BOOKS BEFORE TYPOGRAPHY

A PRIMER *of* INFORMATION ABOUT THE INVENTION OF THE ALPHABET AND THE HISTORY OF BOOK-MAKING UP TO THE INVENTION OF MOVABLE TYPES

BY

FREDERICK W. HAMILTON, LL.D.

EDUCATIONAL DIRECTOR
UNITED TYPOTHETÆ OF AMERICA

PREFACE

AN attempt has been made in this book to trace briefly the story of the book from the earliest attempts made by mankind to convey a message by marks on some substance down to the invention of movable types. The development of writing is rapidly traced from the earliest known pictures and sign marks to the present day. The discussion covers the subjects of writing materials and how they were made; the evolution of the book; the conditions of manufacture, distribution, and preservation of books before printing, and the conditions out of which sprang the invention of typographic printing.

It is believed that a comprehensive knowledge of the main facts in this long story will be of great value to the young printer, and it is hoped that he may be interested to continue the study in some of the many very excellent books which are available. A short list of a few of the best and most accessible authorities in English will be found on page 44. It has not been thought worth while to refer to books in other languages.

The story of the efforts of men to convey their thoughts to the absent is one of absorbing interest and leads into many pleasant byways of knowledge. While we are studying the processes and materials of a trade by which we hope to gain a livelihood it is well to know something about the men of the past whose accomplishments we inherit. To know something about the men of another time who made this time possible, what they did, what manner of men they were, how they lived, and what they created for us, is the task of this and the following volumes in Part VIII of this series.

CONTENTS

BOOKS BEFORE TYPOGRAPHY

CHAPTER I

The Origin of the Alphabet

THE story of printing really begins with the earliest dawn of civilization. As soon as men developed a language, even of the simplest sort, they felt the necessity of a means of communication with those who were not present. This would be needed for the identification of property, the making of records, the sending of orders or information, the making of appointments, and many other purposes which would be developed by the needs of even the most rudimentary civilization. We accordingly find evidences of devices to accomplish these ends associated with the earliest human remains. While the cave man was disputing food and shelter with the cave bear, the sabre-tooth tiger, and the mammoth in those places which are now the seats of the most advanced civilizations, he scratched or painted outline sketches of the animals he fought, and perhaps worshipped, on the wall of a cave or on the flat surface of a spreading antler or a piece of bone.

The oldest known attempt to carve a picture. It dates from the cave period and was found at Dordogne, France.

One of the greatest single steps in civilization was the advance from the use of rough stone implements and weapons to the use of chipped and finished stones for the same purpose, commonly referred to as the transition from the paleolithic to the neolithic age. Just how long ago that was no one knows and only geologists can guess. Among remains dating from this period of transition found in the little village of Mas d'Azil in France, there have been discovered a number of painted pebbles. Whether these were game counters, ownership tags, records, or what not, no one can guess. Whether the marks on them were purely mnemonic signs, numerals, or verbal signs of some sort, no one knows. That they were in some way, however, the ancestors of modern printed matter is unquestionable.
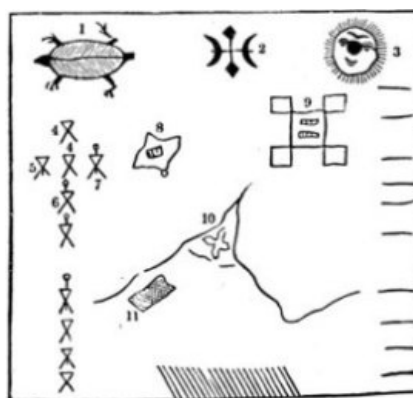
Pebbles from Mas d'Azil.

Among the earliest methods of communicating ideas to the absent, pictures hold the largest place. Other methods were knots, ordinarily known by the name *quipus* which they bear among the ancient Peruvians. The number and arrangements of the knots and the color of the cords made possible a considerable range of expression. Closely associated with these were tallies, or notched sticks, and wampum, or strings of colored shells or beads arranged in various designs. Here perhaps may also be classed the so-called Ogham inscriptions, made by arrangements of short lines in groups about a long central line. The short lines may be either perpendicular to the central line or at an angle to it. They may be above it, below it, or across it, thus providing a wide range of combinations with a corresponding variety of expression. These primitive methods survive in the rosary, the sailor's log line with its knots or the knotted handkerchief which serves as a simple memorandum. They may run all the way from purely mnemonic signs to a fairly well developed alphabet.

More important in its development, however, was the picture. Primitive men all over the world very soon learned to make pictures, very crude and simple to be sure, but indicating fairly well what they stand for. These pictures may be so arranged and conventionalized as to convey a good deal of information. The position of a human figure may indicate hunger, sleep, hostility, friendship, or a considerable number of other things. A representation of a boat with a number of circles representing the sun or moon above it may indicate a certain number of days' travel in a certain direction, and so on indefinitely. This method of writing was highly developed among the North American Indians, who did not, however, get beyond it.

The next step forward is the attempt to represent abstract ideas by means of pictures. The picture then ceases to represent an object and represents an idea. This is called an ideogram. While it has certain very obvious limitations, it has one advantage over more developed systems. The ideogram does not represent a word; it represents an idea. Consequently it may be intelligible to people who, in spoken language, represent the idea by very different words. For example, there are several cases where a common set of ideograms appears to have been used as a means of communication between people

Indian picture writing. The biography of a chief.

whose spoken language was mutually unintelligible. The Chinese sign for "words" made thus

is a typical ideogram. It represents a mouth with vapor rising from it.

The next step forward is the development of the ideogram into the phonogram, or sound sign. When this step is taken, the ideogram, besides representing an idea in a general way, represents a sound, usually the name of the object represented by the ideogram or by one of its components. A succession of these phonograms then represents a series of sounds, or syllables, and we have a real, though somewhat primitive and cumbrous, written language. Concurrently with this process the original picture has become conventionalized and abbreviated. In this shape it is hardly recognizable as a picture at all and appears to be a mere arbitrary sign.

| Night (Egyptian). | Night (Maya). | Supplication (Egyptian). | Supplication (Ojibwa). | Negation (Egyptian). |

| Negation (California Indian). | Negation (Maya). | Medicine man (Ojibwa). | God of Medicine (Easter Island). |

Comparative ideographs.

After a time men discovered that all the sounds of the human voice were really decomposable into a very few and that all human speech, consisting as it does of combinations of these sounds, could be represented by combinations of simple phonograms each of which should represent neither an idea nor a syllable but one of the primary sounds. The phonograms were then greatly reduced in number, simplified in form, and became what we know to-day as letters.

This process appears to have gone on independently in many parts of the world. In many places it never got to the point of an alphabet, and this arrest of development is not inconsistent with a high degree of civilization. The Chinese and Japanese script, for example, are to this day combinations of ideograms and phonograms.

Three of the great peoples of antiquity carried this process nearly or quite to a conclusion, although the method followed and the results reached were quite different in the three cases. The three civilizations, of the Egyptians in the Nile Valley, the Assyrio-Babylonians in the valley of the Tigris and Euphrates rivers, and the Cretans, centering in Crete but spreading extensively through the Mediterranean Basin, developed three great varieties of script. All started with pictures. The Egyptians continued to use the pictures in their formal inscriptions down to the Persian conquest in the 6th century B.C. This picture writing or hieroglyphic was well developed and in the phonogram stage about 5000 B.C. The formal picture writing of the hieroglyphic was admirably suited to formal inscriptions either carved in stone or painted on a variety of substances. It was not suited, however, to the more rapid work of the recorder, the correspondent, or the literary man. The scribes, or writers, therefore developed a highly abbreviated and conventionalized form of hieroglyphic which could be easily written with a reed pen on papyrus, a writing material to be described presently. The first specimens of papyrus, containing the earliest known specimens of this kind of writing, called hieratic, date from about 3550 B.C. Even the hieratic was too formal and cumbersome for the common people and was further abbreviated and conventionalized into an alphabet known as the demotic which was in common use among the Egyptians from about 1900 B.C. to 400 A.D.
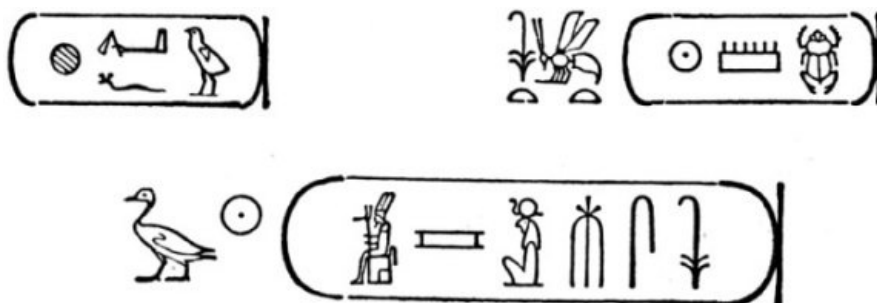
Names in hieroglyphic text of three of the most famous Pharaohs, Cheops, Thothmes III and Rameses II.

Among the Assyrio-Babylonians the use of an entirely different kind of writing material caused the development of a very different type of script. The lands inherited by these people were clay lands and they made enormous use of clay and its products for building materials, utensils, and also writing material. The early inhabitants of this region very soon found that a permanent record could be made by marking a lump of soft clay with a sharp stick and then drying it in the sun or baking it in an oven. Naturally the picture very soon degenerated into a series of marks made by holding the stick, or pointed implement, nearly parallel to the clay and then thrusting it into the surface. The resultant mark was like the

following: ◁ This script is called "cuneiform," from two Latin words meaning "wedge shaped," from the obvious resemblance of the marks to wedges. The number and arrangement of these marks developed successively into phonograms, ideograms, and letters. The language, which was very complicated in its written form, retained all three to the last.

First line of a cuneiform inscription commemorating victory of Shalmaneser over Hazael, King of Syria.

