

up to January 1st, 1902, had inspected in all 3,304,130 boilers and had discovered 2,414,103 defects, of which 257,824 were considered dangerous.

Now if the above were a fair average of the boilers in use, we have the startling fact that more than one boiler in every nine is in a dangerous condition.

In the boilers examined by the Hartford Boiler Insurance Co. up to 1901, 66,615 fractures in plates were found in, at or near the seams, or through the line of rivets, 19,520 of which had arrived at a dangerous state before discovery.

There is no need to resort to mysterious causes for the destructive energy displayed in a boiler explosion. The damage done by explosions is due to the energy stored in the hot water. The energy in one pound of hot water at 150 pounds pressure and 358°F. is about 10,500 foot pounds; that is, it is sufficient to raise one pound to a height of nearly two miles, and at 250 pounds' pressure it has sufficient energy to raise it nearly three miles.

The energy stored in a Lancashire boiler 30 feet long and 8 feet in diameter, with 150 pounds' pressure, has been calculated to be about 207,600 foot tons, which is sufficient to raise the whole boiler 12,500 feet, or more than two miles. It takes 1,730 pounds of gun powder to give an equivalent energy. The energy in a marine boiler 15 feet long, 13 feet in diameter, and with a pressure of 150 pounds is equal to 2,464 pounds of gun powder.

An ordinary return tubular boiler under 75 pounds' pressure has within it sufficient energy to blow it over a mile into the air.

The above figures give some idea of the enormous energy in a boiler, and the destruction caused by its explosion.

There is energy enough stored up in a locomotive boiler with 150 pounds' pressure to project it over one mile high.

Thanking you, gentlemen, for your attention to these few remarks.

Mr. A. M. Wickens,—

I would like to say a few words before we close concerning the explosion at Sunnyside. That was a low water explosion, but they were not pumping any cold water when it blew up. I went to the place as quickly as possible and we found there were 11 inches of water in the boiler. There should have been 34 inches. The boiler had been standing from early morning and there had not been any water put in it. The fire had the boiler entirely red hot, right down to where the brickwork closed in against the boiler to the surface of the water.

The pressure was never above 75 pounds according to the evidence given in court. The sheet was so hot that it bulged. It started at $\frac{3}{4}$ inches in thickness and got as thin as