

THE MECHANIC ARTS OF 1776 AND 1876.

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A TOAST,

TO THE LITERARY UNION.

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by

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1876.

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When the centuries have rolled on and are numbered among the fifties, the historian will point to the present century as the Epoch of the advent of Steel; and then the nineteenth and those centuries immediately following it, will be known as the Age of Steel, as we now point back to the Age <sup>of</sup> Stone, the Age of Copper, or the Age of Iron, from which we are about emerging. Although the manufacture of steel implements was known eighteen centuries ago, it was only a stray outreach of art into a field not rendered intelligible by the light of science; and the artisan struggled in darkness and lost his hold upon the unintelligible facts with every change of the unstable times. This was practically the state of steel manufacture in 1776, but now in 1876, it is all changed.

The scientist has stepped in and unraveled the mysteries of the production of steel, and instead of the few isolated and disjointed facts known only to the few, and sacredly treasured as valuable secrets to be

transmitted only by father to son, full knowledge of all the facts are spread abroad over the whole world.

One scrap from the history of steel manufacture will suffice to show the difficulties under which the artisan labored one hundred years ago. Toward the close of the last century, there appeared in the markets of Europe, a new manufacture known simply as steel.

Artisans were surprised to find that the bars possessed the same qualities throughout their substance, that they could be wrought into implements, and tempered without further preparation; whereas previous to that time steel implements were made into steel, after being formed by a process now known as Case-Hardening. This was one of the secret manufactures so common a century ago; and no one knew its process of production, nor whence it came, until an English artisan searched it out; and found in an obscure village in Germany a shop from whence it came. This was in winter; and one cold, stormy night when the shop was in full blast, with the keys turned as usual, - there came

a knock at the door and a cry for help. The master of the works going to the door, found a poor, ragged specimen of humanity, who begged to come in and warm, as he was dying of cold. The good master could not well refuse such an appeal as this; and after a few questions which seemed to prove the poor man equally as ignorant as destitute, he was allowed to go in to the fire. He soon dropped down as one exhausted, and drawing the old slouched hat over his eyes he seemed to sleep, and no farther notice was taken of him, and work was resumed. But the position was well taken and the feint was well played; for a sharp eye peered out from underneath that old slouched hat, and saw small iron bars boxed with the materials for Case Hardening, and placed in the fire. Other case-hardened bars were taken out- placed in the furnace- melted and cast into ingots, and those ingots drawn under the hammer until all trace of their having been cast was destroyed. The secret had been obtained, and after some hours of apparent sleep, the poor man awoke with a well feigned

yawn and stretch, and saying he should be trudging on his way, heartily thanked the good master for his kindness, and sallied out into the cold night, and sped with all haste to England; a few months afterwards a great shop was established on English soil for the manufacture of Cast Steel.

After that time the manufacture of steel steadily progressed until Bessimer sprang from the scientist's laboratory, and seizing the artisan's tongs, dragged out a new line of facts, - tried them in the puddling furnace, and reduced the price of steel seventy-five dollars per ton. And now in our Centennial year we cannot look over the history of the rise and progress of steel manufacture, without being impressed with the belief that by the close of the present century steel will become cheaper than wrought iron, and displace it in all ordinary articles of manufacture.

Following closely upon the general introduction of cast steel into the mechanics arts, came innumerable improvements dependant more or less directly up-

on it; steel being the forerunner which rendered them possible; and closely in its wake came the introduction of Steam, which in the minds of us has perhaps overshadowed by its brilliancy that invention which rendered its success possible.

There is a curious scrap of history connected with the origination of the original steam engine, which will serve to illustrate how native inventive genius is not infrequently associated with scientific skill in the progress of the meckanic arts.

The renowned Watt had a partner in his shop, and one day when Watt was out there came a poor, wandering mechanic hunting work; after some talk with Watt's partner, he was leaving the shop disappointed as he had done many times before, when he was met by Watt who noticing something peculiar about the man's hat, said to him, "My friend, what kind of a hat is that you've got," Its just timmer, 'ut sur-" "Where did you get it?" "I jus' turn it on my lathe, sur. I had a lang way to gang an I wanted suthin to keep the

water out." "Turned it on your lathe," said the astonished Watt, "No, that is simply impossible. The lathe turns things around; your hat is made oval to fit the head." "I know that, sur, but I jus' gared my lathe to gang anither gait to plaze me, sur, and turns my 'ut." Upon examination Watt found the hat had indeed been turned, and was not slow to perceive that this poor, wandering mechanic was a genius; and asking him in, told him to take charge of any machine he thought he could handle best, and his wages should be satisfactory. This poor mechanic who had invented the renowned oval lathe which was the initiatory step to all form turning as he said, just to please him, and to turn a hat, was Henry Boulton, afterward Watt's partner and associate in the invention of the original steam-engine, which was the result of the native inventive genius of the one, shaped and directed by the scientific knowledge and engineering ability of the other. I need not detail the steps by which the steam power has arrived at its present state of per-

fection and usefulness. How it was snatched from across the water by Fulton, and applied to the navigation of the Hudson, and how the new snorting monster was bitterly opposed by the fisherman and good people dwelling on its banks. How that the state of Louisiana granted Fulton and his company the sole privilege of the navigation of the great Mississippi, if he would place a boat upon her waters that could ascend against her current. How that in 1812 the doubting legislature appointed a commission to examine Fulton's boat and see if he had complied with his contract, -who returned and reported to the wondering legislators, that with them present on board, Fulton's boat had actually ascended the river against both current and wind, at the rate of two miles per hour. How that Dr. Dick writing in 1823 was laughed to scorn, because he said that the steam power would drive mighty ships across the ocean against wind and wave at the rate of eight miles per hour, and how his predictions were fulfilled.

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How that the New Jersey Rail Road Company advertised in 1881 that in fair weather their cars would be drawn by the locomotive built by Baldwin; in damp weather, by the horses. These trials and struggles through which the present splendid results have been achieved, are familiar to many here.

. Since Franklin drew Electricity from the clouds, its peculiar phenomena has occupied the minds of scientists the world over. But it remains for the artisans of the nineteenth century to wrest it from the scientist's laboratory, and harness it for work in the service of mankind.

And now with these three prime movers in modern progress, Steel, Steam, and Electricity, the world moves on at a pace utterly beyond the most ardent conception of "forward march" in the days of Washington. How would the eyes of our forefathers of 1776 stand out with wonder, could they but awake and behold the vast improvements made by the mechanic arts in the century just closed. Instead of the old ox-

cart, stage-coach and post rider of a century ago, the continents are girded with a network of steel bars, and the iron horse rushes with the speed of the winds from city to city, and from sea to sea, laden with his living freight and the commerce of the world; and the burden is caught up by the great steamers which plough the mighty deep across against wind and wave, and bear it on from continent to continent.

Rapidly by this quick change of products, and by the incessant exchange of thought rendering the most distant nations acquainted, and converting the different families of man into one common brotherhood. And yet if we wish for still greater speed, the lightnings are harnessed with wire and cable and the latest news is flashed from city to city, from sea to sea, and plunging undismayed into the domain old Neptune, the width of the ocean is traversed, and the message delivered almost before old time has noted its flight, and the old man's hoary locks stand with afright, and his scythe drops from his hand in

his utter amazement. And so it is the world moves on with increasing change; improvement follows improvement, and the generations know not of that which is in store for their successors.