from the smooth, and the thin from the thick, and to print and bind together sheets of similar quality. The sizes required by printers were small. The books first made were printed on sheets about 16 by 21 inches, one leaf of which was as large as could be printed by one pull of the press. The sizes 15 by 20, 14 by 18 and 12 by 15 inches were common, and in request for quartos and octavos. The largest size seems to have been royal, about 20 by 25 inches. The Cost Book of the Ripoli Press gives names and prices to nine distinct qualities or sizes of paper, but it does not define the weights and measurements. The smallest size and cheapest quality, possibly a pot foolscap, was put down at the price of 2 lire 8 soldi (about $2.18) per ream; the largest and best, probably royal, at 6 lire 8 soldi (about $5.80) per ream.[408]

The Fall of Lucifer, as shown in Zainer's Edition of the Speculum Salutis. ♠
An Illustration of the Degradation of Engraving on Wood.
[From Heineken.]

The paper made for the *Bibles* of Gutenberg and for the earlier books was the ordinary writing paper of the period. Made from linen rags that had not been weakened by caustic alkalies or by steam-boiling and gas-bleaching processes, and strongly sized by the dipping of each sheet in a tub containing a thin solution of glue, it was strong and of hard surface. But the qualities which commended the paper to the copyist were objectionable to the printer. The hard surface caused harsh impression, and strong sizing made the damp sheets stick together. It was soon discovered that unsized paper, which, according to Madden, was about half the price of the sized, was easier to print. It would take a clearer impression, and more thoroughly imbibe the oily ink. These advantages could not be overlooked, and, consequently, hard-sized papers went out of fashion. By far the largest part of the books printed during the last quarter of the fifteenth century were of unsized or half-sized paper.

The early printer tried to gratify luxurious tastes by printing copies

on vellum, but its inordinate price, and the great difficulties then encountered in printing, obliged him to give it up as an impracticable material. When book-lovers found that able printers like Kerver and Pigouchet printed paper more neatly and evenly in color, vellum[409] went out of fashion.

A Print of 1475, probably the work of an amateur engraver. ♠
[From Heineken.]

We do not know what system or method was observed in early proof-reading. Madden has pointed out many curious errors in three distinct copies of a book printed at Weidenbach about 1464, which seem to show that the compositor of each copy read the proof of his own work, and read it badly. Possibly this was the method of many of the amateur printers of that century, whose books, according to Schelhorn, bristle with horrid and squalid errors. It could not have been the method of Gutenberg, whose *Bibles*, although not free from

faults, were obviously read with care. Nor was it the method of careful printers, for there is evidence that many of them enlisted the services of eminent scholars as proof-readers or correctors of the press.[410] These correctors did a double duty; they corrected the errors of the compositors and those of the manuscript copy.[411] From the frequency and earnestness of the complaints then made concerning faulty manuscript texts, it seems that the copyists needed correction more than the compositors. But the correctors were not always equal to the task. Some of them were grossly incompetent, and still further corrupted the texts they undertook to improve.[412] Considering the difficulties the early printers encountered in getting correct copies and competent readers, it is surprising that their books are not more full of faults. The errors of early printed books have been frequently commented on, but the remarks of Prosper Marchand are, perhaps, the most emphatic:

> It is a prejudice altogether too common, a prejudice which dealers in old books have kept alive and profited from, to think that the editions of the fifteenth century are more accurate because they were printed from manuscript copies. Many of these editions were printed from faulty texts, picked up by chance, or selected without judgment by printers who were unable to see their faults, and were still further corrupted by the ignorance and rashness of their editors and correctors. I know that this is a kind of literary blasphemy, but it is warranted by respectable authority. . . . They are deceived who think that books are accurate in proportion to their age. For the most part, the older they are, the more inaccurate they are.[413]

Inaccurate as early printed books may have been, they were more correct than those of the copyists. The errors of a faulty first edition were soon discovered and the faulty editions were supplanted by the perfect. It is not the least of the many benefits of printing that it has effectually prevented the accidental or intentional debasement of texts.

The inferiority of the tools of the early printing office could be plainly exhibited by contrasting them with those of our time—the early hand-press with the modern cylinder printing machine—the entire collection of types made in the fifteenth century with the specimen book of any reputable modern type-founder. But the pride of the young printer in improvements which have been most largely made by the men of this century should be modified by the reflection

that there has been no change in the theory, and but few changes in the elementary processes of printing. The punch, matrix and mould, the tympan, frisket and points, the use of damp paper and oily ink, of curved surfaces for applying the ink, and of blankets for diffusing the impression, are still in fashion. Printing is done quicker, cheaper, with more neatness and accuracy, with more regard for the convenience of the reader, with many new features of artistic merit, and in varieties and quantities so vast that there can be no comparison between early and modern productions—but it is the same kind of work it was in the beginning. It has not been made obsolete by lithography or photography, nor by any other invention of our time. The method invented by Gutenberg still keeps its place at the head of the graphic arts.

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INDEX

ADDITIONAL NOTES AND CORRECTIONS.

Page 24. In the second line of foot-note, change two-thirds to four-ninths.

27. The exact date of the complete invention of copper-plate printing is unfixed. Vasari says that Finiguerra's discovery was made in 1450, but that the Italian practice of making plate prints began about 1460. It is obvious that the alleged discovery in 1450 of the fact that the blacking placed in incised lines could be transferred to paper by pressure was not the complete invention of copper-plate printing. Much more had to be done. The earliest dated Italian print by this method is of the year 1465. The earliest authentic German print is dated 1446. There are others attributed to the years 1422, 1430, 1440, but they are not accepted as genuine by Passavant. See *Peintre-Graveur*, vol. I, pp. 192–197.

Senefelder's first suggestion of lithography was entertained in 1796, but his vague notions about printing from stone did not assume a practical shape before 1798. He did not receive, and perhaps was not entitled to, his patent before 1800.

34. The exact size of the Assyrian cylinder illustrated on this page is seven inches high and three inches wide at each end.

64. On page 447, the date of the erection of this stone by Wittig is put down at 1508, which is the date given by Bernard and by many others. But Wetter, from whose book this statement was taken, knowing that Wittig was dead in 1507, altered the date to 1507. Helbig does not accept either date. He thinks that it should be 1504. *Notes et dissertations*, pp. 10, 11.

65. In foot-note, change *exculptis* to *exsculptis*.

77. I have followed De la Borde's translation of this indulgence, which makes the time seventeen thousand years, but Holtrop's translation is fourteen thousand years. The popes supposed to be associated with Gregory in the promulgation of this indulgence were the Anti-pope Benedict XIII at Avignon, and Pope John XXIII. Holtrop does not regard this as a print of 1418; he places it between 1455 and 1470.

82. It is possible that engraving on wood was done in England in the first half of the fifteenth century. Ottley, in his *Inquiry concerning the Invention of Printing*, page 198, describes an English print of the crucifixion, with legend in English, which he says may be as old as the St. Christopher. This is the legend: "Seynt Gregor. with oyer [other] popes & bysshoppes yn seer, Haue graunted of pardon XXVI. mill yeer. To yeym yat befor yis fygur on yeir knees Devoutly say .v. pater noster .&.v. Auees." Weigel has given other fac-similes of early English engraving.

96. Chatto says that Gringonneur was paid 56 sols about 1393. Passavant says 50 sols. Lacroix says 1392, and estimates the value of 56 sols in modern money at 180 francs.

98. In third line of second paragraph, change fifteenth to fourteenth.

104. In third line of foot-note, change printers to painters.

111. In foot-note, last line of small type, change chap. I to chap. II.

150. Change John I, 3, to John III, 1.

150. Lacroix gives the date of 1292 for the employment of the seventeen book-binders at the University of Paris.

177. In sixth line of note, change 1435 to 1430, and the word double to thrice.

180. In eleventh line, change 1385 to 1381.

218. The date of the termination of the Great Schism is usually put at 1447, but it was not fully ended until Pope Felix V abdicated the papal chair in 1449, and ordered the church to submit to Nicholas V.

250. Passavant (vol. I, p. 50) says that there is in the library at Heidelberg a copy of a xylographic edition of the Lord's Prayer, a block-book of ten leaves, which may be attributed to the fifteenth century.

299. In last line but two of note, change 380 to 280.

319. Holtrop says that Bellaert's name is first mentioned in 1485, as it appears in the fac-simile.

378. A document has been recently discovered at Strasburg which proves that Frielo Gensfleisch, the elder brother of John Gutenberg, was in Strasburg in 1429. This document is the signature of Frielo to a receipt for 26 florins due him on an annuity. See *Book Worm* for January, 1868.

397. It is not probable that this tool of four pieces was the press. Ottley, who thinks that Gutenberg's secret was not that of printing (*Inquiry concerning Invention*, p. 41), says, "there can be no doubt that presses of different kinds were known long before the invention of typography" (p. 37), and that "five of the witnesses, none of whom were partners, knew all about the press" (p. 40). It may also be added that the repetition by different witnesses of the order to separate the four pieces and put them in a disjointed form in the press or on or under the press, is evidence that the four pieces did not constitute the press nor any part of it. Nor can it be supposed that Gutenberg had sent to his home a bulky press to have, as has been asserted, its "joinings renewed." This work should have been done by Sahspach, the joiner who built it. Although I believe that Gutenberg afterward invented the printing press, I think that the press here mentioned was nothing more than the screw press of the carpenter—the wooden vise or press of a workman who needed it when using a file. A printing press would not be needed until the types were made, which it appears were not even then ready. The fact that Gutenberg, Dritzehen, Dünne, and Sahspach worked apart is proof that the proposed printing office was not furnished—that the men were making tools, and the tools were probably moulds and matrices. I have accepted Van der Linde's translation of *zurlossen* as melting, for it is warranted by many evidences that the tool of four pieces and the *formen* were of metal. Ottley's translation, making *zurlossen* mean a loosening or unjointing, or breaking-up, with a view to renewal or reconstruction, could also be accepted.

405. Bernard questions the accuracy of the date of the *Donatus of 1451*, but it is the belief of Fischer and of many others that it was printed in 1451.

412. In the last line of text, insert the word not before always.

413. Compare the spacing in the *Bibles* of Gutenberg with that of the *Psalter of 1457*, as shown in pages 453 and 455. In Gutenberg's *Bibles*, there are some evidences of attempts to keep the lines even; in the *Psalter*, the nicety of full lines or of even spacing was disregarded.

451. Madden admits that Schœffer was a copyist at Paris, but doubts the inference that he was a student of the University. His doubt seems to be based on the faulty Latin of the colophon.

455. I am not entirely satisfied with the fac-simile of types on this page. It is a copy of the fac-simile made by Falkenstein, the only one accessible to me of the edition of 1457. It is, no doubt, a correct representation of form and of general appearance, but the outlines of the letters are suspiciously sharp. They do not accord in this feature with the types shown on page 453. In Falkenstein's fac-simile, the ornamental work about the letter P is a dull bluish purple, so made by printing deep blue over lines previously printed in dull red. I have not attempted to imitate this dull purple color (of which I find no notice save in the book of Papillon), for I believe that this use of purple was exceptional. It was probably caused by an imperfect cleansing of the red block, the after application of the blue and the mixing on the block of both colors, forming a dull purple.

465. Madden doubts the genuineness of the record of the proposed mission of Jenson to Mentz.

467. I have accepted the statement of Bernard that leads were first used in 1465 in the *Offices* of Cicero, but a re-examination of the fac-simile in Sotheby's *Typography* (No. 90) of the *Treatise on Reason and Conscience* convinces me that the types of this work were leaded. As Gutenberg abandoned printing in 1465, it is probable that the *Treatise* is really older than the *Offices*. If so, Gutenberg was the first to use leads.

498. Many bibliographers regard Martens as the predecessor of John of Westphalia, and as a graduate of one of the typographical schools at Cologne. Holtrop thinks that Martens was the pupil of John of Westphalia, his corrector and associate, but not his partner or predecessor.

506. La Caille and Santander say that Gering died in 1510; Van der Meersch says 1520.

529. The weakness of the early press is abundantly proved by the smallness of the forms and the absence of large and black wood-cuts in all books printed before 1800. The inability of the hand-press (even when made of iron, as it was in 1824) is set forth by Johnson in his *Typographia*, vol. II, p. 548. It is there stated that an engraver who had been at work for three years on a wood-cut 11 ½ by 15 inches, was dismayed by the discovery, after a fair trial, that his block was too large to be properly printed on any variety of English press then in common use. The Clymer press, just introduced, was then tested. By lengthening the bar, and getting two men to pull, a few fair impressions were obtained, but the block soon broke under pressure. This wood-cut was only about half the size of the two-page cuts which are now regularly and easily printed for the popular illustrated papers on machines at the rate of 1,000 an hour.

530. The most admirable feature of the best early printing is its simplicity. The types were uncouth, but they were made with single purpose, to be easily read, not to show the skill of the punch-cutter. This object would have been fully accomplished if the compositor had refrained from abbreviations and had spaced his words with intelligence. The pressman did his part of the work fairly, and honestly impressed the types on the paper with unexceptionable firmness and solidity. The readable method of doing presswork is, unfortunately, out of fashion. A perverted taste requires the modern printer to use thin types, dry glossy paper, as little ink and as weak an impression as is consistent with passable legibility.

This general fondness for delicacy is not at all favorable to the production of readable books.

ENDNOTES, quondam FOOT-NOTES.

1 The *Daily Graphic* of New York, may be offered as an exception to this assertion, but this newspaper really confirms its correctness. It is the illustrated side only of this paper which is done by lithography. The side which gives it value as a newspaper is printed with ordinary printing types, and this result could be accomplished by no other method.

2 This body of Canon type occupies about two-thirds [anc24] of an American square inch. A square inch of the Small-pica type, in which this text is composed, contains about 44 ems to the square inch; a square inch of Agate, or of small advertising type, contains 177 ems to the square inch. There are types so small that 447 ems can be put in a square inch.

3 The word xylography is little used by printers or engravers, with whom the art of making engravings in relief is usually known as engraving on wood. It is most frequently used by bibliographers to distinguish early printed work: books printed from types are now defined as typographic, and those printed from engraved blocks as xylographic.

4 The accompanying translation of a tablet taken from the record room of the second Assurbanipal (according to some original scholars, the Sardanapalus of the Greeks), king of Assyria, B. C. 667, will give an idea of one purpose for which the impressions were made:

> Assurbanipal, the great king, the powerful king, king of nations, king of Assyria, son of Esarhaddon, king of Assyria, son of Sennacherib, king of Assyria; according to the documents and old tablets of Assyria, and Sumri and Akkadi, this tablet in the collection of tablets I wrote, I studied, I explained, and for the inspection of my kingdom within my palace I placed. Whoever my written records defaces, and his own records shall write, may Nabu all the written tablets of his records deface.

Mr. Smith of the British Museum is translating some of these tablets.

5 Balbus, the stoic, in replying to Vellejus, the epicurean, opposes his atheistical argument that the world was made by chance, and says:

> He who fancies that a number of solid and invisible bodies could be kept together by weight [gravitation?], and that a world full of order and beauty could be formed by their accidental juxtaposition—from such a man I cannot understand why he should not also believe that if he threw together, pell-mell, a great number of the twenty-one letters, either of gold or of some other material, the *Annals of Ennius* could be legibly put together from the forms scattered on the ground. *De Natura Deorum*, book II, chap. 20.

6 Jackson and Chatto, *Treatise on Wood Engraving*, p. 12.

7 The emperor Justin (518–527) could not write, and was obliged to sign state papers with a stencil.

8 When Latin ceased to be a living language, the whole treasury of knowledge was locked up from the eyes of the people. The few who might have imbibed a taste for literature, if books had been accessible to them, were reduced to abandon pursuits that could only be cultivated through a kind of education not easily within their reach. Schools confined to cathedrals and monasteries, and exclusively designed for the purposes of religion, afforded no encouragement or opportunities to the laity. Hallam, *Middle Ages*.

9 Hallam, *Middle Ages*, vol. III, pp. 286, 287.

10 These observations apply only to the types used for the text letters of books and newspapers. The large types made for the display lines of posters are cut on wood, but these types of wood are used only for printing single lines; they are not combined with the compactness of book types, and do not require their precision of body. The wood types of Japan are, probably, the smallest wood types in practical use; but they are much larger than our book types; they are printed in smaller pages; they are not obliged to stand truly in line, nor to conform to the standards of European and American printers. The cheapness of types which have been cast, as compared with letters which have been engraved, has been explained on page 23 of this work.

11 The characters D, E, 1 are the private reference marks of the type-founder. In this position they cannot be reproduced on the cast type.

12 The superfluous metal which adheres to the cast type, and is afterward broken off, is also called the Jet. The finishing of the types is comparatively simple work which does not require explanation.

13 *Mechanick Exercises, or the Doctrine of Handy-Works, applied to the Art of Printing.* By Joseph Moxon, Member of the Royal Society, and Hydrographer to the King, etc. London, 1683.

14 *The Book of Trades* was popular. Two editions in Latin verse were published, one in 1568, and another in 1574, with descriptions by Hartmann Schopper. Chatto says:

> This is, perhaps, the most curious and interesting series of cuts, exhibiting the various ranks and employments of men, that ever was published. Among the higher orders . . . . . are the Pope, Emperor, King, Princes, Nobles, Priests and Lawyers; while almost every branch of labor or trade then known in Germany, from agriculture to pin-making, has its representative. There are also not a few which it would be difficult to reduce to any distinct class, as they are neither trades nor honest professions. Of these heteroclytes is the *Meretricum procurator*, or, as Captain Dugald Dalgetty says, the captain of the queans. Jackson and Chatto, *A Treatise on Wood Engraving*, p. 409.

Jost Amman was one of the many famous German designers on wood. The publishers of Nuremberg and Frankfort esteemed his ability highly and gave him constant employment.

15 The text of the *Speculum Durandi*, the book of 1473, is *exculptis ære litteris*; [anc65] the text of the *Præceptorum Nideri*, the book of 1476, is *litteris exculptis artificiali certe conatu ex ære*. The language is plain and cannot be construed to mean cut types. When these books were printed, the arts of typography and copper-plate printing were new and had not yet received distinctive names. The reading public knew nothing of the theory or practice of either process, and confounded the productions of one art with those of the other.

The early printers had to define the respective arts as they best could, with words made from Latin. A close examination of the words selected by Husner will show their propriety. The word *exculptis*, sculptured, or cut out in high relief, is here used in contradistinction to *inculptis*, sculptured in, or cut in, as in an engraving on copper-plate. It defines typographic work from copper-plate printing. The phrase *artificiali certe conatu ex ære*, means something more than skillful engraving; it suggests the use of mechanism, and of a beginning of the work in brass, which can be clearly understood only by construing *ex ære*, from or in a brass mould. The phrase here translated *in* brass has been rendered *of* brass, but the language will not bear this construction. The phrase *ex ære*, in, or out of, or from brass, was frequently used by many early printers. I have rarely met the form *æris*, of brass. To represent that early types were of brass is as much a violation of history as it is of grammar.

16 This book was edited and republished in the form of an octavo pamphlet of fifty-six pages, by Signor P. Vincenzo Fineschi, at Florence, in 1781. The equivalent in American currency of the Tuscan lira is calculated from a formula given with great minuteness by Blades in his *Life and Typography of William Caxton*, vol. II. p. xx.

17 Heineken, *Idée générale d'une collection complette d'estampesavec une dissertation*, etc., p. 250.

According to the legend, it was the occupation of Saint Christopher to carry people across the stream on the banks of which he lived. He is accordingly represented as a man of gigantic stature and strength. One evening a child presented himself to be carried over the stream. At first his weight was what might be expected from his infant years; but presently it began to increase, and kept increasing, until the ferryman staggered under his burden. Then the child said, "Wonder not, my friend; I am Jesus, and you have the weight of the sins of the whole world on your back." St. Christopher was thus regarded as a symbol of the church.

18 The Suabia of the fifteenth century was separated by the Rhine from Switzerland and France on the south and west; its eastern boundary was Bavaria; its northern boundary, Franconia and the Palatinate of the Rhine.

19 As these three copies have never been compared side by side, it has not been proven that they are impressions from the same block. The copy described on a preceding page has some peculiarities not found in the others.

20 A book printed at Delft in 1480, says that when St. Gregory was pope, he celebrated mass in the church *Porta Crucis*. As he was consecrating the bread and wine, Christ appeared to him as represented in the engraving, with all the accessories to his passion. Robert of Cologne, who wrote a treatise on indulgences, published at Zutphen in 1518, adds, that Pope Gregory kindly granted 14,000 years of indulgence; that Pope Nicholas V doubled them; that Pope Calixtus, after requiring the repetition five times of the prayers, again doubled the years of indulgence; that Pope Innocent VIII, after adding seven more prayers, two other prayers, and two more of the *Pater Noster* and the *Ave Maria*, again doubled the length of indulgence—so that the sum total amounted to at least 70,000 years: according to other computations, to 92,000 years, or 112,000 years. Holtrop, *Monuments typographiques*, p. 13. There is but one copy of this print, which recently belonged to the collection of Theodor O. Weigel of Leipsic, who published a fac-simile of it in colors, in his great work, *The Infancy of Printing*, plate 113, vol. I.

21 Wetter says that all letters of indulgence for thousands of years are spurious; that they were made by monks and ignorant traveling priests for no other purpose than to allure simple people to church.

22 Sweinheym and Pannartz, who were invited, in 1464, to establish a printing office in the monastery of Subiaco near Rome, were the first printers connected with any ecclesiastical institution. It may be remarked, that they did not thrive under clerical favor, for they soon found it expedient to remove to the city of Rome, where they were equally unfortunate in their efforts to find purchasers for their books.

23 I have used the translation as I find it in Ottley's *Inquiry into the Origin and Early History of Engraving*, vol. I, p. 47. The original is given by Temanza, *Lettere Pittoriche*, vol. v, p. 321. Temanza found this decree in an old book of regulations which belonged to a fraternity of Venetian printers.

24 Weigel, in his *Infancy of Printing*, plate 10, presents the fac-simile of an old printed altar-piece, about eight inches wide and twenty inches long, which contains a representation of the Virgin and the infant Christ. The engraving is in outline only. The interior was colored by stencils, like the image prints.

25 Temanza had some old Venetian playing cards of unknown date, which he believed were made at or about the time of the publication of this decree. They were of large size, on thick paper, and elaborately decorated with gold and colors. The early Venetian playing cards were, probably, more expensively made, and were offered at higher prices than the German cards. In the field of art and ornament, and even in the trades which called for a higher degree of skill, the Venetians surpassed all their competitors. This pre-eminence was maintained many years after the invention of typography. The earlier books of Venice are famous for the whiteness of their paper and the beauty of their types, as well as for admirable presswork and solid bindings.

26 Heineken, *Idée générale*, page 245. He does not give the date. The record from which he quotes, the Red Book of Ulm, so called because the initials were in that color, ends with the year 1474.

27 Singer's *Researches into the History of Playing Cards*. This book abounds in curious information and has many valuable fac-similes.

28 Breitkopf says that the stencil painting of prints was done with great rapidity by the medieval colorist. He alludes to an old German saying of "painting the twelve apostles with one stroke," which, no doubt, refers to the expeditious painting of a once popular image print, of which there is now no fragment in existence.

29 Some antiquarians say that this print is a representation of Amman.

30 Didot, *Essai sur la typographie*, p. 564.

31 Bibliophile Jacob, *Curiosités de l'histoire des arts*, etc., p. 48.

32 One of the cards bears the name of the maker, F. Clerc. The costumes of the figures are French, and of the fashion of the court of Charles VII. One of the queens is a rude copy of the well known portrait of the queen Marie of Anjou; another queen is from an authentic portrait of the king's mistress, Gérarde Cassinel. The robe of one of the kings is plentifully sprinkled with the *fleur-de-lis*; the figure of another king is that of a hairy savage with a torch in his hand. These singular cards illustrate a frightful accident which made a profound impression on the people of France. To divert the half-crazed king Charles VI, a masquerade was planned for a ball given by Queen Blanche, on the 29th of

January, 1392, in which masquerade the king and five of the gentlemen of the court took the parts of savages. The costumes were made by encasing the actors in tight-fitting linen garments, covered with warm pitch and tow. In this uncouth attire, and linked together with clanking chains, they danced in the ball-room to the amusement of the men and the terror of the ladies. Wishing to discover one of the maskers, the Duke of Orleans snatched a torch from the hand of a servant, and thrust it too near an unhappy masker's face. In a moment he was covered with a blaze which quickly spread to his fellows. The king was rescued in time, but four of the masqueraders were burned to death.

33 Breitkopf, *Versuch den Ursprung der Spielkarten*, p. 9, note g. The fac-similes of playing cards in this book are exceedingly grotesque.

34 Cards are not mentioned in a specification of popular games in the Stadtholdt Book of Augsburg for the year 1274. The ordinances of the town of Nuremberg for the period between the years 1286 and 1299 prohibit gambling, but they do not mention cards. For the period between 1380 and 1384, they are both mentioned and permitted.

