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THE CONDITIONS OF SUCCESS IN MANUFACTURING.

In his address from the chair at the opening of the annual meet- of the American Institute of Mining Engineers, in New York, on February 17, Mr. James C. Bayles, president, expressed some views with regard to the conditions of success in manufacturing which are different from those usually held by writers on economic subjects. We quote as follows .

The subject I shall have pleasure in considering this evening is, briefly, whether the conditions of success in manufacturing are so arbitrary and difficult of attainment as to discourage young men from engaging in competition with the vast aggregations of capital

that are popularly supposed to be fast acquiring a monopoly of profitable production.

A thoughtful writer in a recent issue of a leading English magazine, in an article discussing the increasing concentration of industry, presents some statistics that are intended to show that steam has extinguished the handicrafts, and that, as steam-power is most economically employed on the largest possible scale, it is rapidly and inevitably leading to a monopoly of manufacturing by large establishments, and the extinction, one by one, of those that are small. The situation in Great Britain is represented as follows: "Trade after trade is monopolized, not necessarily by large capitalists, but by great capitals. In every trade the standard of necessary size, the minimum establishment that can hold its own competition, is constantly and rapidly raised. The little men are ground out, and the littleness that dooms men to destruction waxes year by year. Of the cotton mills of the last century, a few here and there are standing, saved by local or other accidents, while their rivals have either grown to gigantic size or fallen into ruin. The survivors, with steam substituted for water power, with machinery twice or thrice renewed, are worked while they pay $\frac{1}{2}$ or $\frac{1}{4}$ per cent. on their cost. The case of other textile manufactures is the same, or stronger still. Steel and iron are yet more completely the monopoly of gigantic plants. The chemical trade was for a long time open to men of very moderate means. Recent inventions threaten to turn the plant that has cost millions to waste brick and old lead. Already nothing but a trade agreement, temporary in its nature, has prevented the closing of half the factories of St. Helen's and Widnes, and the utter ruin of all the smaller owners. Every year the same thing happens in one or another of our minor industries. Retail trade was, until lately, the recourse of men whose character, skill, thrift and ambition won credit and enabled them to dispense with large capital. The larger branches of retail trade are already superseded by co-operation, or monopolized more and more generally by vast skillfully organized establishments with which the small capitalists, however diligent, honest and able, cannot possibly compete. They can sell at little over wholesale prices, while giving their customers all and more than all the conveniences proffered by the ordinary tradesman." A gloomy picture, certainly, but possibly somewhat overdrawn.

In this country it is not unusual to hear similar statements from those who study great social and industrial problem from their surface indications only. We hear them on all sides as furnishing an excuse for the lack of success that attends so many industrial ventures, but their sufficiency as an explanation of failure is found in the fact that here, as elsewhere, industrial greatness is usually, if not always, the result of development from small beginnings. The investment of capital in manufacturing enterprises that are to be great from the outset is always perilous and often disastrous to the investors. Among those that start small, the law of the "survival of the fittest" operates in a perfectly natural and proper way. We can see the reason for what happens, whether the happening be success or failure. With conspicuous justice, "the many fail, the one succeeds." To those enterprises that succeed, capital is naturally attracted, while from those that do not succeed it as naturally withdraws in search of safer and more profitable investment. The successful establishments are extended and enlarged, and become co-operations of over-shadowing importance; those less successful barely hold their own or gradually fall back, changing hands from time to time, and finally relapsing into permanent idleness. This process is constantly going on, for the reason that, with the ever-changing conditions of business success, the establishments that become great under one management may decline or collapse under another.

Industrial greatness would perhaps be a function of capital alone if capital were something outside of business, always available for use and self-renewing. But capital represented by land, buildings, machinery, patterns, &c., may become like a millstone around the neck of a corporation, and often does. The management that made a manufacturing establishment great rarely suffices to keep it at the head, even during the life of the generation that saw it begun. Ordinarily, the longer it lives the more dead weight it has to carry, and the instances are comparatively few in the world's industrial history in which a plant adapted to supply the wants of one generation is suited to meet the wants of that which succeeds it. For this reason the field is always open to skill, enterprise and courage.

