SAMUEL SMILES

# INDUSTRIAL BIOGRAPHY: IRON WORKERS AND TOOL MAKERS

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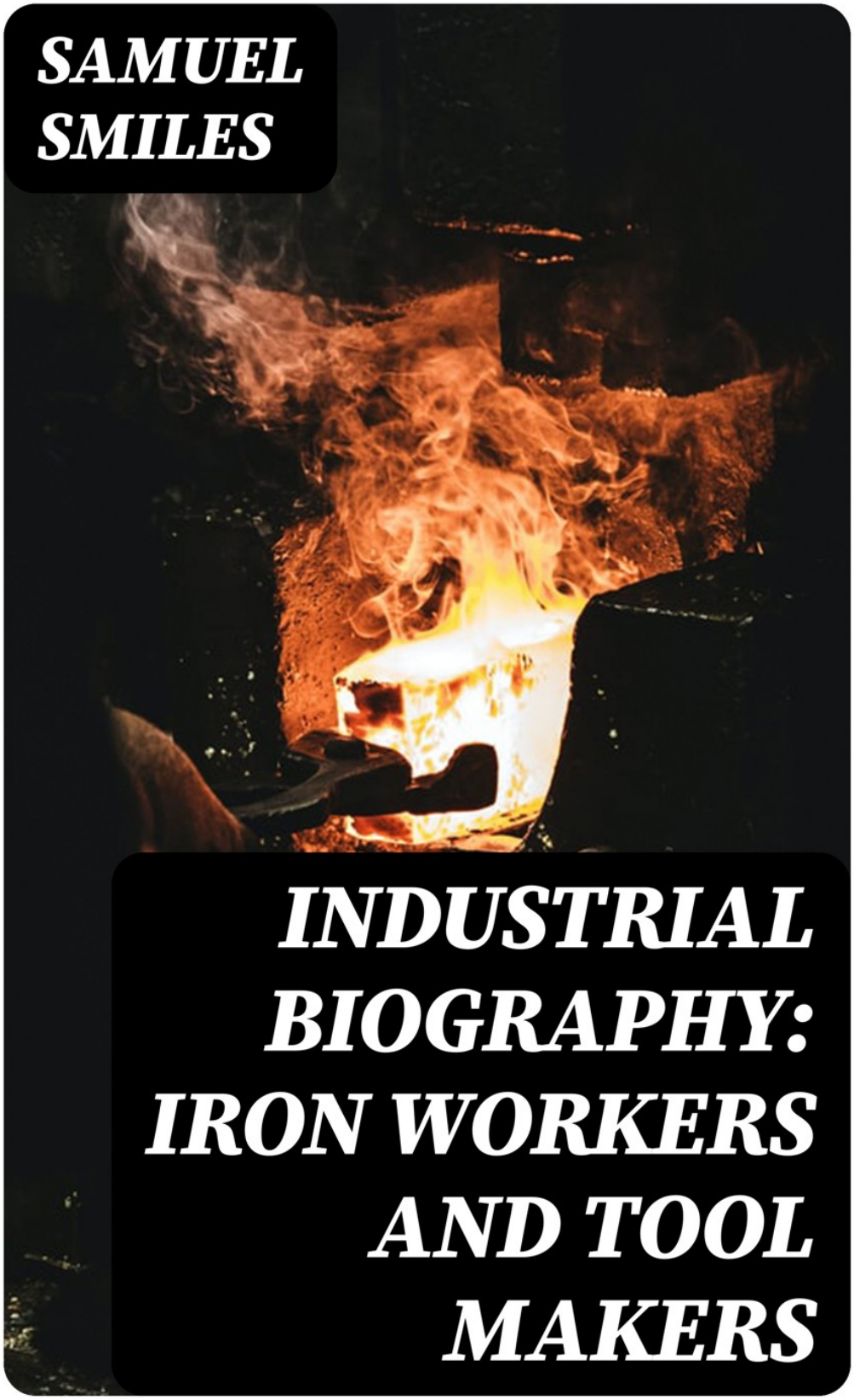

# INDUSTRIAL BIOGRAPHY: IRON WORKERS AND TOOL MAKERS

**Samuel Smiles**

# Industrial Biography: Iron Workers and Tool Makers

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# PREFACE.

