

subject of turning cold water into red-hot boilers, and a series of experiments was carried out by the Manchester Steam Users' Association of a far more elaborate nature than the early ones in 1867. These "Red-hot Furnace Crown Experiments" with a Lancashire boiler were carried out at Preston, with the result that no explosion occurred. A report thereon, published in 1890, is in the Library of the Institution.

Mr. Fletcher was taken ill on Christmas Day, 1896, but was so far better that he was able to come up to London in January and spend some hours in the Lobby of the House of Commons in connection with the Association's Boiler Inspection Bill introduced by Sir William Houldsworth. He became ill again that same evening, but in a fortnight was well enough to go to Hastings, where he remained till Easter, after which he was able to return to business. His health, however, soon broke down again, and after several fluctuations he died on the 14th June, 1897, at his residence, Fairfield, Alderley Edge, Cheshire.

Mr. Fletcher was regarded as an authority on all matters connected with steam-boilers and machinery, and the influence he was able to bring to bear on legislation relating to the subject was very great. The Association of Manchester Steam Users was formed to bring about the periodical inspection of boilers, and Mr. Fletcher spared no effort to inculcate and enforce that principle. The reports¹ published by the Association, for which he was responsible, have been the means of disseminating much valuable information as to the causes of boiler explosions. Mr. Fletcher was elected an Associate on the 4th March, 1851, and was transferred to the class of Members on the 27th April, 1880.

JOHN FRANCIS HALL, son of Mr. John Hall, of Norbury, Sheffield, was born on the 18th February, 1854. After being educated in Sheffield, and at Neuwied, in Germany, he entered the works of Messrs. William Jessop & Sons, of Brightside, Sheffield, as a pupil in 1870. He remained with that firm for twenty years, during the last twelve of which he was responsible for the general management of the works. After mastering the details of the various branches of crucible steel-making, Mr. Hall turned his attention to steel castings as a substitute for iron in work connected with naval architecture. Propeller-blades, stern-posts,

¹ These reports are in the Library of the Institution.

rudders, cranks, anchors and shells were cast in steel under his supervision with great success, and he produced an anchor which has been adopted by the British Government, by several foreign powers and by some of the largest ship-building firms.

Mr. Hall subsequently turned his attention to the development of nickel steel and visited America in 1890 with the object of opening a connection with the nickel mines of Canada, to supply the raw material, and of negotiating for patent rights in the United States. In addition to the anchor already referred to, he effected improvements in the manufacture of armour-plates, in steam-engine cranks, adjustable couplings for marine shafts, and in the treatment of steel generally.

Mr. Hall died at Norbury on the 27th May, 1897. He was an ardent sportsman, both with rod and gun, and in his youth was well known as an athlete. To the Institution of Naval Architects, of which he was a member, he contributed Papers on "Cast Steel as a Material for Crank-Shafts,"¹ and "Flexible Crank- and Propeller-Shafting in lieu of Rigid Shafting for Marine Propulsion."² He was elected a Member of this Institution on the 1st December, 1885.

WILLIAM HUNT was born at Banbury on the 8th January, 1843, and was educated at the Bedford Commercial (now called the Modern) School, where he gained an Exhibition prize of £200. In November, 1858, he was articled to Mr. Henry Daniel Martin, who was at that time, besides having a large practice, Engineer of the East and West India Docks, of the North London Railway and of the then East India Company. Mr. Hunt was engaged for about three years at the East and West India Docks, and then entered the locomotive works of the North London Railway at Bow, where he worked first in the shops, and afterwards in the drawing-office. From 1862 to 1865 he was engaged on the construction of railways in the Isle of Wight.

Mr. Hunt next became chief assistant to the late Mr. John Smith Burke in Westminster, an engineer who had considerable practice. For three years he was engaged under Mr. Burke in laying out new lines of railway, preparing the parliamentary plans and estimates for the same, and performing the necessary

¹ Transactions Institution of Naval Architects, vol. xxv. p. 173.

² *Ibid.*, vol. xxvii. p. 338.