

THE PROGRESS OF PRINTING MACHINERY.

The introduction of printing into England, by Caxton, was the opening of a revolution in the world's history second in magnitude only to the advent of the Messiah. It unbound the chains which had fettered the intelligence of men and prepared the way for a complete changing of the face of the world. From the moment the communication of thought and knowledge was multiplied there began a searching after truth which produced the mightiest results. It was the precursor of human freedom and the assertion of right; before its influence the creations of darkness were swept away, and nations began to struggle onward into emancipation. That such a momentous event should be celebrated on its four hundredth anniversary with all the enthusiasm which those who partake of its latest fruits can bring to its recognition is but right and proper, and it is with infinite pleasure that we signalize the movement in this direction which has been inaugurated in Montreal.

He who, taking up the black letter tome of the Caxtonian era, prepared so slowly, with so much toil, and comparing it with an *édition de luxe* of the present day, is wont perhaps to smile at the wonder, almost awe, with which our far-away ancestors looked upon the printed book. And when he examines a sketch of the rude wooden presses of Gutenberg and Fust, -- machines that underwent little improvement until the middle of last century -- and then turns to watch the thunderous movement of their untiring successors of to-day, he is apt to think that the early printers must have been people of easy contentment with cumbersome appliances. Large bodies move slowly, generally, and great revolutions, though they may find a sudden outburst, are the growth of slowly formed principles and convictions. The world whirled on for thousands of years content with manual writing, and, indeed at one time making very considerable use of it in journalism. The newspaper is by no means an invention of the modern day. The *Aeta Historiae*, the manuscript newspapers of Rome, were the prototype of the largest blank sheet of the present. They recorded remarkable events, gave the details of fires, executions, public debates and campaigns. We hear from the Chinese that they, even, anticipated the Romans, and that the journal founded two thousand years ago is still in existence, with as large a subscription list as it enjoyed when its enterprising founder started it in the era of Ezekiel. The Roman journalists were the first short hand reporters, and in this respect they most undoubtedly claim precedence.

Hardly had printing been discovered than the newspaper appeared. It was one of the first signals of mental emancipation after the bondage of the dark ages. Authorities differ very widely as to the town entitled to premier honour as having been the mother of journalism, but it seems to be pretty well established that to "Nuremberg the ancient" must be accorded the palm. There is trustworthy reason for asserting that the *Gazette* was established as early as 1457, five years after Peter Schöffer cast the first metal type in matrices (1). Nuremberg also gave birth to the first weekly sheet, in the sixteenth century. It bore the short and pleasant title of the *Neue Zeitung aus Hispanien und Italien*. Close following upon its heels came the *Chronicle* of Cologne.

Daily journalism is also traced back to Germany. In 1615 appeared *Der Frankfurter Oberpostamt's Zeitung*, the first morning newspaper in the world, a paper, be it said, still flourishing with unimpaired vigor in the city of Frankfurt. It may be described as the pioneer of that mighty movement which has revolutionized the world by the force of opinion, and taught mankind the power of concentrated thought. The fifth newspaper in the world appeared in England in 1622. It was entitled the *Weekly News*, and had a long and prosperous life. The *English Mercury*, as was shown long ago, was a clever forgery. There was no daily paper in England, however, for 78 years later, when in the reign of easy-going Queen Anne the daily *Courant* was established. Half a century later France saw her daily paper founded in the *Journal de Paris, ou Poste du Soir*. In 1764, the *Quebec Gazette* was founded, and in 1783, the *Montreal Gazette*. The first daily paper in the United States was published in Philadelphia in 1784, under the name of the *American Daily Advertiser*, but Boston must be accredited with

being the birth-place of American journalism, as the *Publick Occurrences* was established there by Benjamin Harris in 1690. It is not meant that this paper shall enter upon a history of journalism as it rose from the weakness of its initiatory days to the proud position it occupies at the present time. We have to deal more especially with the mechanical appliances now in vogue in bringing out the mighty daily editions of the sheets enjoying wide circulation and, in consequence, commanding immense influence.