The Author offers the following book as a continuation, in a more generally accessible form, of the Series of Memoirs of Industrial Men introduced in his Lives of the Engineers. While preparing that work he frequently came across the tracks of celebrated inventors, mechanics, and iron-workers —the founders, in a great measure, of the modern industry of Britain—whose labours seemed to him well worthy of being traced out and placed on record, and the more so as their lives presented many points of curious and original interest. Having been encouraged to prosecute the subject by offers of assistance from some of the most eminent living mechanical engineers, he is now enabled to present the following further series of memoirs to the public.

Without exaggerating the importance of this class of biography, it may at least be averred that it has not yet received its due share of attention. While commemorating the labours and honouring the names of those who have striven to elevate man above the material and mechanical, the labours of the important industrial class to whom society owes so much of its comfort and well-being are also entitled to consideration. Without derogating from the biographic claims of those who minister to intellect and taste, those who minister to utility need not be overlooked. When a Frenchman was praising to Sir John Sinclair the artist who invented ruffles, the Baronet shrewdly remarked that some merit was also due to the man who added the shirt.

A distinguished living mechanic thus expresses himself to the Author on this point:—"Kings, warriors, and statesmen have heretofore monopolized not only the pages of history, but almost those of biography. Surely some niche ought to be found for the Mechanic, without whose skill and labour society, as it is, could not exist. I do not begrudge destructive heroes their fame, but the constructive ones ought not to be forgotten; and there IS a heroism of skill and toil belonging to the latter class, worthy of as grateful record,—less perilous and romantic, it may be, than that of the other, but not less full of the results of human energy, bravery, and character. The lot of labour is indeed often a dull one; and it is doing a public service to endeavour to lighten it up by records of the struggles and triumphs of our more illustrious workers, and the results of their labours in the cause of human advancement."

As respects the preparation of the following memoirs, the Author's principal task has consisted in selecting and arranging the materials so liberally placed at his disposal by gentlemen for the most part personally acquainted with the subjects of them, and but for whose assistance the book could not have been written. The materials for the biography of Henry Maudslay, for instance, have been partly supplied by the late Mr. Joshua Field, F.R.S. (his partner), but principally by Mr. James Nasmyth, C.E., his distinguished pupil. In like manner Mr. John Penn, C.E., has supplied the chief materials for the memoir of Joseph Clement, assisted by Mr. Wilkinson, Clement's nephew. The Author has also had the valuable assistance of Mr. William Fairbairn, F.R.S., Mr. J. O. March, tool manufacturer (Mayor of Leeds), Mr.

Richard Roberts, C.E., Mr. Henry Maudslay, C.E., and Mr. J. Kitson, Jun., iron manufacturer, Leeds, in the preparation of the other memoirs of mechanical engineers included in this volume.

The materials for the memoirs of the early iron-workers have in like manner been obtained for the most part from original sources; those of the Darbys and Reynoldses from Mr. Dickinson of Coalbrookdale, Mr. William Reynolds of Coed-du, and Mr. William G. Norris of the former place, as well as from Mr. Anstice of Madeley Wood, who has kindly supplied the original records of the firm. The substance of the biography of Benjamin Huntsman, the inventor of cast-steel, has been furnished by his lineal representatives; and the facts embodied in the memoirs of Henry Cort and David Mushet have been supplied by the sons of those inventors. To Mr. Anderson Kirkwood of Glasgow the Author is indebted for the memoir of James Beaumont Neilson, inventor of the hot blast; and to Mr. Ralph Moore, Inspector of Mines in Scotland, for various information relative to the progress of the Scotch iron manufacture.

The memoirs of Dud Dudley and Andrew Yarranton are almost the only ones of the series in preparing which material assistance has been derived from books; but these have been largely illustrated by facts contained in original documents preserved in the State Paper Office, the careful examination of which has been conducted by Mr. W. Walker Wilkins.

It will thus be observed that most of the information embodied in this volume, more especially that relating to the inventors of tools and machines, has heretofore existed

only in the memories of the eminent mechanical engineers from whom it has been collected. The estimable Joshua Field has died since the date at which he communicated his recollections; and in a few more years many of the facts which have been caught and are here placed on record would, probably, in the ordinary course of things, have passed into oblivion. As it is, the Author feels that there are many gaps yet to be filled up; but the field of Industrial Biography is a wide one, and is open to all who will labour in it.