35 In Singer's *Researches into the History of Playing Cards* may be found many fac-similes of early Hindostanee cards, some of which, we are told, were engraved on plates of ivory. These fac-similes show that the primitive game was a modification of the old Indian game of chess.

36 The industry of Jost Amman was as remarkable as his skill. The old historian of early printers, [anc104] Sandraart, says, on the authority of his pupil George Keller, that during the four years in which Keller lived with him, Amman produced designs enough to load a wagon.

37 The ordinances of Nuremberg between the years 1380 and 1384 permitted gambling and betting, but in moderation: "Always excepting horse-racing, shooting with cross-bows, *cards*, shovel boards, tric-trac and bowls, at which a man may bet from two pence to a groat." Von Murr, as quoted by Chatto, *Treatise on Wood Engraving*, p. 42.

38 Having visited many convents in Franconia, Suabia, Bavaria, and the Austrian States, I everywhere discovered in their libraries many image prints engraved on wood and pasted either in the beginning or the end of old volumes of the fifteenth century. These facts taken together confirm me in the opinion that the next step of the engraver on wood, after playing cards, was the engraving of figures of saints, which, distributed and lost among the laity, were carefully preserved by the monks, who pasted them on the inner covers of the books with which they furnished their libraries. After the engravers had succeeded in making prints of saints, they found it very easy to engrave historical subjects, with explanations in words. Heineken, *Idée générale*, etc., p. 251.

39 Wood-cuts of sacred subjects were known to the common people of Suabia, and the adjacent districts, by the name of *Halgen* or *Halglein*, saints or little saints, a word which, in course of time, was also applied to prints of all kinds. In France also, the earliest prints were known as *dominos*, or lords, a word which was intended to convey the same meaning. The maker of prints was known as a *dominotier*, whether he made profane cards or pious images. In time the word so far declined from its first meaning that it was applied not only to printers of cards and images, but to the makers of fancifully colored wall-papers. *Versuch der Ursprung der Spielkarten*, etc., vol. II, p. 174.

40 This method is still in use in many parts of the East Indies. A dried leaf

is written on with a pointed steel which scratches the smooth surface. A bit of charcoal is then rubbed over the leaf; the places scratched are filled with atoms of charcoal, which make the writing as legible as it would have been if written with fluid ink.

41 In support of this opinion he quotes the following from Pliny:

> It would be improper to omit the notice of a new invention. We have been accustomed to preserve in our libraries, in gold, silver, or bronze, the personages whose immortal spirits speak to us from distances of leagues and centuries. We create statues of those who are no longer living. Our regrets invest them with features which have not been given to us by tradition, as, for example, is shown in the bust of Homer. The idea of making a collection of these portraits is due to Asinius Pollio, who was the first to throw open his library, and to make these men of genius the property of the public. That the love for portraits has always existed is sufficiently proven by Atticus, the friend of Cicero, who published a book on the subject, and also by Marcus Varro, who had the enlarged idea of inserting in his numerous books not only the names, but, by the aid of a certain invention, the images of seven hundred illustrious persons. Varro wished to save their features from oblivion, so that the length of centuries would not prevail against them. As the inventor of a benefit which will fill even the gods with jealousy, he has clothed these persons with immortality. He has made them known over the wide world, so that everywhere one can see them as if they were present. Pliny, book XXXV, chap. I. [anc111]

This invention has never been clearly explained. A new invention, which exhibited in books the features of seven hundred men, which multiplied them so that they were known over the wide world, and preserved them for posterity, should have been the invention of printing. Pliny speaks of it as a well-known fact, but no other writer of his age makes any mention of it. Why did not Pliny describe the new art instead of praising it?

42 Didot, *Essai sur la typographie* , p. 563.

43 American engravers on wood use box which has been cut across the fibres in flat disks, ninety-two hundredths of an inch thick. Wood so cut, with its fibres like columns, perpendicular to the touch of the graver and to the line of impression, can be engraved with more delicacy, and, for printing, has more strength than wood cut in line with the fibres.

44 The buff-tinted wrappers around fire-crackers and Chinese silks will fairly represent the quality of the paper used for Chinese books.

45 I have before me a thick Chinese pamphlet which is bound in this style. In the essential points of strength, flexibility and convenience, this binding is much superior to that of American or European sewed pamphlets. The most famous bookbinder would be justly proud of the combination of firmness and elasticity in the sewing.

46 To this description of Chinese typography is usually added the untrue statement that the types were made of copper. Why the Jesuit missionaries, who were amateurs in type-founding, should add to their labors by the use of such a troublesome and slowly melted metal as copper, when European type-founders preferred lead, tin and antimony, cannot be explained. I cannot find a copy of the original statement, which was, no doubt, in Latin. The phrase, types of copper, is, probably, an incorrect translation, a repetition of the error explained in a note on page 65 of this book. The missionaries intended to say, and no doubt did say, that

they made types *in* copper, or in copper matrices.

47 *American Encyclopædia of Printing*, p. 104.

48 Polo was more deeply interested in the simplicity of the financial method by which the Emperor filled his impoverished treasury.

> He transferred the bark of the mulberry-tree into something resembling sheets of paper, and these into money, which cost him nothing at all: so that you might say he had the secret of alchemy to perfection. And these pieces of paper he made to pass current universally over all his kingdoms and provinces and territories, and whithersoever his power and sovereignty extended. And nobody, however important he thought himself, durst refuse them on pain of death. *The Book of Ser Marco Polo, the Venetian.* Translated and edited by Henry Vale, London, 1871.

With all his power, the Great Khan met the fate which comes to every financier who tries to fill up a depleted treasury by the issue of paper money. In a very short time the notes were worth but one-half of their original value. But the Emperor was equal to the emergency: when the notes fell to one-fifth of the nominal value, he called them in, and exchanged five old for one new note of the same denomination.

49 Papillon, *Traité historique et pratique de la gravure en bois*, vol. I, pp. 76, 77. Papillon does not name this student. Lanzi describes him as the ecclesiastic Padre della Valla. Passavant (*Le peintre-graveur*, p. 18) says that the initials of like character which have been found in German manuscript books of the twelfth century, were printed.

50 . . . If he was a wool-stapler, he stamped it on his packs; or if a fish-curer, it was branded on the end of his casks. If he built himself a new house, his mark was frequently placed between his initials over the principal doorway, or over the fireplace of the hall; if he made a gift to a church or a chapel, his mark was emblazoned on the windows, beside the knight's or the nobleman's shield of arms; and when he died, his mark was cut upon his tomb. Jackson and Chatto, *Treatise on Wood Engraving*, pp. 17, 18.

51 The letters in the most meritorious manuscript books of the middle ages were not made with running hand, closely connected, like the letters of modern penmanship. The form of writing most in fashion was a spurred or pointed Gothic of remarkable blackness. Each letter was separate, carefully drawn, angled and painted, by many strokes of the reed.

52 The text of the *Codex* is a translation of the four Gospels, written in the Gothic character, by Ulphilas, bishop of the Goths, about the year 370. This book, which is supposed to have been made not later than the sixth century, was discovered in the year 1587, in an abbey in Westphalia, and was taken to Prague. When that city was captured by the Swedes in 1648, the book was sent as one of the trophies of war to Queen Christina. It has ever since been regarded as a great curiosity.

53 Moorish authors tell us that in the days of the last Norman kings of Sicily, ten thousand silk looms were in active operation in Palermo; but this statement is an oriental exaggeration of a fact that required no embellishment. Others say that Jewish and Italian traders carried these silks to Italy, Germany, and the North of Europe. The earliest silk-weavers of Palermo were the captured inhabitants of Greece who had been taken there in 1147.

54 Pliny says that the colors were produced by dyeing, but the garments described by Herodotus could not have been made by this process. We have to infer that they used some form of impression. Breitkopf tells us that the colored cloths of the Egyptians were made by printing. His conclusions seem reasonable when we consider how largely engraved stamps were used by the Egyptians for printing upon clay, and how short was the step from printing on clay to printing on cloth. The art of staining, printing or stenciling cloth with bright colors by different processes, has been practised in Hindostan from a very early period. The antiquity of the Indian manufacture may be inferred from the European adoption of Indian names. The English word *chintz*, and its German synonym *zitz*, are derived from a Hindostanee word that means both a colored printed cloth and a flower. The word *calico* is from Calicut, the town on the Malabar coast from which calico was first exported to Europe.

55 Papillon, *Traité historique et pratique de la gravure en bois*, vol. I, p. 89. His description is very prolix and full of irrelevant matter. I have made use of the translation of Ottley, but have abridged it.

56 This version of the origin of block-printing in Europe has been accepted by many authors, who find in it, or profess to find in it, the evidence that printing was derived from China and was first used in Italy. The wisest judgment passed upon its merits is that of Lanzi, who merely recites the legend, and concludes that "it is safest to say nothing about it." But Humphreys (*History of the Art of Printing*, second issue, page 209) submits the substance of a letter from a Russian book-collector, who asserts that, in 1861, he had seen, in the possession of a Mr. Herdegen of Nuremberg, seven prints which agreed precisely with those described by Papillon. I find no other description of these prints.

57 Du Halde, as quoted by Ottley in his *Inquiry into the Origin of Engraving*, p. 9. There is another version placing the date at 170 B. C.

58 The artist was not restricted by the scant space that allowed him to show only the leg of the pulp-beater on the first page. He does this, and then, with an amusing unconsciousness of its impropriety, proceeds to draw the head and body on the following page, which, in the Japanese book from which this was taken, is the other side of the leaf.

59 Proteaux, *Practical Guide for the Manufacture of Paper*, Paine's translation, p. 17. He does not name his authority for fixing the date in the fifth century, but it is not at all improbable that a card-like paper was then made for some other purpose than that of writing.

60 The phrase *ex rasuris veterum pannorum*, here translated as the scrapings of old rags, has been construed by many authors as linen paper, in opposition to the "compacted refuse material," which is supposed to be cotton, or, at least, a mixture of cotton and cordage.

61 See *The American Encyclopedia of Printing*, p. 329, for engravings of microscopic enlargements of some of the fibres used for paper.

62 Sismondi, *Literature of the South of Europe*, chap. 2.

63 The jealousy with which trades were then guarded is illustrated by the policy of Stromer. He obliged all his workmen to take an oath that they would not reveal the process, nor practise it on their own account. He had two rollers and eighteen stampers, and was about to put in another roller, when he was opposed by his Italian workmen, who probably thought that this extension of the works would give him a monopoly, and would deprive them of all opportunity of

obtaining work from any rival manufacturer. The mutineers were brought before the magistrates and sent to prison. They afterward submitted and returned to work, but were allowed to renounce their oath of obligation.

64 Paper, whenever or wherever invented, was very sparingly used, and especially in manuscript books, among the French, Germans or English, or linen paper even among the Italians, until near the close of the fourteenth century. Upon the study of the sciences it could as yet have had very little effect. The vast importance of the invention was just beginning to be discovered. It is to be added that the earliest linen paper was of very good manufacture, strong and handsome, though perhaps too much like card for general convenience. *Literature of Europe in the Middle Ages*, chap. I, sec. 65.

65 Lewis Beaumont, an illiterate French nobleman, made bishop of Durham in 1330, was so inexpert at reading, that he could not read the bulls written for his people at his consecration. The word *metropoliticæ* occurred: the bishop paused, tried in vain to repeat it, and at last said, "Let us suppose that read." Then he came to the word *ænigmate*, before which he stopped in a fine wrath, and said, "By St. Lewis, he was no gentleman who wrote this stuff." . . . . At an entertainment given at Rome, during the same century, by the bishop of Murray, the papal legate from Scotland, the bishop so blundered in his Latin when he was saying grace, that his holiness and the cardinals could not refrain from laughing. The disconcerted bishop testily concluded in Scotch-English, by wishing "all the false carles to the devil," to which the company, who did not understand the dialect, unwittingly responded, Amen.

66 At a period when the fine arts may be said to have been almost extinct in Italy and in other parts of the Continent, namely, from the fifth to the end of the eighth century, a style of art had been established and cultivated in Ireland absolutely distinct from that of all other parts of the civilized world. In the sixth and seventh centuries the art of ornamenting manuscripts of the sacred scriptures, and more especially of the gospels, had attained a perfection in Ireland almost marvelous. Westwood, *Palæographia Sacra Pictoria*, Book of Kells, page 1. Westwood further says, that in delicacy of handling, and minute but faultless execution, the whole range of palæography offers nothing that can be compared to these early Irish manuscripts, and those that were produced by their pupils in England. Wyatt, in a curt description of the famous Book of Kells, says that he tried to make a copy of some of its ornaments, but broke down in despair. "In one space of about a quarter of an inch superficial, he counted, with a magnifying glass, no less than one hundred and fifty-eight interlacements of a very slender ribbon pattern, formed of white lines, edged by black ones, upon a black ground." In this book, which he studied for hours, he never detected a false line or an irregular interlacement. Giraldus Cambrensis, a learned Welsh ecclesiastic of the twelfth century, who had carefully examined some of the Irish manuscripts at Kildare, says that the writer of this Book of Kells made the drawings from designs furnished by angels through the intercession of St. Bridget. Timms and Wyatt, *Art of Illumination*, p. 14.

67 The text as it now appears in authorized copies of the Vulgate is: *Erat autem homo ex Pharisæis, Nicodemus nomine, princeps Judæorum. Hic venit ad Jesum nocte, et dixit ei.* John 1, 3. [anc150a]

68 Petrarch's detestation of pointed letters and their admirers is amusing. After complaining of the difficulty he met in getting a fair copy of his writings, he commends the workmanship of a copyist to whom he applied, a penman who

wrote Roman letters with great neatness.

His writing is not labored and tortured. It is suitable for our age, and, indeed, for all ages. Young people, always giddy, admirers of frivolity, despisers of useful things, have adopted the fashion of writing in bristling and undecipherable letters, of which accomplishment they are very proud. To me, these medleys and jumbles of angled letters, riding one on another, make nothing but a mess of confusion which the writer himself must read with difficulty. Whoever buys work of this character, buys not a book, but an unreadable farrago of letters.

69 These boards were sometimes paneled from the inside of the cover. Scaliger tells us that his grandmother had a printed psalter, the cover of which was two fingers thick, containing in an interior panel a silver crucifix. Hansard says that he had seen an old book which contained in a similar recess a human toe, obviously a sacred relic of value.

70 This is one of the finest existing specimens of antique bookbinding in the National Library at Paris. It is a work of the eleventh century, and encases a book of prayers in a mass of gold, jewels and enamels. The central object is sunk like a framed picture, and represents the Crucifixion, the Virgin and St. John on each side of the cross, and above it the veiled busts of Apollo and Diana; thus exhibiting the influence of the older Byzantine school, which is, indeed, visible throughout the entire design. This subject is executed on a thin sheet of gold, beaten up from behind into high relief, and chased upon its surface. A rich frame of jeweled ornament surrounds this object, portions of the decoration being further enriched with colored enamels; the angles are filled in with enameled emblems of the evangelists; the ground of the whole design enriched by threads and foliations of delicate gold wire. Chambers, *Book of Days* .

71 Wickliffe says that, in 1380, there were in England many “unable curates that kunnen not the ten commandments, ne read their sauter, ne understand a verse of it.” The author of the *Plowman's Tale* accuses the clergy of faults worse than that of ignorance.

72 Boccaccio, one of the enthusiasts of the fourteenth century in the labor of collecting the forgotten manuscripts of classical authors, has told the following characteristic story about the neglect of libraries and the abuse of books by the constituted conservators of literature. When traveling in Apulia, Boccaccio was induced to visit the convent of Mount Cassino and its then celebrated library. He respectfully addressed a monk who seemed the most approachable, begging that he would open to him the library. But the monk, pointing to a high staircase, said, in a harsh voice, “Go up; the library is open.” Ascending the staircase with gladness, Boccaccio came to a hall, to which there was neither door nor bar to protect the treasures of the library. What was his astonishment when he saw that the windows were obstructed with plants which had germinated in the crevices, and that all the books and all the shelves were thickly covered with dust. With still greater astonishment, he took up book after book, and discovered that in a large number of classical manuscripts entire sections had been torn out. Other books had their broad, white margins cut away to the edges of the text. Full of grief, and with eyes filled with tears, at this sad spectacle of the destruction of the works of wise and famous men, he descended the staircase. Meeting a monk in a cloister, he asked why the books were so mutilated. The monk answered, “This is the work of some of the monks: to earn a few sous, they tear out the leaves and make little psalters, which they sell to the children. With the white margins they make mass-books, which they sell to the women.” Benvenuto da Immola, as quoted by Didot,

Essai sur la typographie, p. 567.

73 The word stationer which has been adopted in the English language has lost its first meaning in the French. It is here used to define a trader who sold books and all kinds of writing materials in a station, shop or store, in contradistinction to a class of peddlers or clerks who had no store or place of business, but who acted as couriers or agents between the buyer and maker.

74 The prices allowed to stationers in 1303 for the use of their copies seem pitiably small. A treatise on the *Gospel of Matthew*, 37 pages, was priced at 1 sol; *Gospel of Mark*, 20 pages, at 17 deniers; *St. Thomas on Metaphysics*, 53 pages, at 3 sols; a treatise on *Canon Law*, 120 pages, at 7 sols; *St. Thomas on the Soul*, 19 pages, at 13 deniers.

75 If the book was objectionable, it was burned and the author was imprisoned. According to the Roman law, the condemnation of death attached not only to the author and buyer of a proscribed book, but to him who chanced to find it and did not burn it. In 1328, Pope John XXII condemned two authors who had written a book in eight chapters, full of grievous heresies—for they had undertaken to prove that the Emperor Louis of Bavaria had the right to discipline, install or depose the pope at his own pleasure, and that all the property of the church was held by it through the sufferance of the Emperor. Lacroix, *Histoire de l'imprimerie*, p. 26.

76 Erasmus, caustically, but truthfully, said of this huge book, "No man can carry it about with him, nor even get it in his head."

77 The National Library at Paris possesses two manuscript Bibles, of which one volume contains 5,122 pictures. Each picture is explained by two lines, one in Latin and one in French; each line is decorated by an initial and a finial in gold and bright colors. If the cost of each picture with its lines be estimated at sixteen francs (Didot's valuation), the value of this book would be 82,000 francs, exclusive of the cost of parchment, binding and copying. By the same estimate, the value of the second volume would be 50,000 francs. Didot pertinently asks the question: Where can we find, in the printed work of our day, an equal prodigality in illustration? *Essai sur la typographie*, p. 715.

78 Abbreviations which deformed written language to such an extent that it is almost undecipherable to modern readers, were once esteemed a positive merit. The habit of making them was continued after printing was invented. In 1475, a printer of Lubec said, in commendation of one of his own books, that he had made free use of abbreviations, to get the whole work in one volume instead of two—a procedure, he thought, that deserved special praise, for he said that the contractions made the book more readable. The modern reader will be of a different opinion. The *Logic of Ockham*, in folio, printed at Paris in 1488, by Clos-Bruneau, contains, among other abbreviations, this bewildering passage:

(The text as printed.)

Sic hic e fal sm qd ad simplr a e pdu= cibile a Deo g a et silr hic a n g a n e pducibile a Do.

(With words in full.)

Sicut hic est fallacia secundum quid ad simpliciter. A est producibile a Deo. Ergo A est. Et similiter hic. A non est. Ergo A non est producibile a Deo.

In 1498, John Petit, of Paris, published a dictionary which professed to be *A Guide to the Reading of Abbreviations*. It was not published too soon, for the practice of making contractions had increased to such an extent that books with abbreviations were legible only to experts.

79 From a catalogue still extant, it appears that this library was composed chiefly of romances, legends, histories, and treatises on astrology, geometry and chiromancy. It was then valued at 2,223 French livres, rather more than the same number of pounds sterling. At this time, the price of a cow was about eight shillings, and of a horse about twenty shillings.—It is difficult to ascertain the real value of the money of the middle ages. Coins were frequently clipped to light weight by knavish traders, and were oftener debased at the mint when the royal treasury was low. Sellers everywhere knew that the value of a coin was not in its stamp, but in its quantity of silver, and they altered prices to meet the altered value of coin. But even in its most debased form, the silver coin of the middle ages had a very high purchasing capacity.

80 He has given an extract from an ecclesiastical account book in which are found the items of expense for the making, binding, and presentation of the manuscript book *Royal Chants* to Princess Louise of Savoy.

To Jacques Plastel, for sketching the designs for forty-eight pictures, 45 livres; to Jehan Pichou, illuminator, for coloring the designs, 80 livres; to workmen of Jehan Pichou, 50 sols, and for *vin du marché* (in colloquial English, *treating* or drink money) with illuminator Pichou, 24 sols; to Jean de Béguines, priest, for engraving the ballads, 12 livres; to Guy-le-Flamenc, for illuminating the large initial letters, 13 livres, 3 sols; for vellum, 3 livres, 12 sols; for the binding, expenses of presentation to Louise of Savoy, and the journey to Amboise, 68 livres, 8 sols. Sum total, 366 livres. Lacroix, *Histoire de l'imprimerie*, p. 47.

81 Stow says that a Bible "fairly written" was sold in 1274, in England, for 50 marks, equal to about 33 pounds. At this time a laborer's wages were 1 ½d. per day, and a sheep could be had for a shilling.—Roger Bacon, who died in 1292, said that he had spent more than 2,000 pounds for books. At this time the annual income of an English curate was £3 6s. 8d.—In 1305, the priory of Bolton gave 30 shillings for *The Book of Sentences*, by Peter Lombard. Hallam says that the accounts of the priory show that the jolly monks bought but three books in forty years. He estimates the equivalent in modern money of this 30 shillings at near 40 pounds.—*The Mirror of History*, a work in four volumes, was sold at Paris in 1332, with great formalities, for 40 livres of Paris.—In 1357, *The Scholastic History* was sold to the Earl of Salisbury for 100 marks, or about 67 pounds. At this time the pay of the king's surgeon was fixed at £5 13s. 4d. per annum and a shilling a day besides.—Wickliffe's translation of the *New Testament* was sold in 1380 for 4 marks and 40 pence.—Pierre Plaont bequeathed, in 1415, to the regents of the University of Paris, a big quarto Bible, which he said was worth 15 pounds. Chevillier says that a printed Bible of the same size in the seventeenth century could be had for 6 francs.

82 The horn-book was the primer of our ancestors, established by common use. It consisted of a single leaf, containing on one side the alphabet, large and small, in black letter or in Roman, with, perhaps, a small regiment of monosyllables, and the words of the Lord's Prayer. This leaf was usually set in a frame of wood, with a slice of diaphanous horn in front—hence the name horn-book. Generally, there was a handle to hold it by, and this handle had usually a hole for a string, whereby the horn-book was slung to the girdle of the scholar. It

was frequently noticed by early chroniclers. Chambers, *Book of Days*.

83 It was a square stick of hard wood, and about eight inches long. The entire series of days constituting the year was represented by notches running along the angles of the square block, each side and angle thus presenting three months; the first day of a month was marked by a notch having a patulous stroke turned up from it, and each Sunday was distinguished by a notch somewhat broader than usual. The feasts were denoted by symbols resembling hieroglyphics. Chambers, *Book of Days*.

84 Men given up to sensuality we may find in abundance, but very few lovers of learning, and those barbarous, skilled more in quibbles and sophisms than in literature. Poggio, as quoted by Hallam.

85 An entry in the books of the Brewers' Company during the reign of Henry V (1415–1430), states the reasons why this change was made from French to English.

Whereas our mother tongue, to wit, the English language, hath in modern days begun to be honorably enlarged and adorned, for that our most excellent King Henry V hath, in his letters missive, and in divers affairs, touching his own person, more willingly chosen to declare the secrets of his will; and, for the better understanding of the people, hath, with a diligent mind, procured the common idiom, setting aside others, to be commended by the exercise of writing; and there are many of our craft of brewers who have the knowledge of writing and reading in the same English idiom, but in others, to wit, the Latin and French, before these times used, they do not in any wise understand; for which causes, with many others, it being considered how that the greater part of the lords and trusty commons have begun to make their matters to be noted down in our mother tongue, so we also, in our own craft, following in some manner their steps, have decreed in future to commit to memory the needful things which concern us.

86 In 1446, a petition was presented to the English parliament, to consider the great number of grammar schools that sometime were in divers parts of this realm, besides those that were in London, and how few there are in these days. Knight, *The Old Printer and Modern Press*.

87 In the Netherlands we find the earliest development of the high school. The schools of the Brethren of the Life-in-Common, founded by Gerard Groot of Deventer, in 1385, which were forty-five in number in 1435, and double [anc177] that number in 1460, were the first nurseries of literature in Germany. The fruits of this attention to education were freely gathered in the fifteenth and sixteenth centuries. The entire Bible was printed in the Flemish or Dutch language within the first thirty-six years of the sixteenth century in fifteen editions. . . . Thirty-four editions of the New Testament in that language alone appeared within the same period. . . . . There can be no sort of comparison between the number of these editions, and consequently the eagerness of the people of the Low Countries for biblical knowledge, considering the limited extent of their language, and anything that could be found in the Protestant States of the [German] Empire. Hallam, *Literature of Europe*, chap. VI, sec. 38.

