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THE COMMERCIAL HISTORY OF A PENNY MAGAZINE.—No. III.

COMPOSITORS' WORK AND STEREOTYPING.



[Ancient View of a Dutch Printing-Office.]

In a very curious set of prints by L. Galle, after the designs of Stradanus, a painter who flourished in the latter end of the sixteenth century, are represented many operations in the arts, as they were practised at that period. We have copied, as above, his view of a printing-office. On the right is the master printer, a grave, bearded personage, dressed in a fur-trimmed robe, apparently giving some directions to his workmen. These consist of several compositors, comfortably seated on cushioned stools; the dirk of one is in a sheath by his side, and the sword of another rests against a column. This ancient privilege of the compositors of all countries to wear swords still forms a matter of pride with the printers of the present day; for it affords a proof that their art was considered a liberal one, and that men of birth and education were accustomed to practise it. The printers of Paris were thus authorized to wear swords by a royal ordinance of 1571. The costume must have strangely contrasted with the paper cap which the printers of Paris then wore, and which they still wear. Near one of the compositors in our print is an old man in spectacles, who is probably engaged in the business of a reader, which we shall have to explain. The men at work at the two rude presses, the further one inking the types, and the other pulling down the screw which gives the impression, exhibit the mode then employed to work off the sheets, which must have been particularly slow. To this we shall advert when we come to speak of the

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printing press and the machine. Altogether this print appears to show that, in the ancient printing-offices, there were few mechanical aids to labour; and we may infer that the compositors especially, comfortably seated, and somewhat luxuriously clothed, were not much affected by that spirit of restless activity which distinguishes a modern printing-office.

There is a well-authenticated story of an English clergyman, who taught himself the printing art, and carried it on with a persevering devotion to one object, of which we have no other example. This good man had projected a complete body of divinity in a great many volumes. He proposed his scheme to several publishers, but they all rejected it. He then caused copies of several volumes to be printed by subscription. This undertaking failed. He was determined, however, that his literary labours should not be deprived of that chance of immortality which the printing-press, to a certain extent, can bestow. He bought a few types, enough to set up two pages, and thus scantily provided, he undertook the wonderful task of printing, not a small tract, or even one goodly volume, but a great number of volumes. When his two pages were arranged, he printed off fourteen copies at a little press which he had established in his house. The types were then broken up to allow him to print the two next pages; and thus with a tortoise pace he printed away for some twenty years, and at last completed his work in twenty-six volumes.

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A copy of this remarkable production is said to exist in the British Museum, and the story, with all its details, may be found in the 'Pursuit of Knowledge under Difficulties.'

The reader will at once comprehend, from this story, that the setting up of types, one by one, so as to produce syllables, words, sentences, paragraphs, chapters, and books, is essentially a slow operation,—a much slower operation than copying with a pen,—an operation which would be worthless except it were possible and desirable to produce many copies from the types thus set up. Taking the labour of the clergyman as worth fifty pounds a year, his work for twenty years would amount to one thousand pounds, and therefore each of his six copies cost more than one hundred and fifty pounds. If he had applied the same manual labour to any ordinary art, such as shoemaking for instance, in which manual labour is not much assisted by the division of employments and mechanical aids, he would probably have added a thousand pounds to the wealth of the community. As it was, he only amused himself.

The slow and profitless toil of this harmless recluse presents a striking contrast to the intense energy displayed in a large London printing office. There are several establishments of this nature in which, we have no hesitation in saying, the division of labour is brought to such perfection, that a volume or volumes, containing as many words as the clergyman's thirty volumes, and, therefore, requiring as much of the compositor's labour, could be printed in a week. In this respect nothing is more remarkable than the extraordinary rapidity with which the bills and reports of the House of Commons are printed by Messrs. Hansard. We have before us the first Report of the Commissioners of Factories Inquiry. It contains about 1200 folio printed pages. Each page holds upon an average 72 lines of 15 words each, or 72 lines of 80 letters; so that the volume contains 1,296,000 words, or 6,912,000 letters. A good compositor can pick up about 15,000 letters in a day, so that it would take one compositor 460 days to produce the text of this volume. But, in addition to this, there are the side notes of the Report, which would occupy at least a fourth more of the time; making the total time that it would occupy one compositor to produce this book, 600 days, or two working years. This Report was ordered by the House of Commons to be printed on the 28th of June, and was laid complete upon the table of the House, about the 10th of July—in less than a fortnight. Such haste does not involve any necessary want of accuracy. These wonderful effects are produced by a perfect division of labour, in which there is activity without hurry, and in which the superintending mind is the moving and regulating power of a human machine, composed of many parts, but all working in harmony to the same end.

Let us now examine a printing office a little more in detail. In Mr. Clowes's establishment, which we noticed in our last Number, we enter a very long room, in which from fifty to sixty compositors are constantly employed. Each man works at a sort of desk called a frame, and in most instances he has the desk or frame to himself. The frames project laterally from the wall;—at intervals there are large tables with stone tops, technically called imposing stones. The visitor will see no presses in the room with the compositors, as in the old Dutch print. These branches of business are separated, for the pressman pursues a noisy vocation, while the compositor is, or ought to be, silent. The one press in the composing-room is merely for taking off proofs. Nor will the visitor see any old gentleman in spectacles occupied merely in reading. The business of a reader requires even more silence than that of a compositor, and he, therefore, has a closet to himself. The workmen in each frame are by no means so dingy in their appear-

ance as some people think, when they call all printers by the name which from time immemorial has been bestowed upon the errand-boy of the office. Everybody has heard of the printer's devil,—that

"Young thing of darkness, seeming
A small poor type of wickedness *."

