

afford information if we look into the reasons affecting the decay of manufacture,—if I may use such a term.

In 1870, the Bessemer process consisted of rolling steel rails from ingots, by passing through a series of roll shapes, one rail length at a time. To-day, less passing through rolls and longer lengths is the method, as tending towards economy per ton in manufacture. In the earlier years the process ensured ample working of the material,—the rails were well rolled; but latterly the opposite is the effect. Several rails are now turned out in one length, and are cut up, at yellow heat, and allowed to cool at pleasure.

In former years the chemical parts were different to those at present used; and as it is possible to employ the same constituents now as then, it follows that, if observed, the difference must be in the process of the manufacture.

The following shews the principal chemical elements of steel rails in 1870 and in 1893, English manufacture:

	Carbon.	Silicon.	Manganese.	Phosphorus.
187030	.22	.60	.10
189345	.08	1.10	.07

The increase in carbon and decrease in silicon, of late years, is the result of endeavouring to overcome the effects of rapid rolling, by maintaining the hardness, as a remedy to meet the mechanical effects of slow rolling in earlier years, which admitted lower carbon and increased silicon. The increase of manganese in later years is to absorb impurities. Carbon .45 to .50 can be used with success, in rails of 65 lbs. per yard, and increased, if found to be necessary, as the rails are made heavier in section.

The result in wear of the earlier steel rails, from 1870 to 1875, of English manufacture, is much greater than any subsequent dates, the life decreasing in proportion as years have passed.

Thus I find that 65 lb. steel rails laid in 1870 to 1873 have served from 18 to 20 years, and carried a tonnage, gross and nett, of eighty millions (80,000,000), a record that will not be equalled, or nearly so, since that date.

Competition has effected lower prices and given less wear.

It is no use complaining of the decrease in wearing value; makers say "but look at the low price." Quite true. Still, the railways, having to replace the steel rails oftener, means increased cost in laying, and additional ties, because ties that may last one year