The Cretan civilization has been unknown to us save through a few uncertain references in Greek literature until within about twenty years. Within that time many excavations have been made, many objects recovered, and much progress made in the reconstruction of this ancient civilization. The written language has been at least partially recovered, although we are not sure that we have all the signs and we do not know how to read any of them. These signs were of two sorts, described as hieroglyphic and linear. The hieroglyphic signs are either ideograms or phonograms. Whether the linear signs are a true alphabet or a syllabary (each sign representing a complete syllable) we do not know. These linear signs have close relations on one hand to the signs used in the island of Cyprus, which we know to have been a syllabary, and on the other to the signs used by the Phœnicians, which we know to have been an alphabet.
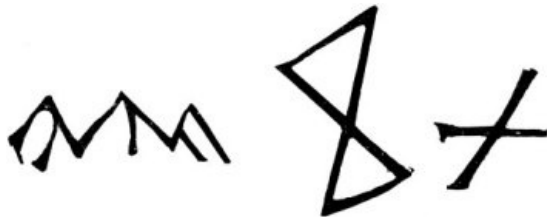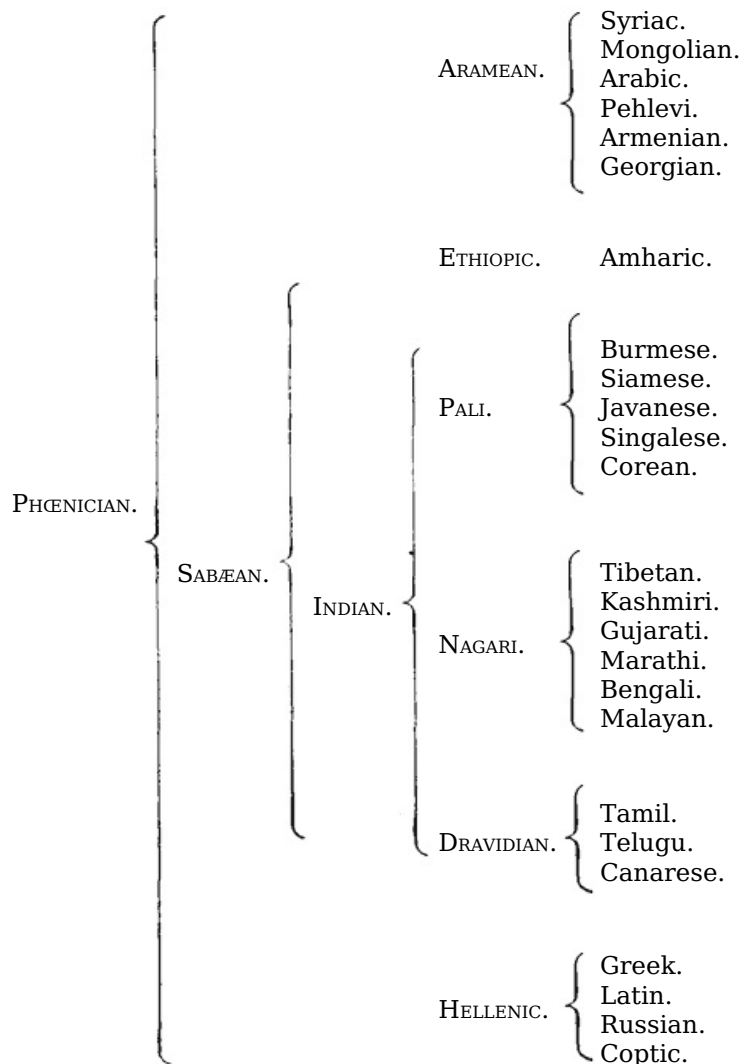

Inscription in the Cretan linear character from a vase.

There seems to be no question that the final step of discarding all signs excepting the few representing the primary sounds of human speech, and thus developing an alphabet pure and simple without concurrent use of phonograms and ideograms, was made by the Phœnicians. The Phœnicians were a trading people of Semitic origin (akin to the Jews and other allied races) whose principal seats were at the eastern end of the Mediterranean. Various theories have been put forth as to the origin of their alphabet. It is clear that they did not originate it absolutely but developed it from previously existing material. Attempts have been made to connect it with the Assyrian cuneiform, and for many years it was commonly believed to have been derived from the hieratic form of the Egyptian. The evidence of later discoveries, together with the difficulty of reconciling either of these theories with all the known facts, points strongly to the conclusion that the principal source of the Phœnician alphabet was the Cretan script, probably modified by other elements derived from commercial intercourse with the Egyptians and the Assyrians. From the Phœnician came the Greek alphabet. From the Greek came the Roman, and from the Roman, with very little change, came our own familiar alphabet. But that is not all. The Phœnician, through various lines of descent, is the common mother of all the alphabets in use to-day including those as different from our own and from each other as the Hebrew, the Arabic, and the scripts of India. It will be noted that there are now four great families of alphabets. They are the Aramean which have the Hebrew as their common ancestor; the Ethiopic which now exists in but one individual; the Indian which now exists in three groups related respectively to the Burmese, Thibetan, and Tamil; and the Hellenic, deriving from the Greek. The relations of these groups are well worth study as indicating ancient lines of conquest, immigration, and literary influence. The lines of descent are shown in the table on the following page.

GENEALOGY OF THE ALPHABET

Hebrew.

Phœnician			
	Aramean.		Syriac. Mongolian. Arabic. Pehlevi. Armenian. Georgian.
	Sabæan.	Ethiopic.	Amharic.
		Indian.	
		Pali.	Burmese. Siamese. Javanese. Singalese. Corean.
		Nagari.	Tibetan. Kashmiri. Gujarati. Marathi. Bengali. Malayan.
		Dravidian.	Tamil. Telugu. Canarese.
	Hellenic.		Greek. Latin. Russian. Coptic.

This table, based on the studies of Canon Isaac Taylor, is taken from Clodd's "Story of the Alphabet."

CHAPTER II

Writing Materials

AS already indicated, the writing materials in use in different places and at different times have varied greatly. Obviously anything capable of receiving an impression or bearing a mark of any kind may be used as material for receiving records or bearing communications.

The surface of a stone, a bone, or a shell, a flat piece of wood, bark or leaf of a tree, a plate of metal, the facet of a gem, any one of a thousand things can be used and has been used for this purpose. The Egyptians and Greeks were in the habit of using the fragments of broken pottery for their less important records. The materials which have been most used, however, have been the Assyrian clay tablet, which has been already described, papyrus, vellum, and paper.

Papyrus was made from a reed which grew abundantly in the Nile Valley and less abundantly in some other places. It is now nearly extinct but it grows in small quantities in Sicily, where papyrus is still made for sale to tourists but not in commercial quantities. The reed was called by the Greeks "*bublos*," or "*biblos*," from which the Greeks got the word *biblion*, a book, and we get the words bible, bibliography, etc.

Papyrus was made by cutting the stalk of the reed lengthwise into very thin strips. These strips were laid side by side on a board until the desired width was obtained. Another layer of shorter strips was then laid across the long ones entirely covering them. This mat, or "net" as it was technically called, was then soaked in the water of the Nile. Whether there was any particular virtue in the Nile water, which is always more or less charged with mud, or the desired result was obtained simply by the action of water on the reed itself, is not clear. After the soaking was completed, the "net" was dried in the sun, hammered to expel air and water, polished by rubbing with some hard smooth substance, and probably sized,

although it is possible that all the sizing necessary was provided by the sap of the reed itself. The sheets were then trimmed even and joined by the edges into a long strip, usually of about twenty sheets. This was rolled on a stick and was then ready for sale as writing material. The quality of the papyrus varied according to the part of the reed from which the strips were cut, and it was the commercial custom to put sheets of varying quality into the same strip or roll. The best sheets were put on the end which would come on the outside of the roll, grading down to the worst at the other end. This was done for two reasons: first, in order that the best material should come where it would receive the most wear, and secondly in order that in case the roll was not entirely used the waste part should be of inferior quality. Papyrus continued to be used as the general writing material of the civilized world until about the time of Christ, and held its place for certain purposes until the 11th century, at which period we find it still used for Papal Bulls and other important documents. It was revived in Egypt by the Copts, as the people of Egypt were then called, in the 7th century and was used by them extensively until the middle of the 13th.

From very early ages, leather was more or less used as writing material, but in the 2nd century B.C.,
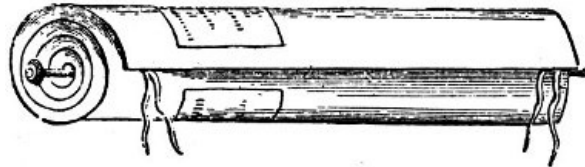
Parchment-roll, or volumen. (Our word volume comes from volumen.)

owing, it is said, to the scarcity and high price of papyrus, Eumenes II, King of Pergamus, a city of Asia Minor, invented or caused to be invented, a writing material made of dressed skins. These skins were not tanned but were dressed by another method which left them flexible but gave them a smooth hard surface which could be easily written on. This material was called, from the name of the city, *pergamena*, from which we get our "parchment." This term is now practically reserved for sheepskins which are harder than other skins used for the purpose. Parchment was long used for legal documents and is still used for college diplomas and other similar purposes. The general term, however, for this type of writing material, which was made from a variety of skins, is vellum. Vellum, of course, came in sheets, and while a single sheet might be rolled as diplomas are to this day rolled for delivery, it was ordinarily used in the sheet form and played an important part in the development of the book.

In the manufacture of vellum the skins of a variety of the smaller animals were used. For example, the famous Alexandrian codex, one of the oldest known copies of the Bible, is written on antelope skin. The skin was first carefully cleaned and the hair removed by soaking in a solution of lye. It was then thoroughly scraped with a knife to remove all fatty or soft parts. It was then rubbed down with pumice stone. Finally it was polished with agate.

Paper is said to have been invented by the Chinese at an unknown but very early date. It was introduced to Europe by the Arabs about the 10th century A.D. It was made of linen or rags and did not vary greatly from the rag paper of to-day. As the process of manufacture is fully described in the book on paper (No. 13) of this series, description is not necessary here. Paper was not much used in Europe until the invention of printing. Being much less substantial than vellum it did not commend itself for the making of manuscript books. Paper was, however, immediately found to be much better suited to printing than any other material, and with the advent of the printed book it very quickly drove other writing materials out of common use. Owing to its having some resemblance to papyrus it was given the old name, the word paper being derived from papyrus.

Late in the 19th century a new writing material made of wood or other flexible fibre treated with chemicals and loaded with clay was invented, to which we also give the name paper. This new material has almost entirely driven the old rag paper out of the field and is now the paper of commerce. Much of this material is far inferior to rag paper. The inferior qualities of it, at any rate, lack durability even when not exposed to wear. It is good enough for the great number of uses where permanence is not required. It should only be used for books of permanent value, especially for records and historical material, when there can be no doubt of the care used in the manufacture and the quality of the fibre employed. A 15th-century book on rag paper is as good to-day as the day it was printed. Most of the paper now in use possesses no such lasting qualities.

In addition to these three leading materials, much use has been made of tablets (Latin *tabella*). The commonest form of tablet was a thin board with one or both sides slightly cut away in such a way as to leave a narrow rim all around. The shallow depression inside this rim was then filled with wax sufficiently stiff to hold its position in ordinary temperatures but sufficiently soft to be easily marked with a sharp instrument called a stylus. The writing could be easily erased by rubbing with a hard smooth object, perhaps a ball at the reverse end of the stylus, and the wax was then ready for another impression. Sometimes these tablets were made of wood covered with paint or a composition from which the writing could be easily washed off. This was the prototype of the schoolboy's slate of to-day and was used for the same purpose. While tablets were ordinarily used for writing of a purely temporary nature, they were occasionally used for permanent records and especially for

correspondence. Two or more tablets could be put together with the wooden sides out, bound, and sealed. In this way the writing was secure from observation or interference and the tablets were less liable to injury than papyrus or vellum. Tablets were used at a very early period and continued to be used, especially for correspondence, all through the middle ages and into the 16th century. Sometimes a considerable number of them would be fastened with thongs by one edge so as to form a continuous document which was one of the precursors of the modern book. The British Museum has a document of this sort consisting of nine leaves about 7 x 9 inches. The writing on it is in shorthand, which is by no means a modern contrivance. This particular document is of Greek origin and dates from about the 3d century A.D.

