STANDARDIZATION*

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THERE was a time when the candle maker and the candle-stick maker each made their wares to suit their own inclinations. As a consequence, seldom did the candle user find that the candle would fit his particular candle-stick. Time, in the days of candle illumination, was, however, not so precious as it is to-day, and a little more or less time consumed in shaving down its end, if the candle was too large, or if too small, in whittling a wedge to support its base, was of little consequence

It nevertheless finally dawned upon these two classes of manufacturers that if they were to get together and standardize the size of the candles, and also make the sockets of their candle-sticks of such dimensions that the candle would properly fit, time would be saved, annoyance prevented and convenience promoted. This is one of the early examples of standardization and it has been referred to by Sir Joseph Whitworth, one of the early workers in the field of standardization, and the introducer of the series of screw threads known as the Whitworth standard.

Standard-Gauge Railway Construction

There was a time, not so long ago, when there was no United States standard track gauge for our railroads. Without standardization of track gauge it was impossible for the equipment of one railroad to be used on another. It has only been through standardization of track gauge that interline transportation has been made possible. We now travel in the greatest comfort from one end of the country to the other without a change of cars. A freight car may be loaded in Maine and without transfer of its cargo arrive in San Francisco or Key West. In fact, it may even be loaded on a barge at Key West and transferred to any part of the Island of Cuba over United States standard-gauge track.

At the present time very active progress is being made in railroad building in South America and Central America, and very shortly activities in the line of railroad building will be again resumed in Mexico; and it can be confidently expected that a Pan-American Railroad, extending from any part of the United States to Argentina, a distance of ten thousand miles, will become a reality. It is unfortunate, in this stupendous undertaking, that all sections of this railroad should not be of standard gauge. A large part of the trackage in the southern countries, as at present built and under contemplation, is of gauge which differs from our own.

I do not believe that there is one single effort which can be taken in bringing countries of the western hemisphere into closer relationship than the building of a standard gauge railroad over this entire distance.

Pipe, Screws, Bolts, Nuts, Etc.

There was a time, within the memory of the present generation, when there was no such thing as standard pipe sizes or threads; and, even more recently, when there were no standard machine screws. Each manufacturer had his own special threads. Selfish interests were so strong and the vision so narrow that great opposition on the part of the manufacturers prevailed against standardization of screw threads. Each manufacturer wished to compel the user of his machines to come to him for repair parts. He did not realize that his business interests were impaired if a user of his machine suffered inconvenience and perhaps financial loss by the shut-down of the machine because of the necessity of sending to the factory to get the necessary repair part.

There is at present before congress a bill which proposes to extend the life of the commission to standardize screw threads, created under the act of July 18th, 1918. Governmental action has in the past legalized other standards.

The first attempt at standardization of screw threads, bolts, nuts, etc., was made in 1864 by a committee of the Franklin Institute of Philadelphia. This committee recommended the adoption of the system known as the United States Standard which was devised by William Sellers. In 1906, the Association of Licensed Automobile Manufacturers adopted standards for automobile screws and nuts, and a year later the American Society of Mechanical Engineers accepted the report of its committee on standard proportions for machine screws. The screw threads adopted by this society differ only in very minor details from the Sellers or U. S. Standard. This report specifies tolerances and includes standards for taps, special taps, special screws and screw-heads of various types. In 1912, the Society of Automobile Engineers enlarged their number of standards.

An act of congress in 1893, established a standard gauging system for sheet iron and steel. This was a purely arbitrary standard. Other arbitrary gauges are in use for wire and drills as well as for sheets. The only rational system is the decimal system in which the gauge number is expressed in thousandths of an unit.

There is a long list of further standardization work which has had its stimulating effect upon industrial progress, but these few illustrations I have given are sufficient to emphasize the importance and magnitude of this line of endeavor.

Only within the present century has standardization in manufacturing processes, methods and practice been seriously pursued and so-called scientific management inaugurated. Industrial progress owes much to the adoption of such standardization. In the automobile industry particularly we have out-classed the world because of such standardization. The adoption of standardization to shipbuilding during the war has put America, within two years time, in the first rank in this industry.

Quantity production can be realized only by reason of such standardization, and at the time of the signing of the armistice, quantity production in the manufacture of our airplanes was well under way and history will no doubt reveal the fact that this was quite instrumental in bringing our enemies to the realization that it was futile to further pursue the war.

Conservation Division, War Industries Board

During the war conservation of our resources became an absolute necessity and the work of the conservation division would have had far reaching effect had the war continued. The conservation division was organized to perform the function, which was expressed by the president in his letter to Mr. Baruch, as "the studious conservation of resources and facilities, by means of scientific, industrial and commercial economies, to meet war requirements."

The necessity for such standardization, as a war measure, was unquestioned, but just how far such standardization, in peace times, would be economically advantageous or economically detrimental, is speculative. Consumers are willing to pay for selection and for the gratification of their individualistic tastes as to style, color, form, etc. It is this fact which, in a very great measure, has resulted in the enormous number of commodities, differing in only slight degree from each other, now being offered on the market. A reference to but a few typical examples of our war-time conservation will be of interest in pointing out the wonderful possibilities in this direction.

Pneumatic tires, reduced from 232 styles to 9; solid rubber tires, 100 styles to 15; steel pens, 700 to 300; china and crockery, from 1,696 pieces to 330; 5,500 styles of rubber footwear discontinued, meaning a yearly saving as follows:—

29,012,600 cartons,
5,245,300 sq. ft. of lumber,
4,795 tons of freight,
1,526,423 cu. ft. shipping and storage space,
2,250,272 lbs. of material that will not have to be dyed,
74,750 lbs. of flour and starch,
30,380 gals. of varnish,
125,300 lbs. of tissue paper,
49,617 days of labor.

*Presidential address at the annual meeting of the American Society for Testing Materials.