

Miscellaneous.

Progress of Discovery During the Last Half Century.

It is related that one of a party of travelers, while standing on one of the mountains of Switzerland, was so transported with the beauties of the scenery spread before him, that in a burst of enthusiasm he declared "he never had seen the equal of such scenery, and he was sure there was nothing like it in Europe, for he had travelled through every country in it." A German at his side said, "he had never seen its like with but a single exception," and he named a certain mountain in the Highlands of Scotland, which he had visited a few weeks before." The former gentleman hung down his head, merely remarking "that, although he had been on that mountain often, he never thought much about it." That mountain was on his own estate.

There is no common saying which contains more truth than "familiarity begets indifference," "'tis distance lends enchantment to the view." We live in an age of wonders, and the last half century has witnessed a succession of the most mighty events and the most astounding discoveries which have ever been made at least during any other such period of the world's history, and yet, living as we do, in the midst of such developments, with new leaves of the book of invention still turning over, we do not wonder—for it is just like human nature, that the majority of mankind are callous to the merits and importance of the discoveries made in their own day, even although they are reaping untold benefits from them.

Let us look back to the beginning of this century, and see what mighty works have been done by inventors since that time. In 1800 there was not a single steamboat in the world. Our inland seas and noble rivers were lying grand and silent in primeval loneliness, except when enlivened by the clumsy bateau, or the rude flatboat. In 1807 Fulton launched the Clermont, which made a passage to Albany in 32 hours. At that time the mode of travel was by schooners and sloops, which were frequently six days on the passage. The improvement was certainly great, but what would Fulton now say, to see steamboats running the same distance in 8 hours—and some of them large enough to stow the Clermont on their forward decks. No steamboat had broken the waters of the Mississippi previous to 1815; the voyage from Cincinnati to New Orleans was a tremendous undertaking, and occupied more time than a steamboat would now take to circumnavigate the globe. At present, it is calculated that there are no less than 3,000 steamboats of all sizes in America, and the time saved to travellers, by the invention of the steamboat, is at least seventy per cent.; that is, a person can travel a greater distance in 30 days now, by steamboat, than he could in 100 days in 1800. Just fancy Benjamin Franklin being almost wrecked in going from New York to Amboy, and the vessel in which he was in, occupying 32 hours on the passage—a distance which is accomplished every day by our steamboats in one and a half hours—a great change, truly.

In Europe, steamboats were unknown until 1811, and no sea was regularly navigated by steamboats until 1818. The progress of Marine Navigation is remarkable. In 1838 no steamship had ventured across the stormy Atlantic to establish ocean navigation. Now we have communication every week with Europe, by regular steam mails; and to show the advantage of steam over mere sailing vessels, within a few days from the present date, some of our finest sailing packets have come in after a passage of fifty days, while our steamships have not been out more than sixteen days. If the last half century had given us no other invention than the steamboat, that alone, considering its importance, is enough to immortalize it. If in 1800 there was no steamship in the wide world, where is the country now where they are not seen, and where they are not exercising a most important influence? No country in the world

On the Hudson, Mississippi, on all our lakes, rivers, and seas, and on all the oceans of the world. On that sea where the waters rolled up in walls to allow Moses and the Hebrews to pass dry shod; on the ancient Nile, where Cleopatra's galley spread its silken sails to the breeze; on the Ganges of Indus in the East, and the Sacramento in the West, there may be seen numerous monuments to the inventor of the steamboat,—the steamship "Rules the Waves."