The ancient Egyptians, Chinese, and other peoples of remote antiquity used inks made of charcoal or soot mixed with gum, glue, or varnish. Similar compositions were used to a late date. The Romans made extensive use of sepia, the coloring substance obtained from the cuttlefish. Irongall inks, inks that consist of an iron salt and tannin, were invented by an 11th century monk named Theophilus. Of course these inks were mixed with coloring matter, and other paints and pigments were used in the preparation of manuscripts. The earlier printing inks were made of lampblack and linseed oil. The subject of printing inks is fully discussed in No. 12 of this series of text-books. The ink was ordinarily applied by means of reeds which were either beaten out at the end into fine brushes so that the characters were painted rather than written, or sharpened and split at the end like a modern pen. Later the quill of the goose or some other large bird, cut to a point and split, largely took the place of the reed and continued to be the writer's tool for centuries. In later years they have been displaced by the modern pen of steel or gold. It is interesting to note that bronze pens imitating quills were used by the Romans and some specimens are still preserved.

Mediæval scribe at work, showing bookcase and writing materials.

The mediæval scribe, or copyist, had in addition to his quill, ink, and vellum, a pair of compasses to prick off the spacing of his lines, a ruler and a sharpened instrument or pencil with which to draw the lines upon which he was to write, a penknife for mending his pens, an erasing knife for corrections, and pumice and agate, or other smooth substance, for smoothing the scratched surface. The accompanying illustration shows the mediæval scribe and his outfit in an extremely interesting manner. In the background appears the bookcase with its doors open showing the manner in which books were then kept, laid on their sides and not standing on their ends. The writer is busily at work upon his manuscript and scattered around him are the tools of his trade. The inkstand is on the table before him, the knife on one of the library shelves, the compasses, a ruler, a ruling pencil, a rubber for smoothing down the vellum, an open pen case, and other implements are all clearly shown.

CHAPTER III

The Evolution of the Book

AS already indicated, ancient books were written on rolls of papyrus. The technical name of such a roll of papyrus was *volumen* from which we get our word volume. With the increasing use of vellum as writing material came the book as we know it, originally called in Latin the codex, from *caudex*, meaning a pile of boards such as may be seen in any lumberyard. The other Latin word for book, *liber*, from which we get our word library and other allied terms, originally meant "bark" and is a curious preservation of the record of the use of bark as a writing material, a use, by the way, of which we have very little other knowledge.

The origin of the book is rather interesting. One of its ancestors, as we have already seen, is the group of tablets bound together with thongs. Another was probably the roll itself. When the manuscript roll was read it was necessary in order to handle it properly and save it from damage to reroll the part of the roll which had been read as the student proceeded. The consequence was that when the reading was finished, the volume was left rolled up in reverse order. Consequently, before being replaced, the volume, if treated properly, had to be rolled back into its original position, a necessity which careless or lazy people found somewhat burdensome. It was discovered, however, that this could be avoided by folding the roll back and forth, creasing it in the spaces between the columns which were written at right angles to the length of the roll, the result being something like a book printed only on one side of the paper and with the edges uncut, like many Chinese and Japanese books of to-day.

The real impulse, however, to the construction of books as distinguished from rolls came with the use of sheets of vellum. These could not be attached easily to make long rolls as could be done with the papyrus sheets, while even the single sheets were large enough to be unwieldy when spread out. Therefore, when long compositions were to be written, the vellum sheets were folded once and laid inside each other just as ordinary note paper is prepared for sale at the present time. In order to provide against the scattering of these leaves they were sewed together through the crease at the back. The result was called a quire.

A Roman student at his books, showing the bookcase with a reading stand on top and the use of the roll.

When the composition filled more than one quire, the quires were originally fastened together in a manner derived, probably, from the method of fastening tablets. That is to say, holes were stabbed through the margin and thongs were passed through the holes and tied at the back. This method of binding, however, had obvious disadvantages and it shortly occurred to some one that thongs, or strips of vellum, could be laid across the backs of the quires at right angles to their length and the stitches by which the quires were held together could be passed over these thongs. This method of binding the quires together is still used in making the best bindings. At this stage of proceedings the loosely fastened bundle of quires was not firmly held together and the unprotected folds of the sheets were exposed to wear. This was remedied by covering the backs with a strip of leather running lengthwise of the sheets. Vellum, however, is particularly liable to warp and twist. This was prevented by putting the sheets between boards. The next step was to fasten the boards to the package of leaves by extending the edges of the leather strip on the back and fastening them to the edges of the boards, which were then fastened at the opposite edges by clasps. The bound book was then complete so far as utility was concerned. It was soon seen, however, that the extension of the leather back to cover the boards entirely added to the beauty and durability of the book and opened a wide field for the exercise of the decorator's art and taste.

It is needless to say that great use was made of this opportunity. The beautiful products of the modern bookbinding art are familiar to us all. Beautiful and costly as they are, they are commonplace as compared with the decoration of the early bookbinders. It must be remembered that these books were never intended to be crowded in serried ranks into shelves from which they should present only their backs to the world. They were precious

treasures to be kept by themselves, handled reverently, laid on tables or shelves, often enclosed in bags. The covers, often blazing with jewels, were adorned by all the resources of many kinds of art. Some were plates of ivory or rare wood covered with wonderful carvings. Some were plates of chiseled gold or silver. Some were brilliant with enamel. Medallions and pictures in the best style of art ornamented them. Gems of every kind, cut and uncut, added color and brilliancy to the effect. As late as 1583 when the great age of book-cover ornamentation was already past, Henry III of France decreed that ordinary citizens should not use more than four diamonds to the decoration of one book, but nobles might use five.

The book as distinguished from the roll began to be popular in the first Christian century. It had certain very great advantages. The rolls were never very long and long compositions or collections of compositions necessarily ran to many volumes. They were not easy to refer to as they had to be unrolled and then rolled up again whenever any passage was to be consulted. They were made of a material which was not durable in any but the very driest of climates. The book on the other hand, while heavy, could contain a very great amount of material in a single volume, could be easily referred to, and was made of much more durable material. For this reason the book form was used for legal documents and other purposes where ease of reference was particularly desired. The growth of the Christian church especially stimulated the substitution of the book for the roll. Christianity, unlike any of the religions with which it came into contact, except Judaism, was a book religion. The Christian was constantly referring to his scriptures for argument with his adversary as well as for his own edification and he wanted to be able to find his favorite passages readily. The conservatism of the Jew prevented his changing the roll form of his scriptures. The Pagan adhered to the rolls with their associations of classic culture. The final passing out of the roll and victory of the book are contemporary with the victory of Christianity over Paganism and its adoption as the religion of the empire.

Byzantine Binding of about 1000 A.D. (The plate is metal and the decorations are enamel and jewels.)

CHAPTER IV

Making the Manuscripts

AS has already been said the papyrus manuscripts were ordinarily written in columns at right angles to the length of the roll. These columns were from two inches to three and a half inches in width. They were ordinarily written on one side of the roll only. As the older writing materials were always scarce and expensive, the backs of the rolls were sometimes utilized, but very rarely for the continuation of the matter written on the other side. If

writing appears on the back of a roll, except in the rare cases where the handwriting is identical with that on the face, the subject matter is of an entirely different character from the original and may safely be regarded as much younger. The title was ordinarily placed at the end of the book although sometimes it appeared at the beginning or in both places. The title was sometimes written on the outside of the roll but more often was written on a tag which was attached to the end of the roll or to the stick upon which the papyrus was rolled. Very wide margins were left at each end of the roll. The ends of the roll were trimmed, rubbed smooth and sometimes colored. The rolls were sometimes wrapped in cloth and sometimes put in cylindrical cases. Whether or not this was done, the rolls were usually kept in cupboards piled on shelves; hence the usefulness of the tag bearing the title.

When the vellum book took the place of the papyrus roll consideration was at once given to the peculiarities of the material. The hair side and the flesh side of the skin are different in color and texture. Care was taken to arrange the sheets in quires in such way that the two pages which were under the eye together should be made on the same side of the skin. The outside page of a Latin codex was ordinarily the skin side. By reversing the fold of the inner sheets of the quire, pages two and three would be the flesh side, four and five the hair side and so on. When paper began to come into use it was at first strengthened by having a covering sheet of vellum for each quire, very much as we use a sheet of cover paper on the outside of a pamphlet. A sheet of vellum was also sometimes inserted in the middle of the quire so that the paper would be stitched between the two vellum sheets.

Originally the narrow columns of the papyrus roll were transferred to the vellum page but gradually the lines were lengthened until the page had one column or at most two. For example, the Sinaitic codex of the Bible which dates from the 4th century has four columns to the page. The Vatican codex also dated from the 4th century has three. The Alexandrian codex which dates from the very late 4th or the early 5th has two, while the codex of Beza which dates from the 6th century has but one column to the page.

In order to prevent mistakes in the putting together of the quires a quire mark was put on each quire, sometimes on the first sheet and sometimes on the last sheet. In the 11th century catch-words were used to show the connection of the quires.

The scribes took great pains with their manuscripts and ruled them carefully before writing. The lines were pricked off carefully by the use of compasses and ruled with a stylus which made a mark or crease on the vellum. This was ordinarily applied with force enough to make a raised line on the back of the page and sometimes with force enough to show through two or three pages. Later these rulings were colored with inks of brilliant hues and formed part of the decoration of the manuscript. It has been claimed that a certain manuscript, probably dating from the 13th century, shows signs of having been ruled with a lead pencil. This is very doubtful, however. The first distinct mention of lead pencils which we have is about 1565. These pencils were made of wood and strips of natural graphite.

The older literary manuscripts were written entirely in capital letters without any spacing between the words. The cursive or running hand with the letters smaller and more or less connected appears in manuscripts of later date. In the older manuscripts marks were introduced to show the ends of sentences and occasionally dots were inserted to mark the separation of words where otherwise the meaning would be ambiguous. These marks, however, are not related to our modern punctuation.

The tendency to separate words appears first in non-literary documents, such as legal documents or matters of record. As the tendency to separate words developed at first only the long words were separated and for a long time short words were connected with those before them as is still done in Italian. It was not until the 11th century that the custom of spacing all words became general and then only in Latin manuscripts. The correct separation of words in Greek manuscripts was never established until the manuscripts themselves were superseded by printing in the 15th century.

The paragraph appears as early as the 4th century B.C. It was generally indicated, however, by a horizontal mark rather than by spacing. The indenting of the paragraph came later and was followed by the use of the larger letter, first employed to indicate the beginning of the sentences. The development of the sentence itself as a device in composition was somewhat similar to that of the paragraph.

It is difficult to tell where the use of punctuation begins. Some very early manuscripts show the rudiments of it. The first punctuation mark was the stop at the end of the period. This was originally two dots, or our colon. When this became one dot it was at first the lower one that was omitted so that the second form of the period is a dot level with the top of the letter. The period, colon, and comma were each represented by a single dot, the value depending upon whether it was on a level with the top, the middle, or the bottom of the letter. During the middle ages a system of punctuation was developed approximately as we now have it.