But the compositors have nothing to say to this title, any more than they have to the swords and the pedigrees of the labourers in the offices of the Alduses and the Stephenses. They are cleanly, well-dressed, intelligent-looking, active artisans; not much thinking about the matter of the work they have in hand, but properly intent upon picking up as many letters in the hour as may be compatible with following their copy correctly, and of producing what is called a clean *proof*,—that is, a proof, or first impression, with very few mistakes of words or letters.

Each *frame*, at which a compositor works, is constructed to hold two pair of *cases*. Each pair of cases contains all the letters of the alphabet, whether small letters or capitals, as well as points, figures, &c., &c. One of these pair of cases is occupied by the *Roman* letters, the other by the *Italic*. The upper case is divided into ninety-eight partitions, all of equal size: and these partitions contain two sets of capital letters, one denominated "full capitals," the other "small;" one set of figures; the accented vowels; and the marks of reference for notes. The lower case is divided into partitions of four different sizes; some at the top and ends being a little smaller than the divisions of the upper case; others nearer the centre being equal to two of the small divisions; others equal to four; and one equal to six. In all there are fifty-three divisions in the lower case. The inequality in the size of the cells of the lower case is to provide for the great differences as to the quantity required of each letter. According to the language in which it is used, one letter is much more frequently wanted than another; and the proportions required of each have been pretty accurately settled by long experience. As some of our readers may be curious to know these proportions as they apply to the English language, we subjoin the type-founder's scale for the small characters of a fount of letter of a particular size and weight:

a	8500	h	6400	o	8000	v	1200
b	1600	i	8000	p	1700	w	2000
c	3000	j	400	q	500	x	400
d	4400	k	800	r	6200	y	2000
e	12000	l	4000	s	8000	z	200
f	2500	m	3000	t	9000		
g	1700	n	8000	u	3400		

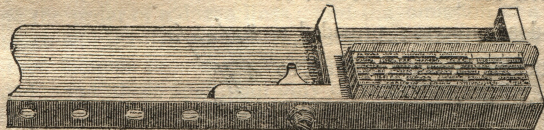
The proportion in which a particular letter is required, renders it necessary that the cells of the lower case should be arranged, not as the letters follow each other alphabetically, but that those in most frequent use should be nearest the hand of the compositor. The point to which he brings the letters, after picking them up out of their cells, is not far removed from the centre of the lower case; so that in a range of about six inches on every side, he can obtain the c, d, e, i, s, m, n, h, o, p, u, t, a, and r, the letters in most frequent use. The spaces, which he wants for the division of every word, lie close at his hand at the bottom of the central division of the lower case. It must be quite obvious that the man who contrived this arrangement saved a vast deal of time to the compositor. We see in the old Dutch print that the cases are divided into equal compartments; so that it is probable that this ingenious principle was not introduced amongst the early printers. We have always observed that a stranger to the art is surprised at the accuracy with which a compositor dips his fingers into the box containing the letter which he requires. This surprise is generally connected with an opinion,

* 'London Magazine.' 1823,

that the compositor would do his work more correctly if the boxes were labelled. A very inexpert performer upon the piano will, nevertheless, strike any one of the seventy-eight notes without making a mistake; and in the same way the youngest boy of a printing-office very soon learns the places of the letters without any difficulty.

Let us now for a little while follow the compositor in the progress of his work.

Standing before the pair of cases which contain the Roman letter, he holds in his left hand what is called a *composing-stick*. This is a little iron or brass frame, one side of which is moveable, so that it may be adjusted to the required width of the page or column which the workman has to set up. It is made perfectly true and square; for without such accuracy the lines would be of unequal length. It is adapted to contain not more than about twelve lines of the type of the 'Penny Magazine.' This little instrument is represented in the cut below.



[Composing-Stick.]

The copy from which the compositor works rests upon the least-used part of the upper case. The practised compositor takes in a line or two at a glance, always provided the author writes an intelligible hand,—which virtue is by no means universal. One by one, then, the compositor puts the letters of each word and sentence into his stick, securing each letter with the thumb of his left hand, which is therefore continually travelling on from the beginning to the end of a line. His right hand goes mechanically to the box which he requires; but his eye is ready to accompany its movements. In each letter there is a nick, or nicks, which indicates the bottom edge of the letter; and the nick must be placed outwards in his composing-stick. Further, the letter must also be placed with the face upwards, so that two right positions must be combined in the arrangement of the types. If the compositor were to pick up the letter at random, he would most probably have to turn it in his hand; and as it is important to save every unnecessary movement, his eye directs him to some one of the heap which lies in the right position, both as regards the face being upwards and the nick being outwards. This nick is one of those pretty contrivances for saving labour which experience has introduced into every art, and which are as valuable for diminishing the cost of production as the more elaborate inventions of machinery. When he arrives at the end of his line, the compositor has a task to perform, in which the carefulness of the workman is greatly exhibited. The first letter and the last must be at the extremities of the line: there can be no spaces left in some instances, and no crowding in others, as we see in the best manuscript. Each metal type is of a constant thickness, as far as regards that particular letter; though all the letters are not of the same thickness. The adjustments, therefore, to complete the line with a word, or, at any rate, with a syllable, must be made by varying the thickness of the spaces between each word. A good compositor is distinguished by uniformity of spacing: he will not allow the words to be very close together in some instances, or with a large gap between them in others. His duty is to equalize the spacing as much as he possibly can; and this is, in some cases, very troublesome. When the workman has *filled his stick*, as it is called,—that is, has set up as many lines as his stick will conveniently hold,—he lifts them out into what is termed a *galley*, by grasping them with the fingers of each hand, and thus taking them up as if they were a solid piece of metal.