London, October, 1863.

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# INDUSTRIAL BIOGRAPHY.

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### IRON AND CIVILIZATION.

"Iron is not only the soul of every other manufacture, but the main spring perhaps of civilized society."—FRANCIS HORNER.

"Were the use of iron lost among us, we should in a few ages be unavoidably reduced to the wants and ignorance of the ancient savage Americans; so that he who first made known the use of that contemptible mineral may be truly styled the father of Arts and the author of Plenty."—JOHN LOCKE.

When Captain Cook and the early navigators first sailed into the South Seas on their voyages of discovery, one of the things that struck them with most surprise was the avidity which the natives displayed for iron. "Nothing would

go down with our visitors," says Cook, "but metal; and iron was their beloved article." A nail would buy a good-sized pig; and on one occasion the navigator bought some four hundred pounds weight of fish for a few wretched knives improvised out of an old hoop.

"For iron tools," says Captain Carteret, "we might have purchased everything upon the Freewill Islands that we could have brought away. A few pieces of old iron hoop presented to one of the natives threw him into an ecstasy little short of distraction." At Otaheite the people were found generally well-behaved and honest; but they were not proof against the fascinations of iron. Captain Cook says that one of them, after resisting all other temptations, "was at length ensnared by the charms of basket of nails." Another lurked about for several days, watching the opportunity to steal a coal-rake.

The navigators found they could pay their way from island to island merely with scraps of iron, which were as useful for the purpose as gold coins would have been in Europe. The drain, however, being continuous, Captain Cook became alarmed at finding his currency almost exhausted; and he relates his joy on recovering an old anchor which the French Captain Bougainville had lost at Bolabola, on which he felt as an English banker would do after a severe run upon him for gold, when suddenly placed in possession of a fresh store of bullion.

The avidity for iron displayed by these poor islanders will not be wondered at when we consider that whoever among them was so fortunate as to obtain possession of an old nail, immediately became a man of greater power than his

fellows, and assumed the rank of a capitalist. "An Otaheitan chief," says Cook, "who had got two nails in his possession, received no small emolument by letting out the use of them to his neighbours for the purpose of boring holes when their own methods failed, or were thought too tedious."

The native methods referred to by Cook were of a very clumsy sort; the principal tools of the Otaheitans being of wood, stone, and flint. Their adzes and axes were of stone. The gouge most commonly used by them was made out of the bone of the human forearm. Their substitute for a knife was a shell, or a bit of flint or jasper. A shark's tooth, fixed to a piece of wood, served for an auger; a piece of coral for a file; and the skin of a sting-ray for a polisher. Their saw was made of jagged fishes' teeth fixed on the convex edge of a piece of hard wood. Their weapons were of a similarly rude description; their clubs and axes were headed with stone, and their lances and arrows were tipped with flint. Fire was another agency employed by them, usually in boat-building. Thus, the New Zealanders, whose tools were also of stone, wood, or bone, made their boats of the trunks of trees hollowed out by fire.

The stone implements were fashioned, Captain Cook says, by rubbing one stone upon another until brought to the required shape; but, after all, they were found very inefficient for their purpose. They soon became blunted and useless; and the laborious process of making new tools had to be begun again. The delight of the islanders at being put in possession of a material which was capable of taking a comparatively sharp edge and keeping it, may therefore readily be imagined; and hence the remarkable incidents to

which we have referred in the experience of the early voyagers. In the minds of the natives, iron became the representative of power, efficiency, and wealth; and they were ready almost to fall down and worship their new tools, esteeming the axe as a deity, offering sacrifices to the saw, and holding the knife in especial veneration.

In the infancy of all nations the same difficulties must have been experienced for want of tools, before the arts of smelting and working in metals had become known; and it is not improbable that the Phoenician navigators who first frequented our coasts found the same avidity for bronze and iron existing among the poor woad-stained Britons who flocked down to the shore to see their ships and exchange food and skins with them, that Captain Cook discovered more than two thousand years later among the natives of Otaheite and New Zealand. For, the tools and weapons found in ancient burying-places in all parts of Britain clearly show that these islands also have passed through the epoch of stone and flint.

