

## THESIS.

Subject. "The Art of Printing"

Name, Pearl Levellyn.

The invention of printing has always been recognized by educated men as a subject of importance. There is no mechanical art, nor are there any of the fine arts about whose early history so many books have been written. The subject is as mysterious as it is inviting.

As tradition represents many nations as contending for the honor of Homer's birth place, so various nations, in order to please national pride, claim the priority of the invention of printing. German authors assert the claim of Gutenberg; while Dutch authors charge Gutenberg with stealing the invention, and give Coster the honor. However, Gutenberg is generally accredited its inventor.

There are several distinct branches of this important art as (1.) Printing of books from movable types. (2.) Printing of en-



graved copper and steel plates, (3.) Lithography, or taking impressions from stones.

We have now to describe the printing of books or sheets with movable types, - generally called letter-press printing, <sup>and</sup> which may undoubtedly be esteemed the greatest of all human inventions.

Fourteen hundred years ago, in the city of Mentz, on the Rhine, was born a man named John Gutenberg. Often when a boy he was found poring over old manuscripts, which he found in the monasteries, where he was educated. He was very religious. Many a time he would exclaim, what a pity it was the Bible was a closed book to the masses; that it could only be possessed by churches, monasteries, or by very rich people. What explanation have you for this? Books in those days were written by hand,



which was of necessity a very slow process. It required years of arduous labor to complete a book when written by scribes. As a result they became objects of luxury treasured up by princes and people of distinction. The monks toiled laboriously over their Bibles, satisfied if they copied two, with their accompanying illuminations, in a life-time. (See Fig. A.)

Fig. A.



When the books were completed, they were covered with great thick leaves of wood and leather, studded with large nails, and placed on shelves

in the monastery to preserve them from the common gaze. Quite frequently they were chained to desks or in cages. (Fig. B.)

Fig. B.



Thus was religious truth held captive; guarded by the clergy to be communicated



possibly through a false medium; every particle of information monopolized by monks and priests. Well might the project of breaking the bonds of human ignorance, spreading abroad the arts and sciences, — everywhere diffusing the light of intelligence, stir to action the inventive powers of a Gutenberg.

In those days "playing-cards" were in common use. These bore figures and devices made by marking the lines on wooden blocks, then by cutting the wood away, thus leaving the lines raised. These were smeared with ink and pressed upon the card. (For specimen of this rude carving see Fig. C.)

From this Gutenberg received his idea of engraving books from blocks. He was an age of



Fig. C.-

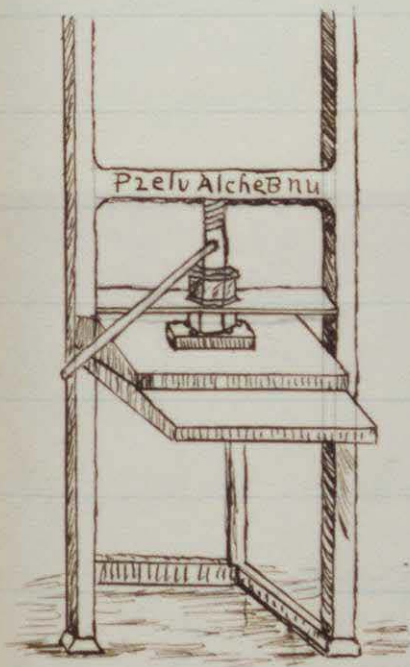


superstition and ignorance; an age in which anything new and unfamiliar was thought to be the work of sorcery; and in which persecution followed him who dared to do apparently marvelous things. Accordingly he locked himself up in his room, and devoted himself to engraving the "History of St. John." But he soon found he was watched, and followed by the dark suspicions of his neighbors. Realizing the importance of concealing his secret, he removed to an old monastery. There, secured by a great oaken door with heavy bolts, he set to work.

It was not long until he had prepared a number of separate types, thus greatly expediting his work. A brush and roller were made for the purpose of inking the types. Finding it impossible to hold them together, he devised



a "chase" or iron frame in which to lock his type. When all this was completed he gazed with delight upon the fruits of his labor — the idea of a "Printing Press" had become a reality. (See Ancient Press Fig 10.)



In strong contrast to Gutenberg's printing room, — his press, the wonder of that age, — his slow tedious methods, — is the room of the modern printer, with his many improvements. On entering, the first thing the "compositor" or typesetter shows you is his frame or sloping desks. It is constructed so as to hold two cases, — (Fig. E.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	aa	bb	cc	dd	ee	ff	gg	hh	ii	jj	kk	ll	mm	nn

Fig. E.

1	2	3	4	5	6	7	8	9	10
a	b	c	d	e	f	g	h	i	j
k	l	m	n	o	p	q	r	s	t
u	v	w	x	y	z	aa	bb	cc	dd



These contain compartments, or boxes, which hold the type. In the cut *b* is the face of the type, *d* the nick, designed to aid the "compositor" in distinguishing the bottom from the top.



*Metal Type* The upper case contains 95 equal sized boxes, appropriated principally to capital and small letters. The lower case contains 53 boxes of various sizes. The letter *a*, as seen in the figure inhabits the largest box; *a, b, c, d, h, i, m, n, o, r, s, t, u,* live in the next sized apartments; *b, f, l,* *q, v, w, y,* dwell in what may be called bed-rooms; *j, k, g, z, z, ce, ou,* double letters etc live more humbly in cup-boards, garrets, and cellars. The reason for this arrangement is, some letters are more frequently required by the "compositor" than others, — *a* being visited by the compositor sixty times as often as *z*. The types are taken from



the cases, and arranged in lines, or "composed" in an iron instrument called a "composing-stick." (Illus. Fig. G.) The slide

Fig G. in the middle is arranged so as to accommodate varying lengths of lines. The compositor with his copy before him, proceeds to "set up type." In his left hand he holds the "composition-stick"; and with his right places the letters of each word of the copy, with the necessary points and spaces, in the composing stick. The compositor is much assisted by the "composing-rule," a thin strip of steel which he places in the stick at the outset, and removes, and places it in front of a complete line. When the stick is full of lines, the compositor lifts them out as if they were solid metal, and places them in a shallow instrument called a "Galley." (Fig L.)





stickful after stickful is carried to the  
 galley until it is full. The type is  
 then taken, arranged in requisite number  
 of pages and placed on an "imposing  
 stone," and surrounded with pieces of wood  
 called "furniture." Furniture gives the paper  
 a suitable margin, since it, being lower  
 than the type, does not print. The whole  
 is now secured in a "chase" by means  
 of locks or "coins." The "chase" is carried  
 from the "imposing stone," and placed up-  
 on a machine. (See Fig. 2.) The type  
 is inked by means of rollers, which are  
 made from a combination of glue, glycer-  
 ine and molasses. The wheel revolves, the  
 paper comes in contact with the inked  
 type, and the impression is taken. When  
 the type is set, thousands of impres-  
 sions are rapidly turned off.

How marvelously human labor is out



rivaled by the mechanical arrangement of the press! It would require 192,000 men to supply by copying, the amount the printing press supplies in one hour.

Could the early printers revisit the earth, with what interest would they make the tour of our modern printing office, - contrast their simple press, with the complex arrangement of some of our perfected machines.

How unlike their own embryatic efforts "which gave to themselves fame, their art an existence, and civilization its motive power."

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