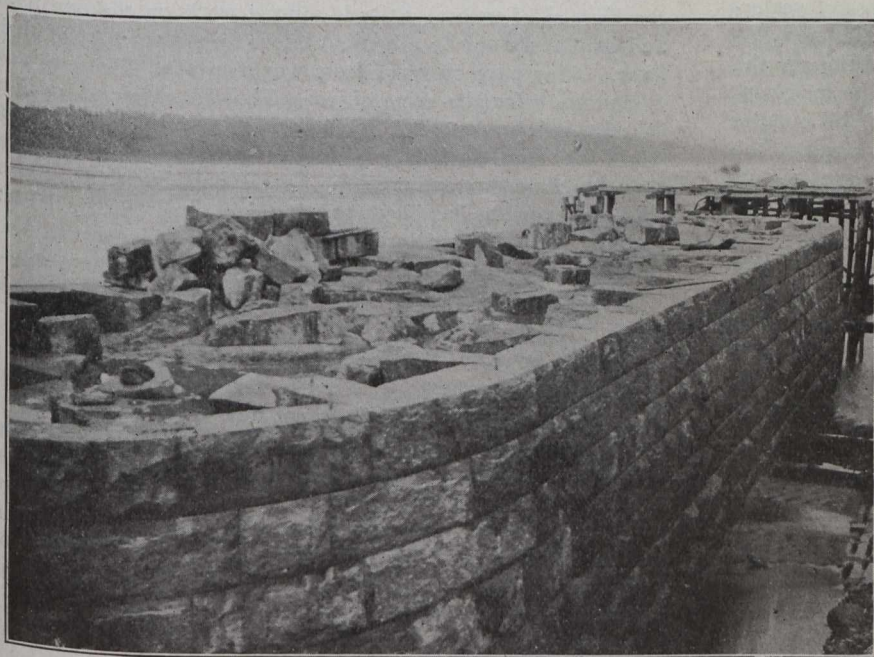


proper position under the bridge it has yet to be lifted over 130 feet in the air and connected to the ends of the cantilever arms. This is done by means of hangers with slotted holes which can be quickly attached to the four corners by means of pins. After this has been done at highest tide the pontoons are floated from under and the span is lifted in place by jacks at each corner of the cantilever arms.



View Showing North Main Pier.

(Completed up to high water mark and the caisson removed. Nov. 8th, 1912)

Entirely new shops have been constructed by the St. Lawrence Bridge Company, of Rockfield, near Lachine, and manufacturing has just been started. This shop is completely equipped with the latest and most powerful electrically driven machine tools, and will have a capacity of about 2,000 tons a month.

The supervision of the entire work is under the direction of the board of engineers appointed by the government. Mr. C. N. Monsarrat is chairman and chief engineer, with whom are associated Mr. C. C. Schneider, of Philadelphia and Mr. R. Modjeski, of Chicago.

THE PRINCIPLES OF SCIENTIFIC MANAGEMENT.

On the occasion of his visit to Toronto to address the Canadian Club, Frederick W. Taylor, M.E., gave an address on "The Principles of Scientific Management" to the Engineering Society of the University of Toronto, on January 21st, 1913.

In his opening remarks Dr. Taylor presented his subject as referring principally to workers of co-ordinated industry, in distinction to isolated workmen, it being applicable only to the former.

Nineteen of every twenty workmen believe that it is to their best interest to turn out as little rather than as much work as possible. It is the most serious fallacy that possesses our working class, and is attributable to two causes, for neither of which are the workmen themselves to blame.

First, if it be suggested to a group of workmen that they double their output, they reply that the procedure would throw one-half of their fellow-workers out of employment. To them it appears self-evident, and others, among whom are many of our philanthropists, uphold the belief, heralding over-production as one of the greatest social evils conducive

to national idleness. It is immensely true in every trade, so its followers believe, that in going slow, their interests are advanced. Any device, therefore, tending to increased output is rebelled against by this deeply rooted nature.

No more fallacious than such belief exists, and it is borne out by history everywhere, with but one exception, that the introduction of such a device or system, into any trade, instead of forcing men out of work, has provided more work for men of that trade. The exception is in farming. Improved processes in the United States have reduced the providers of food supplies from eighty per cent. in years past to thirty-five per cent. at the present time, because the human capacity for food does not increase from generation to generation. This is the only instance where such a condition obtains.

As an illustration of the effect in other forms of labor, Dr. Taylor referred to the cotton industry, its history being comparatively older and its evolution more spectacular. The power loom was invented early in the last quarter of the eighteenth century, but the year 1840 witnessed the climax of its introduction, after a struggle many years in duration, to gain entrance into the manufactories. In Manchester, Eng., the workmen felt that these looms would throw 3,500 of their 5,000 men out of work, and they strongly resented such outside intervention between them and their daily bread. Conditions were grave, as it was most difficult in those days to change

one's trade, or even to move from one works to another. No alternative means of livelihood presented itself. The result was clear and concise. They forced the establishments, destroyed the looms, and maltreated the operators. Their rioting, however, did not affect the entrance of the loom into the industry.

Be the means what it may, bitter opposition, adverse legislation, public opinion, trade unions—all forces are powerless and futile in defeating the introduction of labor-saving development, and the effect is frequently that of accelerating its use.

The speaker stated that there is great opposition from labor leaders to scientific management, but since that opposition has become open and strong, scientific management has gone ahead more rapidly.

The result in the case of the cotton industry in the three-quarter century that has elapsed has been that the workmen have been proven wrong in their convictions. Has the increase of output thrown laborers out of work? In 1840 there were 5,000 workers. At the present time there are about 265,000 employed at the same work in Manchester. For every yard of cloth in 1840 there are now five hundred yards manufactured, though the population of England has not more than doubled within that time.

"There is a broad meaning back of it all. Wealth need only be brought into the world, for the world to use it. Although there are undeniable cases of over-production, they are abnormalities, due to a general cause—the world undertaking a greater number of new enterprises than available capital warrants. It is a disease to which the public is susceptible, and the panics of 1873 and 1893 are unforgotten. On the other hand, production is necessary to wealth, which is derived from two sources, viz., out of the ground and by manufacture at the hands of man. The relation of wealth to production should be recognized, particularly by the poorer classes; their impression is erroneous that by far the major