There was recently exhibited at the Crystal Palace a collection of ancient European weapons and implements placed alongside a similar collection of articles brought from the South Seas; and they were in most respects so much alike that it was difficult to believe that they did not belong to the same race and period, instead of being the implements of races sundered by half the globe, and living at periods more than two thousand years apart. Nearly every weapon in the one collection had its counterpart in the other,—the mauls or celts of stone, the spearheads of flint or jasper, the arrowheads of flint or bone, and the saws

of jagged stone, showing how human ingenuity, under like circumstances, had resorted to like expedients. It would also appear that the ancient tribes in these islands, like the New Zealanders, used fire to hollow out their larger boats; several specimens of this kind of vessel having recently been dug up in the valleys of the Witham and the Clyde, some of the latter from under the very streets of modern Glasgow.[1] Their smaller boats, or coracles, were made of osiers interwoven, covered with hides, and rigged with leathern sails and thong tackle.

It will readily be imagined that anything like civilization, as at present understood, must have been next to impossible under such circumstances. "Miserable indeed," says Carlyle, "was the condition of the aboriginal savage, glaring fiercely from under his fleece of hair, which with the beard reached down to his loins, and hung round them like a matted cloak; the rest of his body sheeted in its thick natural fell. He loitered in the sunny glades of the forest, living on wild fruits; or, as the ancient Caledonians, squatted himself in morasses, lurking for his bestial or human prey; without implements, without arms, save the ball of heavy flint, to which, that his sole possession and defence might not be lost, he had attached a long cord of plaited thongs; thereby recovering as well as hurling it with deadly, unerring skill."

The injunction given to man to "replenish the earth and subdue it" could not possibly be fulfilled with implements of stone. To fell a tree with a flint hatchet would occupy the labour of a month, and to clear a small patch of ground for purposes of culture would require the combined efforts of a

tribe. For the same reason, dwellings could not be erected; and without dwellings domestic tranquillity, security, culture, and refinement, especially in a rude climate, were all but impossible. Mr. Emerson well observes, that "the effect of a house is immense on human tranquillity, power, and refinement. A man in a cave or a camp—a nomad—dies with no more estate than the wolf or the horse leaves. But so simple a labour as a house being achieved, his chief enemies are kept at bay. He is safe from the teeth of wild animals, from frost, sunstroke, and weather; and fine faculties begin to yield their fine harvest. Inventions and arts are born, manners, and social beauty and delight." But to build a house which should serve for shelter, for safety, and for comfort—in a word, as a home for the family, which is the nucleus of society—better tools than those of stone were absolutely indispensable.

Hence most of the early European tribes were nomadic: first hunters, wandering about from place to place like the American Indians, after the game; then shepherds, following the herds of animals which they had learnt to tame, from one grazing-ground to another, living upon their milk and flesh, and clothing themselves in their skins held together by leathern thongs. It was only when implements of metal had been invented that it was possible to practise the art of agriculture with any considerable success. Then tribes would cease from their wanderings, and begin to form settlements, homesteads, villages, and towns. An old Scandinavian legend thus curiously illustrates this last period:—There was a giantess whose daughter one day saw a husbandman ploughing in the field. She ran and picked

him up with her finger and thumb, put him and his plough and oxen into her apron, and carried them to her mother, saying, "Mother, what sort of beetle is this that I have found wriggling in the sand?" But the mother said, "Put it away, my child; we must begone out of this land, for these people will dwell in it."

M. Worsaae of Copenhagen, who has been followed by other antiquaries, has even gone so far as to divide the natural history of civilization into three epochs, according to the character of the tools used in each. The first was the Stone period, in which the implements chiefly used were sticks, bones, stones, and flints. The next was the Bronze period, distinguished by the introduction and general use of a metal composed of copper and tin, requiring a comparatively low degree of temperature to smelt it, and render it capable of being fashioned into weapons, tools, and implements; to make which, however, indicated a great advance in experience, sagacity, and skill in the manipulation of metals. With tools of bronze, to which considerable hardness could be given, trees were felled, stones hewn, houses and ships built, and agriculture practised with comparative facility. Last of all came the Iron period, when the art of smelting and working that most difficult but widely diffused of the minerals was discovered; from which point the progress made in all the arts of life has been of the most remarkable character.

Although Mr. Wright rejects this classification as empirical, because the periods are not capable of being clearly defined, and all the three kinds of implements are found to have been in use at or about the same time,[2]