Unfortunately words had the same tendency to refuse to fit the line that bothers the modern compositor. The scribe, not being limited by the resources of a font of type, did not hesitate to crowd his letters or reduce them in size in order to get a word into a line. He also made use of various devices of abbreviating words and combining letters to produce the same result. These devices, however, were not very satisfactory and division of words was always

more or less practiced. The Greeks usually divided after a vowel with no regard to syllables. They even divided monosyllables in this way. The Romans, however, always practiced syllabic division very much as we do to-day.

Another form of division of the text was what is called calometry, that is to say, the breaking up of the text into short clauses or sense lines to facilitate oral reading. This is done particularly in cases of orations, the Bible, and similar compositions largely used for oral reading. As in the papyrus, the title was ordinarily inserted at the end and accompanied by some account of the work, place of copying, copyist, date, or other information. This sort of appendix was called a colophon. The practice of writing colophons was taken over by the early printers and is the source of much of our most valuable information concerning the early products of the press. Occasionally the title of the work was given at the beginning although the custom of beginning the work with the statement of its title, developing into the title page as we know it, did not become general until some time after the invention of printing. Occasionally a manuscript was even furnished with running titles on the page heads. The pages were not numbered until after the invention of printing.

After the earliest times quotations were indicated by ticks on the margin or by indented paragraphs. Sometimes the substance of the quotation was written in a smaller hand or otherwise distinguished from the body of the text. Scribes were by no means infallible and corrections are not uncommon. Erasures on papyrus were difficult, if not impossible, and therefore other means of correction had to be used. This is particularly the case because writing material was too expensive to be wasted and a copyist's mistake could not be permitted to spoil a roll of a papyrus or a sheet of vellum. In the case of vellum, however, if the mistake were immediately discovered the ink could be washed off with a sponge. If, however, the mistake were discovered only on revision after the ink had bitten into the vellum, it was necessary to use the knife and to restore the surface as well as possible by rubbing it with some smooth hard substance like the rubber shown in the illustration on page 13. Superfluous letters or words were sometimes removed by drawing a pen through them and sometimes removal was indicated by dots, or small marks, which might be over the letters, under them, or even in the open spaces of the letters themselves. Attempts were occasionally made to make one letter over into another to correct a mistake. Omitted passages or notes are inserted in the margin with some indication of the place where they should be read in the text. Abbreviations and contractions were very extensively used, partly to avoid labor and partly to save material. Phrases of frequent occurrence and perfectly well-known meaning were indicated simply by initials like the familiar S. P. Q. R., Senatus Populusque Romanus, the Roman Senate and People, or the s. s. a. b. s. m. used by Spaniards to close letters, meaning "your faithful servant who kisses your hands."

Letters commonly occurring together were elided and abbreviated, as was done to a limited extent as late as the 18th century, at which period we see such abbreviations as yt=that. It may be interesting to note that y in this combination and the similar combination "ye," used as the article, is not the semi-vowel y but is the survival, or revival, of an Anglo-Saxon letter of very similar form called "thorn" and equivalent in value to th. In the "yt" then, we have the y or thorn substituted for th and the vowel elided, but the sign should be pronounced "that." The sign "ye" as in the familiar phrase of the posters "ye olde folkes' concerte," should always be pronounced "the" and never like the pronoun ye.

Another result of the expensiveness of writing material was the practice of erasing whole works in order that the vellum might be used over again. This erasing was done with a knife or pumice stone and when resurfaced by rubbing the vellum could be readily used a second time. A manuscript thus treated is called a palimpsest. The pious monks of the middle ages, naturally believing that the lives of the saints and other religious works were of more importance than the works of Pagan orators, philosophers, and historians, or even than old copies of the Bible which had been superseded by newer and better decorated ones, made extensive use of old manuscripts in this way. Fortunately, however, it is possible by careful treatment to restore the original writing at least sufficiently to make it possible to decipher it. In this way a considerable number of extremely valuable texts which would otherwise have been entirely lost have been recovered from palimpsests.

The reference just made to decoration reminds us that the makers of manuscripts, particularly during the middle ages, took enormous pride in their work and were as anxious to produce sumptuous books as the most ambitious publisher of to-day and were often far more successful. The scribe who was to make a fine manuscript chose his vellum with great care. He laid out his work with compass and ruler with the utmost precision. He was careful that his ink and his pigments should be of the most brilliant color and the finest quality. He looked well to the care of his pen and inscribed each letter with the patient care of the most skillful engrosser of to-day.

The development of the sentence and paragraph had brought the use of letters of larger sizes to mark these divisions. These, especially the paragraph initials, afforded an endless field for his ingenuity and the exercise of his artistic ability. A great initial letter might be made in any fanciful shape of which he could think. It might become a part of a beautifully executed miniature. It might be surrounded by a mass of gorgeous ornamentation extending to the bottom or the other margin of the page and enriched by everything beautiful or grotesque of which the writer could think. All this ornamentation was often executed in gold and colors and was one of the chief methods of artistic expression of the middle ages.

In addition to these decorations the ancient books dating from late Roman times onward were often illustrated, sometimes profusely so. Full page pictures were inserted illustrating the text or giving the portraits of persons referred to in it. The oldest of these pictures are in a bad state of preservation on account of the crude methods of the artists. The background was first painted in a solid color. A figure, for instance, would then be put on in another color, clothing would be painted over that, armor over clothing and so on. The picture being thus built up in layers of different paints it was very liable to flake off, leaving only the background. Illustrations dating from the introduction of a better technique are still very beautiful.

No language could adequately describe the beauty and the richness of these decorations, or illuminations as they are termed. They look out to us to-day from the yellowing vellum with all the brilliancy of color and vigor of conception which they originally possessed. They are not only beautiful in themselves but they are a valuable source of information concerning the life of the middle ages. In those days the painters of pictures made no attempt at archæological accuracy. If they were illuminating a Bible they represented Abraham and Moses, Pharaoh and Solomon, Jesus and Paul and Goliath in the costume of the king, priest, citizen, or soldier of the painter's own day. Their method of treatment of their subjects, the subjects chosen, the use of materials in ornamentation, every detail of these decorations is eloquent of the life and thought of the ages in which they were produced.

CHAPTER V

Ancient and Mediæval Libraries

BOOKS involved libraries. The book is written to preserve a record and this involves the preservation of the book itself. Consequently almost all of the centers of the world's civilization were at the same time the homes of great collections of books, or libraries. The ancient Egyptians had many such although we have the record of but one. Rameses the Great, who has been generally, though probably erroneously, identified as the Pharaoh of the Exodus, but who probably lived within about a century of that time, housed a great library in his palace at Thebes. Such a library, of course, would have consisted of papyrus rolls and must have been rich in that learning of the Egyptians which the old chronicle tells us was familiar to Moses. What would we not give if we could only find those precious rolls in some of the corners which the archæologists are so busily exploring and which are constantly yielding new stores of information about that ancient civilization?

Some centuries later two of the Assyrian kings, Sennacherib and Assurbanipal, collected a great library which has been in large part recovered. Such a library, as we have seen, consisted of clay tablets and these tablets were kept in large earthenware jars. The contents of the library were partly contemporary but more of it consisted of copies of ancient works. Many thousands of these texts have been recovered from the ruins of Babylon and are now being translated. They cover the whole field of literary activity, religion, law, history, grammar, science, magic, and romance.

One of the old Israelitish cities, near Hebron, is called Kirjath-sepher, or city of books. Both the city and the name, however, antedate the Jewish occupation of Palestine and are probably memorials of a time when this city was a center of that Assyrian culture which covered the entire region later known as Palestine.

The classic civilization, with its great development of literary activity, of course involved the formation of libraries in all the more important cities, as such places were the natural centers of culture. We know something of the libraries of Athens, Antioch, Ephesus, Pergamus, Rome, Alexandria and Constantinople. The most famous of these was the great collection, or rather collections, of books at Alexandria. Collectively these rivalled in size some of the great modern libraries, a very remarkable fact when we consider the conditions under which books were made at that time. Undoubtedly practically the entire literary output of the classic civilization was contained in these collections. Unfortunately no traces of them remain. Accident and conquest caused their entire destruction. The earlier historians told a pitiful tale of the wanton destruction of the library by the Mohammedan conquerors who in their fanaticism destroyed as useless or harmful all works not devoted to the dissemination of their own doctrines. While it is probably true that the Mohammedans were responsible for a wholesale destruction, it is probable that the library had already suffered sadly by the destruction by fire of one or more of its separate collections and that what was destroyed in their time was only the remains of the former splendid collection. The library of Constantinople, being later than the others in its formation, probably had more direct effect on the culture of mediæval and modern times than any of the preceding ones.

In addition to these great public or semi-public libraries, there were of course great numbers of private libraries. Wealthy and cultivated men throughout the Roman empire and

beyond had their private collections, as wealthy and cultivated men do to-day. While the illiterate classes were proportionally much more numerous than they are in modern communities, and the use of books was limited to a comparatively small portion of the population, the small educated class was highly cultivated and keenly interested in the reading and ownership of books.

None of these early collections survives even in any existing fragments. The devastating wars of the first Christian centuries destroyed all such perishable things. The Assyrian records not being on perishable material survived the destruction of the buildings in which they were contained and remained buried until brought to light by recent excavations. The Egyptian records have survived partly because they were so largely in the nature of inscriptions on the walls of the great temples and the carefully constructed tombs, and partly because so many of them were sheltered in the resting places of the dead. Not only were the mummies wrapped in cloth and papyrus inscribed with the Book of the Dead and other Egyptian texts, but many documents and papers were buried with the bodies. It was the custom of the Egyptians to bury with the dead all their personal papers including unopened letters and papers belonging to other persons which happened to be in the possession of the deceased at the time of his death. Many a letter has thus been read for the first time by some modern archæologist 3000 years or more after the death of both sender and receiver.

We undoubtedly owe to the Christian church, and especially to the institution of Monasticism, the preservation of so much of the ancient literature as we now possess, as well as the preservation of the spirit of learning and that impulse to create literature out of which grew the literatures of mediæval and modern times. As has already been stated, the monasteries became the centers of literary activity. The studying, copying, and creation of books was a recognized part of the duty of the monks. In society as constituted after the fall of the empire and far into the mediæval ages the monks were the only educated people in the community. The nobles were rough unlettered soldiers. Even kings were unable to read and write. The business of the state was largely in the hands of churchmen who filled the offices of civil administration, conducted the legal business of the community, served as its physicians and, in short, discharged nearly all those functions which required education and literary training. The mercantile class knew only enough to keep track of their business by the help of mechanical contrivances and the rudest methods of accounting. The great mass of mechanics and agricultural laborers were entirely illiterate. King and peasant alike depended upon the clergy for their knowledge of past transactions, national records, and the teachings of religion.