I have been led to these reflections by a careful and more or less thorough study of the conditions of success in the manufacture of iron and steel. The history of the iron industry of this country

shows most strikingly upon how many conditions other than the extent and temporary importance of iron-making plants is success dependent. It is unnecessary to examine its statistics in detail or in general further than to note that they show a gradual and fairly steady Westward progress of the wave of iron production. It is not long since the conditions of success in iron-making were found in small furnaces planted in the woods of New England and the Middle States, and dependent for an outlet upon the haulage of their product over corduroy or country roads; and in rolling mills planted on streams affording ample water-power to drive their rolls. The census tabulations for 1880 place the geographical center of iron production in Western Pennsylvania beyond the Allegheny range, and the development in the South since the census was compiled would probably move the point as far West and South as Pittsburgh. The shifting of the geographical center of production means a gradual but irresistible change in the conditions of success in iron-making; and as offsets to such changes, the prestige of former greatness and controlling industrial importance count for every little. That the Northeast is not keeping up its proportion of the pig-iron production of the country is clearly shown by the statistics of the trade. The natural territorial sources of pig-iron supply for the Northeast are the New England States, New York, New Jersey and the Lehigh Valley of Pennsylvania. That these sources have not made much progress in production in the past 10 years is indicated by the fact that within that time their proportion of the total pig-iron production of the country has declined from 30 to about 20 per cent. Southern and Western irons have come in to supply the increased consumption of the Northeast, and they are today crowding our markets, while so many of the local furnaces stand idle, unable to produce at present prices. These facts are significant as showing that the large capitals of the old-established iron works of the Northeastern States do not give them any conspicuous advantage in competition as against better natural advantages elsewhere offered. In fact, their large capitals are the heaviest burdens they are staggering under.

The steel industry is still comparatively a new one in this country, and we have as yet witnessed no great change in its geographical center of production. Even the youngest in our membership can remember—not its beginning, perhaps, but its initial triumphs

in the production of grades of steel that could safely challenge comparison with foreign makes. But during this brief period we have seen some surprising happenings. Small capitals have grown, and large capitals have in some instances shrunk to nothing. Great establishments have been organized that, because of their greatness, have fallen to pieces almost before they began production, and small beginnings, judiciously planned and managed, have been the foundations of brilliant industrial and financial successes. The changes of the next 20 years, though impossible of prediction, are likely to be quite as important as those of the past 20 years. In the steel-rail industry we have witnessed a marked change that is probably but the prelude to one still more marked. Its beginnings are easily recalled and its history is familiar. Certainly it shows that courage and enterprise often count for more than large capital and the prestige of past success. No industry has seemed to be so completely a monopoly of large capitals as steel-rail making. The bigger the converters and the more of them the better seemed the chances of success. Every thing else needed to be big in proportion, and the more tons of rails a mill could turn out in a year the greater the apparent security of the investment. It looks now as if the small plant was more desirable than the large one, and 4-ton converters seem to be more convenient and desirable property than 15-ton converters. During the next few years we are likely to see Bessemer mills built and run as departments of works of medium size, as rolling-mills might have blast furnaces connected with them; and there are doubtless some large Bessemer plants representing an enormous investment that could be bought for a very small part of their original cost, but which few shrewd business men would care to take as a gift on the condition of keeping them in operation for a term of years.

But if no one need be deterred from entering iron and steel making by the apparent impregnability of the great capitals that stand like fortifications along the highways of industrial enterprise, still less need he fear those gigantic organizations effected by combination and consolidation. More often than otherwise these consolidations are brought about in the hope of shoring up enterprises that can not stand alone. They are very formidable on paper, but they are apt to fall to pieces suddenly through the weakness of their component parts. We have watched the formation of several such

consolidations in the iron trade ; but in every case they have failed to accomplish the object for which they were formed, and sooner or later they have gone the way of all bubbles that owe their expansion to the elasticity of an extremely tenuous film.—[*Iron Age*.