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THE WHITWORTH INDUSTRIAL SCHOLARSHIPS.

In publishing on this page a portrait of Sir Joseph Whitworth, a mechanic whose skill is known and valued wherever industrial knowledge has penetrated, we desire, not only to do honor to a master of his craft, but also to call attention to his liberal bestowal of a portion of his wealth to found scholarships to enable rising artisans to pursue their studies, and to the terms of the gift, which are commendable for their practical value to all who intend to employ their means for like noble purposes.

The rapid strides made by France, Germany, and other continental nations in the mechanical arts have forced the importance of technical education upon other people, and the English have recently made arrangements on the largest scale for embodying practical studies in the scheme of the common school *curriculum*. Sir Joseph Whitworth has taken the lead by presenting $500,000 to be disposed of as follows:

The interest (at 3 per cent, $15,000 annually) to be divided into 30 stipends of $500 per annum, to be awarded to young men, natives of the United Kingdom, selected by open competition for their intelligence and proficiency in the theory and practice of mechanics and its cognate sciences. Each successful competitor is to receive the stipend for three years.

The liberal donor further proposed that as much latitude as possible should be allowed to each successful competitor, in reference to the natural bent of his inclination. If he wished to complete his general education instead of continuing his special scientific study, he might be permitted to do so; he might go to the universities or colleges affording scientific or technical instruction; or he might travel abroad. "The successful artisan should be encouraged to study theory; while the successful competitor in the theory should be aided in getting admission to machine shops and other practical establishments."

Competition was proposed to be in mathematics, elementary and higher; mechanics, theoretical and applied; practical plane and descriptive geometry; mechanical and freehand drawing; physics; chemistry, including metallurgy; and such handicraft processes as smith's work, turning, filing, fitting, pattern-making, and molding. Sir Joseph proposed that theory and practice should be placed on a level, by an equality in the maximum number of marks for the two classes of merit—theoretical science and practical skill. This he did to render the competition accessible on fairly equal terms to the student who combines some practice with theory, and to the artisan who combines some theoretical knowledge with excellence of workmanship.

Sir Joseph, having promulgated his ideas in May, 1869, saw the desirability of encouraging competitors by giving them twelve months' opportunity of improving themselves. To this end he established sixty exhibitions or premiums of $125 each, to be held for one year; these were awarded to youths and young men under twenty-two years of age, who were required to undertake to compete for the more valuable $500 scholarships in May, 1869. In order to render these exhibitions as widely available as possible, they were placed at the disposal of a large number of educational bodies, including the universities of Oxford, Cambridge, London, Dublin, Edinburgh and Glasgow, and other colleges and schools.

The public value of this liberality is shown by the fact that in 1869, out of 106 candidates, only 10 reached the standard of knowledge set up as a necessary qualification, but the average acquirements of the youths have been steadily improving. The stipends, useful to the workmen for whom they were intended, have been coveted as distinctions by persons whose means were ample, so that an indispensable condition of two years' previous service in a machine shop has been imposed.

To encourage the young men to persevere with all their hearts, those who are successful at certain further examinations will receive money rewards over and above their three years' scholarship money, that is, over and above $1,500. It will thus be possible for the same artisan to receive $4,000 in all: a valuable aid to a youth whose hands have to find him with food, lodging, and clothes, as well as books and means of study and travel to perfect him in his calling.

The examinations are thoroughly practical, as the tests with tools will show:

The ax: Each competitor who tried this test was required to square up an octagonal block of wood, using the ax only, and to make the square as large as possible. He was also required to shape an ax haft to a given pattern, by means of an ax and spokeshave. The saw and plane: The competitor had to saw out of a piece of plank two square strips, and plane them up smooth and true; also to make two parallel strips 2 feet long, 2 inches wide, and $\frac{3}{8}$ inch thick. The hammer and chisel: The competitor had to chip a piece of cast iron all over the upper surface, leaving it as smooth as possible from chisel marks. The file: The competitor had to square any two adjacent sides of a cast iron tube, with a succession of 9 inch strokes of the file; also to file up an hexagonal nut on its six sides to match a pattern. The forge: The competitor had to weld together two pieces of square iron, using only a hand hammer; also to make the two halves of a pair of tongs from pieces of round iron. Turning: The competitor had to bore out a bevel wheel to $1\frac{1}{4}$ inches in the hole, using two drills and a punching bit; also to turn a piece of round iron to serve as a mandril, face it on the wheel with a mandril press, and turn and scrape it smooth and clean on the back, face, and teeth. Fitting: The competitor had to key a boss upon a short shaft, cutting a key way $\frac{7}{16}$ inch square, setting the key half into the shaft and half into the boss; to fill up the key and fit it well in; and to make the end of the shaft project 1 inch through the boss, to support the head of the key. Pattern-making: The competitor had to make a pattern of a short piece of iron girder, finished up ready for use in the foundry, including the core box for the two bolt holes in the flanges of the girder. The handicraftsman who could achieve these tasks moderately well could hold his own in any machine shop or engineering establishment of average character.

Such are the Whitworth scholarships, certainly the most munificent endowment ever made for technical education.

SIR JOSEPH WHITWORTH.

Cutting Wheat by Steam.

Lord Kinnaird, a large and enterprising farmer of Scotland, writes to Mr. Mechi that he has had a most successful and satisfactory trial of reaping by steam power. He attached his traction engine to an enlarged reaping machine; and though the ground was soft, owing to wet weather, and the crop laid and leveled so that it could only be cut one way, yet he has no doubt that, in ordinary dry, harvest weather, an acre could be cut down within half an hour, and he confidently expects to be able not only to cut but, by the aid of steam power, to bind up the cut grain in sheaves, and thus gather in the crops—employing only some half dozen hands.

IMPROVED STUCCO.—M. Landrin recommends the mixing of the crude plaster in water containing 8 to 10 per cent of sulphuric acid. After allowing the compound to rest for fifteen minutes, he calcines the plaster. This gives a stucco of excellent quality in which all organic matters are burnt out leaving the material of exceptional whiteness