88 Æneas Sylvius (subsequently Pope Pius II), writing near the middle of the fifteenth century, said that the kings of Scotland would rejoice to be as comfortably lodged as the second class of citizens of Nuremberg. Hallam says that Pope Pius also praised their well-furnished and splendid dwellings, their easy mode of living, the security of their rights and the just equality of their laws.

89 Flanders, during the fifteenth century, was the richest and most densely populated part of Europe. It was famous for the extent of its foreign trade and the variety of its industry. It was not uncommon for one hundred and fifty ships in one day to enter the port of Bruges, in which city were mercantile agents from seventeen different nations. Flanders was full of industries, but its great business was the making of cloth. All the world, wrote an enthusiastic chronicler of the period, is clothed by Flanders. Ghent had fifteen thousand workmen employed on stuffs of wool; Ypres had four thousand makers of cloth; Courtray had six thousand drapers.

90 As early as the twelfth century, the emperor Henry V undertook to curb the exactions of feudalism by the establishment of free cities, and by the grant of extraordinary privileges to mechanics and manufacturers. To the nobility and petty princes of Germany these privileges were a constant offense, and the occasion of many local strifes; but the burghers were industrious and public-spirited, and took care of their rights. To protect their trade from the rapacity of the princes on the Elbe and the coast, the cities of Germany, in the year 1249, established a mercantile organization, known as the Hanseatic League. In the fifteenth century, this league was constituted of traders from all parts of the Netherlands and Germany. It was so powerful that it monopolized the trade of Northern Europe: by threat of war it compelled Edward VI of England to grant extraordinary concessions; it made successful war against Sweden, Norway and Denmark. The Hanseatic League is a wonderful example of the sudden development of successful legislative and executive ability among men of little or no culture, who till then had been excluded from every position of honor in the state.

91 Peasants could not claim exemption from arbitrary arrest or military servitude. They had no liberty to choose a residence, to learn a trade, to travel, to go to school, to marry, to keep property, to transact business, or to associate with others in any peaceable enterprise. Practically, they were but little better than slaves. Beaumanoir, a French jurist of the thirteenth century, defines the nature of their servitude in the plainest words. He says that:

> The third estate of man is that of such as are not free; and these are not all of one condition, for some are so subject to their lord, that he may take all they have, alive or dead, and imprison them whenever he pleases, being accountable to none but God; from others the lord can take nothing but the customary payments, though at their death all they have escheats to him.

92 The determination to keep the peasants enslaved was stronger than all enmities. During the insurrection of the *Jacquerie*, the English knights who accompanied King Edward III in his invasion of France made truce with the French nobles, and joined them in putting down this rebellion. Froissart, the chronicler of chivalry, admired this exhibition of magnanimity. For the sufferings of the peasants he has no sympathy.

93 "Villeins you have been, villeins you are, and shall be,"—said King Richard to the miserable peasantry of Essex, after the killing of Wat Tyler,—"not as before, but in a bondage much more bitter."

94 The ecclesiastical history of the thirteenth and fourteenth centuries, says Hallam, teems with sectaries and schismatics, various in their aberrations of opinion, but all concurring in detestation of the established church. The heresy which began during the twelfth century, or earlier, with the Manichees of Bulgaria, was made more and more formidable by the Albigenses of Languedoc,

by the Waldenses of France and Germany, by the Vaudois of the Alps, by the Lollards of the Netherlands and England, and afterward by the disciples of John Huss of Bohemia, until the faith of the mass of the people was uprooted from its foundation. In Germany, enthusiastic but mystical priests like Eckhardt, Tauler and Suso, keeping themselves within the pale of the church, weakened its rigid discipline by preaching against the arrogant prerogatives of the clergy, and by commanding a higher worship of the heart and life.

95 The British Museum contains a Bible in Flemish verse, known as the *Rym Bible*, written by Jacob von Maerlandt of Damne, near Bruges in Flanders. It is a manuscript of the fifteenth century, upon vellum, with ornamented capitals, and is one of many copies of a version of the Scriptures made in the year 1270.

> Except the Waldensian translation in the Provençal language, this version is, consequently, the most ancient in existence, in the vernacular, and must have preceded by a century the versions of Raoul de Presles, of John Trevisa or the Hermit of Hampole. . . . . The British Museum had another manuscript in prose, of parts of a Bible in Flemish, written in the fifteenth century. It is part of a translation made in the early part of the fourteenth century, and was the text used for the Bible printed in Delft in 1477. Sotheby, *Principia Typographica*, vol. III, p. 123.

The British Museum has, also, a manuscript in Flemish of five books of the Old Testament, made in the fourteenth century.

96 It is a noteworthy fact that the first complaint of an unauthorized reading of the Bible came from the city where the Bible was first printed. Pope Innocent III, alarmed at the consequences of this innovation, and writing at the beginning of the thirteenth century, says he had been informed by the bishop of Mentz that:

> No small multitude of laymen and women, having procured the translation of the Gospels, Epistles of St. Paul, the Psalter, Job and other books of Scripture to be made for them into French, meet in secret conventicles to hear them read and to preach to each other, and having been reprimanded for this by some of their parish priests, have withstood them, alleging reasons from the Scriptures why they should not be so forbidden. Some of them, too, deride the ignorance of their ministers, and maintain that their own books teach them more than they can learn from the pulpit, and that they can express it better. Although, Innocent proceeds, the desire of reading the Scriptures is rather praiseworthy than reprehensible, yet they are to be blamed for frequenting secret assemblies, for usurping the office of preaching, for deriding their own ministers, and for scorning the company of those who do not concur in their novelties. He presses the bishop and chapter to discover the author of this translation, which could not have been made without a knowledge of letters. He wished to know what were his intentions, and what degree of orthodoxy and respect for the holy see those who used it possessed. In another letter Innocent complains that some of the members of this association continued refractory, and refused to obey either the bishop or the pope. Hallam, *Middle Ages*.

97 At the beginning of the fifteenth century, paintings of the *Dance of Death* were in all the large cities of Europe. Woltmann has distinctly stated the causes which gave popularity to these horrible compositions.

> The misery and unhappiness which at this period more than any other visited

the nations of the West, increased more and more the ascetic views on the subject of death. The great aims and ideas of medieval life had passed away, and the ideas of the new period were now fast beginning to form themselves. . . . . Licentiousness prevailed in all lands; immoderate festivity and boundless excesses of sensuality gained more and more the upper hand. . . . . Upon this life of self-will and self-indulgence, of riot and revelry, the terrors of death burst all the more fearfully. In addition to the constant wars, the acts of violence and the shedding of blood which prevailed among men, we find the most various alarms in nature. Famine and desolating pestilences, and in the middle of the fourteenth century the Black Death, made their fearful and triumphal progress through Europe. To escape the dread and thought of this misery, men gave themselves up on the one side all the more passionately to the intoxication of the senses; but on the other they believed themselves struck by the vengeance of God, and sought for safety in contrition and repentance, which often led them into the most repulsive forms of ecstasy. But the most forcible sermons exhorting to repentance, the sermons that spoke to the people in the most intelligible form, were the figurative representations which proclaimed the almighty power of death. *Holbein and his Time* (Bunnèt's translation), p. 248.

98 *Tailleres ymagiers*, the words of the record, may be construed as engravers on wood, or as carvers of wooden statuettes; but the *tailleres* were, probably, engravers. The fraternity of St. Luke consisted chiefly of men who made or contributed to the making of books: an engraver would properly belong to the guild. The words *tailleres ymagiers* suggest engraving quite as clearly as *formschneider* does in German.

99 Laborde, a brilliant French writer on early printing, who traces the origin of printing to playing cards, acknowledges its very ignoble origin with evident mortification:—"What a mother for such a son!"

100 The history of literature, like that of Empire, is full of revolutions; our public libraries are cemeteries of departed reputation; the dust accumulating upon these untouched volumes speaks as forcibly as the grass that waves over the ruins of Babylon. Hallam, *Middle Ages*.

101 The University of Paris made no opposition to the free sale of paper. It was not subjected to taxes or duties in France, not even when oppressive taxes were levied on most manufactures. Didot, *Essai sur la typographie*, p. 730.

102 A school ordinance of Bautzen in Saxony, dated 1418, gives the names and prices of some of these books. For an *A B C* and *Pater Noster*, etc., 1 groschen; for a good *Donatus*, or child's grammar, 10 groschen; for a complete *Doctrinal*, 1 half-mark; for the *First Part*, 8 groschen. There has also been preserved the advertisement of one Dypold Lauber, a teacher and copyist of books at Hagenau in Germany, who lived during the middle of the fifteenth century, from which we may gather a clear notion of the books that were most salable among the people. His catalogue begins with the *Deeds of the Romans*, with illustrations. Then follow poetical works, romances of chivalry, biblical and legendary works, edifying books, religious books, books for the people, fortune-telling books, and other works of like character. Van der Linde, *Haarlem Legend of the Invention of Printing*, pp. 2, 3.

103 Bernard Quaritch, *Catalogue of Block-Books*, 8vo. October, 1873, pp. 1373–1375. The title of the book, as he gives it, is *Ein Vorrede das Puch haist wochenlich Andach zu Seligkayt der weltlichen Menschen*.

104 They were common during the first quarter of the fifteenth century. Bernard, *De l'origine de l'imprimerie*, vol. I, p. 102. Fournier, *De l'origine et des productions de l'imprimerie*, p. 176. Papillon, *Traité historique et pratique de la gravure sur bois*, vol. I, p. 101. Guichard, *Notice sur le Speculum*, p. 118. They have been noticed also by Passavant. It is plain that copyists everywhere recognized the utility of engraving.

105 The engraver or the printer of the book published it, as all other books of this kind were published, without a printed title. It has been described by different authors under these titles: *Types and Antitypes of the Old and the New Testament*; *The Histories and the Prophecies of the Old Testament*; *The Typical Harmony of the Bible*; *Typical Illustrations of the Old Testament, and Antitypical Illustrations of the New, or the Story of Jesus Christ as told by Engravers*. Chatto calls it the *Bible for Poor Preachers*, and claims that it was written especially for their use. He objects to the title, *Bible of the Poor*, as leading to the erroneous opinion that the book was bought by the poor of the laity, who, he says, were unable to read in their own language, much less in Latin. This observation is true, yet Chatto's addition to the old title is not really needed. He overlooks the fact that the charm of the book was in its pictures, which could be appreciated by the poor of the laity as well as by poor preachers. In this sense, it was truly the *Bible of the Poor*.

106 The British Museum has a French manuscript, entitled *Figures de la Bible*, in which the illustrations occupy nearly all the page, leaving room for little more than the text that describes the cuts. The same library has two copies in Latin verse of an abridgment of the Bible, in which the text occupies nearly all the page, while the illustrations are in miniature. These manuscripts of the fourteenth century are not *Bibles of the Poor*, but they show the fondness for books with biblical pictures.

107 1. An edition in Latin, of fifty pages, and supposed to have been engraved and printed by Melchior Wohlgemuth of Nuremberg, between the years 1450 and 1460. Only one copy of this book is known.
2. An edition in German, of forty pages, by Friedrich Walther and Hans Hürning, at Nordlingen, 1470.
3. An edition in German, attributed to Sporer, at Erfurth, in 1475.

108 Fifteen copies are known of the edition here specified as the first. Heineken, noticing little dissimilarities of design and engraving in many of these copies, says that they prove the existence of five distinct editions. For similar reasons, Sotheby says that there are six editions. The weight of authority favors the classification of these fifteen copies in one edition.

109 Jackson and Chatto, *Treatise on Wood Engraving*, pp. 78–80.

110 The Bible of the Poor has always been considered as one of the most valuable of block-books, but copies have been sold at widely varying prices, as may be seen in the annexed statement, compiled from Sotheby's *Principia Typographica*:

Willet copy, 1813	245 guineas.
Inglis copy, 1826	36*l.* 15*s.*
Willet copy, 1833	36*l.* 15*s.*
Lucca copy, 1848	89*l.* 5*s.*
Stevens copy, 1849	11*l.* 12*s.*
Sykes copy, 1824	18*l.* 17*s.* 6*d.*
Rendorp copy, 1825	17*l.* 8*s.* 6*d.*
Devonshire copy, 1815	210*l.*

111 Three typographic editions of the *Bible of the Poor* have been printed: —1. An edition by Albert Pfister, at Bamberg, in 1461. In this edition, the engravings are small and coarsely cut. 2. An edition by Anthoine Vérard, in Paris, about 1500. This edition is a close imitation, beautifully printed, of the first xylographic edition, with explanations in French on the back of the engraved pages and on supplementary leaves. 3. An edition of very different arrangement, having 118 small wood-cuts, printed by Giovanni Andrea Vavassore detto Vadagnino of Venice, between 1515 and 1520. Berjeau, *Biblia Pauperum*, p. 17.

112 The great prices paid for copies of the book seem to show that this is a very general belief. Sotheby has wisely put some of them on record in his *Principia Typographica.*

Gaignat copy	300 francs.
La Vallière copy	800 francs.
Crevenna copy	510 florins.
Wilks copy, 1847	74*l.*
Brienne-Laire copy	600 francs.
Lang copy, 1828	45*l.*
Verdussen copy	240 florins.
Corser copy, 1873 (Quaritch)	550*l.*
Inglis copy	47*l.* 5*s.*
British Museum copy, 1845	160*l.*
Quaritch's, 1873	200*l.*
Stowe copy, 1849	91*l.*

113 A section consists of two or more sheets folded together, so that one leaf will be within another, as sheets of folded letter paper are nested. If five quarter quires of letter paper were sewed together, and bound, the book so bound, in binders' phrase, would have five sections.

114 *Bibliotheca Spenceriana*, vol. I, p. 4, as quoted by Ottley, p. 99.

115 This book is sometimes described as *The History of the Virgin Mary, or The Prefiguration of the Virgin Mary from the Song of Songs*.

116 It is probable that the cowled farmers represent the lay brothers, then very numerous in nearly every thrifty monastery. The farmers, butchers, bakers, carpenters and useful mechanics were often permitted to wear the dress and share some of the privileges of the monks, on condition that they should do the servile work, and accept as a full reward the rich blessings of monastic prayers and masses.

117 These devices give us no certain clue to the engraver or printer of the book, but they are of value in assisting us to ascertain the purpose for which the book was made. There are no old manuscript copies of the book, but there are many evidences that it was designed and produced for the first time in the fifteenth century. It would seem that this pictorial version of the *Canticles* was designed, not so much to illustrate the prefiguration of the Virgin Mary, as the termination of a great schism which had divided the Catholic church between the years 1378 and 1449. [anc218] Christendom had been scandalized by the rule of two, and, for a short period, of three rival popes. It was believed that this schism in the church would have been closed by the action of the Council of Constance, which terminated in 1418; but this result was not accomplished until 1449, when Nicholas V became the only pope. The designer of the pictures has treated the return of Christendom to the rule of one pope as the reconciliation of Christ with the church. To give special significance to the subject, he has introduced the armorial shields of the magnates at the councils. It may be that the engravings were made in 1420, but it could be maintained with plausibility that they were made after the dissolution of the Council of Basle in 1448.

118 The full title of the book is, as given by Heineken, *The Story of the Blessed Virgin Mary, collected from the Evangelists and the Fathers, and Illustrated by Engravings*. Dibdin calls it, *The Defense of the Immaculate Conception of the Blessed Virgin Mary*.

119 The reading should be, *Mon cœur avez*,—you have my heart,—the word heart being represented not by letters, but by a drawing.

120 The following synopsis of the work is condensed from the translation of the text of the book, as given by Sotheby in his *Principia Typographica*, vol. II, pp. 38–45:

> Antichrist is born in Babylon. He yields himself to lust of women at Bethsaida. He is circumcised, and announces himself as the Messiah. He is instructed in magic and all sorts of evil. Elias and Enoch come down from Heaven and preach against him. Antichrist deceives the world by superior eloquence; he performs miracles; his apostles preach to the kings of Lybia and Ethiopia, and "the queen of the Amazons, and the Red Jews." All the kings of the world are converted to Antichrist; he condemns unbelievers to strange tortures; he kills Elias and Enoch. He repeats the history of the resurrection; he bids the whole world witness his ascent to Heaven from the Mount of Olives. The Almighty then gives the order—"Michael, strike him dead; I will no longer bear with the unjust." Antichrist is carried to Hell, where he is received by the Devil and his allies. Antichrist being dead, princes and people become Christians, and there is only one faith. But the people fear the Day of Judgment. These are some of the signs of the great and terrible day: The sea shall rise forty ells above the mountains; it shall then sink away and vanish. The sea shall burn. Trees and plants shall sweat blood. There will be earthquakes. Buildings and trees shall fall down in hopeless ruin. Stones shall fly up in the air. Wild beasts grow tame with fright, and run to men for help. The dead arise. Stars fall from Heaven. Heaven and earth are burnt up and chaos comes again. At this point the imagination of the designer was exhausted: he had done his best. The page following, which should have been filled with an illustration, is judiciously left blank. The last engraving is that of the resurrection of the blessed.

121 The central figure in the lower illustration, the meek and priestly

personage who, surrounded by gamboling devils, and with a monkey perched upon his back, walks with measured pace and uplifted eyes, is the Antichrist. This is the introduction to the explanatory text:

> Antichrist is instructed by adepts, who teach him to make gold, the art of magic, and all sorts of evil. And this takes place at the city named Corosaym. And this stands also written in the *Compendium Theologiæ*. And our Lord curses the said city in his gospel, and says thus: "Woe to thee, Corosaym!"
>
> Here, we see Antichrist goes from Capernaum to Jerusalem, and he there announces himself as holy. And hereof is also written in the book *Compendium Theologiæ*. And our Lord, in the gospel, also curses this city, and speaks thus concerning it: "Woe to thee, Capernaum!"

122 The Latin title is *Ars Memorandi, notabilis per figuras evangelistarum*.

123 The bibliographic title is *Ars Moriendi*, or, literally, The Art of Dying, but the work is more clearly described by the paraphrase *How to Die Becomingly*. It is also known as *The Temptations of Demons*.

124 John of Gamundia was a mathematician and professor of astronomy. At his death, in the year 1442, he was chancellor of the University of Vienna. The calendars made by him were highly esteemed, and were engraved and printed for many years after his death. In his researches after old prints, the late R. Z. Becker, of Gotha, discovered one of the original blocks of a placard or poster edition of the *Calendar of John of Gamundia*. He describes it as about 10 ¾ inches wide, 15 ¼ inches long and 1 ½ inches thick. The block was engraved on both sides.

125 Chatto says that the practice of distributing pictures or prints of a religious character at monasteries and shrines to those who visit them is not yet extinct in Europe.

> In Belgium it is still continued, and, I believe, also in France, Germany and Italy. The figures, however, are not generally impressions from wood blocks, but are, for the most part, wholly executed by means of stencils. One of the latter class, representing the shrine of *Notre Dame de Hal*, colored in the most wretched taste with brick-dust red and shining green, is now lying before me. It was given to a gentleman who visited Halle, near Brussels, in 1829. It is nearly of the same size as many of the old devotional wood-cuts of Germany, being about four inches high by two and three-quarters wide. *Treatise on Wood Engraving*, pp. 57, 58.

126 The Brotherhood of the Life-in-Common may, perhaps, be regarded as an exception. Madden in his *Lettres d'un bibliographe* has shown that this fraternity were much interested in the production of books, and that they had a printing office in a monastery at Cologne; but he has not yet made it appear that they did the manual labor.

127 Southey says that, at the beginning of the sixteenth century, many educated men complained that the reputation of learning, its privileges and rewards, were lowered when it was thrown open to all men. It was seriously proposed in Italy to prohibit the publication of any book costing less than three soldi.

The amusing insolence manifested by authors, scholars and readers toward the early development of literature in any new field, or by a new method, is a subject that could be amply illustrated. The city of New-York furnishes a comparatively recent example in the field of journalism. The daily newspapers of 1835, which

were then sold for six cents each, refused to recognize the rightful existence of the new daily then sold for one cent. So strong a prejudice was created against "the penny paper," that many timid men were afraid to be seen with the despised sheet in their hands: the six-penny papers were respectable, and the penny paper was vulgar. The same contemptuousness was manifested when duodecimos supplanted the folios and quartos—when books bound in cloth took the place of books bound in leather. The despised forms of printing have had their revenge. The rod of Aaron has swallowed its rivals.

128 The full title of the book is *Donatus de octibus partibus orationis*, or Donatus on the Eight Parts of Speech. It is sometimes designated as *Donatus pro puerilis*, or the Donatus for Little Boys.

129 This extract is from the chapter entitled, "When, where, and by whom was found out the unspeakably useful art of printing books?" It contains statements of value, which will be quoted at greater length on an advanced page.

130 There can be no doubt whatever about the genuineness of these blocks. They were bought in Germany, about two hundred years ago, by Foucault, the minister of Louis XIV of France.

131 Van der Linde says that the *Donatus* and *Abecedarium*, a religious primer hereafter to be noticed, are used in all the religious schools of Italy to this day.

> I look with melancholy respect at an *Abecedarium*, a little octavo of four leaves, *Il Sillabario*, printed in our time in 1862, at Asti. Beneath the heading, Jesus Maria, the Alphabet follows, and after that the *Pater noster*, *Ave*, and *Credo*. Beside the *Sillabario*, I have a little grammar entitled *Donato ad uso delle scuolle secondarie. Nuova editione accresciuta e riformata.* Pinerola, &c., 1865. . . . The esteem in which these Catholic school-books, those foul springs from which, for instance, Erasmus drew the first elements of Latin, were held, was so great that the first efforts of the humanists to improve them were regarded as heresy, and heaven and earth were moved against such dangerous destroyers. . . . Donatuses were printed in every place where schools were established, and where the art of printing was introduced. *The Haarlem Legend*, p. 3.

132 Sometimes described under the title of *Speculum Humanæ Salvationis*.

133 Jackson and Chatto, *Treatise on Wood Engraving*, p. 83.

The book was written for the instruction of the traveling mendicant friars who had, since the thirteenth century, gradually monopolized preaching and the pastoral work of the settled clergy. Provided with nothing but a little Church Latin, and therefore too ignorant to derive their discourses from original sources, they felt the want of homiletic and catechetical assistance as an aid to their understanding and memory. Picture books, with a brief explanatory text, were the best means of supplying this want. Hence originated representations of the mystic relation between the Old and the New Testament, of which the *Biblia Pauperum* is the first fruit. Van der Linde, *Haarlem Legend*, p. 3.

134 There is an edition, with a text in Latin and in German, which was printed at Augsburg in 1471; there are many editions in German only, some without dates, and others with dates of 1476, 1492, and 1500; a Flemish edition by Veldener in 1483; and various editions in French.

135 There are two copies of the book which exhibit the blemish of a leaf

made up of two distinct pieces of paper, each piece printed by a different impression, but so pasted together as to constitute one perfect page. We do not certainly know the cause that made this patchwork necessary, but it would seem that a gross blunder had been made in the printing-office; perhaps a transposition of lines by the compositor, or illegible presswork by the pressman. It was necessary that the sheet containing the error should be canceled and replaced. But the frugal printer refused to destroy the entire page for an error confined to but half a page. He tore off the lower half of the leaf, and replaced it by attaching a piece of white paper to the bottom of the upper half, which contained the engraving in brown ink. On this pasted piece of white paper, he took a corrected or perfect impression from the types. In this copy, the impression, which deeply indented the paper in the double thickness where it was pasted, proves that the types were printed after the engravings. There is another copy in which the illustration on the upper half of the sheet was canceled, and replaced by the same method.

136 Ottley, selecting one letter for examination from a great number of letters of the same kind, found that it was always the same where-ever it occurred, not only in the first, but in the second edition. Koning and Enchedé, pursuing a badly cast or defective letter, found that the peculiar blemishes of this letter re-appeared in other letters on many pages. This precision of form is the peculiarity of typography: it proves that the letters of unvarying uniformity could not have been made by any engraver on wood, but must have been produced by a mould.

137 The Latin and Dutch editions of the *Speculum* maintain such a remarkable conformity with each other in the engravings, in the types, in the quality of the paper, in the presswork, and in every typographic feature, that it is evident that the four editions were published in the same country and by the same printer. As all bibliographers, whatever theory they may have concerning the origin of printing, attribute, without hesitation, the Dutch edition of the *Speculum* to Holland, the Latin editions should also be attributed to Holland. Guichard, *Notice sur le Speculum*, pp. 118 and 119. This is the opinion of all bibliographers except Heineken.