Under these circumstances the monasteries naturally built up libraries. Originally these libraries began with copies of the scriptures or of books containing portions of them, such as the Gospels and the Psalms. To these were added Mass books, collections of the writings of the fathers of the church and the sermons of famous preachers, volumes of commentaries on the scriptures and the works of the fathers, and lives of the saints, and, in course of time, treatises on theological subjects. Even the life of a monastic community, however, is not all religious. Consequently we find the monks writing chronicles which were the beginnings of history. These chronicles originally were merely dry statements of the events which happened in the monastery, the community in which it was located, or even the country. At first dry notebooks without historical perspective and with very little detail, they gradually developed into something like a historical narrative of occurrences with estimates of character and statements as to the causes and effects, as well as the mere occurrence, of events. Then came works on natural history, medicine, music, grammar, in fact all the matters in which men are interested. Poetry struggled for expression and the romantic adventures of the real men and women of the time stimulated imagination to the production of tales and romances. For historical information and for literary models the writers looked to the great authors of a previous age, and attention was given to the copying of such remains of ancient literature as had survived the fall of the old civilization. Practically every manuscript that we have of the ancient authors is the salvage from some old library of a mediæval monastery.

Every religious house came to have its library, or scriptorium, which was at once the place for the making and the keeping of books. Some brother especially suited for the task, sometimes even the abbot himself, was in charge of the library and of the brothers who worked there. Sometimes the entire work on a manuscript would be done by a single man. At other times there was a division of labor. One brother, for example, would pick out the vellum, see to the condition of the skins, arrange the quires, and rule them with compass and stylus. Another, or a group of others, would write the plain text. In the case of a large book, a certain number of quires might be given to each one of a group of copyists. A third would put in the illuminated capitals and the pictures, or either of them, while still another would examine the completed manuscript, comparing it with the original and correcting any errors which might be discovered.

To the artist and illuminator this work was undoubtedly delightful but to the man who had to do the drudgery of mere copying of long works, it was undoubtedly a wearisome task. Every effort was made to incite these men to care and patience by magnifying the importance of their work and especially by representing it as a work of religion. It was held that the making of books, especially books of religion, was in a very special way agreeable to God

and that salvation might be obtained in this manner when other means failed. It was even taught that there was a special relation between the amount of writing done and the number and magnitude of the sins to be atoned for. A story was widely circulated which is interesting for the light which it throws upon the childlike and literal way in which the things of the spirit were regarded by the mediæval mind. It was said that a certain man entered a monastery with his soul burdened by many and grievous sins. He was set to the copying of a Bible and in due time completed the task alone. The task brought him salvation because the number of letters in the Bible exceeded by one the number of his sins.

In time some of these libraries came to be of very considerable size even by modern standards. A few of them remain almost intact to our own day. The mediæval librarians, as was proper considering the value of their charges, were very solicitous about the care of their books. Readers were warned to handle the books with care, to be careful about turning the leaves and especially to keep their fingers off the ink. Evidently the ancient readers had the tendency common to unskillful readers everywhere to trace the lines with their fingers as they read. The books were classified by subject matter, numbered, and catalogued. Some of these ancient catalogues showing the exact contents of the monastic libraries and the contemporary ideas of classification, not always the same as our own, are still preserved. An interesting list remains of nine books brought over to England by St. Augustine the missionary which formed the first library of Christ Church in Canterbury. It consisted of a Bible in two volumes, a psalter, a book of gospels, lives of the apostles, lives of the martyrs and an exposition or commentary on the gospels and epistles.

Books were loaned quite extensively. This was especially true among the monasteries of the same order. These orders naturally looked to certain of their houses as the leading or mother establishments in various localities. These leading establishments were often the actual mother houses from which others had been created by colonization, besides being the seats of the high officials of the order. Naturally the age and wealth of these central houses enabled them to possess large and valuable libraries. It was their duty to see that the smaller houses were provided with correct copies of the rules and regulations of the order, service books which it used, and other valuable material, as well as to assist them to secure more strictly literary material. Therefore some of these places became veritable circulating libraries for the subordinate houses. In addition to this there was a certain amount of loaning between the orders and persons outside the orders both clerical and, at a later period, lay.

These loans were carefully registered and regulated and excepting when occurring in the regular discharge of duty were guarded by the most vigilant precautions. The books were, of course, carefully provided with identification marks. Loan was made a matter of record and pledges were exacted for the safe return of the volume. This pledge was sometimes the deposit of a manuscript supposed to be of equal value, sometimes a mortgage on property, and sometimes a deposit of money or jewels. In spite of all these precautions, however, loans were not infrequently abused. Borrowed volumes were sometimes never returned. Sometimes the identification marks were removed, as existing manuscripts show. Sometimes passages were erased from a borrowed book because the borrower considered them heretical. Ancient borrowers were also addicted to one of the most exasperating of modern literary crimes, the scribbling of their own opinions on the margins of borrowed books. Valuable books were kept chained to the desks which were provided for those who had occasion to consult them. The old library of Durham Cathedral contains many of the old volumes, still chained to their original places. In the early days of Bible translation in England the huge folio Bibles of the period were chained in the churches where all could consult them.

All this precaution, of course, is testimony to the great value of books at this period. It is true that the labor of the monks was not paid but they had to be supported while at their work and owing to the time taken to write, or rather paint, a manuscript, for it was really rather painting than writing, this was no small item. The materials used were also expensive. Parchment was costly and tended to become more so as the increase of literary activity and the multiplication of books increased the demand for it. Considerable expense was also involved in the colored inks and especially in the gold which was used so lavishly in the decorations. Monasteries and rich men regarded manuscripts as among their chiefest treasures. Special provision was made for the purchase of materials and the maintenance of the monastery libraries. The name of the generous benefactor who gave a book or, more commonly, the material for one, was inscribed in the book, often with a request for the prayers of the reader, and was borne upon the honorable roll of the benefactors of the house. Large sums of money and even estates were given for choice manuscripts and manuscripts were considered worthy gifts for kings. We have a record of the 12th century in England of fifty marks being paid for a Bible. This sum of money, taking into account the very great difference in purchasing power, would represent at least $3000 of the money of to-day.

As time went on enlightened kings like Alfred of England and the Emperor Charlemagne patronized and forwarded learning. Laymen, particularly kings and great nobles, began to collect libraries of their own. The National Library of France was begun by King John, who reigned from 1350 to 1364, who started it with twenty volumes. His son Charles V brought the number up to 900. It contained books on devotion, astrology, law, medicine, history, and

a few classics.

The revival of learning in the 14th century, as might be expected, gave a great stimulus to the production of manuscripts and at the time of the invention of printing from movable types in the middle of the 15th century the manufacture of manuscripts was going on rapidly and there were many great libraries in existence. Matthias Corvinus, King of Hungary in the 15th century, had a library of nearly 50,000 volumes. Duke Frederick of Urbino in Italy had one nearly as large. Duke Frederick had thirty-four copyists regularly employed in his library. It is interesting to note that this library contained perfect copies of practically every book known to be in existence at that time. This fact throws an interesting light on the extent of the world's literature so recently as 500 years ago. Among the earliest of the libraries formed outside of monasteries were those collected by the Arabs of North Africa and Spain. Although some of the early Mohammedan conquerors were ignorant and bigoted fanatics like the destroyer of Alexandria, the Arabs, or Saracens as they are sometimes called, as a whole were a highly civilized people of great culture in art, science, and literature. They were far in advance of their Christian neighbors and continued to be so until their final overthrow in Spain by Ferdinand and Isabella about the time of the discovery of America.

The growth of the universities from the 12th century onward played a great part in the multiplication of books and the growth of libraries. Then, as now, the library was the heart of the university. Even more than now the students depended on its contents. Obviously only the richest students could buy any great number of books, and, equally obviously, every student needed to use them, bought what he could, borrowed the rest, and became a book collector for the rest of his life. The university libraries grew by purchase, by copies made on the spot, and by bequests. Then, as now, there were in every university a good number of men "working their way." The copying of manuscripts was their great resource.

Naturally all this demand caused the production of many very badly executed manuscripts. This and other abuses were, however, controlled to a great extent by the university authorities who assumed control over the publication and sale of books. Old books, of course, could be freely sold, subject only to careful checking up of the correctness of the copy. New books had to be read three days in succession before the heads of the university or other public judges, always churchmen, and had to receive their sanction before being copied and put on sale.

This was done by the stationer who derived his name from the Latin word *statio* meaning a shop. The stationers made, sold, and rented books and sold writing materials and the like very much as at present. They were stringently regulated by the universities. They must be men of learning and character; must bind themselves to obey the laws of the university; must offer no copy for sale unless it was approved; must sell at rates fixed by the university; must purchase only books sanctioned by the university; and must loan books to those too poor to buy them at rates fixed by the university.

This careful regulation of the book trade of the university towns was originally intended for the best of purposes and was productive of much good. Unfortunately it also opened the door to much evil. It established the principle of control of the press, a principle always destructive of liberty and progress. By long use this control came to appear quite the right and normal thing. Used at first to secure the interests of learning and the protection of scholars, it became at length the powerful weapon of party in Church and State. It was used alternately to silence Protestant, Catholic and Dissenter, and to muzzle all discussion of social and political questions. Control of the printing press became at last the greatest enemy of civilization, freedom, and enlightenment alike in the old world and in the new and it remained until largely swept away by the movement which culminated in the French Revolution of 1793.

Some of the university libraries early grew to generous size. That of the Sorbonne, for example, numbered 1720 volumes in 1338. This particular library consisted very largely of religious literature, as the main interest of the Sorbonne of that day was theological. Other university libraries were of wider range. Many of the old university libraries are yet in existence.

CHAPTER VI

The Dawn of a New Era

METHODS of inscribing words or characters upon vellum or other writing material other than by the toilsome process of handwriting had long been in existence. Among the oldest of human remains are stamps and seals for the impression of symbols, words, or signatures upon plastic substances, as the impression of a signet or seal is now made on

sealing wax softened by heat. Originally these seals were incised so that the impression was left in raised characters on the receiving substance, as is now usually the case with seals and signets. Later the designs were sometimes cut in relief so that the figure resulting from the impression was not raised in the substance but pressed into it. From this it was but a step to put some coloring substance on the raised part of the seal or die and so print it on an unyielding surface such as vellum or papyrus, as hand stamps are now used for a great variety of purposes. Documents were signed in this way by persons who were either too illiterate to write their names or too occupied with business to take the time to sign the great numbers of documents which were brought before them. The peculiar characteristics of the Chinese alphabet early prompted this inventive people to the use of these types, for such these devices were. The Chinese are said to have used movable types made of porcelain at a very early period. The use of the seal or the stamp bearing a single letter naturally led to its enlargement and to the inclusion of more than one letter on the same stamp. As early as the 6th century the Chinese were printing books from wooden plates on which were cut in relief all the characters which were to appear upon a single leaf. This was nothing more or less than our modern stereotype plate, excepting that it was carved by hand on wood instead of being made of metal by a mechanical process. There is, however, no evidence whatever connecting these Chinese essays at printing, whether from blocks or types, with European printing. This last appears to have had an entirely independent origin and development.