Until the middle of the last century printers were content to use the clumsiest of presses and the rudest material. They had not thought of improving upon the machinery that the discoverers of printing had left them, and as a consequence work was slow, though certain. The press of Benjamin Franklin suggests the speed at which the printers of his age worked. They laboured with earnestness and steadiness; they had primitive appliances but they had also primitive faith and enthusiasm, elements serving them to efforts which their comparatively resourceless position stamp as herculean. The hand press was pulled incessantly and the newspaper produced at large intellectual and money cost, until steam was brought into requisition, in 1814, and the types were made to perform their appointed duty with a rapidity suited to the demands of the time.

Strange to say the first opposition to the introduction of steam came from the printers themselves. Mr. Walter father of the present owner of the *Times* had had the first press of what may be termed the modern era secretly constructed, and all arrangements made without his workmen having any knowledge of his proceedings, for he anticipated resistance. When, early in the present century he issued the *Times* from a steam-impelled press, the new

was the outgrowth of the ideas of many thinkers and experimenters. Five years before Hoe patented the machine an English printer, David Morrison, had caught the idea. The principle of rotation was proposed by Nicholson, but he could not get over the difficulty of fixing the types on the revolving cylinder. He conceived the idea of wedge-shaped type, but this was found impracticable. Stereotyping was in a primitive condition in those days, or Nicholson might have ante dated Hoe.

The principle of the Hoe Rotary machine is simple enough when understood. Each page of the paper is "locked up" in a detached segment of a large central cylinder or drum. The column rules were in the form of a wedge, held to the bed, which was known as the "turtle," by tongues projecting at intervals along their length, slid into rebated grooves, and as the thin part was directed toward the axes of the cylinder, the type was held securely in the form no matter how rapid might be the revolutions of the drum. The principle, that of the arch held together by the keystone, was a beautiful and ingenious one, which earned its discoverer fame and fortune.

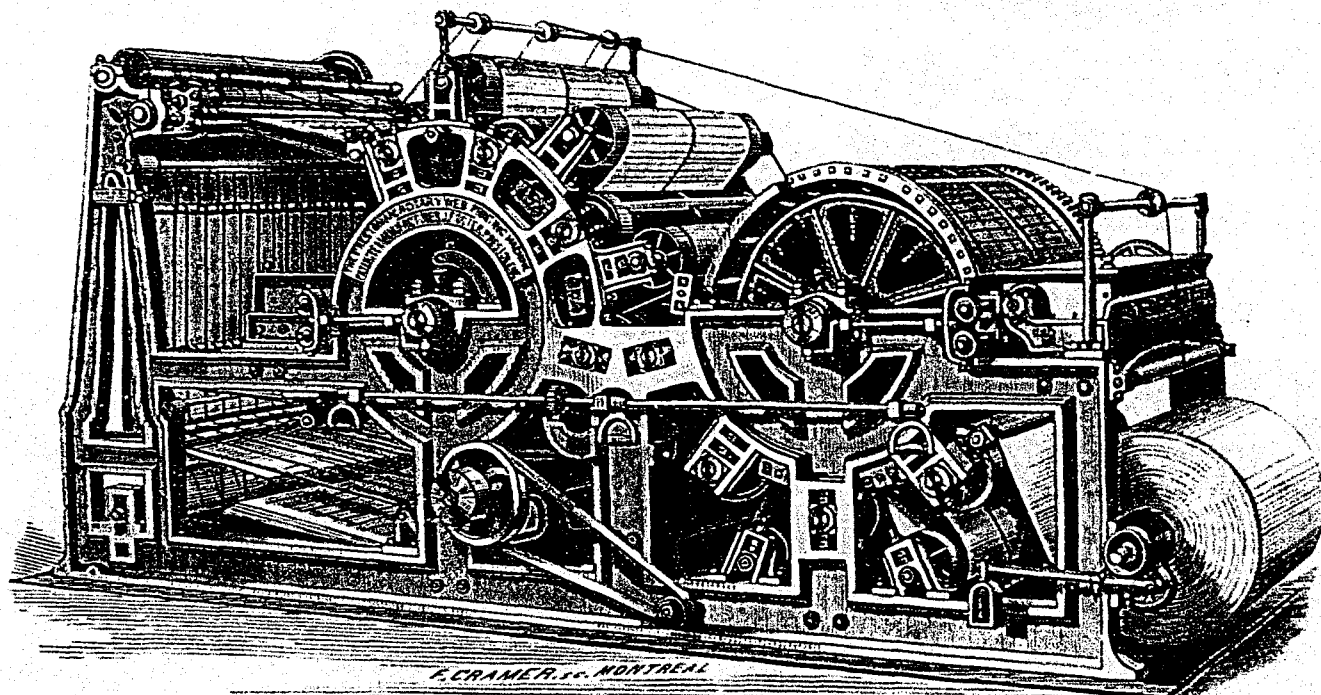
The type fitted in these "turtles" occupied a segment of about one-fourth of the large central cylinder, the remainder of whose surface was used for the distribution of ink. Around the main cylinder, and parallel with it are placed smaller impression cylinders, varying in number from four to ten, according to the size of the machine. A ten cylinder press is as large as -- say an average cottage. The large cylinder being put in motion, the type is carried in succession to all the impression cylinders, to which sheets of paper are fed by hand; these cylinders carry the paper to the printing surface and the printed sheets are immediately carried by tapes to self-acting flyers which deposit them in piles at