138 The fac-simile given by Holtrop in his *Monuments typographiques* presents the following measurements, in American inches: In the Latin edition, described in this book as the first, 25 lines measure 5 ½ inches. In the Dutch edition, here described as the third, 27 lines measure 5 ½ inches. In the Dutch edition, here described as the fourth, 26 lines measure 5 ½ inches. As we find no indication of the use of leads or thin blanks to increase the distance between lines, it would seem that the types of the three editions were cast in different moulds. Sotheby's fac-similes, which seem to have been made with equal care, do not exactly agree with those taken from Holtrop's book. There are, no doubt, differences of size, not only in the fac-similes, but in the original copies of the book. Allowance must be also made for the unequal shrinkage on different leaves of the very thick paper, which may have been unequally dampened, and unequally extended before printing.

139 When a new engraving on wood, in imitation of an old one, is desired, the modern engraver does not redraw, but transfers the subject, substantially by the following process: The back of the print to be copied is moistened with a solution of alkali, or of benzine, which, soaking through the paper, forms a new combination with the oil in the ink. The black of the ink is thereby liberated, so that it can be completely removed by firm pressure. The print so treated is then

laid, face downward, on the block, and the free black is transferred to the block by the pressure of a burnisher, or of a press. The black re-appears on the block, but in a properly reversed position, ready for the tool of the engraver.

140 The neglect of engraving on wood by the early typographers has frequently been noticed as a strange fact. It was, no doubt, induced by the difficulties encountered in trying to print wood-cuts with types. The blocks would warp and crack in spite of all precautions. The evil was but partially checked by diminishing the size of the blocks. To evade the annoyance produced by warped blocks, some printers engraved large illustrations on separate pieces of wood, which were roughly fitted to each other, but not conjoined. Other printers printed the wood-cuts of their books by a separate impression. As these illustrations were printed in the same black ink which was used for the text, the double impression is rarely ever noticed, not even by the practical printer.

141 The Dutch folio of Jan de Mandeville, placed by Holtrop about 1470, as a work of printing, is so bad that the earliest editions of the *Speculum* are masterpieces by the side of it. The work of an unknown Schiedam printer of the latter part of the fifteenth century is equally bad. The Brussels incunabula of the Brotherhood of the Life-in-Common are bad; those of Arnold ter Hoorne at Cologne (1471–83) are sometimes barbarous. Heineken mentions a book printed in Augsburg in 1557, and says: "If the name of the engraver on wood and the date had not been found, one might think that this was the oldest book in the world." In the series of the different Dutch incunabula of this kind, the *Speculum* presents itself very favorably; it is not badly, but well printed; it is not a first experiment, but the fruit of practice. Dr. Van der Linde, *Haarlem Legend of the Invention of Printing*, p. 37.

142 The frisket of the modern hand-press is a light frame-work of iron, which is covered like a kite, with a sheet of paper pasted to the edges. Just before the act of impression, this frisket is placed between the form of inked types and the sheet of paper prepared to receive the impression. The office of the frisket is to prevent the sheet from being blackened by anything but the face of the types. For this purpose, every part of the page to be printed is neatly cut out of the paper mask pasted on the frisket. Every part of the sheet that should remain unprinted is masked or covered by the uncut paper of the frisket. When the impression is taken, the sheet receives only the impression from the type, and is unsoiled by the ink that accumulates about the types and their fixtures.

143 Veldener, who was a German, and, probably, a pupil of Ulric Zell of Cologne, began to print at Louvain in 1473. Like many printers of the Netherlands, he moved his printing office from place to place. He printed at Louvain in 1473; at Utrecht in 1478; at Culemburg in 1483. The last book bearing his imprint is dated 1484.

144 For a fac-simile (from Holtrop) of this face of type see page 277.

145 A fuller notice of Cornelis the binder will be given in the chapter on the Legend of Coster, in which his relations to early printing will be described. Attention may be called to the significance of the fact that no fragments of any book in the types of the *Speculum* have been found in the covers or binding of any manuscript book of earlier date than 1467.

146 This work was in use as late as the reign of Charles V. It was enjoined by him that a printer should furnish without alteration "the little book commencing with the alphabet, the little book which directs how to bless the table

(grace at meals), and the little book which directs how to answer at the holy mass." Van der Linde, *Haarlem Legend*, p. 2.

147 Hessels does not describe this as Type VIII, but as the *Type of the Enschedé Abecedarium*. He thought it "advisable to separate these two little works [the *Donatus* and the *Abecedarium*, which are printed in this face], to a certain extent, from the others" but he admits that the types of these books bear the family likeness and cannot be omitted.

148 Berjeau, who accepts this *Abecedarium* as one of the first products of the invention, says that impositions of eight pages seem more complex than they really are—that the printer had but to fold a sheet, to mark the pages and then unfold the sheet, to see the method at a glance. This reasoning is specious, but it is inconclusive. It was the argument of the courtiers with Columbus after he had stood the egg on its end. Anybody can do it. Simple as the process may seem, the imposition of eight pages of type in one form was not done by any of the early printers, and we have to infer that they did not know how to do it.

149 Caxton, who printed thousands of pages in folio, made use of but eight fonts. Blades, *Life and Typography of Caxton*, vol. II, p. xxvii. Gutenberg, who practised printing for thirty years, did his work with not more than six fonts of type. Schœffer, who was a printer and publisher for forty-three years, made use of but six fonts.

150 Leon De la Borde, *Debut de l'imprimerie à Strasbourg*, pp. 70, 72.

151 Leads are very thin pieces of metal which are inserted between the lines of types to increase the distance between the lines, and to give the printed page a more open and inviting appearance.

152 This apparently easy method of demonstrating the practicability of types of wood has been attempted by many writers. Wetter, the author of a valuable history of printing, published in his book a page printed from types of wood, which he offered as conclusive evidence that types of wood could have been made and were made by the early printers. But his types of wood are larger than those of the *Speculum*, and they are also provided with leads to keep them in line. Notwithstanding these precautions, they are more out of line than the types of the *Speculum*. Meerman, in his *Origines Typographicæ*, printed a few words from types of wood with a similar result; but he showed a practical disbelief in his own theory, by engraving all the fac-similes of the alleged types of wood upon plates of copper. The substitution of copper for wood was, virtually, an acknowledgment of the impracticability of wood types. Schinkel, a Dutch printer, was more successful than either Meerman or Wetter in obtaining a good impression from small types of wood, but he subsequently admitted that his success was but a trick, and that it did not prove that they could be used in the ordinary practice of printing. Léon De la Borde afterward conceded that types of wood would be impracticable.

153 The impracticability of types of wood is cleverly stated by Enschedé:

> "I have exercised printing for about fifty years, and I have cut letters and figures for my father's and my own printing office in wood of palm, pear, and medlar trees; I have now been a type-founder for upwards of thirty years; but to do such things as those learned gentlemen [Junius and Meerman] pretend that Laurens Coster and his heirs have done, neither I nor Papillon [the most clever wood-engraver of France] are able to understand, nor the artists Albrecht Durer, De Gray, and Iz. Van der Vinne either; but such learned men who dream about

wooden movable letters make Laurens Janzoon Coster use witchcraft, for the hands of men are not able to do it. To print a book with capitals of the size of a thumb, as on placards, *House and Ground*, which are cut in wood, and which I have cut myself by hundreds, would be ridiculous; to do it with wooden letters of the size of a pin's head is impossible. I have made experiments with a few of a somewhat larger size. I made a wooden slip of Text Corpus [a body about the size of Long-primer], and drew the letters on the wood or slip; thereupon I cut the letters. I had left a space of about the size of a saw between each letter on purpose, and I had no want of fine and good tools; the only question now was to saw the letters mathematically square off the slip. I used a very fine little saw, made of a very thin spring of English steel, so cleverly made that I doubt whether our Laurens Janszoon had a saw half as good; I did all I could to saw the letters straight and parallel, but it was impossible; there was not a single letter which could stand the test of being mathematically square. What now to do? It was impossible to polish or file them. I tried it, but it could not be done by our type-founder's whetstones, as it would have injured the letters. In short, I saw no chance, and I feel sure that no engraver is able to cut separate letters in wood, in such a manner that they retain their quadrature, for that is the most important part of the work of type-casting. If, however, I wished to give my trouble and time to it, I should be able to execute the three words, *Spiegel onzer Behoudinis*, better than the Rotterdam artist has done in the Latin works of M. Meerman; but it is impossible, ridiculous, and merely chimerical, to print books in this manner." Van der Linde, *Haarlem Legend*, pp. 72, 73.

154 This taste for variety in the shape of letters was more clearly exhibited in Greek and German than in Roman types. The Greek types of the sixteenth century are so full of ligatures and variants, that they are undecipherable to the scholar who has been taught the language only in modern text books. So far from trying to make letters readable, the literati of that period tried to make them obscure: they were evidently determined not to make the acquisition of the language easy for their successors. When Francis I of France established the royal printing office, he engaged a skillful Greek penman to design additional varieties of contractions. Two centuries afterward, Pierre Fournier, the younger, a type-founder of Paris, commended the Greek types of his own manufacture as much less complicated than any Greek types then in use. But I count 776 characters in the font. More than 300 of Fournier's contractions, once esteemed as admirable graces, have been rejected by modern type-founders. Blades, who has made a careful analysis of the characters used by Caxton, shows that in the face described by him as 1 there are at least 167 distinct characters. But 24 of these are capitals and 81 are double letters. In faces 2 and 2* there are 380 [anc299] characters, exclusive of figures, spaces and marks of punctuation.

155 Blades, in his *Life and Typography of William Caxton*, has given a practical illustration of these changes in Plate IX B, which also illustrates the feasibility of types of pure lead, for a notice of which see next page.

156 The most approved process in the modern art of stereotyping is that in which the mould is made of calcined gypsum or plaster. The same material is used by type-founders in the manufacture of the largest types of metal. The cheapness of sand, and the ease with which it can be worked, make it the most serviceable of materials for all founders who wish to produce cheap castings.

157 To satisfy his own doubts as to the feasibility of casting small types in moulds of sand, Bernard, of Paris, gave to a brass-founder the types of a few

Roman capital letters as the models from which he requested founded duplicates. He charged the founder not to dress nor finish the face of the founded letters, nor to give them more than ordinary care. The founded letters so made were printed by Bernard in his history as practical illustrations of the feasibility of sand moulds. They lack the finish of types made by the professional type-founder; they look like badly worn types, but they are legible. The brass-founder assured Bernard that a workman could make one thousand similar types in one working day. Bernard then gave to this founder separate types of a word in Gothic letters and requested him to furnish duplicates of these types founded on one body. The duplicates returned showed the very defects of the types of the *Speculum*; the thick lines were spotted, and the letters were out of line. Bernard's impression shows that the movable types which made the word were jostled or trivially disturbed at the instant of moulding. A disturbance of this nature would explain the irregularity of line and the rounding of the edges. The spotted and ragged edges of the founded word were probably caused by the roughness of the moulding sand, or by the sticking fast to the mould of bits of metal. It is a proper inference that in both cases the defects were the imperfections of the same process. The experiment of Bernard fully proved the feasibility of making small types in sand moulds.

158 In the sand mould, the hot metal is poured in; in the metal mould, whether worked by hand or machine, the hot metal is forced or cast in. The phrase "casting type," which implies a sudden throw or violent jerk, has entirely supplanted the older phrase of "founding type."

159 Didot, *Essai sur la typographie*, p. 607.

160 The process seems impracticable, but whoever carefully studies the British and American patent reports, will find specifications of inventions in typography that are much more absurd. There can be no doubt of their use. Koning cites one M. Fleischman, who had not only seen conjoined matrices in the type-foundry of C. Hardwich, of Nuremberg, but had experimentally cast types from them in an old mould that appears to have been made for this express purpose. Speckelinus, Paul Pater, Meerman, Schoepflin, Spiegel, and other early chroniclers, have specifically mentioned types pierced with a hole, and bound together with wire. These so-called types were either punches or matrices. Koning, *l'Origine, etc., de l'imprimerie*, p. 12.

161 Benjamin Franklin, in his autobiography, has given a curious description of his attempt to supply his defective printing office with types cast in matrices of lead:

> "Our printing house often wanted sorts, and there was no letter-foundry in America; I had seen types cast at James's in London, but without much attention to the matter; however, *I contrived a mould*, and made use of the letters we had as puncheons, *struck the matrices in lead*, and thus supplied in a pretty tolerable way all deficiencies. I also engraved several things on occasion; made the ink; I was warehouse-man, and, in short, quite a factotum."

162 *Dissertation sur l'origine, l'invention, etc., de l'imprimerie*, p. 18.

163 It has been shown that book types must be on square bodies. As a necessary consequence every form of types must be squared. If the lines of types in any page are not of uniform length in the metal, and the page is not truly squared, the form cannot be handled nor printed. But although the lines are of uniform length in the metal, they do not always appear so in print. The last line of a paragraph is frequently short; lines of poetry are always of an irregular length.

To make the form square, and yet produce this desired irregularity at the end of every short line, the compositor inserts metal blanks, technically known as quadrats. As these blanks are about one-third shorter than the letters, they are not touched by the inking roller; they receive no ink and take no impression, and are consequently invisible to the reader. Quadrats are now regarded as an indispensable part of every font of types, but the appearance of the *Speculum* shows that the printer of the book had to do his work without them. That he knew the utility of quadrats is apparent, for he used low types as spaces between words. His imperfect press compelled him to reject quadrats at the end of short lines, and to fill the blanks with bearers.

164 To protect types in places similarly exposed, stereotypers insert at the extreme ends of short lines types of flat face expressly designed for this object, which are usually known as guards. When the plates have been made perfect in other points, the guards are no longer needed, and are cut away. When books were printed on hand presses during the first half of this century, pressmen sometimes pasted on or tacked on thin strips of wood around the forms of types to shield the ends of lines from injury. It is a strange surprise to encounter this modern method of protecting types from injury in one of the earliest books.

165 A paper-mark is an opaque design on the web of the paper, placed there to enable the buyer to identify a particular manufacture. It is made by bending the wires on which the moist pulp is couched in some peculiar shape which leaves its impression on the paper when it is perfected. Certain sizes of paper are even now known by the names of marks that are no longer used. Foolscap once bore the mark of a fool's head with cap and bells; Post once had the mark of a post-boy's horn. Paper-marks are now made chiefly for the finer qualities of writing papers. The illustrations of old paper-marks, on the following pages, were taken from Koning, and are about one-eighth of the original size.

166 Water-marks have much less weight in bibliography than some writers have attributed to them. In very few instances can a prime limit be fixed for their use; and, as the marks might be repeated, and the paper itself kept for any length of time, and imported to any place, they cannot be used as evidence either of the date when, or place where, they passed through the press. Blades, *William Caxton*, vol. II, p. XVIII.—The results of the examination of the paper-marks are, for the present, mostly negative. Van der Linde, *Haarlem Legend*, p. 86.

167 Hessels, *Haarlem Legend*, p. xvii.

168 *Haarlem Legend*, p. 35.

169 Bernard, *De l'origine et des débuts de l'imprimerie*, vol. I, pp. 97 and 98.

170 Bernard, *De l'origine et des débuts de l'imprimerie*, vol. I. p. 98.

171 The phrase could be applied to the forms of the letters in the books, without regard to the quality or any peculiarity of the printing or the binding. Two forms of writing were then in use: one, a black angular, and somewhat condensed form of Gothic character, which is defined in Fournier's *Manuel typographique* as *lettres de forme*, or letters of precision; the other, a round, light-faced, more careless and more popular form of letters, named by him as *lettres de somme*. To this day, carefully written but disconnected letters, whether upright or inclined, are colloquially known as *print* letters. The doctrinal which was put in form may have been written in *lettres de forme*. The phrase *getté en molle* could have been fairly applied to these precise letters, in contradistinction to the more careless shapes of

the *lettres de somme*.

172 Leon de Bubure, in a paper published in the *Bulletins de l'académie royale de Belgique*, 2d series, vol. VIII, No. 11, shows that printing was practised at Antwerp as early as 1417. He submits an extract from the records of the city in which it appears that one Jan the printer publicly acknowledged, August 5th, 1417, that he was indebted to William Tserneels, manufacturer of parchment, in the sum of 2 pounds 12 shillings 4 pence, for which he bound himself and his chattels. It seems that this Jan the printer received a very liberal credit, for there are other acknowledgments of obligations for larger amounts, all incurred in 1417. After this date his name does not again appear on the record.

173 Van der Meersch, *Imprimeurs Belges et Neèrlandais*, vol. I, p. 92.

174 Some of the evidences that have been adduced to prove the priority of typographic printing in the Netherlands are really ludicrous. In 1777, Desroches, a member of the Academy of Brussels, published a pamphlet, in which he undertook to prove that the art of printing books was practised in Flanders in the beginning of the fourteenth century. His authority was an old rhymed chronicle of Brabant, written by Nicholas, clerk of the city of Antwerp. In that part of the chronicle which narrated events before 1313, it is stated of one Ludwig, that "He was one of the first who discovered the method of Stamping which is in use to this day." Desroches construed the word *Stampien* as printing. But the context shows that this Ludwig was a fiddler, and that he had invented nothing more than a method of beating time by stamping with the foot. In other examples which might be adduced, it is plain that the word translated as printing does not mean printing with ink. This word has been made to serve in notices of embossing, stamping, stenciling and moulding.

175 Hessel's translation, as given in *The Haarlem Legend* of Van der Linde, p. 8.

176 Van der Linde takes exception to this part of the chronicle. He says that Zell's knowledge of geography was confused, and that he wrote Holland where he should have written the Netherlands. His reasons for suggesting this correction are, that the manufacture of block-books and the prints of images, and the cultivation of literature and of literary arts, during the first half of the fifteenth century, were in their most flourishing condition in the cities of Bruges, Antwerp, Brussels and Louvain, all of the Southern Netherlands, while they were comparatively neglected in Haarlem, Leyden, Delft and Utrecht, of the Northern Netherlands. At that period Holland had not taken its place as the foremost state of Europe, in its championship of liberty and civilization.

177 Van der Linde, *Haarlem Legend*, p. 66.

178 Behold what favor is due to the writing! Compare work with work and examine copy with copy [i. e. notice the uniformity of the letters]. Consider how clearly, how neatly, how handsomely, John Brito, a citizen of Bruges, prints these works, having discovered a very wonderful art, nobody having instructed him, and the very astonishing implements also, not less praiseworthy.

179 Van Praet says that the word *imprimit*, or printed, was frequently used by the scribes and copyists of that period as the equivalent of *scripsit*, or wrote. It was also used to describe painting by stencils. *Notice sur Colard Mansion*, p. 11.

180 The same face of types was used by Machlinia of London. It would seem that Veldener was not only working as a printer, but that, even at this date, he was doing business, to some extent, as a manufacturer of types for the trade.

181 The date usually assigned for the introduction of printing in Cologne is 1466, but some authors suppose, and Hessels and Madden say it is probable, that Ulric Zell began to print there as early as 1462.

182 We have in this country two remarkable illustrations of attempts to make types by men who had no experience in type-founding. Benjamin Franklin's experiment is mentioned in the note on page 303. In 1794, Wing and White of Hartford, men entirely ignorant of type-founding, undertook to make type, never having seen a type-mould.

183 Hessel's translation as given in the *Haarlem Legend*, p. 50.

184 The comments of a modern critic on the strange omissions of this positive statement are to the point:

> "This forgetfulness of Coornhert has always seemed to me one of the most striking peculiarities of the Haarlem legend. How can it be! Here is a man, very learned, very patriotic, who appreciates the importance of the discovery, who contends with zeal to establish for his country the honor of being the cradle of the greatest of modern inventions. He knows the name, the family name and the family of the inventor, and he does not divulge them to his fellow-citizens! This surpasses belief. And what shall we say of the burgomaster Van Zuren? He writes a special treatise to retrieve the glory of the invention to the honor of the city of which he is a magistrate, but it never occurs to him that he should honor the memory of the inventor—I will not say by a monument of some kind, for that might be demanding altogether too much—but at least by a mention, by some souvenir, by giving his name to some street, or still less, by a simple record in a book. It is not possible to find another example of a forgetfulness so incredible." C. Ruelens, *Bibliophile Belge*, vol. III, 1868.

185 Ottley's translation as quoted in Johnson's *Typographia*, vol. I, 12.

186 An attempted play or pun on the Latin *faustus*, happy. But the German printer's name was not Faust, but Fust. This pun was the origin of the error.

187 In Junius's description of the thief, there is a strange confusion of singular and plural. Beginning with the specification of one John as the thief, the story ends with an intimation that there were two thieves. This substitution of *they* for *he* is not a typographical error, nor is it a slip of the pen. It seems to have been intended to sustain the insinuation of the complicity of Fust in this theft.

188 The full title of the book from which this translation was made is *Hadriani Ivnii Hornani, Medici Batavia. In qua præter gentis & insulæ antiquitatem, originem, decora, mores, aliaque, ad eam historiam pertinantia, declaratur quæ fuerit vetus Batavia. Ex. offic. Plantiniana,* 1588, 4to. Hadrianus Junius was born at Hoorn, in the year 1511. His education, as a boy, was received at a grammar school in Haarlem; as a young man at the university of Louvain. In 1537, with one Martin Costerus, he made a tour in foreign countries. In 1540 he obtained from the university of Bologna the degree of doctor of medicine. Two years afterward he was living in Paris. In 1543 he went to England, and for six years succeeding, he was employed as physician to the duke of Norfolk. Soon after the death of the duke, he published in London a Greek lexicon, which enhanced his reputation as a scholar, but did not mend his fortunes. In 1559 he returned to Haarlem, where he married a lady of wealth. Three years after his marriage he accepted the appointment of tutor to the crown prince of Denmark, but finding finding that the position or the climate was disagreeable, he resigned the office. In 1563 he was appointed town physician, and rector of the Latin

grammar school at Haarlem, which appointments he held until 1569. About this period he wrote *Nomenclator*, a lexicon in eight languages, and *Batavia*, a description of Holland. At various times he was formally invited to enter the service of the kings of Hungary, Poland and Denmark. William of Orange sent front Delft for his services as a physican: at a meeting of the deputies from the States, he nominated Junius as the historian of Holland. In 1574 he was made town physican at Middleburg, with a liberal salary and a free living. When Haarlem was captured in 1573 by the Spaniards, the library of Junius was plundered, and many of his manuscripts were destroyed. He took this calamity greatly to heart, and died at Arnemuiden in 1575. Justus Lipsius said he was the most learned Netherlander after Erasmus.

189 The publication of *Batavia*, the work upon which the fame of Junius rests, seems to have been suggested to William of Orange by Junius himself, who expected to receive from the States a salary for his services as historian. In 1565, the question of salary, first named at 200 pounds of 40 groots, was put to vote. The prudence of the Dutch character is shown in the deliberations of the deputies. Haarlem, Delft, Leyden, and Gouda assented; Dordrecht and Amsterdam requested time for its consideration. Dordrecht afterward consented, but on condition that the money should be paid out of the taxes; that Junius should publish a volume every year; and that he should publish nothing without the approval of the States. In the meantime other States receded from their action, saying that the publication was ill-timed during a period of general distress. After some influences had been used, the States gave a grudging and qualified assent. In 1570, Junius petitioned for the payment of 200 guilders, as he had then finished the first book of the history. The petition was not favorably received, and its consideration was postponed for one year, at which time it was finally decided by the deputies to pay Junius 300 guilders, to prohibit him from publishing the first volume of the book with a dedication to the States, and to release him from all obligation to continue the work. This disparaging treatment of the author prevented the publication of the book with the completeness and at the time Junius had proposed. After his death the manuscripts of *Batavia* were collected and transcribed by his son Peter, who, with Peter Douza, undertook the publication. The book was published during 1588, from the office of Christopher Plantin, at Antwerp. The selection of a printer in a neighboring city shows that there was then no competent printer at Haarlem. It is another evidence of the indifference of the people of Haarlem toward typography.

190 He relates not as a legend, but as veritable history, that the virgin Soter, who possessed but three pennies, gave them for the building of a church in Dordrecht. Other three pennies were miraculously and regularly found in her purse, and were as regularly bestowed, until the church was built. He repeats, with simplicity, the story of the eleven thousand virgins of Cologne, who came from England to the now unknown port of Verona in Holland. He says that a certain stone in a church in Leyden was once a loaf of bread, and that the transubstantiation was made by a curse. He formally records the delivery by one Margaret, countess of Hennenberg, of 365 babies—a miracle, writes Van der Linde, “that makes you think of an upset pot of shrimps.” Junius adds that this would be a miracle beyond belief, if it had not been attested by the authority of public monuments . . . . but he accepts the common belief. These examples of the credulousness of the author of *Batavia* warn us not to accept his criticisms on other traditions. Junius begins his description of printing at Haarlem with a

solemn declaration of his intention to tell the truth. The declaration of candor is not needed: what the reader of *Batavia* does need is, not the protestation of the intention of the author to tell the truth, but some convincing evidence of his ability to distinguish the true from the false. His preface is long, pedantic, and in every way irrelevant, as may be inferred from a glance at the following classical names which he has sprinkled in the first paragraph: Carneades, the Daughter of Time, Democritus, Phœnicians and Egyptians, Cadmus, Athenians, Greeks and Thebans, Cecrops, Philostratus, Linus, Tacitus, Palamedes, Hyginus, Carmenta, Evander, Crassus, Scævola and Plutarch!