The facility with which some compositors can lift about what is called a *handful* of moveable type, without deranging a single letter, is very remarkable. This sort of skill can only be attained by practice; and thus one of the severest mortifications which the printer's apprentice has to endure, is to toil for an hour or two in picking up several thousand letters, and then see the fabric destroyed by his own clumsiness, leading him to mourn over his heap of broken type,—technically called *pie*,—as a child mourns over his fallen house of cards.

Letter by letter, and word by word, is the composing-stick filled; and by the same progression the galley is filled by the contents of successive sticks. In the instance of the 'Penny Magazine,' and in that of newspapers and most other periodical works, a proof is taken before the types are made up into pages. In books, however, when the compositor has set up as many lines as fill a page, he binds them tightly round with cord, and places them under his frame. We need scarcely say that the sizes of books greatly vary; but they are all reducible to a standard determined by the number of leaves into which a sheet of paper is folded. The most common size is called *octavo*, the size of the 'Library of Useful Knowledge,' and this contains 16 pages to the sheet: the next is *duodecimo*, the size of the 'British Almanac,' containing 24 pages to a sheet; and the next *octodecimo*, or eighteens, containing 36 pages in a sheet, which is the size of Miss Martineau's 'Illustrations of Political Economy.' There are many other sizes, such as the larger *quarto*, and the smaller *twenty-fours*. In every case when a sheet or sheets is complete, the compositors arrange the pages in proper order upon the imposing stone; surround each page with pieces of wood called *furniture*, so as to leave an equal margin to every page; and, finally, wedge the whole tightly together in a stout iron frame, called a *chase*. If the work is properly executed, the pages thus wedged up, constituting one side of a sheet, termed a *form*, are perfectly tight and compact; and the *form* may be carried about with as much ease as if it were composed of solid plates, instead of being formed of 40,000, or 50,000, or even 100,000 moveable pieces.

Whether the lines which a compositor sets up are made into pages, and *imposed* as a sheet, or whether a proof is taken of them in an earlier stage, such as we have described to be the process in the 'Penny Magazine,' the business of the *reader* commences immediately after that of the compositor. No one unacquainted with the details of a printing-office can conceive the great differences between the correctness of one compositor and of another. The differences in the talent, the acquired knowledge, and even the moral habits of different men, are the causes of these remarkable variations. A *proof* shall be brought to the reader produced by the joint labour of two or three compositors of different degrees of merit. In a particular part of it he will find one letter constantly substituted for another, although the sense is upon the whole given correctly: this is the work of the careless and slovenly compositor, who does not take the trouble to look over the types as he sets them up line by line. He is a bad economist of his own time; for he has to correct all these faults at last, without making any charge for his correction; and he corrects them with much less ease in the second stage than in the first. Again, in another part of the proof, although the merely literal faults may be very few, there is a perpetual substitution of one word for another. This is the work of the ignorant or conceited compositor, who jumps at the meaning of his author, and thus contrives to produce the most ludicrous errors in his original proofs, and to insinuate some error or other into the most carefully corrected book. We have seen proofs in which an ode to a Grecian *urn* was translated into an ode to a Grecian *nose*; in which Queen Mab was drawn by a team of

little *attorneys*, instead of the little '*atomies*' of Shakspeare; and the *aromatic* principles of the English constitution, instead of the *democratic*, made us think of a Persian court, rich with all delicate odours, instead of the House of Commons and the hustings. Caleb Whiteford, who is celebrated by Goldsmith in his poem of '*Retaliation*,' published an amusing collection of '*Mistakes of the Press*;' but his most ingenious inventions could not compare to the real blunders which are sometimes offered to the printer's reader. Lastly, the proof may present, and it very often does so, a most favourable specimen of what may be effected by carefulness and good sense. A wrong letter will not occur in twenty lines; a gross mistake never occurs; and, what is still more surprising, while the compositor has been engaged in an operation almost purely mechanical, he will have corrected the generally loose punctuation of the author,

and produced a harmony in that most difficult department of literary labour, which is seldom attained except by long experience. Such a compositor is always properly estimated in a printing-office. The best work is generally put into his hands; and he is enabled to execute it with so much facility, that his earnings are often nearly double those of the ignorant and slovenly workman.

We subjoin, what will be useful to many persons, an exemplification of the marks which are used in correcting a printer's proof. The passage furnishing the example may be found in the first number of '*The Commercial History of a Penny Magazine*,' page 376, and the reader may amuse himself by comparing the passage, as it is correctly printed, with the following specimen of a printer's bad proof, in which every possible variety of error is introduced:—

¹/ The process of printing, when compared with that of writing, is unquestionably a ~~dear~~ process; provided a ² *cheap* sufficient number of any particular book are printed, so ⁴ # as to render the proportion of the first expense upon a ⁶ 0 single copy inconsiderable. If, for example, it were required, even at the present ~~moment~~ time, to print a ⁸ / single copy, or even three ⁹ / *copies* or four, only of any production, the cost of printing would be greater than the cost of transcribing.