The steamboat is not the only important invention of the last half century—the progress of invention is just as marked in other departments of discovery. Look at that Iron Horse moving out of his stable, screaming and panting to start on his journey. That is the steam engine in its most perfect state—it is a near approach to the spiritual and physical combination. Behold how easily he drags the ponderous train at the rate of thirty miles per hour, thus conveying hundreds of passengers in concert and safety, to a distance in an hour which, but a few years ago, would take them nearly a whole day to accomplish by stages. Within three months the Queen of England was transported from the interior of Scotland to London, a distance of 400 miles, in ten hours. In 1800 the same journey could not be accomplished in less than eight days. If the steamboat has revolutionized intercommunication by river and sea, the locomotive has done more to revolutionize travel by land. In 1800 there was not a single locomotive in the world nor for 29 years after, viz., the 6th day of October, 1829, the day on which the Rocket ran on the Liverpool and Manchester Railway, at the average rate of 15 miles per hour. From that moment we date the commencement of a new and most astonishing era in the history of discovery. In England there are now 5,600 miles of railway constructed, and as many more proposed, at a cost of more than \$500,000,000. In the United States there are at least 5,700 miles of railway constructed, and there cannot be less than 20,250 miles of railroad now in operation in Europe and America, for neither Asia nor Africa can yet boast of a single line completed. What were the old Roman roads in comparison to the footpaths of our iron horses. In 1835 there were only 15 miles of railway in New York, now there are about 1,500, and a traveller can now journey as far in one day as he could in eight days in that year. The wealth invested in railroads is enormous, and their influence upon mankind, in every respect, is beyond calculation. But this grand invention is not the limit of the great discoveries made in our day.

Who, if he were told, twenty years ago, that the sunlight would be used for a limner's pencil, would have believed it? Not one; and yet this has been done. When M. Daguerre, a distinguished chemist of Paris, first published, in 1839, that he had discovered a method of taking pictures on metal plates by the sun; the public regarded his metal tablets with feelings of wonder. And if this discovery has not yet produced such important results, nor affected the customs of society so much as the steamships and railways, still it is a beautiful and wonderful discovery; and the time may not be far distant when it will be applied to paint the planets as they roll in their courses, and thus impress the warm kiss of the star on the pale cheek of the artist's metallic canvas.

Among the grand discoveries of the last half century, the Electric Telegraph stands out in bold relief. It has given to man the power of transmitting his thoughts to his fellow man thousands of miles distant in a few seconds. "Electricity leaves her thunderbolt in the sky, and, like Mercury dismissed from Olympus, acts as letter carrier and message boy." In 1837, when Morse first proclaimed that he could write messages by electricity at any distance, wise people shrugged their shoulders and looked with blank unbelief upon such a daring proposition; and when the proposal was before Congress, in 1843, to appropriate \$30,000 to test his system of telegraphing, it met with some determined side cuts and stern opposition from men (and there are a great number in the world,) who are conservatives

in nothing else but scientific discovery. In 1843 the first line of telegraph was completed in our country, between Washington and Baltimore, and since that time the progress of telegraph lines has been most surprising and astounding, if anything can now surprise us in the shape of discovery. All the important cities in our Union are linked together by the lightning tracks, and wherever we travel, there we behold, suspended on slender poles, those attenuated threads, along which the lightning fleets with messages of love, hope, gain, or fear. The telegraph has produced most astonishing changes in the modes of conducting business. A few years ago what a wear and tear of horse flesh there was in getting news for our daily papers; what a trouble and delay there was in getting the news from Halifax during the winter season. Now what a change. A steamship arrives at Halifax, Boston, or New York this morning, and the European news is published in the New Orleans papers in the evening. The speeches delivered in the halls of Congress to-day, are delivered to the readers of the newspapers in all our important cities next morning. Our astronomers, "pale watchers of the rolling spheres," employ the lightning pen to register their observations. The whole science of Voltism, Electro-magnetism, and Electrotyping, are trophies of the discoveries made during the last fifty years. Volta's letter to Sir Joseph Banks, announcing the discovery of the Voltaic Pile, is dated March 20th, 1800. The splendid discovery of the Electro Magnet, by Oersted, is dated 1821; and the beautiful art of Electrotyping, whereby electricity is made to resolve the metals from their liquid solutions, and copy, with the utmost accuracy, the medals of Durer, the most delicate etchings, and even write in permanent characters of gold, is but a few years old. Electro-magnetism has been employed to separate metals from their ores, to drive machinery, to make huge bars of iron dance in mid-air, like the fabled coffin of Mahomet and what it may accomplish in future times, (for there are still mysteries connected with it), it is not possible to predict.

Before the beginning of this century, what was the printing press in comparison to what it now is. A few years ago there was not a single printing press driven by steam, now there is not a paper with a large circulation printed without it. From printing 1,000, 2,000, and 4,000 copies per hour, the latest improved press can print 10,000, and the time is at hand when a single press will be throwing off 16,000 copies per hour. In other departments of typography the improvements have been equally striking and beneficial.