191 In the year 1630, Adrien Rooman, of Haarlem, published a print which contained the engraved representation of a printing office, to which he put the words—"Invented at Haarlem about 1430;"—but "The magistrates and citizens of Haarlem, in everlasting remembrance of the event and the man," erected a monument in front of the Coster house, with an inscription on it, which fixed the date at 1440.

192 Lambinet caustically observes that the romance of Junius obeys the dramatic law of unity, in time, place, and hero; the typographic art is invented complete in one day. The vague language of Junius has been used as a proper warrant for a very liberal construction of the date. When Van Lennep objected, in 1823, to the chimerical year of the invention, 1423, fixed upon by a Haarlem committee, the synod enjoined him: "If he will again carefully read the account of Junius, and not forsake, out of his prejudice, all common sense, he will plainly see himself, and be obliged to acknowledge, that Junius said not a single word about the time of the invention." Van der Linde, *The Haarlem Legend*, p. 68.

193 There has been much dispute concerning the functions of this keeper. Junius says that this Lourens Janszoon was the keeper of a church; that this keepership was an honorary office which belonged to Coster's family by hereditary right. The duties of the office seem to have been those of a church trustee. Some writers say that this custos was nothing more than a sexton, but it is of no moment whether custos means sexton or trustee. The care with which Junius introduces evidences of the respectability of Coster's house and the dignity of his family implies his fear that there might be, on the part of a heedless reader, some doubt concerning the social position of a custos. Nothing is said of the ancestors of Coster. Probably, there was reason for this omission. Coster's distinction in Haarlem was not that of patrician blood. His wealth was not, so far as we can learn, derived from any inheritance, nor could it have been acquired through the emoluments of a custos, which was an honorary but not a lucrative office. He had been engaged in some occupation which Junius considered derogatory to his dignity. Of this occupation we shall hear more hereafter.

194 The assurances of his wealth, leisure and respectability seem to have been provoked by the published statements, with which Junius was familiar, that Gutenberg, the rival German inventor, was of noble birth. It is not the only instance in which the Dutch legend is the echo of the German history. The first coincidence is that Coster, like Fust, was indebted to his son-in-law for valuable assistance in perfecting typography. And both sons-in-law were named Peter.

195 If Junius had not said that Coster changed the characters of wood for letters of lead and of tin, and that the false workman was expert in composing letters and in founding types, there might be some doubt whether these characters of wood were made disconnected or conjoined. His language is obscure, for he has used the words form and character as the equivalent of type, where these

words could be applied with equal propriety to a letter engraved on a block. This obscurity was not caused by the poverty of the Latin language, for he afterward described types with clearness. There was obviously some confusion in the mind of Junius. It is not certain that he clearly understood the broad difference between typography and xylography; it is certain that he intended to convey the idea that Coster was the inventor of printing in its broadest sense—the inventor of printing from blocks as well as from movable types. The absurdity of this broad claim must be obvious to all who have read about early image prints and playing cards and the printed fabrics of Italy and Sicily.

196 The wine-flagons of Thomaszoon may have had some features which carried conviction to the observer of the seventeenth century, but the modern reader of the story will fail to see that they should have been made of worn-out types. But the tin wine-flagons and the noticeable house on the market-place are not to be despised. Useless as proofs of the credibility of the legend of Junius, they illustrate to some extent the pedigree of the Coster family, a pedigree with which Junius was well acquainted, but for which he could find no place in his legend. These wine-flagons were the pewter pots of a tavern about a century old.

197 There were many Johns among the early printers of Mentz: John Fust, John Gutenberg, John Petersheim, John Meydenbach. When it was thought proper to acquit Fust of this accusation, John Gutenberg was selected as the man; but the discovery of records which proved that Gutenberg was making experiments in typography at Strasburg during the year 1436, compelled the withdrawal also of this accusation. Meerman, with a skill in casuistry equal to the occasion, then undertook to prove that there were two Gutenbergs—brothers, but with different surnames—Johan Gensfleisch, the elder, and Johan Gutenberg, the younger; and that it was the elder brother who betrayed Coster and revealed the secret to John Gutenberg. It was a weak artifice. German historians have fully proved that Gutenberg's brother Frielo had nothing to do with typography; that John Gensfleisch, the elder, was an uncle, not a brother,—old, rich and blind—of all men, most incapable of any attempt at the purloining or practising of an intricate art like printing. There is no evidence to inculpate Petersheim or Meydenbach.

198 The story of theft is not only improbable, but it is unsupported by external evidence. Jacobus Koning, a diligent searcher in the archives of Haarlem, discovered that, on and after Christmas day, 1440, the constabulary of Haarlem were often sent to Amsterdam upon important business. The inference attempted is that the constables were in search of the workman who stole Coster's implements. The records do not say that they were sent for a thief. Their business was of another nature. There had been a great mortality in Haarlem, and the officers of the town had left it while the pestilence was raging. The journeys of the constables were made to the temporary residences of the magistrates who, from a more healthy city, sent directions for the government of the town. Koning knew this fact but suppressed it.

The accusation of unfair practice, is frequently made by men who have been defeated in a fair contest. Whenever such an accusation is accompanied, as it was in this instance, with dramatic details, it effects a lodgment in the popular belief, from which it is not easily removed. Junius was not the first, nor the last, to use this discreditable but effective method of making-up a case. There is an old French record which narrates how Nicholas Jenson was sent from Paris to Mentz in the year 1458 to get a knowledge of the German invention. Jenson did acquire this knowledge, and became an eminent printer. His detractors say that he stole the

secret; his eulogists say that he learned nothing, that he was the real inventor.—The story of Richard Atkyns about the English theft is too full of absurdities for criticism.—Sometime between 1520 and 1570, Daniel Specklin wrote a chronicle of Strasburg, in which he relates that printing was invented at that city in the year 1440, by John Mentel; that Mentel's unfaithful servant, one John Gensfleisch, stole the secret, not the punches, and took it to Mentz.—There is a popular legend in Italy that Pamphilo Castaldi invented printing types at Feltre in the year 1450; that John Fust, who happened to be in the town, abstracted the knowledge of the invention, carried it to Mentz, and arrogated all the honors of the rightful inventor.

199 It was on the inner cover or binding of this account book that the fragment of a typographical *Donatus* was found. See page 259.

200 Lambinet had reason to speak of the aged witnesses, Cornelis, Gallius and Talesius, as "walking and talking centuries." Van der Linde characteristically describes the story of Junius as "a story in which all the authorities hear the principal facts in their infancy, but only to communicate them to each other in their second childhood."

201 Erasmus says: "All those who apply themselves to the sciences are under no small obligations toward the excellent town of Mentz, on account of the excellent and almost divine invention of printing books with tin letters, which, as they assure us, was born there."

202 To satisfy these doubts, and to bridge the chasm between Coster of 1440 and Bellaert of 1483, Meerman undertook to show that Coster's three grandsons, Peter, Andrew and Thomas, continued the practice of typography and printed many small works. Dr. De Vries maintained that "there was after Coster's death, until about 1470, an uninterrupted, carefully concealed practice of printing. . . . That there existed in Holland for many years a seminary of the practicers of the art is confirmed by many and strong evidences." But De Vries offers conjectures for evidences. History is silent about the printing office that was conducted by the sons of Coster. This office and these printers were really created by Meerman to fill a disagreeable gap in the story of Junius—a gap not seen by any of his numerous commentators from Scriverius to Seiz. There is no book that bears their names; there is no record that mentions them as printers; there is not even a tradition that they had anything to do with printing. If their names had not appeared upon the pedigree of Gerrit Thomaszoon, we should know nothing of them. The typographical successors of Coster are as fictitious as their progenitor.

203 Wolf, *Monumenta Typographica*, vol. I, pp. 193 and 621.

204 *Laurecrans voor Laurens Coster von Haarlem, eerste Vinder von de Boeck-druckery, etc.* Haarlem, 1628. Reprinted in Dutch, with description in Latin, in Wolf's *Monumenta Typographica*, vol. 1, pp. 209–451. The poetry of Scriverius is as whimsical as his prose. Here is his charge of theft against John Gutenberg:

> Ah, rascal! ah, are you there? is it you Hans Gutenberger?
> Why does this name become you? Yes, two-fold rascal, and worse!
> Notorious by theft, oh shameless man!
> This word is still too mild for your villainy.
> Because you concealed Laurens' good and carried it away,
> And stole it falsely: so hear we now speak
> Of Goedenbergher's praise; however they disguise it,
> By the Goeden-berg they betray the Guyten-(rogue)berg.

205 Condensed from Hessels' translation in *Haarlem Legend*, p. 113–14.

206 Wolf, *Monumenta Typographica*, vol. 1, pp. 813–868.

207 Seiz, *Annus Tertius Sæculoris Inventæ Artis, etc.* Haarlem, 1742.

208 Condensed from Hessels' translation in *Haarlem Legend*, p. 123.

209 John Enschedé then said that "Jansen Koster used no wooden movable letters, as later, and still living scholars [Meerman] assert—scholars who know nothing of the mechanism of type-founding—and who, therefore, gently swerve from the path of simple truth." Meerman's reason for rating this Dutch edition of the *Speculum* as first of all was the inferior appearance of the types and the printing, which inferiority, he maintained, had been produced by wood types and want of experience in presswork. Fournier told him truly that the types of his alleged first edition were metal types; that the printing of the book was inferior because the types were worn out; that his first edition had all the signs of a last edition—but Meerman refused this explanation.

210 Dr. De Vries, the most eminent defender of the legend in this century, said: "The work of the learned but not very judicious Meerman had done more injury to the cause of Haarlem than the writings of all other antagonists."

211 *Éclaircissemens sur l'histoire de l'invention de l'imprimerie.* 1843.

212 This Museum then contained, among other relics, copies of the *Apocalypse*, the *Ars Moriendi*, the *Canticles*, the *Donatus*, the *Speculum*, the *Temptations of Demons*, and other printed works that have here been noticed in the chapter on The Works and Workmanship of an Unknown Printer, most of which were claimed as the work of Coster's office. The wood block of the *Horarium* (see page 260), some official documents, some autographs of the sheriff Louwerijs Janszoon, a picture said to be a likeness of Coster, several engravings of Coster (curiously dissimilar, and one of which is an undeniable forgery), are also contained in this Museum. Van der Linde denounced the Museum as a municipal show-booth. *The Haarlem Legend*, p. 164.

213 Gerrit Thomaszoon died about 1563 or 1564. In the year 1611, the pedigree belonged to Adrien Rooman, the town printer at Haarlem. At his death it fell into the hands of Dr. John Vlasveld. For nearly two centuries it was unknown to the public. In 1809, it was sold at auction, Jacobus Koning paying for it, and for an old wood-cut, supposed to be the work of Coster, four hundred guilders.

214 Van der Linde, *The Haarlem Legend of the Invention of Printing*, p. 42. In the singular words "who brought the first print in the world" we may find the cause of that mysterious indefiniteness of description which may be observed in all the authorities. It is more than an indication that the story of Junius is based on the pedigree and on information derived from Thomaszoon and his friends.

215 There is, of course, no reason why a chandler could not have invented typography, but we have no evidence that this chandler invented anything. Our knowledge of the tastes of the man, as shown in his selection of a new business, is enough to prove that he was not at all like the later chandler, Benjamin Franklin, with a leaning to types and letters.

216 The variable orthography of the name of Coster, which is here copied literally from the records, is a sufficient explanation of the irregularities in the spelling of his name which are to be found in all the authorities. I have adopted the orthography as I find it in the book of Van der Linde.

217 The exact nature of the relationship between Laurens Janszoon Coster

and Gerrit Thomaszoon is not clearly defined, but the archives of the town and the vellum pedigree corroborate each other in establishing the existence—of Lourens Janszoon Coster (son of Jan Coster), tallow chandler and innkeeper, who left Haarlem in 1483—of Thomas Pieterszoon (probably the son-in-law of Coster), sheriff, who died in 1492—of Gerrit Thomaszoon (according to the pedigree, a great-great-grandson of Lourens Janszoon Coster), a sheriff and an innkeeper. He was, also, a sacristan or church-warden.

218 For this unwarrantable confusion of the names and deeds of the two men Junius and Scriverius are responsible. Junius, who wrote in Latin, caught at the word Coster, which he found in the pedigree, as a subject for the display of his critical ability. He explains and expounds it: "Lourens Janszoon, surnamed Coster, by reason of the office which belonged to the family by hereditary right." There was no need for this absurd expansion of the meaning of the word *custos*. This attribution of an honorable office to an insignificant man was purposely made to give him a dignified position. Gerrit Thomaszoon, who knew that Coster was a man of no note, gave him only the distinction of the first printer. This was not enough for Junius, who thought that he would be deficient in patriotism if he did not make Coster as reputable as his rival Gutenberg, who was represented as of noble blood. The word Coster was his opportunity, and he made the most of it. It is not probable that Junius studied the archives of Haarlem for the purpose of getting exact information about Coster, but it is possible that he had read or heard of Lourens Janszoon, the wealthy man, and that he confounded him with Coster, the chandler. Whether he made this confusion with intent or in ignorance cannot now be ascertained, but we can see that the wealth and respectability of Janszoon were attributed to Coster. Scriverius perpetuated the blunder. He found a document signed by Louwerijs Janszoon, as sheriff, in 1431. Without further research, he leaped to the conclusion that this man who died in 1439, who had nothing in common with Coster but similarity of name and similarity of occupation as innkeeper, was the very Lourens Janszoon Coster who, according to Junius, invented types and practised printing in 1440.

219 Moxon's copy of this engraving is shown on page 333 of this book.

220 Van der Linde tells a curious story about Hollandish credulity:

> The most amusing imitation was that of an amateur artist of the last century, C. Van den Berg, who wished to play the collector J. Marcus a trick. He engraved a small wood-cut after the portrait of Van Campen, with the name *Laur' Jassoe*, in old-fashioned style, underneath. With a little soot and dirt, he gave the copies an antique appearance, and made Marcus happy for a few weeks. The poet Langendijk, the type-founder Enschedé, and other amateurs, each got a copy. Van den Berg was too honest to mean anything more than fun; he told afterward to Marcus himself the value of that antique wood-cut. Although every investigator could and ought to have known these things, yet Jacobus Koning was bold enough, in the second nomenclature of his collection of rare books and manuscripts, to describe a copy of this portrait as "*printed by*, or at the time of, Lourens Janszoon Koster." . . . . . The Haarlem painter L. Van der Vinne, in his youth, painted, in the beginning of the former century, a study, after a drawing of Van Campen. But lo! in 1762, this picture is offered for sale by Van Damme at Amsterdam (the same who produced the false inscriptions respecting the imaginary Corsellis of Oxford), provided at the back with a very old inscription, *Lours Jans to Harlem* MCCCCXXXIII, and the monogram A O, which was explained to mean Albert Van Oudewater. Excellent discovery! Here

was a genuine contemporaneous portrait by a painter of the fifteenth century! A trifle, however, was wanted to make the joy perfect. Albert Van Oudewater, who had painted the celebrated inventor of printing in 1433, was born in 1444! This history is full of despairing irony from beginning to end. Just as the sheriff Lourens Janszoon invents the art of printing *after his death*; just as Cornelis works at *Donatuses before his birth*; just as the chandler Lourens Janszoon Koster entirely forgets his invention *during his lifetime*; so the painter Albert Van Oudewater becomes a zealous Costerian "*long before he was born*." Van der Linde, *The Haarlem Legend*, p. 145.

221 The striking dissimilarity between the calm philosophic face of the Coster of Meerman and the sour look and misanthropic features of the Coster of Scriverius is neatly explained by Dr. Abr. De Vries:

> The portrait given by Scriverius was painted from a sketch or study made after Coster's death, and was, necessarily, gloomy and cadaverous; but no portrait, however beautiful, unless it was a true and genuine likeness, could satisfy the truth-loving Scriverius. The truth was to be well founded if he endorsed it. The cadaverous hue and the marks of death in Van Campen's picture are strong evidences for the genuineness and faithfulness both of the original representation and of Van Campen's copy!

222 In Holland, Dr. Van der Linde's book has been denounced as impolitic and unpatriotic, but it has not, as yet, met with a suitable answer. The indignation manifested toward the author has been so violent that he, a native Hollander, has found it expedient to remove to Germany.

223 The only positive evidence which seems to give a color of probability to the assertion that typography was first practised in the Netherlands is the fact that an unknown printer had printed there some little books before the arrival of Ketelaer and De Leempt, in 1473. Whoever this printer may have been, it still remains to be proved that he did any typographic work before 1463.

224 There is no known authentic autograph of Gutenberg. In his day the name was written by other persons, Guttemburg, Gudenburch, Goodenberger, Guthembergius, Gudenbergh, Kuttenberg, and in many other ways. The form of spelling used in this book is the one that is preferred by the German bibliographers. Gensfleisch, in German, is goose-flesh; Gutenberg is good hill.

225 Bodmann, a librarian at Mentz, said that he had discovered two old documents which set forth that Gutenberg had a brother, Conrad, and two sisters, Hebele and Bertha. Helbig says that these documents, as reprinted by Fischer, are spurious.

226 It seems that Else Gutenberg was the last surviving member of her family. According to a German custom prevailing at that time, a son was, under certain circumstances, permitted to take the name of his mother when it was feared that her family name might become extinct.

227 The name of the brother of Frielo Gensfleisch, senior, was John Gensfleisch, senior. He is the man improperly described by Meerman as the elder brother of John Gutenberg. The identity of his baptismal name with that of the inventor of printing has been the occasion of many mistakes. The uncle has been confounded with the nephew. The family was wealthy: it had, in or near Mentz, three houses or estates, known as Zum Gudenberg, Zum Jungen and Zum Gensfleisch. The members of the family were sometimes called Sulgeloch or

Sorgenloch, from a property on which they resided outside of Mentz.

228 This is the version of chroniclers in the interest of the nobles. The childish dispute about precedence seems an insufficient cause for the quarrel. It was, probably, the occasion, but not the cause. It was the spark which set on fire the stifled resentment of the burghers against a long course of neglect and of misgovernment. The Gensfleisch families seem to have been always prominent in the civil disturbances of Mentz. Gutenberg's great-great grandfather took sides with one of the rival archbishops, and, in 1332, aided him in burning some convents, for which he was put under ban by the Emperor Louis. In the same year, he and other noblemen made themselves so offensive to the burghers that they were obliged to flee for their lives.

229 Charles Winaricky, a learned Bohemian, wrote a dissertation on the birthplace of Gutenberg—*Jean Guttenberg, né en 1412 a Kuttenberg en Bohème*, 12mo. Brussels, 1847—in which he tried to prove: that Gutenberg was born in the year 1412, in the town of Kuttenberg in Bohemia, from which town he derived his name; that he was a graduate of the university of Prague; that he acquired his knowledge of metallurgy from the metal workers of that old mining town; and that his proficiency in many curious arts was the result of his Bohemian education. Winaricky's book abounds with curious information, but his reasoning is largely based on conjecture. It cannot be used to discredit the positive dates and facts of many German records.

230 This is the form of complaint: "I, Johan Gensfleisch, the younger, also called Gutenberg, declare by this letter, that the worshipful sage burgomaster and the council of the town of Mentz owe me every year a certain interest, according to the contents of letters which contain, among other things, that, if they do not pay me, I am at liberty to seize and imprison them. As I have now to claim much rent in arrears from the said town, which they were hitherto not able to pay me, I caused M. Nicolaus, secretary of Mentz, to be seized, whereupon he promised me and swore to give me 310 valid Rguilders, to be paid at Oppenheim, before the following Whitsuntide. I acknowledge, by this letter, that the burgomaster and council of Strasburg have induced me to relieve of my own free will, in honor and love of them, the said M. Nicolaus from his imprisonment, and from the payment of the 310 guilders. Given on Sunday (12th of March), 1434."

The ease with which Gutenberg relinquishes his monetary claim, and which at once shows him to be a better knight than financier, exhibits a trait of character which explains much in his later fate. Van der Linde, *Haarlem Legend*, p. 13.

231 For more than three hundred years this important document, with other records of the courts of Strasburg, rested unknown and undisturbed in the old tower *Pfennigthurm*, in which place it was discovered by Wenkler, the keeper of the records. He communicated this fact to Schoepflin, who, perceiving its value, made it the great feature of the *Vindiciæ Typographicæ*. The record is imperfect, for it does not contain all the testimony of all the witnesses. Whether this deficiency is due to the neglect of the recorder, or to the decay or mutilation of the record, has not been fully explained. Schoepflin, who says it is written in an almost obsolete German dialect hard to be understood, reprinted it in full, accompanied with a translation in Latin, which has been censured as inaccurate. Dr. Dibdin, and a few carping bibliographers, who looked with disfavor on all newly discovered documents which obliged them to revise their own theories, have tried to throw discredit on this record, but its authenticity is now recognized as beyond controversy. The records were placed in the Library of Strasburg for

safety, but they were destroyed by the Prussians during the siege of that city in 1870.

232 Conventionally used for I.

233 The eighteen witnesses were Master Hirtz, Jacob Imerle, Midhart Honöwe, Heinrich Bisinger, Wilhelm von Schutter, the wife of Lorentz Beildick, M. Jerge Saltzmütter, Stösser Nese von Ehenheim, Martin Verwer, Henrich Seidenneger, M. Gosse Sturm, of Saint Arbogastus, Hans Ross, the goldsmith, and his wife, Andrew Heilmann, Claus Heilmann, Heinrich Olse, Hans Riffe and Johan Dritzehen. Their testimony is not on the record. It is unfortunate that we have lost the testimony of M. Gosse Sturm, of Saint Arbogastus, and Ross, the goldsmith. It is probable that these men, who had intimate relations with Gutenberg, could have described this secret art with greater clearness.

234 After the development of the towns, all members of the nobility did not seek their occupation exclusively in deeds of knighthood. Industry, art, and the refinement of town life gradually superseded the warlike spirit of the nobility, to whom the town offered distinguished dignities and situations, while enterprises of commerce and industry gave them distinction and riches. The privilege of coining money, especially, was often farmed out to an association of ancient families. At Mentz this association consisted of twelve families (Münzer-Hausgenossen), among whom was also the family of Gensfleisch. They possessed, moreover, the privileges of the valuation of coin, of the assize of weights and measures, or offices for the exchange of money and of the sale of gold and silver staves to the mint. Such employment brought them chiefly in connection with the goldsmiths, whose work consisted, at that time, of one of the most considerable trades, which comprised mechanics and chemistry, nay, the whole dominion of plastic and graphic art, in its application to metals, whether separate or in conjunction with diamonds and other precious materials. They were mostly patricians who established powder-mills, paper-mills and similar new manufactories. Van der Linde, *Haarlem Legend*, p. 17.

235 Glass mirrors, almost unknown in the fourteenth century, were regarded as novelties in the fifteenth. It seems that they were first made in Germany. Winaricky lays great stress on the fact that the Bohemians were the earliest and the most skillful workers in glass, and that they also excelled as lapidaries and metallurgists. He says, but without proof, that the art of polishing stones and making mirrors was acquired by Gutenberg in Bohemia. The learned Beckmann says that

> "Early German mirrors were made by pouring melted lead or tin over a glass plate while yet hot as it came from the furnace. In and around Nuremberg, convex mirrors were made by blowing with the pipe in the glass bubble while it was still hot a metallic mixture with a little salts of tartar. When the bubble had been covered and cooled, it was cut in small round mirrors. These small convex mirrors were called *ochsenaugen*, or ox-eyes. They were set in a round board, and had a very broad border or margin. One of them in my possession is two and a half inches in diameter. . . . This art is an old German invention, for it is described by Porta and Ganzoni, who both lived in the beginning of the sixteenth century, and who both expressly say that the art was then common in Germany. Curious foreigners often attempted to learn it, and imagined that Germans kept it a secret."

236 The most common prejudice is the supposition, *à priori*, legitimated

strictly scientifically by nothing, that printing with movable types was only an improvement on that with wooden blocks on which the letters were cut; that it was a development of it, an extension, a fortunate application, the highest step of the ladder, consisting of playing cards, images of saints, pictures with super, sub and other scriptions, texts without pictures. In short, xylography, in a technical, logical and reformatorical sense, would be the mother of typography. But it is such only in the sense of an external impulse, of an external push to meditating on quite *another* means than wood or metal engraving, or *another* mode of obtaining books. Zell finds that push in the block-Donatuses, but the inspiration of genius, the first invention of a quite independent art, of a totally new principle, which has nothing in common with wood and metal engraving, he ascribes . . . to Gutenberg. In Gutenberg's mind, the grand idea arose that all words, all writing, all language, all human thoughts, could be expressed by a small number, a score of different letters, arranged according to the requirements; that, with a large quantity of those different letters, united as one whole, a whole page of text could be printed at once, and, repeating this process continually, large manuscripts could be swiftly multiplied. . . . This thought, this idea, begot the invention of typography. . . . Every other explanation is at once unhistorical and unpsychological. *Haarlem Legend*, p. 11.