cylinder presses, or about £3,000 per annum, and this outlay, with the allowance for wear and tear, and the interest upon original cost was found to be enormous, and the great publishers began to cast about for something newer and more economical.

A rich field was now opened up to inventors, and on both sides of the Atlantic intense activity was displayed. As early as 1862 the *London Times*, with characteristic energy set about solving the new problem in printing. The stereotyping process had been brought to perfection by its engineers and they saw that the multiplication of forms was not the ultimate goal of rapid printing; it was patent to them that the old process of feeding sheets by hand, and printing only one side at a time must give way to a speedier and more thorough method. The idea of using paper from the web, as long practised in calico printing, presented itself almost naturally, and steps were taken at once by Mr. Walter, aided by Mr. Macdonald, the manager, and Mr. Calverly the chief engineer of the *Times* to convert a long cherished wish into an actual realization. Four years of labour produced the "Walter Machine," which, at one operation damped, printed on both sides, cut and delivered in sheets, copies of the *Times* at a speed exceeding that attained by the Hoe Machine. The paper was taken from a continuous roll hung at the end of the machine, and the printing accomplished from stereotype plates curved and fixed to the surfaces of cylinders, against which the paper was pressed by "impression cylinders," by a variety of beautiful mechanical processes.

This invention, in its wonderful completeness, took the printing world by storm. Before it Hoe's process faded completely; a single glance at the working of the Walter showed that the supremacy of the Rotary Press had passed away for ever, and, indeed, that already it was practically antiquated. The great journals which had been among the first to adopt the ten feeders discarded them in favor of the new giant, -- in work, not in size -- which had just been born. The Walter press laboured under grave defects, also, as was discovered after a time, especially was the damping apparatus unsatisfactory for a long time. The novelty of the method of printing had naturally a good deal to do with hitches in working, which kept many credulous of its real practical utility. Meanwhile the experiments of others had borne fruit. Almost simultaneously with the introduction of the Walter Machine, the Bullock press, an American invention was announced. Indeed the American press claims precedence as a self-feeder, but the point is not worth discussing. It is essentially different in principle from the Walter in that the paper is cut from the roll before passing to the printing cylinders, and there are no tapes connected with it. The printing is accomplished from stereotype plates, and the perfected sheets are turned out at the rate of 10,000 an hour. The merits claimed for the Bullock (whose inventor was killed accidentally while testing one of his first machines) are compactness, simplicity and effectiveness. It has been found that the cutting of the sheet before printing, and the necessity of having grippers to each of the cylinders is a source of occasional derangement and delay.