¹⁰ *run on* It is when hundreds, and especially thousands, of the same work are demanded that the great value of the printing press in making knowledge cheap, is particularly shown. ¹¹ / It is probable that the first printers did not take off more than two or three hundred, if so many, of their works, and, therefore, the earliest printed books must have been still dear, on account of the limited number of their readers. ¹² *tr* CAXTON, as it appears by a passage in one of his books, was a ¹³ *N.P.* cautious printer; and required something like an assurance that he should sell enough of any particular book to repay the cost of producing it. In his '*Legends of Saints*,' he says, "I have submised (submitted) myself to translate into English the ¹⁴ / ¹⁵ *italic* ³ *Saints* of ¹ *Legend*,' called '*Legenda aurea*' in Latin; and William, Earl of Arundel, ¹⁶ *b.c.* sent me a ¹⁷ *stet* ¹⁸ *wf* worshipful gentleman, promising that my said lord ¹⁹ *s. caps* should, during my ²⁰ *tr* life, give and grant to me a yearly fee, ²¹ / ²² / that is t ²³ *Caps* o note, a buck in summer and a doe in winter. ²⁴ *x* ²⁵ / ²⁶ / ²⁷ /

24 desired me - and promised to take a reasonable quantity of them - and

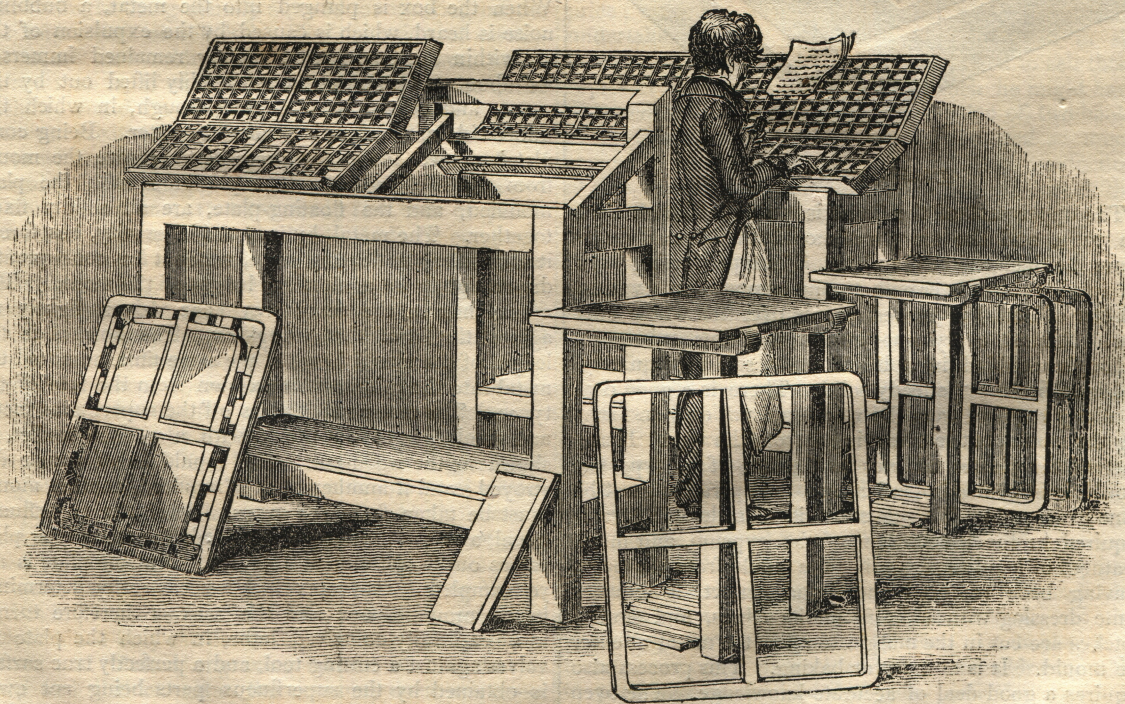
1. Is the mark for changing the wrong letter in the word process.
2. To substitute one word for another.
3. and 24. The first is the method of marking a short insertion, the second of marking a long one.
4. To have a blank space put between the two words.
5. To turn a letter which has been placed upside down.
6. To close the word in which a space has been improperly left.
7. and 8. To take away (*dele*, blot out) a superfluous letter or word.
9. 12. and 22. Different marks for transposing the arrangement of letters, words, or sentences.
10. To have no fresh paragraph.
11. To substitute a comma for a full-point or period.
13. To commence a new paragraph.
14. 19. 21. and 27. To insert points and marks of quotation.
15. To have any particular part printed in *Italic*.
16. To have words or letters printed in '*lower case*,' or small letters; Roman is always understood, unless otherwise directed.
17. To have a word remain, which has been accidentally or erroneously marked.
18. Points out a letter which does not match with the others; a '*wrong fount*.'
20. and 23. To have certain parts printed in small or full capitals. *Stet* is the Latin for "let it stand."
25. To set straight whatever may stand crooked.
26. To remove the unnecessary black mark between the words, which arises from what should form the space not having been pushed down.

