SIR ISAAC HOLDEN, RA.I.T.

ALTHOUGH not an engineer, Sir Isaac Holden, Bart., who died on Friday morning, the 13th inst., at the advanced age of 90 years, was endowed with inventive and constructive genius sufficient to place him in the front rank of mechanics; his work in the perfection of woollen-combining machinery will entitle him to honourable mention amongst the industrial benefactors of his country. He was well equipped for his life-work, for although born in poor circumstances, his father being a headman in a Kentishweare mine, he secured what must be regarded as liberal education, none the less prized because hardly won. Indeed, as is the case with many worthy ambitious Scotch parents, the Holdens intended that their son should 'was his pow in the pulps,' and the role of school teaching was but a stepping-stone. We have no occasion here to follow his scholastic career at Paisley, Leeds, Slaidburn, and Reading, except to remark that its vicissitudes ultimately brought him in touch with one of the large woollen manufacturers when at Glasgow, and induced him in his engagement as bookkeeper with Messrs. Townend Brothers, Cullingworth, near Bingley. That was in 1830, when Holden was in his 23rd year. Soon after his insatiate mechanical ingenuity was discovered, he became manager, and then partner, when he commenced that long-continued striving after the perfection of certain mechanical appliances in textile manufactures.

The Townends were engaged in the woollen trade, and while they themselves had managed to resist the temptation of entering upon that search for a mechanical means of preparing wool for the weaver in supersession of the laborious manual combing, their young manager was soon drawn into the vortex which had already overwhelmed many others. The failure or a success provoking its incompleteness. To make the point of Holden's ultimate success the clearer, it may be explained that the finest of woollen goods require that the short and refractory fibres of wool should be eliminated, while the curly threads have to be straightened and smoothed out, the long fibres being drawn into one united sliver to be sent to the weaver. This work was done up to 20 years ago, solely by hand combs in cottage workshops. Two combs were used by each worker. The wool in the first instance labelled in its matted form into one of these, having previously been washed and oiled; and, after being driven by an oven, the other comb was passed through it gently and left in the one end while the first used comb was withdrawn and also passed through the wool in a similar manner. Thus the combs were used alternately, the one while 'lashed' in the wool being fixed to a standard. The firm of comb had much to do with the success and with the subsequent difficulties of mechanical methods. It had three sets of teeth, each set of different height or length, so that when the tip of the comb was used the teeth were wider apart than when subsequently all three were worked into the wool. It was on this score that the earlier machines failed, beginning with one of date 1723, and including Dr. Cartwright's of 1760, Collie's of 1827, and others.

Early in the forties four distinguished inventors were at work to overcome the many difficulties which rejoiced the hearts of the hand combers. These men held stated revels at the festival of Bishop Blaize, their patron saint, who is said to have invented wool combing in the days of Diocletian. Heilman was actively engaged at Alasco, Donisthorpe, Lister (now Lord Masham), and Holden in England. The diligence with which the work was pursued can be imagined when it is explained that two million sternings had been spent in research and experiment, Holden disfiguring himself 50,000l, and Lister even more. Each success, however, perhaps on different lines, and a magnificent reward was vouchsafed to all of them. Although the subject is fascinating, we cannot afford space to review the successive phases of the friendly rivalry. Heilman took out the first patent—it was in 1842—although Lister had succeeded before this, the arrangement of the former's invention being on the plan of a horizontal circular comb, with filling and disengagement of the fibres at different parts of the circle. It is, however, with Holden's work that we are more concerned. He had seven of Collie's machines failed at Townends', and conducted his earlier experiments there, effecting successive improvements in detail, as did others, so as to bring the machine to a higher state of efficiency. But, as we have already hinted, the Townends were not a magistrine as to the ultimate undoubted success of mechanism, and did not fully support Holden in his contention in favour of patents, so that not instantly the enthusiasm had to sever his connection with the firm, and become associated with Lister's. He should be stated here that Holden took a common-sense view of the patenting of inventions. He always held that a patent should only be applied for when long and expensive experimental work had to be rewarded; where the invention was accidental or easily arrived at there was, he urged, no call for such recompense as the Patent Act affords.

It was in 1846 that Holden first joined Lister at Bradford, and then commenced in earnest the work of invention. Holden, from the time he first saw the men dally but faultlessly working the hand-comb, was convinced that the mechanism to replace the manual labour should be purely initiative. There is the well-told but sappetically received story of Heilman being similarly impressed by his daughter combing her hair-locks first loosely with a wide-toothed comb and latterly firmly with a fine-toothed comb. The two inventors worked on different lines, Holden acting on the principle that square motion was the preferable, and that the work could be most effectually done by striking a fine comb into the "beard" of wool near to the comb head and pushing it away at once so as to avoid locking. The first patent for this square motion was taken out in 1846, but even then the idea was far from being finally worked out with success, for when first applied at the mills of Messrs. Lister and Holden at St. Denis, it was found that, except with a very light weight of wool, it was not successful. Incessantly did Holden work; but it is impossible here to review in detail the progress which ultimately brought success. There have been subsequent improvements, particularly with the "Nobel" machine—an adaptation of the Heilman, and now largely used in England; but the Holden is alone in operation at the Bradford establishment and throughout France, while Heilman is most in favour in Germany. It is not necessary to do more than suggest the economic advantage of the new mechanism. The machine can do 100 times the work of the hand combs, and yet modern workers are employed, probably 10 times the number; they have better wages, healthier surroundings, and greater leisure. Of this prospect the inventor was satisfied when at Townends, for he had studied Lord Brougham's work on "The Results of Machinery."

We need not review Mr. Holden's other achievements in making heidos and guaspey yarns, in planning to remove oil, which was deleterious in any combination in silk, &c., nor his association with Lord Masham in works, in 1844, at St. Denis, afterwards abandoned in 1800, and in 1825 at Rheims and Croix, near Roubaix, as well as at Bradford in 1846. Mr. Lister retired in 1828, and the fact that his interest was bought at 85,000l, indicates the worth of the concern at that early date. Indeed, during the years of the American War, immense profits were made, and in 1850 Holden's two sons, Mr. Angus and Mr. Edward, were assumed as partners. As to his political and social career little need be said; he brought him happiness in his ample recognition of its duties, or, rather, privileges. He was made a baronet in 1863; but it is an open secret that such honours were offered him earlier. Even to the last he found a satisfaction in following those strict rules of physiology which were characteristic of his life, and of that golden rule which was concentrating all his efforts for the benefit of the time, in which an important element in his success as an inventor.