Fast following upon the Bullock came the "Victory" machine, and the "Northumbrian," in England, constructed on principles differing from the Walter, but accomplishing the same result. The "Victory" press was the first to combine folding arrangements. In the latest improvements to the Walter the papers are folded by an attachment as rapidly as they are printed. These are the most prominent of English fast machines printing from stereotype plates alone. France, however, claims to have been equally forward with England in the matter of web-printing. Derriey's machine, a beautiful piece of mechanism, was patented in 1866, and in 1868 the *Petit Moniteur* was printed from it, but as the stamp laws of France did not permit of printing paper in the web, it had to be thrown out. This press now prints the *Imparcial* of Madrid, but it has been transformed into a hand-fed machine. The enormous circulation of some of the Parisian papers, particularly the *Petit Journal* and *Petit Moniteur*, the former of which surpasses the *Daily Telegraph*, necessitated improved arrangements. After the war, though the newspaper stamp was increased, printing from the web was not prohibited under the Empire, and so French inventive genius had an opportunity of working. Derriey's machine came into use again on the *Petit Moniteur*, of which it printed enormous editions with ease. The *Imprimerie Nationale* adopted the machine, and it is now in many continental establishments. The celebrated press builder Marinoni followed with a machine which is a marvel of compactness, speed, efficiency



THE NEW STYLE, AUTOMATIC.

departure was hailed as one of the most imposing magnificence of conception, while the speed of work, *eleven hundred copies per hour*, was regarded as transcendently marvellous. The hand press workmen saw their occupation gone, and, of course, rebelled against the new order of things as vigorously as they could, but eventually the *Times* process began to be generally adopted. The steam cylinder press sufficed for the wants of journalism in England so long as the Government levied a heavy stamp duty upon newspapers, and a tax upon advertisements. The newspaper was long a luxury and beyond the reach of the masses, but it was doing its work and with the spread of intelligence came the emancipation of the press. Little by little were concessions forced from successive Governments, until the last restriction was swept away, and the penny newspaper rose to commence its mission of the diffusion of intelligence. As papers became cheap their circulations began to expand, until it was found that the appliances at the command of publishers were utterly inadequate to supply the public. The *Times*, always in the van, eagerly seizing every new idea tending to rapidity of production aided largely in the development of mechanical ingenuity applied to printing. The enterprise displayed by this establishment has been the wonder of the age, and justly. It would weary the reader to detail the various efforts of the *Times* proprietor to obtain rapidity and cleanliness of production with economy of labour, or the number of machines that from time to time occupied the attention of advanced printers. Suffice it to say that American skill produced, when the century was about half through, a printing machine that revolutionized the systems in vogue, and created a completely new school in the mechanics of printing. Hoe, with the rotary press apparently solved the problem which had long baffled the most expert of European mechanicians, and his invention was received with unbounded applause.

Like all great inventions, the Rotary Press

either end of the machine. The ink is supplied from a well under the main cylinder, and conveyed by rollers to the distributing surface, whence it passes to the type.

Each impression cylinder requires a hand to feed it, and as the feeding is done from both sides of the press, right handed and left handed operatives are necessary. Feeding is far from the easy, simple work it appears to be to the uninitiated.

For a long time the Hoe press stood without a rival. It was looked upon as the perfection of machines, and every newspaper of large circulation in England and the United States adopted it. So important did the proprietors of the *Times* consider it that, no less an engineer than Sir Joseph Whitworth was engaged to erect it, and he declared it to be one of the finest pieces of machinery he had ever inspected. It was in the *Times* office that a new species of stereotyping suitable to this machine was perfected, and thus the production of newspapers rendered possible of infinite expansion. As time went on competition increased, the expenses of journalism multiplied, and it became evident that there were objections connected with the Hoe machine of a very serious character. The press printed only one side of the sheet at once, and as the principle of "perfecting" had been discovered this was found to be a disadvantage. To gain more power more machines were required, necessitating a heavy outlay of capital. The number of hands required to work the machinery is very great. An eight feeder Hoe press will require a hand at each board, several more to carry off the sheets to the folding machines, and supply them with fresh sheets. In the event of any one hand stopping, all the rest have to stop, a defect of the most serious nature where circulation is large and immediate delivery an object of life and death. Another heavy objection is the cost. It would cost in Montreal not less than \$116 per week to keep an eight cylinder press going. In some of the English offices it used to cost £50 to £60 per week to run ten