In Europe, as has already been noted, stamps were used for signatures and other purposes. It has been observed that certain manuscripts of the 12th century show initials so uniform as to appear to be stamp or die impressions. It can hardly be regarded as clearly established, however, that this is the case. As early as the first half of the 15th century bookbinders used dies both in relief and in intaglio, that is having the design cut into the surface of the die. None of these devices, however, appears to have been used for the purpose of multiplying impressions as is now done with the printing press.

At a comparatively early period, probably as early as the first part of the 12th century, there came a call for the dissemination of knowledge in somewhat rudimentary form among the common people. At an earlier period still this desire had expressed itself in the elaborate sculpture and stained glass with which the churches were decorated. The church itself was the poor man's Bible and his library the lives of saints and martyrs. The story was told to him by the priest. It was visualized by the artist. Conventional types or attributes of biblical and other personages were adopted so that the peasant or the artisan could recognize anywhere the figure of Christ, of one of the evangelists, of Moses, or of the patron saint of his church or city.

The clergy and the lettered classes had long been accustomed to the pictures which not only decorated but interpreted the pages of their books. It was only natural that there should be a desire to have at least these pictures in the hands of the people so as to reinforce in the home the teachings of the church. The multiplication of these pictures, so costly and so tedious in their production, was clearly out of the question, but why not make a stamp big enough to carry a picture of a saint or a simple biblical scene, make an impression from it on vellum and so produce a rude but cheap picture which could be multiplied indefinitely and sold at a low rate?

No one knows who invented this idea or who first practised making these picture sheets. We know, however, that such sheets were printed as early as the 12th century. Originally printed upon cloth or vellum, by the middle of the 14th century they came to be printed on paper, and by the early part of the 15th they had become very common. Circulated at first only in single leaves, at a later period the leaves were folded and combined into quires as in other books and we have the fully developed block book as it is called, each leaf being printed from a single plate.

Some of these books were printed in many editions and had enormous circulation. At a later period a few lines of explanatory text were added to the picture. In some cases these lines were part of the plate. In other cases they were written and in some they were even printed, as the use of the block book survived the invention of typographical printing. These block books were exactly like the picture books which we now place in the hands of little children. They were to be looked at rather than read. The meager explanatory text, as in the case of the child's book, served the double purpose of a simple reading lesson and of an aid to the explanation of the book for the benefit of the owner by some wiser person. One of the most popular of these books was the Biblia Pauperum, or Poor Man's Bible. This contained a large number of pictures covering the more striking incidents of the biblical story. These were not arranged in any particular order, as the idea of historical study of the scriptures had not yet made its appearance.

A sample page for instance, shows an architectural design. The larger part of the page is occupied by three panels. Above and below the middle panel are two smaller ones leaving four blank rectangles at the corners of the page. The middle one of the larger panels shows Jesus rising from the tomb while the other two show Samson carrying away the gates of Gaza and Jonah being disgorged by the whale. Each of the two smaller panels at top and bottom is occupied by two figures, the four being intended to represent David, Jacob, Hosea, and Zephaniah. Fortunately the "portraits" are labelled as these biblical worthies are represented in the ordinary costume of well-to-do citizens of the early part of the 15th

century.

Page from the second edition of the Poor Man's Bible, about 1450.

This and other block books continued to be reprinted in type after the invention of typography. One block book and one only, so far as is known, was without pictures. This was a Latin grammar commonly known as Donatus, from its author the famous Roman grammarian Donatus of the 4th century. This was the one Latin grammar in use in the middle ages, when Latin was the foundation of all culture. It was, therefore, very extensively used and it is supposed that more copies were printed of it than of any other block book. It has the further distinction of being the only block book printed on vellum. Ordinarily the desire for cheapness and the much greater ease of handling the material caused the block books to be printed on paper. The importance of the Donatus as a book of reference and the hard usage it was likely to receive at the hands of schoolboys caused the use of the more expensive but more durable material.

Particular interest attaches to one block book called the Speculum Humanæ Salvationis or "Mirror of Salvation." In a way this book is the connecting link between block books and type printed books. There is no copy of this book in existence printed entirely from wooden blocks. Most of the early editions are printed from movable types with a block printed illustration at the head of each page. One of them, however, has twenty pages of the text out of the sixty-two which constituted the entire book printed from wood blocks. These twenty pages are inserted at intervals among the others, and how and why they came there is a riddle beyond guessing.

It has been conjectured by some that the long-held belief that Gutenberg was a polisher of mirrors is erroneous and that the reference in certain of the scanty documents concerning him to business about mirrors may refer to attempts on his part to print an edition of this book, "The Mirror of Salvation."

In making a block book the design was cut on the side of a flat piece of wood, not on the end of the block as was the later practice in wood engraving. Sometimes, as has been said, a design thus cut was only a picture. Sometimes it was both picture and text. The design was cut in relief, that is to say the wood was cut away leaving the design to be impressed upon the paper raised. The block was then thoroughly wetted with a thin, watery, pale brown material much resembling distemper. A sheet of damp paper was laid on it and the back of the paper was carefully rubbed with a dabber or burnisher. It is probable that other inks were employed, especially for vellum, and it is also extremely probable that a rude press, ancestor of the modern printing press, was used to produce the impressions in many cases. The resulting book consisted of sheets printed on one side only, although there are a few very late examples in which printing appears on both sides. The pictures were commonly roughly colored by hand.

Playing cards were at one time supposed to have been the first products of this method of printing. It was naturally supposed that the small and comparatively simple design on the face of the playing card might be regarded as the original from which the more elaborate picture and book might be developed. This opinion has now, however, been abandoned, as it is known that the earliest playing cards were hand drawn and painted and that the block

printed playing cards which we have date from the 15th century when block printing was very common.

It has already been said that these blocks contained not only pictures but text, one very important block book consisting of text alone. What determined the form of the letters composing this text?

There were four types of handwriting recognized in the manuscripts of the period which we are considering. The first was the book hand. This was the recognized type of script used in the production of books and it existed in two forms, the set or upright in which the letters were carefully formed, held upright, and without ligatures or connecting strokes between letters, and the cursive in which the letters were sloped and ligatured. The second type was the church hand, used for ecclesiastical manuscripts and familiar to us as the Gothic or black letter. This also appears in two forms. Manifestly the Gothic does not lend itself to a cursive form so that the two types which appear are the set or upright, similar in its characteristics to the corresponding book hand, and the ornamental or calligraphic which, as its name implies, was an ornamental type of the set hand. The third type was the letter hand, used by persons who were not professional penmen in correspondence and the ordinary uses to which handwriting is applied. The fourth was the court or charter hand. This hand was used for court records, deeds, charters, and all sorts of legal documents. The first two types were highly conventionalized and left very little to the "hand" as we now say of the individual writer. The third, as might be supposed, while following certain general models offers all the peculiarities of individual handwriting at any age. The fourth is intermediate in regard to its conventionality between the first and second types and the third.

These recognized conventional types of handwriting were imitated in the cutting of the blocks. They were also imitated when the letters, instead of being cut in groups on a block to form an inscription, were cut on the ends of single types to be used in printing. The first printing, whether on blocks or from types, was an imitation of manuscript and this determined the letter faces.

The early 15th century, then, sees everything prepared for the invention and use of movable types for printing purposes. There is a greater demand for books than the hard working copyists can supply. The idea of making impressions from stamps has become very familiar through long use. Ink and paper suitable for these impressions have been discovered and are obtainable at a reasonable price. The rude presses used for so many other purposes have been adapted to the taking of these impressions. Everything is ready for the invention which is to revolutionize the intellectual life of mankind.

SUPPLEMENTARY READING

The Story of the Alphabet. Edward Clodd.

The Story of Books. G. B. Rawlings.

Books in Manuscript. Falconer Madan.

Books and Their Makers in the Middle Ages. Vol. I. G. H. Putnam.

Encyclopædia Britannica. Eleventh Edition.
    Articles:
        Alphabet (very scholarly and in large part suitable only for very advanced students.)
        Paleography.
        Manuscript.
        Book.
        Libraries.
        Bookbinding.
        Bookselling.
        Papyrus.
        Paper.
        Ink, and many others which will suggest themselves during the study of the articles named.

REVIEW QUESTIONS

1. Name some of the earliest devices for communicating ideas to the absent.

2. What was the most important of these devices, and why?

3. What is an ideogram?

4. What is a phonogram?

5. Tell how phonograms became alphabets.

6. Who were the Egyptians and what kind of characters did they use?

7. Who were the Assyrio-Babylonians and what kind of characters did they use?

8. Who were the Cretans and what kind of characters did they use?

9. Who invented the alphabet?

10. Where did they get the material for the alphabet?

11. What is papyrus, and how was it made?

12. What is vellum, and how was it made?

13. Who invented paper, and when?

14. Who introduced it into Europe, and when?

15. What made the use of paper common, and why?

16. What writing material was invented in the 19th century?

17. What are some of its advantages and disadvantages?

18. What are tablets and how were they made and used?

19. What kind of ink did the ancient people use?

20. When were irongall inks invented?

21. What kind of ink did the early printers use?

22. What did the ancient writers write with?

23. What was the form of the ancient papyrus book?

24. What effect did the use of vellum have on the form of the book?

25. Describe the evolution of the bound book.

26. When did books become popular as compared with rolls?

27. What were some of the advantages of the book as compared with the roll?

28. What can you tell of the make-up and appearance of a manuscript roll?

29. What can you tell of the make-up and appearance of a vellum book?

30. What can you say of the lettering, spacing, etc. of early manuscripts?

31. Give some account of the introduction of (a) word separation, (b) paragraphs, (c) sentences, (d) punctuation.

32. What did the writer do when the words did not fit the line?

33. What can you say about titles, running heads, and numbering of pages?

34. How were quotations indicated?

35. How were mistakes treated?

36. What use was made of abbreviations and contractions?

37. How do you pronounce "ye" and "yt," abbreviations for "the" and "that," and why?

38. What is a palimpsest?

39. What did the old writers do to make their books beautiful?

40. What is the present value of the book decorations of the middle ages?

41. What are the oldest libraries we know anything about?

42. What is the oldest one of which any part has been preserved?

43. What was the most famous library of classical time, and what became of it?

44. Have we any remnants of the libraries of the classical period? Why?

45. To what do we owe the preservation of classical literature?

46. How did the monasteries come to have libraries?

47. What was the scriptorium of a monastery?

48. How was the work done there?

49. How were books cared for in the middle ages?

50. How were they loaned and under what conditions?

51. What can you say of the value of books in the middle ages, both in money and in sentiment?

52. Who besides the monasteries had libraries?

53. What had the universities to do with the growth of libraries?

54. What did the universities do to secure the multiplication of books and the correctness of copies?

55. How old is the practice of marking letters or words by some sort of stamp?

56. What early experiments did the Chinese make in printing?

57. Did these experiments have any effect in Europe?

58. What is a block book?

59. When were block books first made, and why?

60. Describe some famous block books.

61. Describe the process of making a block book.

62. What determined the form of the letters composing the text of block books?

63. Describe the four types of handwriting and their principal varieties.

64. Tell how and why the first half of the 15th century was ready for the invention of typography.

TYPOGRAPHIC TECHNICAL SERIES FOR APPRENTICES

THE following list of publications, comprising the Typographic Technical Series for Apprentices, has been prepared under the supervision of the Committee on Education of the United Typothetae of America for use in trade classes, in course of printing instruction, and by individuals.