237 Wolf, *Monumenta Typographica*, vol. I, p. 586.

238 See page 315 of this book. The chronicler is in error in specifying Mentz as the place where the art was discovered, but the specification of the period between 1440 and 1450 as that in which "the art was being investigated" by John Gutenberg is sustained by other testimonies.

239 The pilgrimage to ancient Aix-la-Chapelle took place every seventh year, and, commencing on the 10th of July, lasted fourteen days, during which time the ordinary service in the church did not take place, but a free market was held. The concourse of people was uncommonly great on that occasion, so that, for instance in the year 1496, 142,000 pilgrims were counted in the town, and 80,000 guilders in the offering boxes on one day. Aix-la-Chapelle possessed relics of the first rank, as the swaddling-clothes of Christ, his body-cloth at the Crucifixion, the dress worn by Mary at his birth, and the cloth on which St. John the Baptist was beheaded. Van der Linde, *Haarlem Legend*, p. 18.

240 There is no evidence that Gutenberg had been taught xylography, or any of the many branches of book-making. He was not, for that reason, incompetent to invent an entirely new branch. The history of great inventions shows that many inventors never received a thorough technical instruction in the arts or trades which they undertook to reconstruct. Jacquard, inventor of the automatic loom, was, in his boyhood, a bookbinder and a type-founder. Arkwright, inventor of the spinning jenny, was a barber until he was thirty years of age. Stephenson, inventor of the locomotive, tended a steam boiler, but had not served time as a machinist nor as a carriage-builder. Fulton, inventor of the steamboat, was not a sailor, machinist nor ship-builder. Morse, inventor of the electric telegraph, was an artist, not a mechanician, nor even a man of science. Koning, inventor of the cylinder printing machine, was not a printer. The greatest inventions have been made by men not within, but without, the arts they improved. It would seem that a thorough technical education in any art or trade cramps the inventive faculties, disqualifying the expert from making any attempt at radical changes, permitting him to attempt improvement in the details only.

241 Some authors will not admit that Gutenberg derived any benefit from

xylography. Bernard treats block-printing as an art so paltry, that he refused to describe the block-books, or to admit that xylography had any noticeable influence, direct or indirect, on the invention of types. Van der Linde says that history knows nothing of Gutenberg as a xylographer—that there is no documentary evidence that he ever cut or printed a block. These disclaimers—obviously provoked by the absurd statements of other authors that Gutenberg invented xylography, that he printed with types of wood, that typography is the natural outgrowth of xylography—cannot be accepted without qualification. The fact remains that Gutenberg, his associates and pupils, were benefited by the highest technical skill of that time in all the processes of engraving in relief, in the compounding of inks, in the construction and use of presses, and in the manipulation of paper. Compared with the invention of the type-mould, these may seem trivial matters, but the success of Gutenberg's new ideas about printing depended upon his attention to every process that promised aid. It is not probable that the man who hired joiners and goldsmiths could have neglected to avail himself of whatever skill the block-printers possessed. The experience in printing acquired by the block-printers was far from contemptible, but the educating influences they had exerted over the book-buying public were of great importance. It was Gutenberg's discernment of the fact that the block-printers had created a demand for printed work which could never be satisfied by the method of xylography, which gave him the impulse to seek for a more scientific method. Block-printing, although in no sense the mother of typography, was its forerunner, and for that reason alone demands respectful consideration.

242 This passage has been translated by Ottley: Gutenberg sent "to fetch all the forms that they might be loosened, and that he might see it [done], and that the joinings of some of the four pieces might be renewed." This translation makes the action of Gutenberg unintelligible. Bernard's translation is: "Gutenberg sent to get the forms, so that he could be sure that they had been separated; these forms had given him a great deal of solicitude." This is obviously a very free and evasive translation. Wetter, who interprets the passage as descriptive of block-printing, says that "the words are too obscure for us to infer anything definite from them. We are in no case to understand by the word *formen* separate letters, but whole blocks." This is an unwarrantable assumption, and in contradiction to the statement that the forms were melted. Van der Linde says that "the words are plain. Translators have stopped at the words *zurlossen* and *ruwete*. *Zurlossen*, or *zerlassen*, means melting, and ruwete is dialect for *reuete*, repented."

243 The commonest meaning of the word form, in most European languages, is a shape or figure prepared by carving; but it has also been applied, colloquially, to the mould made from this carved shape, and also to the article made from the mould. A type-founder's punch is the form of a letter; the mould in which the type is cast is the form or former of the letter; the types prepared for printing are also known as the form. On a future page it will be shown that the word *formen* as used in the trial, was also used at a later date to describe the most important tools in Gutenberg's printing office at Eltvill.

244 Here we may recall the surprise of Madame Zabern at the cost of the work. She would not have hazarded the low estimate of ten guilders, if Dritzehen had been surrounded by many types or printed sheets. The only tools appertaining to typography, which have a value out of all proportion to their apparent cost, are the punches, matrices and moulds. The modern inexpert would underrate the value of a similar collection as grossly as did Madame Zabern.

245 It could not have been four pages of metal types, for types disconnected and put in disorder, in or under the press, would have betrayed the secret almost as plainly as if they had been in order. Nor could it have been any attachment to a press like the frisket or tympan. It is impossible to name any jointed or buttoned tool of four pieces, connected with composition or presswork, which would suggest to an inexpert the secret of typography.

246 Bernard gives this form of type-mould a passing notice. He says:

> M. de Berny showed me one of these primitive mechanisms in his own foundry. This mould, which is still [1853] in use, is constructed with two kinds of knees [or squares] enabling the type-maker to adjust it in various ways so as to cast any body desired. *De l'origine*, etc. vol. I, p. 44, note.

247 The inability to produce any book printed by Gutenberg at Strasburg was the occasion of the following pithy answer: Koch had asserted before the Institute, that Strasburg was the cradle of printing. Schaab interrupted him, "Yes, but it is a cradle without a baby."

248 Schaab says that there is on record in Mentz a document which proves that John Gensfleisch leased this house in October, 1443. Reasoning from the two disconnected facts, that this house was used by Gutenberg for a printing office, and that it had been leased by Gensfleisch in 1443, careless readers have assumed that John Gensfleisch was the first printer in Mentz, and that he was either the true inventor of printing, or the unfaithful workman who stole the invention of Coster or of Mentel. It is not necessary to repeat what has been written concerning the impossibility of a theft from the fictitious Coster, nor about the absurdity of representing the uncle as a printer.

249 Fischer, *Essai sur les monuments typographiques*, p. 70.

250 Bernard refuses this statement. He says that the fragments of other editions of the *Donatus* in this type, supposed to be of the same period, which he inspected in the British Museum, show ink that is permanent.

251 The text letters are of the form known to librarians as *lettres de somme*, or letters of account, which may be understood as the carelessly made letters then used in books of account. The letters of the large lines are of the form known as *lettres de forme*, or letters of precision, the angular and carefully made letters of fine books. The *lettres de somme* will be defined in this book under the name of Round Gothic; the *lettres de forme*, under the name of Pointed Gothic.

252 Deceived by the close fitting-up of the matrices, earlier writers said that the letters were xylographic. The comments of Dr. Van der Linde on this error are pertinent:

> . . . . It was thought necessary to find the wooden letters of the imagination, and hence bibliography presents the dismal spectacle that almost all monuments of the excellent invention, that fruit of a vigorous mind, of a simple, but ample and grand idea, have been declared by would-be connoisseurs one by one to be xylographic. This caused the double trouble of first making out, with much verbosity and an air of perspicuity, incontrovertibly typographical masterpieces to be wood, and then afterward putting aside this pedantry and returning to the simple truth. The origin of typography presents nowhere anything narrow-minded, worthless, or trifling, for it belongs to the *grand* facts of history, but trifling minds have soiled it with their own littleness. *Haarlem Legend*, p. 77.

253 It is possible that other books, now lost and forgotten, may have been

printed in the small types, but Helbig thinks that the types were made expressly for the *Letters of Indulgence*, as bank-notes are now made, with the intention that the copies of each edition should be exactly alike in appearance, and that they should be difficult of imitation. Bernard dissents from the belief that the *Letters of Indulgence* were printed by Gutenberg. He attributes them to some printer of unknown name in Mentz, supposed by him to have been either the false workman described by Junius, or some graduate or seceding malcontent of Gutenberg's printing office. But we have no evidence of a typographical printer before Gutenberg. Jäck has endeavored to prove that two *Letters* were printed by Pfister of Bamberg. De la Borde thinks one of the faces of type used in the *Letters* was cut by Schœffer in a friendly competition with Gutenberg. These conjectures cannot be made plausible.

254 It is sometimes described as the *Mazarin Bible*, and sometimes as *Gutenberg's First Bible*.

255 This is known as the *Bamberg Bible*, because nearly all the known copies of this edition were found in the neighborhood of the town of Bamberg; as *Pfister's Bible*, because it has been attributed, incorrectly, to Albert Pfister, a printer of Bamberg; as the *Schelhorn Bible*, because it was fully described by the bibliographer of that name; as *Gutenberg's Second Bible*, because it is the belief of many authors that it should have been printed by Gutenberg about 1459, after his rupture with John Fust.

256 Bernard, *De l'origine et des debuts de l'imprimerie*, vol. II, p. 30.

257 In the year of our Lord 1450, they began to print, and the first book they printed was the *Bible* in Latin: it was printed in a large letter, resembling the letter with which, at present, missals are printed. *Cologne Chronicle* of 1499.

258 In the first essays of printing, great difficulties were encountered. For when they [the first printers] were printing the Bible, they were obliged to expend more than four thousand florins before they had printed three sections. Trithemius, as reprinted by Wolf, *Monumenta Typographica*, vol. II, p. 654.

259 These evidences, which seem to favor the theory of the priority of the *Bible of 36 lines*, combine many features of probability, but they are not free from objections. Too little is known about the book to warrant a positive statement as to its age. In nearly all the popular treatises on printing, the *Bible of 42* lines is specified as the first book of Gutenberg, but it is the belief of many of the most learned bibliographers, from Zapf to Didot and Madden, that the *Bible of 36 lines* is the older edition. The theory that it must have been printed by Gutenberg between 1457 and 1459, and the proposition that it may have been printed by Albert Pfister of Bamberg at or soon after that time, will be examined on an advanced page.

260 His name is often improperly written as Faust. In all the books subsequently printed by Fust and his partner, Schœffer, the name appears as Fust. It was so written and printed by all his contemporaries, and is so seen, wherever it occurs, in the record of the famous trial he instituted. It is so spelt in the church record of his burial. During his lifetime, and for at least thirty years after his death, the name is always given as Fust. The notorious reputation subsequently made by Dr. John Faust, who was born in Wurtemberg in 1480 (several years after the death of Fust), who studied magic in Cracow, and, by his learning and wickedness, horrified wise men like Luther and Melancthon; whose life, deeds and death are involved in a mystery that dramatists have turned to such good

account, has been transferred by carelessness to John Fust, the printer. The confusion has been perpetuated by a legend. The fable, not yet weeded out of treatises on printing, that Fust was arrested in Paris for selling bibles, supposed to have been manufactured at the instigation of the devil, has served to foster the error.

261 Those who favor this view of Fust's character, find a peculiar significance in the radical meaning of his name, Fust—in German, fist, the symbol of all that is hard, close, grasping, and aggressive.

262 These were the terms of the contract, made in August, 1450:

> The partnership between Gutenberg and Fust should be for five years, in which time the work projected by Gutenberg should be completed.—For the purposes of this partnership, not specified, Fust should advance to Gutenberg 800 guilders, at 6 per cent. interest. The tools and materials made by Gutenberg for the uses of the partnership should remain mortgaged to Fust, as security for this loan of 800 guilders, until the whole sum should be paid.—When the aforesaid tools and materials should be made, Fust should, every year, furnish Gutenberg with 300 guilders to provide for the payment of the paper, vellum, ink, wages and the other materials that would be required for the execution of the work.—For these advances Fust should have one-half of the profits made from the sale of the products of the partnership.—Fust should be exempted from the performance of any work or service connected with the partnership, and should not be held responsible for any of its debts.

263 There are two kinds of copies, with differences which seem to justify the opinion that they belong to two distinct editions. In one kind, all the copies have 42 lines to the column, and all the summaries of chapters are written and not printed. In the other kind, the first eight pages of the first section have 40 lines to the column; the ninth page has 41 lines; the tenth and all other pages (except two 40-line pages in the book of *Maccabees*) have 42 lines; and the pages of 40 and 41 lines have their five summaries printed in red ink. The same face of type is used in both kinds of copies, but the pages of 40 and 41 lines occupy the same space as the pages of 42 lines, begining and ending, for the most part, with the same words. Bernard says that the 40-line pages were reset by Peter Schœffer after Fust had acquired the unsold copies of the *Bible*, with intent to lead the purchaser of the book to form the belief that it was an entirely new edition. Other writers suggest that a portion of the first section may have been spoiled, and replaced by a subsequent reprinting. But the differences are not confined to the first section. In many other sections there are differences in the spelling and abbreviation of words which clearly prove that the two kinds of copies were printed from separately composed and distinct forms. The double composition of every page for the same edition seems a ridiculous waste of labor, but the proofs of this double labor are unmistakable.

264 Bernard says that over-colored and under-colored pages are by no means rare. He attributes this unequal blackness to imperfections in the inking implements. *De l'origine de l'imprimerie*, vol. I, p. 182.

265 See the fac-similes of Sotheby and Humphreys. The written summaries of this Bible, as they present them, are unlike the printed text.

266 At the sale of the Perkins library near London, June 6, 1873, a copy of the *Bible of 42 lines*, on vellum, was sold for £3,400, and a copy on paper for £2,690—more than the first printers got for all the copies.

267 Hessels' translation, as printed in the *Haarlem Legend*, pp. 24 and 25.

268 Philip de Lignamine, in a book entitled *A Continuation of the Chronicles of the Popes*, which he printed in Rome in 1474, writes concerning the year 1458: "Jacob Gutenberg of Strasburg, and another called Fust, very skillful in the art of printing with characters of metal on parchment, each printed three hundred leaves daily at Mentz." Jacob is an error of memory or of typography, and the mention of Strasburg as Gutenberg's birthplace is incorrect, but the statement that he printed in 1458 is, no doubt, true. It seems the testimony of a printer, whose knowledge of the facts had been derived either from personal observation, or from the reports of workmen once employed at Mentz.

269 This *Catholicon* was written, or edited, as the title informs us, by John of Genoa, of the fraternity of preachers, or mendicant friars. It contains an elaborate Latin grammar and an etymological dictionary in five divisions. It was a text book of authority in the higher schools.

270 Van Praet says that Gutenberg, as a noble, dared not advertise his connection with a mechanical art. This is absurd, for Gutenberg's connection with printing in Mentz had been known for at least ten years, and printing was not then regarded as a business derogatory to the standing of a noble. Wetter says that Gutenberg was humiliated by the superior workmanship of Fust and Schœffer. But the work of these printers was not of such unquestionable superiority. Helbig's conjecture seems most plausible, but Gutenberg may have been so intent on the personal satisfaction he derived from the realization of his ideas, that he was comparatively indifferent to the gratification derived from notoriety.

271 In Germany, the punch or the model letter is known as the *patrice*, a word obviously derived from the root of the Latin *patronarum* of the text. The reversed duplicates of punches, here translated as matrices, are noticed in the text as *formarum*, a variation of the word form, which we find so often in the record of the Strasburg trial. "The admirable proportion, harmony and connection of the punches and matrices," should be understood, not as a commendation of the beauty of the printed letters, but as a specification by the inventor of what he conceived was the great feature of typography, the making of types of different faces and thickness on bodies of absolute uniformity, so that they could be combined with ease. It should be noticed that the invention or the use of isolated letters or types is not boasted of; it was the method of making the types which the inventor regarded as the most admirable feature of his invention.

272 This work is attributed to Gutenberg, chiefly on the authority of this inscription, which was found in a copy in the possession of the Carthusian Friars at Mentz:

> The Carthusian Friars near Mentz, through the liberality of John Gutenberg, own this book, which was made by his wonderful art, and by the skill of John Nummeister, clerk. In the year of our Lord 1463, on the 13th calend of July [June 19].

Helbig doubts the genuineness of this annotation, and intimates that it may be the work of Bodmann, a librarian at Mentz, who has been suspected of attempts to foist spurious documents on those who were eager to know more of the life and labors of Gutenberg. In his treatise on the *Typographic Monuments of Gutenberg*, Fischer, on the authority of Bodmann, printed the copy of a verbose document which set forth that John Gutenberg and Frielo Gensfleisch assented to the action of their sister Hebele in conveying to the Convent of Saint Clare, of which she

was then a nun, her share in the paternal inheritance. It also recites that John Gutenberg will give to the convent a copy of every book to be printed by him. This document, which is dated 1459, is not accepted as genuine by discreet bibliographers.

273 Bernard says that some of these works were probably printed by an unknown printer at Mentz (not the printer of the *Indulgence of 31 lines*); but this conjecture of two printing offices, about which history and tradition are silent, which never produced any work of value, cannot be accepted.

274 A copy of this book in the National Library at Paris has an annotation which sets forth that "Henry Kepfer of Mentz put this book in pledge for twelve days, and has not reclaimed it. . . ." Henry Kepfer was one of Gutenberg's workmen who appeared for him on the trial.

275 Fischer says that a library at Mentz once contained several pamphlets printed by Gutenberg in the large types of the *Bible of 36 lines*. He gives fac-similes of the illuminated initials in one of these pamphlets, which closely resemble those of the *Psalter of 1457*. This similarity is more than an indication that the letters of this *Psalter* were made by Gutenberg.

276 In the tenth and eleventh centuries, Mentz, then the capital of Germany, contained a population of about 100,000 inhabitants. It was the most powerful city of the empire, the great city where the emperors were crowned. In the fourteenth century, it was so strong that it could send out of its walls 10,000 armed citizens to destroy the strongholds of the noble robbers who had ravaged its commerce.

277 Helbig says that all the larger houses that had not been destroyed by fire were confiscated. The booty was divided in three parts: Adolph took the first and the best part, the nobles of his army claimed the second; the soldiers, "a band of mercenary savages," took the remainder. *Notes et dissertations*, p. 52.

278 Hessels' translation.

279 Schaab says that an aristocratic appointment at the court procured this nobleman a comfortable life. Voluntarily he followed the princely court, where he had a free table and fodder for his horses. Even for his dress he received cloth in the court colors, and generally wore a kind of mantle, called Tabard. It was in accordance with the morals of that time to carouse at court. They went there with empty cups and returned with full ones. The princes tried not before the sixteenth century to put a check to this excess by special orders. The elector Johan Schweikard von Kronenberg ordered, even in the year 1605, to leave the *grossen Saumagen*—this was the name of the cups then used—for the future at home . . . . However comfortable and German-like all this may look, miserable were these court-wages, this dress, these alms presented to the inventor of typography. But no, it is perfectly in harmony with the general course of earthly things. Van der Linde, *Haarlem Legend*, p. 29.

280 Henry Bechtermüntz had died before the book was finished.

281 The *Vocabularium ex quo* was reprinted by Nicholas Bechtermüntz, in the same types and in the same form, in the years 1469, 1472, and 1477. Only one copy is known of the first edition of the book.

282 From the preface to a curious and little-known poem entitled *Encomion Chalcographiæ*, by Arnold Bergellanus, as reprinted by Wolf in his *Monumenta Typographica*, vol. I, p. 5.

283 It appears from this, that Humery, who owned the printing office, had neglected to properly record or establish his title. It was through the grace of the

archbishop, who understood the matter, that he was spared the trouble of re-establishing his right by legal process.

284 One day when I was reading this interesting passage [of Bodmann, concerning the types of Gutenberg], the idea presented itself to me that it would be well to examine with care a certain volume printed by Frederic Hauman, which was in a neglected corner of my library. I took it up, not thinking that I should make any discovery. I knew that the last productions of the presses of Nicholas Bechtermüntz were printed with other types than those of Gutenberg, and that, among the known impressions of the Brothers of the Life-in-Common at Marienthal, none were executed with these characters. But judge of my astonishment, of my joy, perhaps, when I recognized in this neglected book not only the types of the *Catholicon* of 1460, the only ones appertaining to Gutenberg that could have been employed in the books that proceeded from the presses of Eltvill, but also the types that had been used in the *Letters of Indulgence* of 1454 and 1455, in the *Appeal against the Turks* of 1455, the *Calendar of 1457* described by Fischer, the *Bible of 36 lines*, and all the characters of Albert Pfister —or, to be brief,—when I recognized the most ancient types of John Gutenberg. Helbig, *Une découverte pour l'histoire de l'imprimerie*, p. 4.

Helbig gives a list of seven books, of little value, printed by Hauman, in these types of Gutenberg. He expresses his astonishment that they had not before been identified, but he offers no explanation of the singular fact that these types were not used by any printer between 1469 and 1506.

285 Helbig, *Une découverte pour l'histoire de l'imprimerie*, p. 4, note.

286 See pages 315 and 316 of this book.

287 Many authors who do not mention Gutenberg speak of Mentz as the city in which printing was first practised. Van Laar, at Cologne, in 1478; Caxton, at Westminster, in 1482; the archbishop Berthold of Mentz in 1486; Meydenbach of Mentz in 1494—these are a few of the many writers who have certified to this fact. A cloud of witnesses, says Van der Linde, join in the song of Celtes: "You wind yourself, already, O broad-waved Rhine! to the town of Mentz, which first of all printed with metal letters." Van der Linde, *Haarlem Legend*, p. 32.

288 In the year 1742, the Jesuits, who then had control of the church of Saint Francis, tore it down in order to rebuild another edifice upon the same ground. The tablet and the tomb of Gutenberg were destroyed. The inscription on this tablet was published for the first time in a book printed by Peter Friedburg at Mentz in the year 1499. Helbig, *Notes et dissertations*, p. 10.

289 Ivo Wittig was an ecclesiastic of eminence, chancellor and grand rector of the University of Mentz, to which he gave his large library of books and manuscripts. When the Swedes approached Mentz, this precious library was removed. Unfortunately, it was put on a boat of the Rhine which was wrecked, and his rare collection of books was lost. Helbig says it is an irreparable loss, for Wittig was deeply interested in printing, and his collection, no doubt, contained materials of the highest importance concerning its history.

290 This is an error. This house is not connected with the history of printing in any other way than in being the residence of Gutenberg when a child. When the Gensfleisch family were sent or went in exile, their houses were confiscated. It is not probable that Gutenberg died in the house bearing his name.

291 The Jesuit Serarius says that he saw this tablet one hundred years after it was erected. Between 1632 and 1636, when the Swedes were in Mentz, this

house was sacked, but the tablet was spared. In 1741, it was taken down and placed in the wall in the court of a house belonging to the University. But this monument, which escaped the barbarity of the Swedish soldiers, was destroyed by the conscripts of the French republic, who were lodged in this house between the years 1793 and 1797. Helbig says it is probable that these ruffians suspected John Gutenberg of aristocratic tendencies. They did not know that the old citizen of Mentz was, unwittingly, the leader of all democrats, revolutionists and reformers, the man above all others, who, by his invention, had paved the way for the French revolution.

292 Bernard's conjectures as to the reason for this change are plausible. He says: The sales of the *Bible* had not been so great as Fust had expected. Envious copyists had probably fostered a prejudice against the printed Bible as purely mechanical copying, and for that reason, or on account of its known errors, inferior to the ordinary manuscript. Fust hoped to remove these objections, and to attract purchasers by giving the unsold copies the appearance of a new edition. Madden does not accept this hypothesis. He thinks that the two kinds of copies were composed at the same time by different compositors, who, setting their types from dictation, not seeing the manuscript copy, made their abbreviations without uniformity, and, as a necessary consequence, produced pages of unequal length. This explanation is quite as reasonable.

293 It could, with more propriety, be called a ritual. The psalms are followed by prayers, collects, litanies, the service for the dead, hymns, etc. But it is always described as a psalter.

294 The rubricated capital letters on the larger body, which are very large and square, might be regarded as another incomplete font, for which small letters had not been provided.

295 Savage said, before he had critically examined the ink of the book:

> It is a curious fact that, under Fust and Gutenberg, the process [of printing in colors] should be carried nearly to perfection; for some of the works they printed, both in the quality of the ink and in the workmanship, are so excellent that it would require all the skill of our best printers, even at the present day, to surpass them in all respects: and I do not hesitate to say, that, in a few years after, the printers were actually superior to us in the use of red ink, both as to color and as to the inserting of a great number of single capital letters in their proper places in a sheet, with a degree of accuracy and sharpness of impression that I have never seen equaled in modern workmanship. *Decorative Printing*, London, 1822, pp. 6 and 7.

