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THE GIFTS OF SCIENCE TO ART.

STEAM—DAGUERRETYPE—LIGHTNING CONDUCTORS—
THE SAFETY LAMP—ELECTRO-PLATING AND GILDING
—THE ELECTRIC TELEGRAPH.

Each succeeding age and generation leaves behind it a peculiar character, which stands out in relief upon its annals, and is associated with it for ever in the memory of posterity. One is signalized for the invention of gunpowder, another for that of printing; one is rendered memorable by the revival of letters, another by the reformation of religion; one epoch is rendered illustrious by the discoveries of Newton, another by the conquests of Napoleon. If we are asked by what characteristic the present age will be marked in the records of our successors, we answer, by the miracles which have been wrought in the subjugation of the powers of the material world to the uses of the human race. In this respect no former epoch can approach to competition with the present.

Although the credit of the invention of the steam-engine must be conceded to the generation which preceded us, its improvement and its most important applications are unquestionably due to our contemporaries. So little was the immortal Watt himself aware of the extent of the latent powers of that machine, that he declared, upon the occasion of his last visit to Cornwall, on ascertaining that a weight of twenty-seven millions of pounds had been raised one foot high by the combustion of a bushel of coals under one of his boilers, that the *ne plus ultra* was attained, and that the power of steam could no further go. Nevertheless, the Patriarch of the steam-engine lived to see forty millions of pounds raised the same height by the same quantity of fuel. Had he survived only a few years longer, he would have seen even this performance doubled, and still more recently it has, under favorable circumstances, been increased in a threefold ratio.

But it is not in the mere elevation of mineral substances from the crust of the globe, nor in the drainage of the vast subterranean regions which have become the theatre of such extensive operations of industry and art, that steam has wrought its greatest miracles. By its agency coal is made to minister in an infinite variety of ways to the uses of society. Coals are by it taught to spin, weave, dye, print, and dress silks, cottons, woollens, and other cloths; to make paper, and print books on it when made; to convert corn into flour; to press oil from the olive, and wine from the grape; to draw up metal from the bowels of the earth; to pound and smelt it, to melt and mould it; to forge it; to roll it, and to fashion it into every form that the most wayward caprice can desire. Do we traverse the deep?—they lend wings to the ship and bid defiance to the natural opponents, the winds and the tides. Does the wind-bound ship desire to get out of port to start on her voyage?—steam throws its arms round her, and places her on the open sea. Do we traverse the land?—steam is harnessed to our chariot, and we outstrip the flight of the swiftest bird, and equal the fury of the tempest.

The great pyramid of Egypt stands upon a base measuring seven hundred feet each way, and is five hundred feet high. According to Herodotus, its construction employed a hundred thousand labourers for twenty years. Now we know that the materials of this structure might be raised from the ground to their present position by the combustion of four hundred and eighty tons of coals.

The Menai Bridge consists of about two thousand tons of iron, and its height above the level of the water is one hundred and twenty feet. Its entire mass might be lifted from the level of the

water to its present position by the combustion of four bushels of coal!

Marvellous as the uses are to which heat has been rendered subservient, those which have been obtained from light are not less so. Ready-made flame is fabricated in vast establishments, erected in the suburbs of cities and towns, and transmitted in subterranean pipes through the streets and buildings which it is desired to illuminate. It is supplied according to individual wants, in measured quantity; and at every door an automaton is stationed, by whom a faithful register is kept of the quantity of flame supplied from hour to hour!

It resulted from scientific researches on the properties of solar light, that certain metallic preparations were affected in a peculiar manner by being exposed to various degrees of light and shade. This hint was not lost. An individual, whose name has since become memorable, M. Daguerre, thought that as engraving consisted of nothing but the representation of objects by means of incisions on a metallic plate, corresponding to the lights and shades of the object represented—and as these same lights and shades were shown by the discoveries of science to produce on the metals specific effects, in the exact proportion of their intensities—there could be no reason why the objects to be represented should not be made to engrave themselves on plates properly prepared!! Hence arose the beautiful art now become so universally useful, and called after its inventor—DAGUERRETYPE.

But of all the gifts which Science has presented to Art in these latter days, the most striking and magnificent are those in which the agency of electricity has been evoked.

From the moment electric phenomena attracted the attention of the scientific world, the means of applying them to the useful purposes of life were eagerly sought for. Although such applications had not yet entered into the spirit of the age as fully as they have since done, it so happened that in this department of physics, a volunteer had enlisted in the army of science, the characteristic of whose genius was eminently practical, and soon achieved, by his discoveries, an eminence to which the world has since offered universal homage.

Art often presses into its service the discoveries of Science, but it sometimes provokes them. Art surveys the fruit of the toil of the philosopher, and selects such as suits her purposes; but sometimes not finding what is suitable to her wants, she makes an appeal to Science, whose votaries direct their researches accordingly toward the desired objects, and rarely fail to attain them.

One of the most signal examples of the successful issue of such an appeal presents itself in the *safety-lamp*.

The same gas which is used for the purpose of illumination of our cities and towns (and which, as is well known, is obtained from coals by the process of baking in close retorts) is often spontaneously developed in the seams of coal which form the mines, and collects in large quantities in the galleries and workings where the coal-miners are employed. When this gas is mingled with common air, in a certain definite proportion, the moisture becomes highly explosive, and frequently catastrophes, attended with frightful loss of life, occurred in consequence of this in the mines. The prevalence of this evil at length became so great, that Government called the attention of scientific men to the subject, and the late Sir Humphrey Davy engaged in a series of experimental researches with a view