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THE HIGHER ORGANIZATION OF MANUFACTORIES.

"It is surprising how many manufacturers have to be burned out to discover what their goods cost them."

So said an adjuster of losses for a fire insurance company, the other day, speaking of the happy-go-lucky way in which manufacturing—particularly of patented specialties—is apt to be carried on. So long as the business, as a whole, is profitable, no critical attempt is commonly made to learn the precise cost of any single article or detail.

Some day a fire occurs, damaging or destroying a quantity of finished and partly finished products. Then arises the question, What was the exact value of such articles at such and such stages of manufacture; not their selling price, but their actual cost to the maker?

From data furnished by the manufacturer, cost of raw material, labor, wear and tear of machinery, shop rent, interest, and so on, a careful calculation is made, giving results which frequently surprise and not infrequently astound the manufacturer, who thus learns for the first time the prime sources of his profits or losses. Very often articles which were roughly supposed to be paying handsomely are found to cost more than they bring, the real profits of the business coming from other sources. More than one instance was cited by the speaker above referred to, in which the exact information developed through or incidental to a fire has been used as a basis for a thorough reorganization of a business, to its permanent benefit.

While the business was "booming," the proprietors, even if they had the requisite mathematical skill, had neither time nor incentive to enter upon any elaborate calculations as to the precise cost of each process in the production of their wares, to see if the aggregate cost might possibly be lessened by some minute percentage.

They certainly would not think to call in a competent expert to make such calculations in the ordinary course of business. Something extraordinary, like flood or fire, with its concomitant conflicts of interest, seems to be necessary for that; though it is a matter of common experience, and should be a matter of common expectation, that leakages occur in the best paying business, and that few processes are so perfect that it is safe to rest too long on the easy custom of letting well enough alone.

There are other occasions than flood and fire that compel judicious and far-sighted manufacturers to revise their methods; among them, dull seasons and hard times. Many, we doubt not, are now readjusting their machinery and processes to meet more effectively, not merely the conditions of production hitherto existing, but those of the immediate future, with its lower prices and keener competition. Is it not safe to assume that many others are neglecting the opportunity, to their future hurt?

The fact that a business pays is not always a guarantee that it is wisely managed. The real question is, Does it pay as well as it might? Where the possible margin for profit is small, as in the production of most staple goods, the manufacture is pretty sure to be conducted with scrupulous safeguards against needless wastage and excessive cost. It is with better paying specialties, which are in the best sense monopolies, that such economies are lacking.

Chief among the sources of avoidable loss is an absence of critical estimates of cost and a lack of thorough organization of men and machinery. Work is done by hand by high priced workmen, when it could be done better with cheaper labor, using intelligently selected or properly constructed tools and machines designed for the specific work to be done. Another source, less commonly recognized, is the lack of a nice adjustment of the manufacturing plant, in quantity as well as in kind, to the amount of work to be done.

The economic importance of the American system of production by means of special tools and machine tools turning out interchangeable parts is now understood the world over. It is everywhere recognized as marking the most important advance in the broader methods of the useful arts that our modern manufacturing age has witnessed. Not so many are aware that there is now in process of evolution a still more significant advance in the productive arts, economically considered, a higher differentiation, which promises to effect for mechanical production in the gross as signal an improvement as machine tools, with interchangeability of products, has effected in the details of manufacturing. It applies to the manufactory as a unit, and its output as a whole, the economy which the machine tool accomplishes in respect to the single product, and promises a proportional advantage to the public at large in the cheapening of all manufactured articles. It involves the organization of the highest grades of mechanical knowledge and skill, for a broader and higher type of mechanical business, which cannot fail to react powerfully upon all lines of production.

The new business has grown out of the business of making special tools to order, the second stage of the evolution being the production of specific lines of special tools of wide utility, with adaptations designed to meet the exigencies of special manufactures. The final step marks a complete and radical change in the furnishing of workshops.