Each publication has been compiled by a competent author or group of authors, and carefully edited, the purpose being to provide the printers of the United States—employers, journeymen, and apprentices—with a comprehensive series of handy and inexpensive compendiums of reliable, up-to-date information upon the various branches and specialties of the printing craft, all arranged in orderly fashion for progressive study.

The publications of the series are of uniform size, 5 x 8 inches. Their general make-up, in typography, illustrations, etc., has been, as far as practicable, kept in harmony throughout. A brief synopsis of the particular contents and other chief features of each volume will be found under each title in the following list.

Each topic is treated in a concise manner, the aim being to embody in each publication as completely as possible all the rudimentary information and essential facts necessary to an understanding of the subject. Care has been taken to make all statements accurate and clear, with the purpose of bringing essential information within the understanding of beginners in the different fields of study. Wherever practicable, simple and well-defined drawings and illustrations have been used to assist in giving additional clearness to the text.

In order that the pamphlets may be of the greatest possible help for use in trade-school classes and for self-instruction, each title is accompanied by a list of Review Questions covering essential items of the subject matter. A short Glossary of technical terms belonging to the subject or department treated is also added to many of the books.

These are the Official Text-books of the United Typothetae of America.

Address all orders and inquiries to Committee on Education, United Typothetae of America, Chicago, Illinois, U. S. A.

PART I—*Types, Tools, Machines, and Materials*

1. **Type: a Primer of Information**   By A. A. Stewart

Relating to the mechanical features of printing types; their sizes, font
schemes, etc., with a brief description of their manufacture. 44 pp.; illustrated;
74 review questions; glossary.

2. **Compositors' Tools and Materials**   By A. A. Stewart

A primer of information about composing sticks, galleys, leads, brass rules,
cutting and mitering machines, etc. 47 pp.; illustrated; 50 review questions;
glossary.

3. **Type Cases, Composing Room Furniture**   By A. A. Stewart

A primer of information about type cases, work stands, cabinets, case racks,
galley racks, standing galleys, etc. 43 pp.; illustrated; 33 review questions;
glossary.

4. **Imposing Tables and Lock-up Appliances**   By A. A. Stewart

Describing the tools and materials used in locking up forms for the press,
including some modern utilities for special purposes. 59 pp.; illustrated; 70
review questions; glossary.

5. **Proof Presses**   By A. A. Stewart

A primer of information about the customary methods and machines for taking
printers' proofs. 40 pp.; illustrated; 41 review questions; glossary.

6. **Platen Printing Presses**   By Daniel Baker

A primer of information regarding the history and mechanical construction of
platen printing presses, from the original hand press to the modern job press,
to which is added a chapter on automatic presses of small size. 51 pp.;
illustrated; 49 review questions; glossary.

7. **Cylinder Printing Presses**   By Herbert L. Baker

Being a study of the mechanism and operation of the principal types of
cylinder printing machines. 64 pp.; illustrated; 47 review questions; glossary.

8. **Mechanical Feeders and Folders**   By William E. Spurrier

The history and operation of modern feeding and folding machines; with hints
on their care and adjustments. Illustrated; review questions; glossary.

9. **Power for Machinery in Printing Houses**   By Carl F. Scott

A treatise on the methods of applying power to printing presses and allied
machinery with particular reference to electric drive. 53 pp.; illustrated; 69
review questions; glossary.

10. **Paper Cutting Machines**   By Niel Gray, Jr.

A primer of information about paper and card trimmers, hand-lever cutters,
power cutters, and other automatic machines for cutting paper. 70 pp.;
illustrated; 115 review questions; glossary.

11. **Printers' Rollers**   By A. A. Stewart

A primer of information about the composition, manufacture, and care of
inking rollers. 46 pp.; illustrated; 61 review questions; glossary.

12. **Printing Inks**   By Philip Ruxton

Their composition, properties and manufacture (reprinted by permission from
Circular No. 53, United States Bureau of Standards); together with some
helpful suggestions about the everyday use of printing inks by Philip Ruxton.
80 pp.; 100 review questions; glossary.

13. **How Paper is Made**   By William Bond Wheelwright

A primer of information about the materials and processes of manufacturing
paper for printing and writing. 68 pp.; illustrated; 62 review questions;
glossary.

PART IV—*Presswork*

26. Making Ready on Platen Presses By T. G. McGrew

The essential parts of a press and their functions; distinctive features of commonly used machines. Preparing the tympan, regulating the impression, underlaying and overlaying, setting gauges, and other details explained. Illustrated; review questions; glossary.

27. Cylinder Presswork By T. G. McGrew

Preparing the press; adjustment of bed and cylinder, form rollers, ink fountain, grippers and delivery systems. Underlaying and overlaying; modern overlay methods. Illustrated; review questions; glossary.

28. Pressroom Hints and Helps By Charles L. Dunton

Describing some practical methods of pressroom work, with directions and useful information relating to a variety of printing-press problems. 87 pp.; 176 review questions.

29. Reproductive Processes of the Graphic Arts By A. W. Elson

A primer of information about the distinctive features of the relief, the intaglio, and the planographic processes of printing. 84 pp.; illustrated; 100 review questions; glossary.

PART V—*Pamphlet and Book Binding*

30. Pamphlet Binding By Bancroft L. Goodwin

A primer of information about the various operations employed in binding pamphlets and other work in the bindery. Illustrated; review questions; glossary.

31. Book Binding By John J. Pleger

Practical information about the usual operations in binding books; folding; gathering, collating, sewing, forwarding, finishing. Case making and cased-in books. Hand work and machine work. Job and blank-book binding. Illustrated; review questions; glossary.

PART VI—*Correct Literary Composition*

32. Word Study and English Grammar By F. W. Hamilton

A primer of information about words, their relations, and their uses. 68 pp.; 84 review questions; glossary.

33. Punctuation By F. W. Hamilton

A primer of information about the marks of punctuation and their use, both grammatically and typographically. 56 pp.; 59 review questions; glossary.

34. Capitals By F. W. Hamilton

A primer of information about capitalization, with some practical typographic hints as to the use of capitals. 48 pp.; 92 review questions; glossary.

35. Division of Words By F. W. Hamilton

Rules for the division of words at the ends of lines, with remarks on spelling, syllabication and pronunciation. 42 pp.; 70 review questions.

36. Compound Words By F. W. Hamilton

A study of the principles of compounding, the components of compounds, and the use of the hyphen. 34 pp.; 62 review questions.

37. Abbreviations and Signs By F. W. Hamilton

A primer of information about abbreviations and signs, with classified lists of those in most common use. 58 pp.; 32 review questions.

PART VII—*Design, Color, and Lettering*

PART X—*Miscellaneous*

62. **Health, Sanitation, and Safety**   By Henry P. Porter

Hygiene in the printing trade; a study of conditions old and new; practical suggestions for improvement; protective appliances and rules for safety.

63. **Topical Index**   By F. W. Hamilton

A book of reference covering the topics treated in the Typographic Technical Series, alphabetically arranged.

64. **Courses of Study**   By F. W. Hamilton

A guidebook for teachers, with outlines and suggestions for classroom and shop work.

ACKNOWLEDGMENT

CONTRIBUTORS

[Pg ix]

The Patteson Press, New York, New York
The Plimpton Press, Norwood, Mass.
Poole Bros., Chicago, Ill.
Edward Stern & Co., Philadelphia, Pa.
The Stone Printing & Mfg. Co., Roanoke, Va.
C. D. Traphagen, Lincoln, Neb.
The University Press, Cambridge, Mass.

For Composition

Boston Typothetae School of Printing, Boston, Mass.
William F. Fell Co., Philadelphia, Pa.
The Kalkhoff Company, New York, N. Y.
Oxford-Print, Boston, Mass.
Toby Rubovits, Chicago, Ill.

For Electrotypes

Blomgren Brothers Co., Chicago, Ill.
Flower Steel Electrotyping Co., New York, N. Y.
C. J. Peters & Son Co., Boston, Mass.
Royal Electrotype Co., Philadelphia, Pa.
H. C. Whitcomb & Co., Boston, Mass.

For Engravings

American Type Founders Co., Boston, Mass.
C. B. Cottrell & Sons Co., Westerly, R. I.
Golding Manufacturing Co., Franklin, Mass.
Harvard University, Cambridge, Mass.
Inland Printer Co., Chicago, Ill.
Lanston Monotype Machine Company, Philadelphia, Pa.
Mergenthaler Linotype Company, New York, N. Y.
Geo. H. Morrill Co., Norwood, Mass.
Oswald Publishing Co., New York, N. Y.
The Printing Art, Cambridge, Mass.
B. D. Rising Paper Company, Housatonic, Mass.
The Vandercook Press, Chicago, Ill.

For Book Paper

American Writing Paper Co., Holyoke, Mass.
West Virginia Pulp & Paper Co., Mechanicville, N. Y.

*** END OF THE PROJECT GUTENBERG EBOOK BOOKS BEFORE TYPOGRAPHY ***

intellectual property (trademark/copyright) agreement. If you do not agree to abide by all the terms of this agreement, you must cease using and return or destroy all copies of Project Gutenberg™ electronic works in your possession. If you paid a fee for obtaining a copy of or access to a Project Gutenberg™ electronic work and you do not agree to be bound by the terms of this agreement, you may obtain a refund from the person or entity to whom you paid the fee as set forth in paragraph 1.E.8.

1.B. "Project Gutenberg" is a registered trademark. It may only be used on or associated in any way with an electronic work by people who agree to be bound by the terms of this agreement. There are a few things that you can do with most Project Gutenberg™ electronic works even without complying with the full terms of this agreement. See paragraph 1.C below. There are a lot of things you can do with Project Gutenberg™ electronic works if you follow the terms of this agreement and help preserve free future access to Project Gutenberg™ electronic works. See paragraph 1.E below.

1.C. The Project Gutenberg Literary Archive Foundation ("the Foundation" or PGLAF), owns a compilation copyright in the collection of Project Gutenberg™ electronic works. Nearly all the individual works in the collection are in the public domain in the United States. If an individual work is unprotected by copyright law in the United States and you are located in the United States, we do not claim a right to prevent you from copying, distributing, performing, displaying or creating derivative works based on the work as long as all references to Project Gutenberg are removed. Of course, we hope that you will support the Project Gutenberg™ mission of promoting free access to electronic works by freely sharing Project Gutenberg™ works in compliance with the terms of this agreement for keeping the Project Gutenberg™ name associated with the work. You can easily comply with the terms of this agreement by keeping this work in the same format with its attached full Project Gutenberg™ License when you share it without charge with others.

1.D. The copyright laws of the place where you are located also govern what you can do with this work. Copyright laws in most countries are in a constant state of change. If you are outside the United States, check the laws of your country in addition to the terms of this agreement before downloading, copying, displaying, performing, distributing or creating derivative works based on this work or any other Project Gutenberg™ work. The Foundation makes no representations concerning the copyright status of any work in any country other than the United States.