After a closer inspection, Savage discovered that the red was painted.

> Papillon declared that the red ink was of the most perfect beauty. Chatto said that this earliest known production [of the press of Fust and Schœffer] remains to the present day unimpaired as a specimen of skill in ornamental printing. The art of printing was perfected by Fust and Schœffer. Jackson and Chatto, *Wood Engraving*, p. 168.

296 He says the ink was dull yellow:

> On some of the leaves where music is given there is an appearance as if the oil in the ink had penetrated through the vellum and tinged the opposite side of the leaf with a dingy yellow. This had been supposed to be the case, but I find

that the original tune had been printed with a dull yellow ink, and that subsequently a different one had been written in over the first, with black ink to match the color of the text; and so exactly is this effect produced that, if it were not for the remains of the printing of the original tune, it might pass unsuspected of being any other than the production of the press. *Practical Hints on Decorative Printing*, pp. 49 and 51.

297 *De l'origine*, etc., vol. I. p. 225.

298 *History of Printing*, p. 85.

299 Some writers say that the earliest printing inks were gum-water colors, which could be washed off the vellum with a wet sponge. But the ink of the *Psalter* was a true printing ink, a smoke-black mixed with oil. The modern pressman, who has ineffectually tried to make ordinary printing ink stick to parchment imperfectly cleansed of oily matter, will at once attribute this failure of the printer of the *Psalter* to the oiliness of the vellum and the weakness of his printing ink.

300 *Practical Hints on Decorative Printing*, p. 50.

301 This method of printing in colors was patented by Solomon Henry of Great Britain in 1786, and in another form by Sir William Congreve in 1819, and by him applied to the printing of maps. *Abridgment of Specifications relating to Printing*, London, 1859. Improvements in machine presses have put out of use these methods of printing in colors.

302 *Life and Typography of William Caxton*, vol. II, p. liii, note.

303 Blades shows fac-similes of the printed work of Colard Mansion, in which we see that his red and black were printed by the same impression. *Life and Typography of William Caxton*, vol. I, p. 43. Also, plates III and VIII.

304 The modern printer who may regard this method of color-printing as puerile and wasteful of time, must be reminded that, slow as it may now seem, it was a quicker method than that of hand-drawing and painting. The difference between the old and the modern process of printing in colors will be fully stated, by saying that Schœffer printed, probably, but forty copies of this initial in one day, and that the modern pressman on a machine press would be required to produce, from two impressions, about twenty-five hundred copies in one day. Far from being a specimen of the skill of the early printers, this initial B is a flagrant example of their inexperience and the rudeness of their methods.

305 See fac-simile, plate 15, *Humphrey's History of Printing*.

306 See fac-simile on page 455 for the frequent transposition of the letters *t* and *c*. Also in first line of same fac-simile, *Presen spalmorum* for *Presens psalmorum*.

307 Fournier thinks that *all* the letters of the *Psalter* were cut on wood. *De l'origine, etc., de l'imprimerie*, p. 231. But Bernard says: "After a careful study of many copies, I declare that this book is certainly printed with types of founded metal, and founded, too, with admirable precision." *De l'origine et des débuts*, etc., vol. I, p. 224.

308 The last edition of the book, printed by his son, John Schœffer, in 1516, shows the great initial B entirely in red ink. It proves that the letter previously printed in two colors was engraved on one block. It proves also that the original method of painting the letter in two colors had been found expensive and impracticable.

309 The one first printed is dated April 6th, 1462: it is a manifesto, from Diether, notifying all people that he is the lawful ruler, and that Adolph is the usurper. This document, which is in German, contains 106 lines of Great-primer type, and is printed on a sheet of the size 12 ½ by 17 ¼ inches. But when Adolph captured Mentz, he issued counter proclamations. First of all was a proclamation dated August 8, 1461, from the Emperor Frederic III, announcing the deposal of Diether. It was printed on a half sheet, in German, and in the types of the *Bible of 1462*. The other proclamations were bulls or briefs in Latin, against Diether, from Pope Pius II, dated at Tivoli. All of them are in Round Gothic types on English body. The first bull warns the people to shun Diether as they would a pestilent beast; the second is the warrant for the installation of Adolph; the third orders the clergy to obey Adolph; the fourth orders the people to obey Adolph, and releases them from allegiance to Diether. The fifth bull relates to a different matter: it sets forth the unsuccessful mission of Cardinal Bessarion to the Turks. Bernard, *De l'origine*, etc., vol. I, p. 242.

310 Bernard, *De l'origine*, vol. II, p. 273.

311 We do not know whether Jenson acquired his knowledge of printing secretly or openly—in the office of Gutenberg or Schœffer, or elsewhere, but he succeeded in his undertaking. Nor is the date of his return to Paris known. Madden thinks that Jenson was taught the art not in Mentz, but in Cologne. During his absence, Charles VII died. On the 15th August, 1461, Louis XI, his son, was crowned at Rheims. A lover of books, and the founder of the great National Library, the king should have been deeply interested in the mission of Jenson, but he had formed a strong dislike to all the officers that had been appointed by his father, and began his reign by dismissing the court favorites. Jenson was treated as one of their number. All his efforts to get a suitable recompense for what he had done, and money to establish an office in Paris, were unavailing, and he was obliged to abandon Paris. He went to Venice, and made himself famous by his new design of Roman letter, and by the admirable presswork of his books.

312 These *Bibles* have been the occasion of an incredible legend which was first told by one John Walchius. It would not deserve repetition here if it had not so often appeared in modern literature. He says that Fust offered one copy of this *Bible* to the king for sixty crowns, and another copy to the archbishop for fifty crowns. To tempt indifferent purchasers, he abated his price until it was but forty crowns, a price so small and so insufficient as to excite the greatest wonder. The purchasers of different copies, fearing trickery, compared their copies. Instead of discovering imperfection, they found an unvarying uniformity which was unaccountable. Meanwhile Fust was still offering for sale other copies, and all were exactly alike. As it was clearly impossible that any copyist could write so many books with this precision, it was obvious that Fust was in league with the Devil, and that the *Bibles* were their joint production. The logical process by which this conclusion was reached is not stated; but we are told that complaint was made, that Fust was arrested, and thrown in prison, from which he was not released until he had revealed the secret. The absurdity of the story is transparent. Bernard has shown that it rests on no valid authority.

313 See page 435 of this book.

314 In this year Conrad Sweinheym and Arnold Pannartz, who had established a printing office in the monastery of Subiaco, near Rome, printed an edition of *Lactantius*, in which Greek types were used.

315 The phrase, *neque ærea*, must be understood as, not by engraving *in*

brass or copper plates, or not by the process then employed by the copper-plate printers.

316 The use of the words, Peter, my son, may be understood as the first acknowledgment by Fust of the marriage of his daughter to Schœffer.

317 The Library of Geneva has a copy of this edition of *Cicero*, which contains, in his own handwriting, the acknowledgment of Louis de Lavernade, first president of Languedoc, that the book had been presented to him in Paris, by John Fust, in July, 1466.

318 The record of this church says that the mass was instituted to John Fust, printer of books, "by Peter Scofer and Conrad Henlif," who gave to the church the *Epistles of Saint Jerome*, printed on parchment, and valued at 12 crowns of gold. In 1473, Schœffer established another mass for Fust and his wife Margaret, with the Dominicans at Mentz, for which he gave a copy of the *Epistles of Jerome* and of the *Constitutions of Pope Clement V*. As two books were here required, it shows that the price of books was rapidly depreciating.

319 Bernard says that this Conrad was the son of John Fust, and that Christina Fust, who married Schœffer, was Conrad's daughter. The only evidence that this Christina was Conrad's daughter is the statement in the application, which is printed above. But this statement is not enough to overturn the contradictory statements of other writers of that day, who had better knowledge of the true relationship of all the parties. Wetter thinks that Conrad was another son-in-law to Fust. We know very little about him. It does not appear that he had any thing to do with printing before the death of Fust, nor did he exercise any known influence as a printer. His name is not to be found in any of Schœffer's books. It is not known when he died.

320 This manuscript was returned, as had been agreed. It was probably used to collate the text of their edition of this book, a big folio of 548 double-columned pages in types on English body, which was completed by Schœffer and Conrad Fust, June 13th, 1469.

321 This passage is an allusion to the running of the disciples to the sepulchre where Christ had been laid. "So they ran both together; and the other disciple did outrun Peter, and came first to the sepulchre . . . . yet went he not in . . . . Then cometh Simon Peter following him, and went into the sepulchre." St. John, XX, 4, 6.

322 *Institutes of Justinian*, 1468.

323 It seems that this was done to avoid the expense of making a new mould, and to save the labor of cutting new capital letters—an evasion of duty not at all creditable to the alleged inventor of the type-mould. Gutenberg made four sizes of Pointed Gothic—the Paragon of the *Bible of 42 lines*, the Double-pica of the *Bible of 36 lines*, the Double-great-primer and Meridian of the *Psalter of 1457*—and three sizes of Round Gothic, the large English of the *Letter of Indulgence of 31 lines*, the small English of the *Letter of Indulgence of 30 lines*, and the Pica of the *Catholicon of 1460*. They were cast on seven distinct bodies. Schœffer's three faces of types, one of them imperfect, were cast on two bodies.

324 He consigned his books to one Hans Bitz of Lubec, who died, leaving the debt unpaid.

325 To become a freeman of the city of Frankfort, Schœffer paid a tax of 10 pounds 4 shillings.

326 There is in Paris a treatise by Dun Scotus, printed by Anthony

Koburger of Nuremberg in 1474, which contains a bill of sale written by Peter Schœffer, which states that the book was sold to one John Henry for three crowns of gold.

327 His agent in Paris was Hermann Stathoen, who died there in 1474, before he had been made a citizen. According to the French law, all his effects reverted to the crown. The books of Schœffer were seized by the king's commissioners, and were scattered and sold before his partner Conrad Fust, or Henlif, could make a reclamation. He appealed to the king, Louis XI, who ordered that Schœffer should be recompensed by the payment of 2,425 crowns. This was a large sum for that day: it was nearly four times as large as the sum fixed on in a valuation of all the books in the Louvre in 1459.

328 His son, John Schœffer, who had some control over the printing office before his father's death, timidly and tardily introduced paging-figures, but they were not regularly used in his later works. We may suppose that the father disliked the innovation. The invention of leads is the only improvement that can be attributed to Schœffer.

329 Ten years before, John Schœffer had conceded full justice to Gutenberg, and had told the story with more truth. In the dedication of an edition of Livy, printed by him in 1505, John Schœffer uses this language: "Will your Majesty [addressing the Emperor Maximilian] deign to accept this book, printed in Mentz, the city in which the admirable art of typography was invented, in the year 1450, by the ingenious John Gutenberg, and was afterward perfected at the cost and by the work of John Fust and of Peter Schœffer . . . " This acknowledgment did not prevent the Emperor from making a subsequent official declaration, in the privilege or copyright for a grand edition of Livy, published by the same printer, and dated December 9, 1518, that the grandfather of John Schœffer had invented printing [*chalcographia*]. So much for the strength of audacious falsehood! Bernard, *De l'origine et des débuts*, vol. I, p. 309.

330 *Annales Hirsaugienses*, vol. II, p. 421.

331 The description of the more ingenious method of "founding the forms of all the letters of the Latin alphabet, which they called matrices, from which [matrices] they again founded types, either in tin or in brass," has been denounced by many writers on typography as the confused statement of a man who did not thoroughly understand what he related, and who has reversed the proper order of the process of type-making. A more careful reading will show that Trithemius attempted to describe the process of matrix-making, which is set forth in page 302 of this book. He says the types were made either of brass or of tin, for his memory failed him, and he could not recollect that it was the matrix which should have been of brass, and the type of tin. The characters "which before this had been cut by hand" may be regarded not as types, but as punches of soft metal. They would necessarily be damaged by pressure in the semi-fluid metal selected for making the matrices. The tools which Trithemius vainly tried to describe were the punch of steel and the mould and matrices of brass. That punches and matrices of wood or of soft metal unequal to hard pressure were used by the earlier printers is proved by the variable shapes of their types.

332 The impressions of Gutenberg, which clearly show that his types were cast and not cut, should outweigh the statements of all the chroniclers; but it may be proper to call attention to the fact that the types of the *Bible of 42 lines* were used by Schœffer in 1476, and that the types of the *Letters of Indulgence* and of the *Bible of 36 lines* were in use by Hauman at the end of the fifteenth century. If

these types had been cut, they would have been soon worn out. The reappearance of these faces fifty years after they were first used shows that the types of Hauman must have been cast from the matrices of Gutenberg.

333 This version is found in *Wolf's Monumenta Typographica*, vol. I, pp. 466 and 469, under the heading of *The Statement of an Unknown Author*, and is attributed by Wolf to one Jo. Frid. Faustus of Aschaffenburg (who died in 1620), or to his son. Wolf admits (p. 452, note) that the identity of the author is not clearly established. It is probable that the statement was written by a descendant of John Fust, who was predisposed to magnify his services and those of his partner. Van der Linde calls the writer an arch liar. Bernard rejects the entire statement as unworthy of credit, or even of notice.

334 Five of the disputed works are the *Donatus of 1451*, the *Bible of 36 lines*, the *Letters of Indulgence of 1455*, the *Calendar of 1457* and the *Almanac of 1455*. The chief reason for attributing these works to Pfister is that they exhibit the types of the *Bible of 36 lines*.

335 There is no English equivalent for *libripagus*, which means a workman who is an engraver, a printer, and a stenciler. Like other writers of his day, Paul of Prague had to coin a word to define printers, who for many years after were called *typographi*, *typothetæ*, *chalcographi*, *excusores* and *protocharagmatici*. Most writers called printers *impressores*, or impressors, from the process of impressing types. This word, which was finally accepted in all European languages, has served to foster the error that the vital principle of printing is impression.

336 Ticozzi, Stefano, *Storia del letterati e degli artisti del dipartimento della Piave*, Belluno, 1813. See, also, *L'imprimerie*, No. 58, October, 1868.

337 Bernard, *De l'origine*, vol. II, p. 94. This vain and scandalous inscription was probably made by one of Mentel's descendants. It is not stated when this tablet was erected. Bernard supposes that it is a second tablet, which was put up in place of one made soon after his burial.

338 It was probably provoked by the false assertion of John Schœffer, that Peter Schœffer, his father, and John Fust, his grandfather, were the proper inventors, to the exclusion of Gutenberg. Schott, knowing that Mentel's claims as an inventor were as valid as those of Fust or Schœffer, placed on his books, after 1520, an armorial shield containing a crowned lion, with this inscription: "Arms of the Schott family, granted by the Emperor Frederic III to John Mentel, the first inventor of typography, and to his heirs, in the year 1466." There are doubts concerning this patent of nobility. When it was demanded many years afterward, it could not be produced [*De l'origine*, vol. II, p. 69]. It may have been granted to Mentel, not as the first printer, but as the first printer in Strasburg. Schœpflin, who speaks of this document as if he had seen the original, denies that it gave to Mentel the title of inventor of printing [*Vindiciæ Typographicæ*, p. 98, note]. There was a tradition that the Emperor Frederic III had given to a corporation of master printers known as the Typothetæ, an heraldic shield, representing an eagle holding in one claw a composing-stick, and in the other claw a copy-guide, surmounted by a griffin distributing ink with two balls. But these are not the arms displayed by Schott, nor did Mentel, nor his successor Flach, make any display of them in their books.

339 In another book Spiegel says 1442.

340 Meerman, *Origines Typographicæ*, vol. II, p. 199. It is not clearly proved that Specklin, who was a magistrate of Strasburg at the close of the

sixteenth century, is the author of this statement. Bernard says that this version contains about as many errors as words.

341 Lichtenberger, *Initia Typographica*, p. 56.

342 The first book printed at Strasburg with a date was a copy of the *Decretals of Gratianus*, a folio in two volumes, which bears this imprint: "By the venerable Henry Eggestein, master of liberal arts, and citizen of the renowned city of Strasburg, in the year 1471." This was not his first book, for in another book printed in the same year, he tells the reader that he has printed "innumerable volumes of law, philosophy and divinity." He printed two or three editions of the *Bible* in Latin, and one in German, and many other books in folio. The types of these books are unlike those used by Mentel. Eggestein was recorded in the tax list among the city officers, and was afterward bishop's chancellor in the court of Strasburg. The partnership between Mentel and Eggestein was of short duration. The date of Eggestein's death is not known: his name is not found in any books printed with his types after 1472.

343 It is supposed that he printed the *Bible* in German and in Latin, *Questions of Conscience*, *A Concordance of the Bible*, *The Epistles of Saint Jerome*,*The City of God*, *The Specula of Vincent of Beauvais*. All these books are thick folios—many of them in types on English body. Some are in two, and the last named in eight, volumes. Other works have been attributed to him, but Madden says that some of them (books with a curious form of the letter R—which others say were the work of Zell) were printed at the Monastery of Weidenbach.

344 For a table of the chronological order in which printing was established in the Netherlands, see page 323 of this book.

345 The high reputation of Schœffer's office was fairly sustained by his son John, who died in 1531. Peter Schœffer, junior, another son, was equally able, for he printed books in Hebrew, Latin, German and English. He found no proper encouragement at Mentz, and had to establish his office successively at Worms, Strasburg and Venice. His last known work, with date 1542, was printed at Venice, where it is supposed he died. Ives Schœffer, son of Peter, junior, who succeeded John Schœffer in the management of the office at Mentz, was an industrious publisher from 1531 to 1552, the supposed year of his death. Victor, the son of Ives, gave up the business, and the name of Schœffer disappeared from the roll of printers at Mentz. Helbig, *Notes et dissertations*, etc., p. 47–50.

346 A description of this *Bible*, with other particulars of importance, was given by Dr. Dziatzko, the librarian at Freiburg, in a letter to Hessels, and by him printed in the introduction to the *Haarlem Legend*, p. XXII.

347 The Brotherhood were forbidden by the vows they had taken to ask for alms or accept gifts, and were required to live by the labor of their hands. They devoted themselves to the duties of teaching school and copying books. At Weidenbach they were remarkably successful. They built a church in 1490 with the money they had made from the sale of manuscript and printed books. Madden says that the monastery of Weidenbach was not only a publishing house, but a prominent school of typography, and that there are reasons for believing that it gave instruction to Caxton, Jenson, Mansion and other eminent printers.

348 This John Sensenschmidt subsequently went to Bamberg, and in 1481 there published the *Bamberg Missal*, with a text in Pointed Gothic types of five-line pica body, probably the largest text types ever used in a book. It was admirably printed and rubricated.

349 These two thousand impressions were taken from about three hundred cuts—for the cut that served for the portrait of Paris of Troy was used for Odofredus of Germany and the poet Dante of Italy. Wood-cuts professing to represent cities and battles in Greece and Syria were repeated for battles and cities in France and Germany, with an indifference to the anachronisms and a cool disregard of the incredulity of the reader that are amazing. The author had a keen relish for the marvelous—for men with one eye, with immense ears, with enormous legs, and like monstrosities. The *Dance of Death*, which is reproduced on page 185 of this book, is one of the most meritorious designs, but most of them are of small value. The fac-simile of Koburger's map on the opposite page should be contrasted with the map of Germany in any modern atlas. It is presented as an illustration of the medieval notion of geography, and as one of the first attempts at map-printing.

350 In 1477, Sorg printed the first illustrated edition of the whole Bible; in 1483, a description of the council of Constance, containing nearly one thousand engravings.

351 Representing that the use of wood-cuts by typographers was an infringement on the vested rights of the guild, the block-printers induced the magistrates to pass a law commanding printers not to use wood-cuts. Not deriving the benefits they expected from this restriction, the block-printers proposed to concede to the typographers the right to use as many cuts as they pleased, providing they would agree to use only the wood-cuts made by regular engravers.

352 In 1472, Melchior of Stanheim, abbot of the monastery of St. Ulric at Augsburg, established a printing office in his monastery, buying types and tools from other printers. He bought five presses of Schüssler for 73 florins, and had five other presses made for him by a joiner of Augsburg. The equipment of his office cost 702 florins, which was then regarded as a large sum.

353 See chapter XV and pages 322–325 of this book for a fuller description of the works of this printer.

354 See notes on pages 281 and 322.

355 Many bibliographers say that he went to Cologne in 1473. Madden regards him as a pupil of the monastery at Weidenbach. Blades thinks that he was self-taught, or taught by some unknown printer, and that, as early as 1472, he began his typographic work at Bruges, in which he was assisted by William Caxton.

356 He printed eight books in 1478; seven in 1479; nine in 1480; ten in 1482. In fifteen days he printed three books, one of 85, and another of 305 leaves. During the seventeen years he was in business he printed 150 books. His last book at Gouda was dated June 23, 1484; on the 18th of September, 1484, he published at Antwerp, a book of 400 pages. Fifteen days after, he completed another book. During the first six months of 1485, he published one volume each month. One of these books had 34, and another 76 engravings specially cut for the work.

357 The colophon of this book is a queer piece of mysterious English: . . . Enprentyd in the duchye of Braband, in the town of Andewarpe, in the yere of our Lord M. CCCC. XCIIII. By maistir Gerard de Leew, a man of grete wysedom in all maner of kunyng: whych nowe is come from Lyfe unto the doth, which is grete harme for many of poure man. On whas sowle God almythy for hys hygh grace haue mercy. Amen. Van der Meersch. *Imprimeurs Belges et Néerlandais*, vol. I, p. 119.

358 The printed date of this book is M.CCCC.LXI. It is a curious circumstance that this exact printer should begin with an error which makes his first publication appear ten years earlier than it was.

359 In 1479, Dominic made this contract for printing a book. The publisher Boniface should furnish the paper, and should pay 10 livres for 200 copies of a book of 23 or 24 leaves of royal octavo or ordinary quarto. If he printed more than 200 copies, he should forfeit all claims for work done. In another contract, made in 1480, Dominic agreed to print 100 copies of a book of 100 or 120 pages for 4 florins in gold. The prices for printing seem insufficient, but the cost of labor was small. The compositors of the Ripoli Press were the sisters of a convent.

360 The partnership should be for three years. Zarot bound himself to furnish all the types, Latin and Greek, Roman and Gothic, and to make all the ink. The four associates were to furnish the money. One of them, De Burgo, should advance 100 ducats as soon as they could keep four presses steadily at work. If any partner should obstruct the business, he should lose all his rights. Rent should be paid out of the general fund. Profits should be divided in three parts, of which Zarot should have one part, and the four associates, two parts. Zarot should pay the associates one third the actual cost of the presses and other implements, which should become his property at the termination of the partnership. Current expenses should be paid out of the general fund from the profits of sales. The priest Gabriel (a partner) should be the agent, treasurer and general manager. He should have one copy of every book printed. Books for publication should be selected at a general meeting of all partners. The corrector and the copyists should be paid in printed books. Every workman should be bound by oath to keep the secrets of the partners, and was forbid to give any book to any other master printer of the city. If any partner wished to print a book on his own account, and could not agree with his associates, he would be permitted to have it done elsewhere.—Peter and Nicholas de Burgo immediately asked for the use of three presses or more, for works on common and civil law and medicine, they providing and paying for the presses and for working them, and half the current expenses of the office. They also agreed to give one-fourth of the profits, to pay a bonus of 25 ducats, and one copy of each book, provided the society would not sell it under price.

361 It will be seen that the business of publishing is almost as old as that of printing. Valdarfer agreed to set up the types of the books produced at the rate of 24 imperials (?) for every 20 pages. The wary publishers took the precaution to specify in the agreement that the blank pages should not be counted.

362 The Senate of Lucca, by a vote of 38 to 9, voted to pay the priest Clement, a professional calligrapher and bookbinder (who had applied for the means to go to Venice and get a knowledge of the art), a subvention of two florins monthly, on condition that he should practise his art as a public officer, teaching all who wished to learn. Clement declined the offer.

363 Gering reprinted the books of Keyser and Stol as soon as he could procure copies. Each house boasted of the superior accuracy and greater cheapness of its own publications.

364 In this style the pages were surrounded by narrow pictorial borders in pieces of irregular length. These pieces were repeatedly used on different pages, but always in new combinations, so as to present some feature of novelty. The ground-works of the borders were generally stippled. The large illustrations in the text were in outline, obviously intended for coloring. Red letters were often printed on every page, but the larger initials were painted.

365 Blades thinks that it was printed at Bruges by Colard Mansion and William Caxton, about 1472. Madden thinks it was printed at the monastery of Weidenbach by Mansion and Caxton, who went there about 1474 to learn practical typography. Other bibliographers say that it was printed by Zell at Cologne. The types of this *Recuyell* are thoroughly French, and are like the larger types used by Mansion. Bernard thinks that these types were made and first used at Cologne, by the order of the Duke of Burgundy for the French edition of the same work.