In what may be termed minor machines, the inventions and improvements have not been of minor importance. Fifteen years ago pins were all made by hand, each was made of more than one piece, and a number of persons were required to finish every one. A single machine now completes the operation from beginning to end; and, in Waterbury, Conn., 4,030,000 are finished every day, and the machinery for counting and sticking them in papers, is equally ingenious. In all kinds of machinery for manufacturing textile fabrics, the improvements made, during the last half century, would require volumes to describe them in all their numberless variations. In weaving, especially, we now behold the most beautiful carpets, with their most intricate patterns, woven by a few rods and cams, without the finger of man touching them, after they are set in motion. The rich carpets of Brussels are now made by steam, and iron finergers lap the wires, to raise the figures, with more accuracy and speed than the most skillful weaver. In some departments of manufacture, improvements have succeeded one another with such rapidity, that one set of machinery has been calculated to last only three years.

In Chemistry, what discoveries have been made; in fact, the whole science has been remodelled. The discovery of the voltaic battery was to chemistry what a strong man is to a great law-giver, in executing his mandates. In the hands of Davy, chemical compounds of what were supposed mere earthy crystals, were

resolved into metals in 1808, and since that time the most astonishing progress has been made in the science.

Agricultural chemistry is but a few years old, and bromine, iodine, palladium, rhodium, &c., are discoveries of very late years. The Animal Chemistry of Liebig has been but recently given to the world cotton and sawdust are now made to propel cannon balls, and rend rocks by a spark from a battery, and Chloroform has come to the aid of surgery, and arms and limbs are amputated from men and women every day, and they as ignorant of the operation performing on them as the dead in their graves.

Gas Light was unknown in 1800; it was not until two years after that Murdoch made his first public exhibition at Soho; since that time his discovery has encircled the earth,—in Europe and America all the principal cities are lighted with it, and even New Zealand villages,—where no white man had built his residence in 1800—are now illuminated by the same subtle but beautiful agent of human comfort and happiness. We have it asserted, also, and that but of yesterday, that water is now made in a New England city, at but little expense, to give both light and heat, to cold, blind, and erring mortals. In the department of Chemistry there is still as great an ocean before us as there is behind, in physical discovery.

In Astronomy the advancement has been equally rapid and wonderful. Mechanics has come to the aid of mathematics new and powerful telescopes have drawn the stars down to earth and opened up the secret chambers of Orion to the ken of mortals, and so refined have the disquisitions of philosophy become, that the planet Neptune was recently discovered, even before a ray of its light had entered human eye and, as Sir David Brewster has well observed, "by a law of the Solar System, just discovered by Daniel Kirkwood, a humble American mechanic, who, like Kepler, struggled to find something new among the arithmetical relations of the planetary elements, we can determine the broken magnitude of the original planet, long after it had been shivered to atoms."

There is not a single department in science and art but has been greatly enriched with splendid discoveries during the last fifty years; and those discoveries, although so many are blind to their value, have been the means of conferring great benefits upon all classes. Look at the simple article of Lucifer Matches; twenty years ago we knew nothing about their benefits. None but those who were comparatively rich could buy them, and fifteen years ago a box, which now sells for one cent, could not be purchased for less than twelve cents. During the last war between America and England, cotton cloth, which now can be purchased for eight cents, could not be purchased for forty. Blanchard has given to the world a machine which, by putting a rough block of marble upon a spindle, soon turns it into the likeness of Clay or Webster. Bogardus has given to the world his engraving machine (we are sorry that it is so little known) which can engrave the finest numbers, and the most beautiful flowers, on metal, with a facility and accuracy, which baffles all manual workmanship. In planing machines, spike machines, machinery for making shoes for men, and shoes for horses; in machines for making all instruments, from a needle to an anchor, what part of the whole world's history can equal the last half century? Nasmyth's Steam Hammer, which was invented but a few years ago, can be managed with the docility of a lamb. We have now gold and steel quills instead of goose quills. This is certainly the age of invention. The triumphs of warriors are naught compared with the triumphs of inventors. The iron bridge spanning the sea, the iron ship sailing on the sea, are greater evidences of mental power than Austertitz or Waterloo.

And if the last half century has given birth to so many grand discoveries and inventions, is there any reason to doubt that the future may more than outstrip the past. We can see none. Hope is pointing her finger to the year 1900.