At first the manufacturer who discovered the need of a special tool had it made more or less imperfectly in his own shop, often with serious delays and expenses which a shop especially designed for machine making could easily lessen or obviate entirely. The latest advance is for the intending manufacturer to order his shop in bulk, made to measure, so to speak, as he formerly would have ordered a single tool. He submits the machine, apparatus, or other articles which he intends to manufacture, or models or drawings of them, for an estimate—first of the proper cost of the machine or article when made by proper tools and processes in a properly organized factory; second, of the cost of producing such tools; third, of the cost of an entire plant capable of turning out the articles required, at the specified cost for labor, and in the quantity demanded, the organization of the factory to show the best possible adaptation of means to the desired end.

Here, it is obvious, is the basis of a new line of business of vast possibilities and enormous industrial importance, and it is gratifying to know that more than one American firm of large capital and corresponding experience and trustworthiness is making it a considerable part, if not the whole, of its business to provide in this way complete and thoroughly organized establishments for any and every variety of productions, from steam engines to sewing machines and fire arms.

It is obvious, too, that no ordinary shop can compete either in the quality or the price of its products with an establishment fitted out from the start with special machinery in this manner, with a plant rigorously and skillfully planned and constructed for the economical production of its specialties.

This latest and highest development of the manufacturing arts promises to be especially serviceable to those founding factories for new inventions. It is now no longer necessary to develop a plant for such work tentatively or experimentally, and at uncertain costs, as heretofore; but the business can begin with the most suitable and economical productive outfit that the existing state of the arts will afford, with a prescribed capacity, at a fixed price, and with a basis of expert knowledge as to the proper cost of the intended products. It is always cheaper to buy expert knowledge than to win it by hard experience; and easier to secure capital to meet a known outlay, however great, than to induce capitalists to back an uncertainty.

At any rate, the new departure promises, as already observed, to advance materially American manufactures in respect both to quality and cheapness. Where superiority comes with diminished cost, as it must in the better equipped and better organized manufactories developed under the new system, the advantage both to producers and consumers cannot be questioned.

The only possible sufferers will be those non-progressive people at home or abroad who may try to compete by old time methods with those who avail themselves of the superior facilities made available by the new order of things in the equipment and organization of manufactories. The manufacturer who continues to work in ignorance of the real cost of his products, or uses ill-adapted and inefficient machines and processes through ignorance of possible better ones, is a needless waster of wealth, and has only himself to blame if driven to the wall.

General Lafayette and the Bartholdi Statue.

In stimulating the people to opening their pockets for the completion of the granite base of the statue of Liberty, the N. Y. World deserves credit. By persistent daily appeals through its columns over \$50,000 has been received at the World office. The World points out that Lafayette gave away about \$140,000 of his private fortune during our Revolution, to promote the cause of American liberty; the question is then asked, how, remembering this, fifty millions of free Americans can refuse to provide the means to pay for a resting place for the statue of Liberty sent to us by Lafayette's countrymen? The question would remain unexplained, except to those who have visited the burial spot in Paris, where the brave General's bones are deposited, and have been witnesses of the neglected condition of the place. To such as these, the question will arise why some measure has never been taken by our patriotic people, to raise funds to erect a suitable monument to the memory of the gallant young officer who came from a foreign land to the aid of our forefathers, when men with strong heads and mighty arms and generous hearts were so much needed?

Railway Progress in the African Desert.

The Times correspondent in the Sudan telegraphs as follows: "The construction of the railway is a curious and interesting sight. In advance is a picket of cavalry, while far off on either side the vedettes scout in the bush. At the immediate head of the line is a battalion of infantry echeloned, and advancing as the rails are laid. Streams of coolies carry the sleepers from the trucks, and teams of four artillery horses drag up the rails, two at a time, to the navvies, who lay them in a twinkling, and drive the spikes. In the rear are gangs who complete the line, and further back the ballasting parties."