When the ordinary reader of a newspaper, or of a book, meets with an occasional blunder either of a letter or a word, he is apt to cry out upon the carelessness with which the newspaper or book is printed. It is in the very nature of the process of producing words and sentences by the putting together of moveable types, that a great many blunders should be made by the compositor in the first stage, which nothing but the strictest vigilance can detect and get rid of. The ordinary process of correction is for the printer's reader to look upon the proof, while another person, generally a boy, reads the copy aloud. As he proceeds the reader marks, in the manner just shown, all the errors which present themselves upon a first perusal. The proof then goes back to the compositor; and here a business of great labour and difficulty ensues. The omitted words and letters have to be introduced, and the incorrect words and letters have to be replaced by the correct. The introduction of two or three words will sometimes derange the order of a dozen lines; and the omission of a sentence will involve the re-arrangement of many pages. In this tedious process new blunders are oftentimes created; and these again can only be remedied by after vigilance. The first corrections being perfected, the reader has what is called a *revise*. He compares this with his first proof, and ascertains that all his corrections have been properly made. In this stage of the business the proof generally goes to the author; and it is rarely that the most practised author does not feel it necessary to make considerable alterations. The complicated process of correction is again to be gone over. The printer's reader and the author have again revises; and what they again correct is again attended to. The proof being now tolerably perfect, the labour of another reader is in most large establishments called in. It is his business to *read for press*—that is, to search for the minutest errors with a spirit of the most industrious criticism. The author has often to be consulted upon the queries of this captious personage, who ought to be as acute in discovering a blunder, as a conveyancer in finding out a flaw in a title-deed. But in spite of all this activity blunders *do* creep in; and the greatest mortification that an author can experience is the lot of almost

every author,—namely, to take up his book, after the copies have gone out to the world, and find some absurdly obvious mistake, which glares upon him when he first opens the book, and which, in spite of his conviction that it was never there before, has most likely escaped his own eye, and that of every other hunter of errors that the best printing-office can produce.

When the sheet is finally corrected for press, the work of the compositor is for a time at an end; but when it is printed off, or when a stereotype cast has been taken from the moveable types, it is a part of his business, and for which he is paid nothing additional, to return the types to the cases from which they were taken. This operation is called *distribution*. It is a most beautiful process in the hands of an expert compositor; and probably no act which is partly mental and partly mechanical offers a more remarkable example of the dexterity to be acquired by long practice. The workman holding a quantity of the type in his left hand as it has been arranged in lines, keeping the face towards him, takes up one or two words between the forefinger and thumb of his right hand, and drops the letters, each into its proper place, with almost inconceivable rapidity. His mind has to follow the order of the letters in the words, and to select the box into which each is to be dropped, while his fingers have to separate one letter from another, taking care that only one letter is dropped at a time. This is a complicated act; and yet a good compositor will distribute three or four times as fast as he composes,—that is, he will, if necessary, return to their proper places 50,000 letters a day. The letters being inverted in printing are not read as they are read in a book, and thus "to know his p's from his q's" is a difficulty to a beginner.

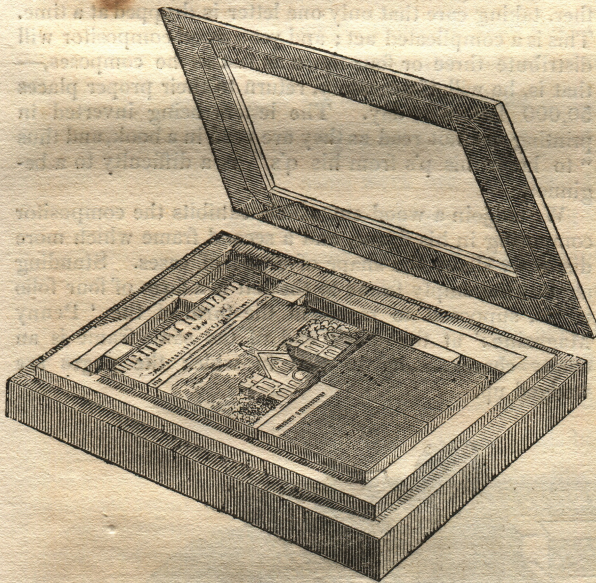
We subjoin a wood-cut which exhibits the compositor composing in his frame, and a second frame which more distinctly shows the shape of a pair of cases. Standing against the empty frame to the left is a form of four folio pages, supposed to represent the form of the 'Penny Magazine;' at the other end of the same frame is an empty chase similar to that in which the pages are wedged up.



[Frames, Cases, &c.]

It is in this stage, when the pages of the 'Penny Magazine' have been rendered as correct as the care of several readers can ensure, and when the original wood-cuts have been inserted in their proper places, that the process of *stereotyping* commences. This process is by no means universally applied to all printed books. Its peculiar advantages are confined to works in very large demand, and of which the demand is continued long after the first publication. In the case of the 'Penny Magazine,' there is another great advantage afforded by this process, namely, the facility of procuring several metal copies, or plates, of each number, as we shall presently explain. In the mean time we would direct the reader's attention to a brief account of the process of stereotyping.