366 Thomas, in his *History of Printing*, said that printing was done in Mexico before 1569. The subsequent discovery of Mexican books with earlier imprints has compelled a gradual putting back of the date to 1540, which is that of the earliest existing book. There is a tradition about a Mexican book said to be printed in 1536, but the book is not in existence, and the correctness of this date has not been proved. Harrisse quotes an author who says that printing was taken to Mexico in 1532, by the Viceroy Mendoza, and that Pablos was the first printer. But Mendoza did not go to Mexico until 1535. Pablos was the foreman of Cromberger, who had one office in Seville and one in Mexico.

367 This is Hallam's enumeration of the hooks printed in large cities before 1500:

Florence	300
Milan	629
Bologna	298
Rome	925
Venice	2835
London	130
Paris	751
Cologne	530
Nuremberg	382
Leipsic	351
Basle	320
Strasburg	526
Augsburg	256
Louvain	116
Mentz	134
Deventer	161

If allowance be made for the books that are lost, these numbers are too small, but the list will give a correct idea of the comparative activity of the early printers at different places. During this period were published 291 editions of Cicero, 95 of Virgil, 57 of Horace, 91 of the Latin Bible and many hundreds of the decretals and digests of canon law.

368 The Bishop of Angers in 1470 paid 40 crowns of gold for a copy of the *Bible of 1462*. The *Catholicon* of Gutenberg sold for 41 crowns of gold in 1465. A copy of Mansion's edition of the *Consolation of Philosophy* by Boethius, brought 40 crowns in 1481. A missal was sold in 1481 for 18 gold florins. Bernard notes a sale in which a printed copy brought a higher price than a manuscript. A copy on vellum of the *Summary of St. Thomas* by Schœffer, was sold at Paris for 15 crowns of gold. A manuscript of similar size was sold for 10 crowns. It is

difficult to form just conclusions from these prices, for the bindings of the books have not been described. Hallam says that the florin was worth about four francs of present money, equivalent, perhaps, to twenty-four in commodities, and that the crown was worth rather more. Another estimate allows to the money of the fifteenth century eight times its present purchasing power.

369 The mandate is too long for an unabridged translation, but the following extracts will fairly set forth the reasons for his action:

> Although, by a certain divine art of printing, abundant and easy access is obtained to books in every science . . . yet we have perceived that certain men, led by the desire of vainglory or money, do abuse this art; and that which was given for the instruction of human life is perverted to purposes of mischief and calamity. For, to the dishonoring of religion, we have seen in the hands of the vulgar certain books of the divine offices and the writings of our religion translated from the Latin into the German tongue. . . . Some volumes on this subject, certain rash unlearned simpletons have dared to translate into the vulgar tongue, whose translation . . . many learned men have declared unintelligible, in consequence of the very great misapplication and abuse of words. . . . Let such translators, if they pay any regard to truth, say whether the German language be capable of expressing that which excellent writers in Greek and in Latin have most accurately and argumentatively written on the sublime speculations of the Christian religion and the knowledge of things. They must acknowledge that the poverty of our idiom renders it insufficient, . . . they must corrupt the sense of the truth in the sacred writings . . . which, from the greatness of the danger attendant upon it, we greatly dread; for who would leave it to ignorant and unlearned men and to the female sex, into whose hands copies of the Holy Scriptures may have fallen, to find out the true meaning of them?

This was not the first restriction imposed on the liberty of the printers, for the University of Cologne in 1479 had assumed the right to control the printing of books by Quentell and Winters.

370 Gutenberg's employment of the goldsmith Dünne at Strasburg, and the payment to him of a big sum for work connected with printing, can be most satisfactorily explained by the conjecture that Dünne was hired to cut punches and make a mould. I find no mention of punch-cutting or mould-making at Mentz, but there is, in the accounts of the Ripoli Press, an unequivocal notice of one John Peter of Mentz, who was selling matrices to the printers of Florence in 1476. It is evident that this John Peter had experience in this branch of typography. The Ripoli Press bought of him, in 1477, the matrices of a full font of Roman, for 10 florins in gold. John Peter was not the only punch-cutter. In 1478, the Ripoli Press paid the goldsmith Benvenuto 110 livres for the punches of three fonts—two of which were of Roman and one of Gothic face. In 1481, another goldsmith, Banco, made a sale to the manager of the Ripoli Press, of "100 little letters, 3 big letters, and 3 vignettes on copper."

371 Square notes of music, partly written, partly printed, are seen in the *Psalter of 1457*. Greek letters were made by Schœffer and Sweinheym, but the first book in Greek was printed by Paravisinus at Milan in 1476. Hebrew types were made at Soncino in 1488. At the close of the century, a German printer at Paris made an imitation of writing, but the letters were not connected, and the only penmanlike features were in the capitals. About 1500, Manutius had the engraver Francis of Bologna cut punches for Italic types, in imitation of the handwriting of

Petrarch.

372 Jacob Bellaert of Haarlem combined isolated engravings, cut for the purpose, in the belief that each combination would seem a new engraving. Kerver tried to give variety to his pages by varying combinations of detached pictorial borders. But it was quickly demonstrated that typography could deal successfully with letters only. The large ornamental initial letters of books were not cast, but cut, sometimes on wood, oftener on metal. Small and ornamented capital letters were cast by Mentel of Strasburg, and by Ratdolt of Venice in 1477.

373 Colonna and Manthen at Venice said that their Gothic was a "sublime letter." John Herbort, in 1483, said his was "a most captivating letter, unquestionably excelling all others." Nicholas Prevost said his book was printed "in types the most beautiful and most becoming for polite literature." Chevalon said his Gothic was "the polite and fashionable letter."

374 In France, the punches are struck in hot copper to prevent their breakage.

375 I know by experience that the ordinary metal used for types can be cast in a matrix of lead to the number of 125 or 150 types before the matrix will be destroyed. After 50 or 60 castings, there will be an alteration in the mould; the finer lines will disappear and ruder lines be presented. This will account for the differences that the same letters present on every page. *Magazin Encyclop. de Millin*, 1806, vol. I, p. 74, as quoted by Bernard, vol. I, p. 299.

376 Gutenberg's larger bodies were irregularly graduated and of Pointed Gothic face; his smaller bodies were not separated at proper distances, and were of Round Gothic face. The unknown printer had four faces and four bodies of the size English. Caxton had two faces and two bodies each of the sizes Paragon, Great-primer and English. The types of many printers at Paris and Venice show irregularities of body which seem remarkable and inexplicable to the modern printer.

377 The smallest sizes which I have met in any book of the fifteenth century are in the *Decretals of Gregory*, printed in black and red by Andrew Torresani at Venice in 1498, in which book the text is in Bourgeois and the surrounding notes are in Brevier. Nonpareil was first made by Garamond of Paris about the middle of the sixteenth century. Diamond was made by Jannon of Sedan about 1625. Nothing smaller was attempted until 1827, when Henry Didot, then 66 years old, cut a font on the French body of 2 ½ points—a body known to American printers as Brilliant, or Half-nonpareil—about twenty-five lines to the American inch.

378 It has been suggested that these distinct bodies were founded in sand moulds; that a new pattern for the body was made every time a new font was cast; and that the irregularities in body are the results of unintended or undetected variations in the pattern. But this hypothesis cannot be accepted. The small bodies, the sharp edges, close fitting-up and even lining of the types, are peculiarities which could not have been produced by a sand mould, nor by a mould of any plastic material.

379 *Lettres d'un bibliographe*, 4th series, p. 231.

380 See page 66 of this book. Was this obscure metal antimony? The text books say that antimony was, for the first time, set apart as a distinct metal in 1490, by Basil Valentine, a monk of Erfurt. But Madden says that a book supposed to have been printed at Cologne, before the year 1473, plainly describes antimony as a metal frequently used and much abused by many monks of the

thirteenth century in their pharmaceutical preparations. *Lettres d'un bibliographe*, 4th series, p. 115.

381 It agrees exactly with the old French standard (of 1723) for height of type, which was 10 ½ geometric lines, or, by modern French measure, 24 millimetres. Fournier, *Manuel typographique*, vol. I, p. 125.

382 The sloping shoulder, which was in general use in the first quarter of this century, was discarded to meet the requirements of the new art of stereotyping. It was found that these sloping shoulders made projections in the plaster mould, which imperiled the making of an accurate cast. The blackening of the sheet from square shoulders was prevented by altering the mould and placing the shoulder lower on the body.

383 See page 399 of this book.

384 Bernard believes that Gutenberg cast for the *Bible of 42 lines* at least 120,000 types, or enough for two sections, or forty pages. He supposes that twenty pages were perfected, and ready for press or under press, while the succeeding twenty pages were in the compositor's hands. This would be the method adopted by the modern printer, and it may have been the method of Gutenberg, but it is probable that the difficulties connected with the new art compelled him to print the book more slowly, and with imperfect system. But the printers who followed him certainly used quick methods.

385 Caxton said that he had "practysed & learned at [his] grete charge and dispense to ordeyne this said booke in prynte."

386 Many of the early master printers practised their trade for a few years in one place, and a few years in another, roving about from town to town with a seeming indifference to change which seems unaccountable to the modern printer, who knows how expensive it is to move a printing office. The roving habits of the masters will not seem so strange when it is known that the equipment of the early office was simple, and that the more expensive tools could be carried with little difficulty.

387 The engravings of cases shown by Moxon have boxes of unequal size. No doubt, they were so made from the beginning, for a day's experience would teach any compositor that his case must have a larger box for the letter e than for the letter x.

388 See page 528.

389 Bernard says that sticks of wood were used by Christopher Plantin, "king of printers." It is characteristic of the taste of his time, that Plantin had sticks of wood, although he boasted that some of his types were cast in [matrices of] silver.

390 Madden, in his first collection of *Lettres d'un bibliographe*,—the most curious piece of analytical criticism that has appeared in typographical literature—has demonstrated that the method of dictation was practised in the office at Weidenbach. In this series of letters he critically examines three books, printed at this office with the same types, and at the same time, and points out the peculiar errors of three different compositors, who, not seeing the copy, were misled by their misapprehension of the dictated words. He claims that these books were the practice work of three amateur compositors who were then learning the trade. Each compositor had copies of his own workmanship printed as evidences of his skill, or as a memento of his errors. Novel as they may seem, I am inclined to accept the conclusions of Madden. Many copies of early printed books, known to

be of the same edition, or done at the same time, show variations in the typographical arrangement which cannot be explained by any other hypothesis than that of a double composition by compositors working from dictation.

391 The composition of Schœffer's edition of the *Decretals* has been injudiciously praised by Bernard. In the fac-simile on page 463, it will be noticed that the page is crooked, and that the justification and making-up are very faulty. In a copy of Torresani's edition of the *Decretals*, the frequent contractions make the work almost unreadable. This book has been highly commended for its even spacing; but it is a sufficient answer to say that any printer could space admirably, even in the narrowest measure, if allowed to mangle words to suit his convenience.

392 The statement made by Lacroix that one book was paged in 1469 does not prove that this was the usage. In some books printed at Venice during the last ten years of the fifteenth century, the leaves (not the pages) are numbered on every odd page. But this was not the common practice. In the *Statius* of Aldus, printed at Venice in 1502, and in the Italian translation of the *Commentaries of Julius Cæsar*, printed by Bernard Venetus of that city in 1517, neither leaves nor pages are numbered.

393 Some early chases held their types not with quoins, but by the pressure of screws. A German printer's hand-book, dated Leipsic, 1743, has diagrams of imposition in which the pages are fastened by screws perforating the chase. Quoins and bevels were not an early invention.

394 See page 395 for illustration of primitive screw press.

395 *Mechanick Exercises*, vol. I, pp. 52, 69. To the printer who has seen only the press in which the platen covers the bed this may seem an absurd method, but it was a method in general use even as late as the beginning of this century. Men are yet living who have printed books by the method shown in the cut—pulling down the bar when one-half of the form was under the platen—releasing the pressure—running the other half of the bed under the platen—and finishing the presswork of the other half of the sheet by a second pull.

396 There should have been a gradual improvement in the construction of the press, as there was in the making of the types, but there was no decided change for two centuries. Moxon, in 1683, commending the "new fashion" presses of Blaew, denounced the "old fashion presses as make-shift, slovenly contrivances practised in the minority of this art." Nor was Blaew's press perfect. To insure proper register, Jackson (who undertook, at Venice in 1745, to print wood-cuts in colors) was obliged to reconstruct the press of Blaew.

397 It must also be remembered that on the early printing press two pressmen were required for the work—one to beat or to ink, and one to pull or to print. The ordinary task of the hand-pressman of New-York in 1840 was rated at 1500 impressions, but these impressions were made by one man (working an inking machine) and one pull on forms of large size. Considering the surface printed, the performance of one hand-pressman in 1840 was about eight times more than that of one pressman in 1458.

398 Words and lines were sometimes printed in red in a text of black, with a nicety of register rarely equaled by any printer during the first years of this century. The early method of printing red with black, has been described by Moxon. The black form was first printed with quadrats in the places that should be occupied by the red words or lines. This done, the form remaining on press, the

quadrats were taken out and the vacant space partially filled with "underlays" of reglet, about one-sixth inch thick. On these underlays the types to be printed in red were placed, which adjusting made them about one-sixth of an inch higher than the types of the black form. The bearers were then raised, the impression was readjusted, a new frisket was put on, and the pressman was ready to print red as he had printed the black. This method of printing red with black, a clumsy method at best, which can be practised only on small forms on the hand-press, has been out of fashion for many years.—The color work of the early printers has been overpraised. Superior, no doubt, to that of printers of the last century, who tried to do more work in less time, it cannot be compared with the color work of our time. The rubricated *Book of Common Prayer* printed by Welch, Bigelow & Co. of Cambridge, Massachusetts, the *Specimen Book* of Charles Derriey of Paris, the *French-English Dictionary* of George Bellows of Gloucester, England, may be offered as specimens of modern color presswork which show an exactness of register and a purity of color and of impression not to be found in any early book.

399 This unevenness does not prove the use of two distinct inks. In some instances, it was caused by the negligence of the pressman who applied an unequal quantity of ink upon different pages. In many instances, it was produced by the variable qualities or conditions of the paper or vellum. If the paper laid out for one form differed from that used for other forms in being too coarse or too dry, or over-wet, or if the vellum had been polished too much or too little, or had not been entirely freed from lime and grease, it would take up from the types, during each condition, a variable quantity of color, and produce prints of a different degree of blackness. These variations in color are most noticeable in books of vellum. In a prayer book printed by Kerver in 1507, the ink is black wherever the vellum is smooth, and gray where it is rough. In another edition of the same book on paper, printed by Kerver in 1522, the ink is not so black as it appears on the smooth vellum, but the color is more uniform. Equal carefulness seems to have been taken with each book, and the ink was, no doubt, substantially the same. Some of the early printers sorted their sheets *after* printing, separating the under-colored from the over-colored and binding each together.

400 In trying to avoid the gloominess of early printing, modern printers have gone too far in the opposite direction. The fault of imperfect blackness which is justly censurable in many modern books is largely due to what Hansard calls the "razor-edged" hair lines and thin stems of modern types which give the printer no opportunity to show black color. Readers have been taught to prefer a feminine elegance in types, a weak and useless imitation of copper-plate effects, to the masculine boldness, solidity and readableness of the old-style letter of the last century.

401 Mr. Ticheborne, a recent contributor to *Chambers' Journal*, says that the older printing inks are more easily saponified and washed off by alkalies than those of the last century. Some of the old inks he found so sensitive, that on introducing them to a weak solution of ammonia, the printed characters instantly floated off the surface of the pages. His explanation, that the oil had not been properly prepared by boiling, and was not changed into an insoluble varnish, and "resinfied," is, no doubt, correct. A practical ink-maker, in a series of papers to *L'imprimerie* (vol. I, p. 129), says that in many books of the fifteenth century, the adhesion of the color to the paper is very weak, and that the ink can be made pale or washed off with a moist sponge.

402 Lanzi refers to an Italian manuscript of 1437 in which it is asserted that

the new method of painting in oil, as practised by the Germans, must begin with the process of boiling linseed oil. *History of Painting in Italy.* Bohn's edition, 1852, vol. I, p. 86.

403 Our *Inck-makers* to save charges, mingle many times *Trane-Oyl* among theirs and a great deal of *Rosin*; which *Trane-Oyl* by its grossness Furs and Choaks up a *Form*, and by its fatness hinders the *Inck* from drying; so that when the Work comes to the *Binders*, it *Sets-off*; and besides is dull, smeary and unpleasant to the eye. And the *Rosin*, if too great a quantity be put in, and the *Form* be not very *Lean-Beaten*, makes the *Inck* turn yellow: And the same does the New *Linseed-Oyl*.——*Secondly.* They seldom *Boyl* or *Burn* it to that consistence the *Hollanders* do, because they not only save labour and Fewel, but have a greater weight of *Inck* out of the same quantity of *Oyl* when less *Burnt* away than when more *Burnt* away; which want of Burning makes the *Inck* also, though made of good old *Linseed-Oyl*, Fat and Smeary, and hinders its Drying; so that when it comes to the *Binders* it also *Sets-off*.——*Thirdly.* They do not use that way of clearing their *Inck* the *Hollanders* do, or indeed any other way than meer Burning it, whereby the *Inck* remains more *Oyly* and *Greasie* than if it were well clarified.——*Fourthly.* They, to save the *Press-man* the labour of *Rubbing* the *Blacking* into *Varnish* on the *Inck-Block*, *Boyl* the *Blacking* in the *Varnish*, or at least put the *Blacking* in whilst the *Varnish* is yet *Boyling-hot*, which so *Burns* and *Rubifies* the *Blacking*, that it loses much of its brisk and vivid black complection.——*Fifthly.* Because *Blacking* is dear, and adds little to the weight of the Inck, they stint themselves to a quantity which they exceed not; so that sometimes the *Inck* proves so unsufferable *Pale*, that the *Press-man* is forced to *Rub* in more *Blacking* upon the Block; yet this he is often so loth to do, that he will rather hazard the Content, the Colour shall give, than take the pains to amend it: satisfying himself that he can lay the blame upon the *Inck-maker*. Moxon, *Mechanick Exercises*, vol. II, pp. 76, 77.

404 No exception need be made for the initial letters of the *Psalter of 1457*. The thin curved lines of the ornamental portions of these letters could not have been cut on the flat boards then used by all engravers on wood. The absence of cracks and broken lines, after long service, in every print taken from these cuts is presumptive evidence that they were cut on metal. The ornamentation is unlike that of the professional engravers of block-books and at once suggests the thought that they were cut on brass or type-metal by the hand that cut the types of the text.

405 That the early printers did encounter serious difficulties in the use of wood-cuts in type forms is proved by their selection of blocks of smaller size. Full-page cuts are rare in the books of Koburger, Leeu and Veldener. Von Os of Zwoll cut up the blocks of the *Bible of the Poor*. Blades says that Colard Mansion printed the types and wood-cuts that appeared on the same page by two impressions. Sad experience in the warping and cracking of blocks of wood in forms of types was, no doubt, the reason for this extra labor. This difficulty seems to have been avoided by Pigouchet, Kerver and the printers of ornamental books, whose cuts have all the mannerisms of engraving on metal.

406 The disconnection between the arts of engraving on wood and typography is fairly indicated by the quarrel between the type-printers and block-printers of Augsburg.

407 Some engravers on wood who would not work with typographers undertook a new branch of printing—the making of prints, thirty or forty inches long, for the decoration of interior walls. Becker has published a collection of

these large prints, taken from the original blocks, some of which he says were made before 1500. See cut on page 535.

408 If Florentine money had eight times the purchasing power of its American equivalent, these were high prices. They justify the observation of Keyser and Stol, printers at Paris in 1486, that the price of paper was out of all proportion to the price of printed books.

409 Vellum was made out of the dressed skins of very young kids and lambs; parchment from the skins of sheep and goats. The vellum was very thin, flexible and highly polished; the parchment was thick and horn-like; but each substance was prepared by nearly the same process. The skin, when freed from hair, was put in a lime-pit, until it was deprived of its fat. It was then stretched on a frame, pared with a knife, rubbed with lime and pumice-stone, and repeatedly dried and wet, and rubbed and stretched, until the surface was made faultlessly smooth.

410 See page 469 for the testimony of Schoeffer's proof-reader.

411 The copyists, underpaid by the stationers, did their work recklessly, abbreviating words so freely that it was often impossible to discover the meaning of the author. The faults of the calligrapher, who preferred beauty to accuracy, and of the young scholar, who rashly undertook to correct errors—tended to the same result. Fichet, a professor of the University of Paris, who seems to have been the first man of letters who esteemed printing, said, in a complimentary letter to Gering, Crantz and Friburger, that books were becoming barbarous through the faults of the copyists. Bouhier, a later president of the University, said that the books of the copyists were monstrous, and often unintelligible.

412 Marchand quotes at length an author who says that John Andrew, the corrector for Sweinheym and Pannartz, was a very presumptuous meddler with texts. When he met a word he did not understand, he printed it in Latin, or put in words at a venture, often making the text more unintelligible than ever. Another ecclesiastical reader, Bishop Nicholas Perotti, was quite as great an offender.

413 Marchand, *Histoire de l'imprimerie*, vol. I, pp. 97–103, and notes. In support of this assertion he cites the opinions of Schelhorn, Maittaire, Naudé, and other eminent bibliographers, and gives many specifications of the inaccuracies of the early printers from Fust and Schœffer to Froben. Not even Aldus Manutius escapes, for Marchand quotes at length the accusation of Erasmus that the *Homer*, *Cicero*, and *Plutarch* of Aldus were *depravatissima*. This criticism is hardly warranted by the errors of these editions, and is decidedly unjust in its reflection on a printer whose industry and carefulness as an editor have never been surpassed, and who, in his edition of *Plato* of 1513, offered a gold coin for every mistake that should be discovered. This damaging accusation would probably never have been made if Erasmus had not quarreled with Aldus, and had not thought it necessary to deny with much asperity that he had served as a corrector of the press in the Aldine office. As a corrector, Erasmus was not beyond reproach, as will be more clearly seen in his reading of the *Greek Testament*. Froben's lamentation over the two pages of errata in this book (published by him, but corrected by Erasmus) shows how much easier it is to discover errors after commission than it is to correct them in time. Stung by the taunts of critics, Erasmus said that if the Devil did not preside over typography, there must have been a diabolical malice on the part of the compositors.

TRANSCRIBER'S NOTE

Original printed spelling and grammar are retained, with a few exceptions noted below. For example, *Gernszheim*, *Gernszheym*, and *Gernsheim* are all retained.

Original page numbers are shown like this: p023.

Illustrations have been moved from within paragraphs to nearby places between paragraphs. This results in some missing page numbers, since illustration pages and even blank pages were numbered. At least one illustration was originally printed over two facing pages. In the html edition only, a larger image has been externally linked which combines the two into one. A few other illustrations have larger images externally linked as well, in the html edition only.

Foot-notes have been renumbered 1–413 and moved to the end of book.

Large curly brackets '{}' used to combine information on multiple lines have been eliminated, by minimally changing the text to retain the original meaning.

The original Index employed ditto marks and white space to indicate topics related by a word or phrase. These marks, sometimes of dubious scope, have been replaced by em dashes, one for each word to be regarded as repeated. For example, under the topic heading "Bible of 36 lines", several topics started with two ditto marks and sufficient white space to indicate the four-word phrase; herein "— — — —".

to table of contents

Page 19. In the sentence ending with "when it has been prepared for printing by each of the different methods:", the colon was changed to full stop.

Page 125. Changed the first *that* to *than*, in "quicker process that that of careful writing".

Page 127. Added full stop after "have been established in the most satisfactory manner".

Page 207. Full stop added after "but they cannot be entirely overlooked".

Page 295. "Abcedarium" changed to "Abecedarium".

Page 302. Second comma in "and for lining, like other matrices," changed to full stop.

Page 313 note. Changed *gette en molle* to *getté en molle*.

Page 356. The comma in "Koning tried to supplement the many deficiencies of Junius, with extracts" looked more like a fly-speck, but was present in both 1st and 2nd editions, and seems plausible.

Page 357 note. Changed "Eclaircissemens" to "Éclaircissemens".

Page 372 note. Added a left double quotation mark to '*long before he was born*.'", although this placement is perhaps questionable.

Page 547. Changed "Bechtermuntz" to "Bechtermüntz".

Page 555—*Additional Notes and Corrections.* None of the corrections recommended in this section have been applied. However, hyperlinks are provided. The references are to page numbers, but we have attempted to be a bit more precise about the exact location of the subject matter of each note, by inserting a new hyperlink anchor. For example, the anchor "[anc104]" is located in the foot-note that was originally printed on page 104 of the book, where a correction is to be applied. ¶ There are two notes in the *Additional Notes and Corrections* section that refer to page 150. The second one seems to be a mistake, however, and really refers to page 154, where the appropriate hyperlink anchor "anc150b" has been inserted. Similarly, the note that refers to page 451 seems to fit better page 450, where the new

hyperlink anchor has been inserted.

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