

good a quality of metal for seamless tubes as the best quality made in Germany. The fabrication of the steel puts a great strain on the metal and more or less loss is expected, principally on account of cracks and light surface defects. Most of these are quite insignificant in depth and do not effect the strength of the tube perceptibly but, as they tend to spoil the appearance of the highly finished surface, a rigid inspection is employed to cull out tubes showing such defects. The surface defects caused in the first operations of manufacture are removed, as far as practicable, with pneumatic chisels before the blank is worked any further. At present in the United States, practically all seamless steel tubing is made from solid rounds rolled from the blooms, the principal exception being seamless containers which are made by the plate and cup process.

If any difference in quality or finish is noticed between American and German seamless tubes it is probably due to the system of inspection which depends on the specifications and the use for which the tubes are made. For instance it would be waste to put more than fifty cents per ton on inspection of a lot of tubes for one purpose, whereas the same lot might require several dollars per ton to fit it for other conditions. Hence it is most important in ordering seamless tubes to specify clearly for what they are to be used and, as far as possible, adhere to standard specifications.

In looking at the relative advance in the iron and steel industry in America and Germany it would be well to consider what industrial research has had to do with efficiency.

The details of the industry in each of these countries have been worked out so far in a way best suited to their respective conditions. The problems in America have been handled, for the most part, by men who have depended more on practical than high technical training with the object of achieving immediate results to satisfy the pressing demands of the times.

Our general public have a confused or imperfect idea of the significance of the industrial research to the ultimate development of our industries.

In Germany, on the contrary, industrial research has become a highly specialized branch of their industries and receives the popular recognition and support so necessary to the largest success.

It seems safe to predict, with the dispelling of public indifference to this kind of research and the training of men along sound scientific lines who will combine in their work energy and audacity with a strong sense of initiative, even Germany must soon yield to America in the worth and volume of achievements in this field.