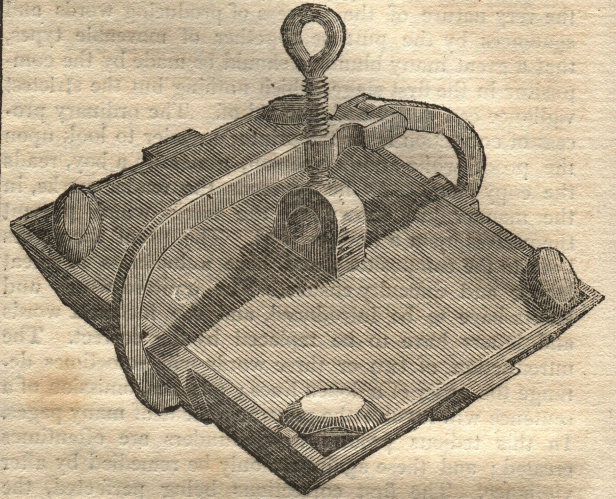
The first operation is that of taking a *mould* from each page of moveable types. The pages are not arranged as they would be combined in a sheet, and wedged up together in one iron frame or chase, but each page is put in a separate chase. It is essential that the face of the types should be perfectly clean and dry, and that no particle of dirt or other substance should attach to the bottom of the types, so as to prevent them being completely level upon the surface. The page is now placed upon the lower part of a *moulding-frame*, represented in the following cut:—



[Moulding-Frame.]

The upper part of the frame is somewhat larger than the page, and the margin of mould thus formed determines the thickness of the plate. The types having been previously rubbed over with an oily composition, gypsum (plaster of Paris) is poured evenly over the whole surface. Almost every one knows that this substance, although moulded in a liquid state, sets very quickly, and soon becomes perfectly solid. There is a good deal of nicety required from the workman, not only in forming the mould, but in removing it from the type. If any part of the plaster adheres to the face of the type, the mould is of course imperfect, and the operation must be gone over again. To prevent this, considerable care is required in the preparation of the gypsum, and much neatness of hand in separating the mould from the page. Having been removed and found perfect, it requires some dressing with a knife on its edges, and several notches are cut in the margin to allow the metal to enter the mould. It is now fit for baking. This process also requires a good deal of accurate knowledge. The oven in which the moulds are placed upon their edges must be kept at a very regular temperature; for if it be too hot, the moulds warp. The process of casting begins

when the moulds have been baked sufficiently long to be perfectly dry and hard. The *casting-box*, which contains the mould, is represented in the following cut:—



[Casting-Box.]

At the bottom of the pot is a moveable plate of cast-iron, called a *floating-plate*; and upon this plate, the face of which is perfectly accurate, the mould is placed with its face downwards. Upon the back of the mould rests the cover of the casting-box, the inside face of whose lid is also perfectly true. The cover is held tightly down upon the mould by a screw, connected with two *shackles*, as shown in the above cut; and also by two *nippers*, belonging to the apparatus for plunging the pot into the metal pit, as shown in the cut of the last page. This apparatus, which is attached to a crane, is so constructed as to swing with a perfectly horizontal motion; and the casting-pot, with the mould, being thus suspended over the metal pit, is gradually forced down into the molten mass, and there kept steady by a lever and weight. The lid of the box, it will be observed, is cut off at the corners; and it is through these spaces that the metal enters the box, and insinuates itself into every hollow. When the box is plunged into the metal, a bubbling noise is heard, which is caused by the expulsion of the air within the box. After having remained immersed for about ten minutes, it is steadily lifted out by the crane, and swung to a cooling trough, in which the under side of the box is exposed to water. Being completely cooled, the caster proceeds to remove the mould from the casting-box. The plaster mould, the plate moulded, and the floating-plate, are all solidly fixed together. The metal, by its specific gravity, has forced itself under the floating-plate, which it has consequently driven tightly up against the ledges of the mould. The mould has in the same way been driven tightly up against the lid of the casting-box. The notches in the ledges of the mould have, at the same time, admitted the metal into the minutest impression from the face of the types. The caster now breaks off the superfluous metal and the ledges of the mould with a wooden mallet, as shown in the wood-cut. The mould is of course destroyed; and if another plate is required, another mould must be taken from the types. After the superfluous metal and the plaster are removed, the stereotype plate comes out bright and well formed. But the plate is not yet complete. Its proper thickness cannot be determined by the mould alone; and the back is therefore turned in a beautifully-contrived lathe, in which the plate revolves against a cutting tool, and a perfectly true surface is obtained by the superfluous parts being cut away in a series of concentric circles. Again, the very best casting cannot prevent occasional defects in the face of the plate. It requires therefore to be minutely examined

by a workman called a *picker*. It is his business to remove the small globules of metal which occasionally fill up such letters as the *u* and the *e*; to insert a new letter, which he can do by soldering, if any one be broken; and, what is a still more delicate operation, to remove with his graver any impurities which fill up the lines of a wood-cut. To execute this latter duty properly, he ought to be in some degree an artist, and possess the keen eye and the steady hand of an engraver.

It will be seen from this imperfect description, that the process of stereotyping is one which demands considerable labour, and occupies a great deal of time. In the various stages of preparing the mould, of regulating the proportions of the metal, of casting the plate, and of subsequently examining and correcting it, much skill and experience are demanded. At the commencement of the 'Penny Magazine,' we had considerable difficulty in procuring clean and sharp impressions of the wood-cuts; partly from the circumstance that the wood-cuts themselves were not well adapted to be moulded, and partly that the composition of the plate-metal was not so well understood as it now is. At present, the workmen in Mr. Clowes's foundry very rarely fail in producing good casts; and the *pickers* have learnt to clear out the filled-up parts of a cast from a wood-cut without injury to its effect. Still the process altogether is tedious and laborious. The reader will have perceived that stereotyping is distinctly superadded to the operation of printing from moveable types. When a *form* is perfectly corrected, it is ready at once to be laid on the press or machine, without any further preparation; but when a mould is to be taken from it, and a plate to be cast from that mould, the moulding and the casting involve so much additional labour and expense. Stereotyping is therefore applicable only in peculiar cases; but in those cases it is so valuable, that it may be pronounced absolutely necessary to the production of cheap books in large numbers, and therefore a most important auxiliary in the diffusion of knowledge by the printing press. Let us follow out this assertion by taking the example of this very Number of the 'Penny Magazine.'