1.E. Unless you have removed all references to Project Gutenberg:

1.E.1. The following sentence, with active links to, or other immediate access to, the full Project Gutenberg™ License must appear prominently whenever any copy of a Project Gutenberg™ work (any work on which the phrase "Project Gutenberg" appears, or with which the phrase "Project Gutenberg" is associated) is accessed, displayed, performed, viewed, copied or distributed:

> This eBook is for the use of anyone anywhere in the United States and most other parts of the world at no cost and with almost no restrictions whatsoever. You may copy it, give it away or re-use it under the terms of the Project Gutenberg License included with this eBook or online at www.gutenberg.org. If you are not located in the United States, you will have to check the laws of the country where you are located before using this eBook.

1.E.2. If an individual Project Gutenberg™ electronic work is derived from texts not protected by U.S. copyright law (does not contain a notice indicating that it is posted with permission of the copyright holder), the work can be copied and distributed to anyone in the United States without paying any fees or charges. If you are redistributing or providing access to a work with the phrase "Project Gutenberg" associated with or appearing on the work, you must comply either with the requirements of paragraphs 1.E.1 through 1.E.7 or obtain permission for the use of the work and the Project Gutenberg™ trademark as set forth in paragraphs 1.E.8 or 1.E.9.

1.E.3. If an individual Project Gutenberg™ electronic work is posted with the permission of the copyright holder, your use and distribution must comply with both paragraphs 1.E.1 through 1.E.7 and any additional terms imposed by the copyright holder. Additional terms will be linked to the Project Gutenberg™ License for all works posted with the permission of the copyright holder found at the beginning of this work.

1.E.4. Do not unlink or detach or remove the full Project Gutenberg™ License terms from this work, or any files containing a part of this work or any other work associated with Project Gutenberg™.

1.E.5. Do not copy, display, perform, distribute or redistribute this electronic work, or any part of this electronic work, without prominently displaying the sentence set forth in paragraph 1.E.1 with active links or immediate access to the full terms of the Project Gutenberg™ License.

1.E.6. You may convert to and distribute this work in any binary, compressed, marked up,

nonproprietary or proprietary form, including any word processing or hypertext form. However, if you provide access to or distribute copies of a Project Gutenberg™ work in a format other than "Plain Vanilla ASCII" or other format used in the official version posted on the official Project Gutenberg™ website (www.gutenberg.org), you must, at no additional cost, fee or expense to the user, provide a copy, a means of exporting a copy, or a means of obtaining a copy upon request, of the work in its original "Plain Vanilla ASCII" or other form. Any alternate format must include the full Project Gutenberg™ License as specified in paragraph 1.E.1.

1.E.7. Do not charge a fee for access to, viewing, displaying, performing, copying or distributing any Project Gutenberg™ works unless you comply with paragraph 1.E.8 or 1.E.9.

1.E.8. You may charge a reasonable fee for copies of or providing access to or distributing Project Gutenberg™ electronic works provided that:

• You pay a royalty fee of 20% of the gross profits you derive from the use of Project Gutenberg™ works calculated using the method you already use to calculate your applicable taxes. The fee is owed to the owner of the Project Gutenberg™ trademark, but he has agreed to donate royalties under this paragraph to the Project Gutenberg Literary Archive Foundation. Royalty payments must be paid within 60 days following each date on which you prepare (or are legally required to prepare) your periodic tax returns. Royalty payments should be clearly marked as such and sent to the Project Gutenberg Literary Archive Foundation at the address specified in Section 4, "Information about donations to the Project Gutenberg Literary Archive Foundation."
• You provide a full refund of any money paid by a user who notifies you in writing (or by e-mail) within 30 days of receipt that s/he does not agree to the terms of the full Project Gutenberg™ License. You must require such a user to return or destroy all copies of the works possessed in a physical medium and discontinue all use of and all access to other copies of Project Gutenberg™ works.
• You provide, in accordance with paragraph 1.F.3, a full refund of any money paid for a work or a replacement copy, if a defect in the electronic work is discovered and reported to you within 90 days of receipt of the work.
• You comply with all other terms of this agreement for free distribution of Project Gutenberg™ works.

1.E.9. If you wish to charge a fee or distribute a Project Gutenberg™ electronic work or group of works on different terms than are set forth in this agreement, you must obtain permission in writing from the Project Gutenberg Literary Archive Foundation, the manager of the Project Gutenberg™ trademark. Contact the Foundation as set forth in Section 3 below.

1.F.

1.F.1. Project Gutenberg volunteers and employees expend considerable effort to identify, do copyright research on, transcribe and proofread works not protected by U.S. copyright law in creating the Project Gutenberg™ collection. Despite these efforts, Project Gutenberg™ electronic works, and the medium on which they may be stored, may contain "Defects," such as, but not limited to, incomplete, inaccurate or corrupt data, transcription errors, a copyright or other intellectual property infringement, a defective or damaged disk or other medium, a computer virus, or computer codes that damage or cannot be read by your equipment.

1.F.2. LIMITED WARRANTY, DISCLAIMER OF DAMAGES - Except for the "Right of Replacement or Refund" described in paragraph 1.F.3, the Project Gutenberg Literary Archive Foundation, the owner of the Project Gutenberg™ trademark, and any other party distributing a Project Gutenberg™ electronic work under this agreement, disclaim all liability to you for damages, costs and expenses, including legal fees. YOU AGREE THAT YOU HAVE NO REMEDIES FOR NEGLIGENCE, STRICT LIABILITY, BREACH OF WARRANTY OR BREACH OF CONTRACT EXCEPT THOSE PROVIDED IN PARAGRAPH 1.F.3. YOU AGREE THAT THE FOUNDATION, THE TRADEMARK OWNER, AND ANY DISTRIBUTOR UNDER THIS AGREEMENT WILL NOT BE LIABLE TO YOU FOR ACTUAL, DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE OR INCIDENTAL DAMAGES EVEN IF YOU GIVE NOTICE OF THE POSSIBILITY OF SUCH DAMAGE.

1.F.3. LIMITED RIGHT OF REPLACEMENT OR REFUND - If you discover a defect in this electronic work within 90 days of receiving it, you can receive a refund of the money (if any) you paid for it by sending a written explanation to the person you received the work from. If you received the work on a physical medium, you must return the medium with your written explanation. The person or entity that provided you with the defective work may elect to provide a replacement copy in lieu of a refund. If you received the work electronically, the person or entity providing it to you may choose to give you a second opportunity to receive the work electronically in lieu of a refund. If the second copy is also defective, you may demand a refund in writing without further opportunities to fix the problem.

1.F.4. Except for the limited right of replacement or refund set forth in paragraph 1.F.3, this

work is provided to you 'AS-IS', WITH NO OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE.

1.F.5. Some states do not allow disclaimers of certain implied warranties or the exclusion or limitation of certain types of damages. If any disclaimer or limitation set forth in this agreement violates the law of the state applicable to this agreement, the agreement shall be interpreted to make the maximum disclaimer or limitation permitted by the applicable state law. The invalidity or unenforceability of any provision of this agreement shall not void the remaining provisions.

1.F.6. INDEMNITY - You agree to indemnify and hold the Foundation, the trademark owner, any agent or employee of the Foundation, anyone providing copies of Project Gutenberg™ electronic works in accordance with this agreement, and any volunteers associated with the production, promotion and distribution of Project Gutenberg™ electronic works, harmless from all liability, costs and expenses, including legal fees, that arise directly or indirectly from any of the following which you do or cause to occur: (a) distribution of this or any Project Gutenberg™ work, (b) alteration, modification, or additions or deletions to any Project Gutenberg™ work, and (c) any Defect you cause.

Section 2. Information about the Mission of Project Gutenberg™

Project Gutenberg™ is synonymous with the free distribution of electronic works in formats readable by the widest variety of computers including obsolete, old, middle-aged and new computers. It exists because of the efforts of hundreds of volunteers and donations from people in all walks of life.

Volunteers and financial support to provide volunteers with the assistance they need are critical to reaching Project Gutenberg™'s goals and ensuring that the Project Gutenberg™ collection will remain freely available for generations to come. In 2001, the Project Gutenberg Literary Archive Foundation was created to provide a secure and permanent future for Project Gutenberg™ and future generations. To learn more about the Project Gutenberg Literary Archive Foundation and how your efforts and donations can help, see Sections 3 and 4 and the Foundation information page at www.gutenberg.org.

Section 3. Information about the Project Gutenberg Literary Archive Foundation

The Project Gutenberg Literary Archive Foundation is a non-profit 501(c)(3) educational corporation organized under the laws of the state of Mississippi and granted tax exempt status by the Internal Revenue Service. The Foundation's EIN or federal tax identification number is 64-6221541. Contributions to the Project Gutenberg Literary Archive Foundation are tax deductible to the full extent permitted by U.S. federal laws and your state's laws.

The Foundation's business office is located at 809 North 1500 West, Salt Lake City, UT 84116, (801) 596-1887. Email contact links and up to date contact information can be found at the Foundation's website and official page at www.gutenberg.org/contact

Section 4. Information about Donations to the Project Gutenberg Literary Archive Foundation

Project Gutenberg™ depends upon and cannot survive without widespread public support and donations to carry out its mission of increasing the number of public domain and licensed works that can be freely distributed in machine-readable form accessible by the widest array of equipment including outdated equipment. Many small donations ($1 to $5,000) are particularly important to maintaining tax exempt status with the IRS.

The Foundation is committed to complying with the laws regulating charities and charitable donations in all 50 states of the United States. Compliance requirements are not uniform and it takes a considerable effort, much paperwork and many fees to meet and keep up with these requirements. We do not solicit donations in locations where we have not received written confirmation of compliance. To SEND DONATIONS or determine the status of compliance for any particular state visit www.gutenberg.org/donate.

While we cannot and do not solicit contributions from states where we have not met the solicitation requirements, we know of no prohibition against accepting unsolicited donations from donors in such states who approach us with offers to donate.

International donations are gratefully accepted, but we cannot make any statements concerning tax treatment of donations received from outside the United States. U.S. laws alone swamp our small staff.

Please check the Project Gutenberg web pages for current donation methods and addresses. Donations are accepted in a number of other ways including checks, online payments and credit card donations. To donate, please visit: www.gutenberg.org/donate

Section 5. General Information About Project Gutenberg™ electronic works

Professor Michael S. Hart was the originator of the Project Gutenberg™ concept of a library of electronic works that could be freely shared with anyone. For forty years, he produced and distributed Project Gutenberg™ eBooks with only a loose network of volunteer support.

Project Gutenberg™ eBooks are often created from several printed editions, all of which are confirmed as not protected by copyright in the U.S. unless a copyright notice is included. Thus, we do not necessarily keep eBooks in compliance with any particular paper edition.

Most people start at our website which has the main PG search facility: www.gutenberg.org.

This website includes information about Project Gutenberg™, including how to make donations to the Project Gutenberg Literary Archive Foundation, how to help produce our new eBooks, and how to subscribe to our email newsletter to hear about new eBooks.