This supplementary number will be out of the compositors' hands, that is, it will be completely read and corrected, on Tuesday evening, the 19th of November. This is two or three days later than the ordinary time, a clear fortnight being usually allowed for working off the first impression of 160,000. The operation of casting will delay the working off for more than twenty-four hours; that is, if the moveable types were used, the machine would be working off the impressions from them on Wednesday morning, whereas the stereotype plates will not begin to be wrought off till the middle of Thursday. But the process of stereotyping has enabled us, during this time, to have ready *two* sets of plates from each page of moveable types. At the comparatively small expense of casting, we have saved the labour of having the text composed twice over, and the much greater labour and expense of having duplicate wood-cuts. If stereotyping had not existed, we must still have incurred this expense; because, by working off *two* Penny Magazines upon a *double* sheet, instead of *one* Penny Magazine upon a *single* sheet, we obtain our number of copies by 80,000 revolutions of a cylinder instead of by 160,000. Here, therefore, is a great economy of labour produced by having a double set of stereotype plates. But excellence of workmanship is also ensured by this arrangement. If our wood-cuts were subjected to 160,000 inkings, and 160,000 pressures of a cylinder, they would be irreparably injured long before the last impression was worked off; and those customers who obtained only the latter impressions would find a blurred and blotted engraving instead of one that is sharp and distinct. But the economy does not cease here: we can take as many casts as we please from the moveable types. In fact we always take six sets of

plates, to replace those which begin to wear, and to provide against accidents. With this Supplement we are somewhat late. We remedy the evil by working *four* sets of plates instead of *two*; employing two machines instead of one. With one set of plates we should require twenty days to produce 160,000 copies; with two sets of plates we require only ten days; and with four sets of plates we require only five days.

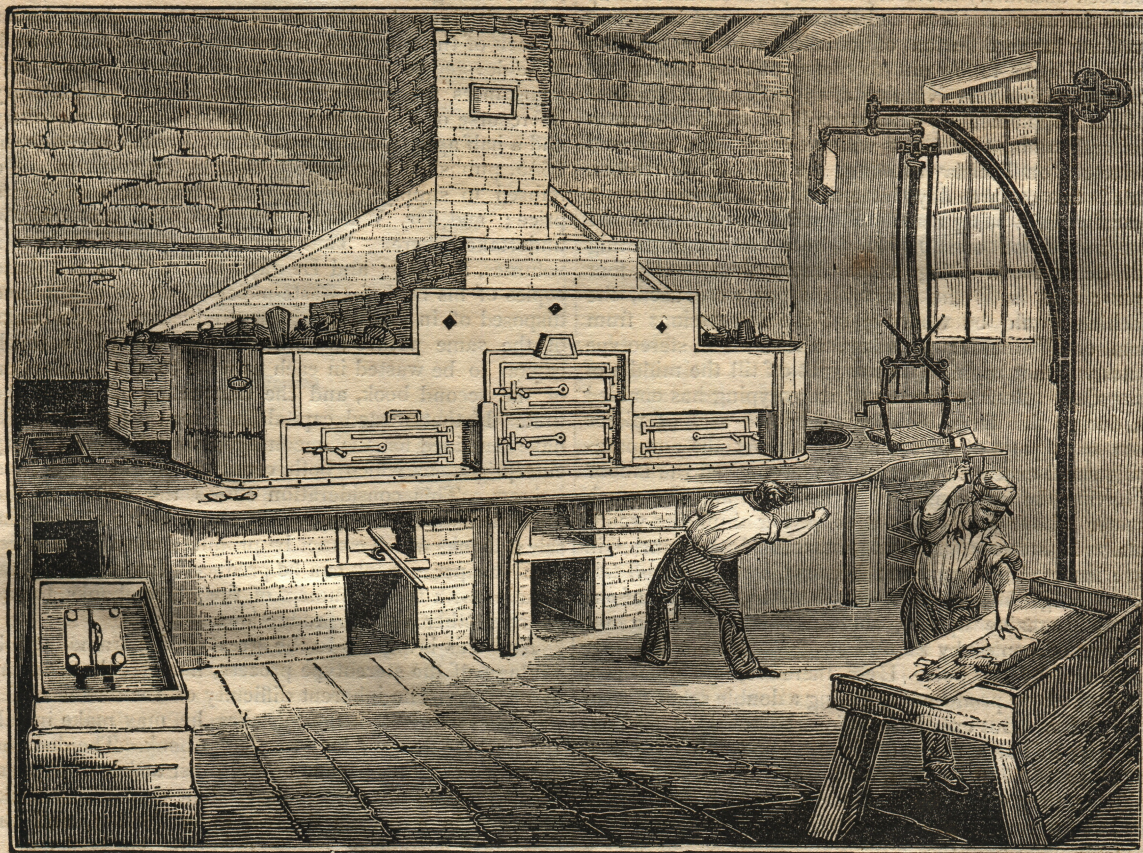
But there is another advantage which stereotyping gives us, in allowing us to multiply casts to any extent. We can assist foreign nations in the production of 'Penny Magazines;' and we can thus not only obtain the high moral advantage of giving a tone to the popular literature of other nations, which shall be favourable to peace, and a right understanding of our common interests, but we can improve our own 'Penny Magazine' out of the profit which accrues from the sale of these casts. The American Government has a tariff, or duty, of 33 per cent. upon all foreign books imported into the United States. This tariff would prevent the 'Penny Magazine' being sold at two cents (nearly a penny), and would probably advance it to three cents. We send our pages stereotyped to a bookseller at New York, who employs American labour and American paper in working them off. By thus avoiding the tariff he can sell the 'Penny Magazine' at two cents. Further, the art of wood-cutting is imperfectly understood in France and Germany. We sell, therefore, to France and Germany many casts of our wood-cuts, at a tenth of what it would cost them to have them re-engraved. These countries are thus enabled to produce their '*Magasin Pittoresque*,' and their '*Penny-Magazin*.' This literary intercourse may appear to some people to be of trifling importance; but that circumstance cannot be uninteresting which has a tendency to direct the popular reading of four great countries into the same channels; and which, by lessening the cost of producing cheap books in each of the countries, leaves some capital free in each to be devoted to other intellectual objects. These circumstances are strikingly contrasted with the literary intercourse of France and England more than a century and a half ago. Le Jay, an eminent French advocate, in 1645, published a polyglott bible in ten volumes. He refused to supply England with copies at a moderate price; and Dr. Walton's polyglott was consequently undertaken here. That work was published in six volumes, in 1657; and Le Jay was obliged to sell those copies of his book for waste-paper which he might have disposed of in England. The production of two books of the same nature in both countries caused so much capital to be wasted in each as went to the production of the second book, and the destruction of part of the first. If that wasted capital had been saved, it would have remained for the encouragement of other literary enterprises, by which both countries might have been gainers. This consideration shows the fallacy of the argument that the large sale of cheap books hinders the sale of books which cannot be produced at so low a price. The cheaper a book can be produced, the more capital remains with the consumers of the cheap books to encourage other literary productions.

And this brings us to the great and paramount advantage of the stereotype process, namely, the economy of capital. The inherent difficulty of the business of a publisher consists in the mistakes he may make in calculating the demand for a particular book. The demand for broad-cloth, or bacon, or any other article of physical necessity, does not greatly vary. The demand for books depends, in a certain degree, upon fashion, and the prevailing current of public opinion. In books of a merely temporary interest, or which are addressed only to particular classes, and deal with particular modes of thought, a publisher often loses very considerably by overprinting. In this case the copies which remain locked

up in his warehouse for years, and are at last sold for waste-paper, absorb so much capital that might have been applied to other literary purposes if the demand for them had not ceased. But in books of universal interest, which address themselves to all classes, and which consequently may be sold cheap in the expectation of a large sale, the risk of over-production is very much diminished. But the publisher must still watch the demand. He must not run too much before it with his supply, for he may be ruined by his stock;—he must not lag too much behind it with his supply, for he may thus lose the market. Before the first Number of the 'Penny Magazine' was issued, it was impossible to say whether the periodical demand for the work would be 20,000 or 100,000 copies. Stereotyping came to the solution of the difficulty. It enabled the publisher then; and it enables him now, to adjust the supply exactly to the demand. One hundred and six Numbers have been published, and yet the supply of any one has not fallen behind the demand a single day. Twenty million 'Penny Magazines' have been issued from the commencement; and yet the publisher has rarely more than 2 or 300,000 in his warehouse. A small quantity of each number can be worked off from the stereotype plates at a day's notice; and a little foresight, therefore, can always ensure that the market shall be supplied, while the stock is kept low. This is the great secret of all commercial success. It is a secret which enables those who possess it to make a fortune with 5 per cent. profit, while those who do not understand it are ruined with 25 per cent. profit. It is the leading principle of the philosophy of shopkeeping; a subject upon which we may one day or other speak more at length.

The capital which is thus saved by the process of stereotyping, involving as it does all the savings of interest, of insurance, of warehouse-room, and all those other manifold charges which attach to a large stock, of

necessity goes to the encouragement of other literary enterprises, and of the various labour which they involve. As long ago as the year 1725, William Ged, an inhabitant of Edinburgh, discovered the principle of casting metal plates. He carried the principle into commercial operation, for he was actually engaged by the University of Cambridge to print bibles and prayer-books. The compositors thought that the invention would injure their trade; and both they and the pressmen did every thing in their power to lessen the credit of Ged's books, by secretly making errors in the moveable types after the pages had passed the reader. The bibles, therefore, were so defective, that the University was obliged to give up the scheme. The art was revived, fifty years afterwards, by Mr. Tilloch, was subsequently prosecuted by Didot of Paris, and was ultimately brought to pretty nearly its present perfection by the late Lord Stanhope. If its progress had not been interrupted for three-quarters of a century by the ignorance of Ged's workmen, it is probable that during all that time the cost of producing bibles and prayer-books, and other standard works, would have been materially diminished; and the capital thus saved would have remained to have set the compositors and the pressmen to work in other directions. For the encouragement of all labour there must be a previous accumulation of the results of labour, which becomes a real labour-fund for the payment of wages. Every saving of previous labour renders this fund more productive for the encouragement of future labour. In the case of stereotyping for books of large numbers, not only is labour prevented from being wasted, but the equal evil of converting active capital into dead and unproductive stock is at the same time prevented. Whatever diminishes the risk of the capitalist ensures a more constant demand for labour, and therefore increases the rate of wages.



[Stereotype Foundry.]