SECTION G.—*Mechanical Science.*—President, Mr. Charles B. Vignoles, F.R.S., Pres. C.E.

In his introductory address, bearing chiefly on railway development and the defence of the country, the President remarked that that day, the 15th of September, was the anniversary of an event in which Liverpool played a most important part forty years ago. The opening of the Liverpool and Manchester Railway was entirely owing to the high public spirit shown by the merchants of Liverpool. At that time the ways and means of communication were so completely crippled that the trade of Liverpool would have become paralysed, had not better, speedier, and cheaper means of communication been created, and especially by the opening of the railway connecting Liverpool and Manchester. In this great work Liverpool took the lead; and it was particularly owing to the zeal of one of Liverpool's most distinguished citizens, the late Mr. Henry Booth, who was the original secretary of the railway company, and to the energy and scientific knowledge which he brought to bear upon the question of railways, that attention was paid to the improvements of the steam-engine, which was now performing such wonders both at home and abroad. He (the President) thought the people of Liverpool had not shown themselves sufficiently grateful to the memory of Mr. Henry Booth in allowing his name to lapse, as it were, from public recollection; but he was glad to have been invited to a meeting held in Liverpool a short time ago, at which a subscription was inaugurated for the raising of a statue to that eminent man and successful worker in mechanical science. The subscription list needed only a little addition to complete this most desirable object. Liverpool was peculiarly appropriate for this meeting of the British Association, for that Association and the railway system might be said to have had their birth in the same year, both having originated just forty years ago. He had himself taken part in laying down the Liverpool and Manchester Railway, and felt a special interest in this anniversary. The President then went on to mention the principal subjects which would be discussed in that Section. He next referred to the position of this country in regard to the means and preparedness for military defence, and as to the military service of England. He might, perhaps, be disabusing the minds of many persons who had supposed that the Government of this country was not prepared or was not alive to the necessity of creating the best means of internal communication, in the event of war or invasion of the country, when he mentioned to them that for several years past the military authorities had been in constant communication with the chief engineers of the country, and had formed deliberate arrangements, by which, in the event of such a casualty as a military invasion of England, within forty-eight hours the military forces of the whole country, say 100,000 men, might be brought down upon any given point that might be attacked. Therefore they might feel reassured as to the position of England in case of an invasion. As an old soldier himself, he had, at the request of the Government, treated this question, and had shown completely that within twelve hours of the alarm of invasion at any given point, the rolling stock of the railways of the country could be applied for concentrating all the military resources of the country upon the point threatened. He had stated in Liverpool forty-one years ago that the institution of railways would have this very result; and it had been practically exemplified in the war that was raging on the Continent. On Tuesday, he might mention, papers would be read upon the construction and stability of ships by some of the most distinguished men in the country, bearing upon the most unfortunate accident that had occurred to the ironclad steamship *Captain*, to the causes of which the attention of the whole scientific world was now being directed.

REPORT OF THE COMMITTEE ON BOILER EXPLOSIONS

Mr. Lavington E. Fletcher, C.E., reporter. The other members of the Committee were Sir William Fairbairn, Bart., C.E., F.R.S., LL.D., &c.; Sir Joseph Whitworth, Bart., C.E., F.R.S.; John Penn, C.E., F.R.S.; Frederick J. Bramwell, C.E.; Hugh Mason, Samuel Rigby, Thomas Schofield, Charles F. Beyer, C.E.; and Thomas Webster, Q.C., F.R.S.

In concluding their report, the committee stated that they decidedly incline to the plan of enforcing inspection directly by law rather than indirectly by penalty. They are not without apprehensions that, however ingeniously the principle of joint-stock insurance might be surrounded with a series of checks and counter-checks, yet that it would lead to inspection being cut down to the lowest possible point. On the other hand, were the inspection enforced by law, and nationally administered either by a central steam board or by a series of district ones, they consider that a far more generous system would be secured. The steam boards, uninfluenced either by private or local interests, or by the desire to accumulate profits, would take altogether higher ground, and inspect, not simply in their own interests, and just sufficiently to narrowly escape explosion, but with a view to assist steam users, disseminate practical information on the making and management of boilers, and promote progress. These objects would be altogether foreign to competing joint-stock insurance companies. The committee hold the view that, had coroners' verdicts been as satisfactory as they might have been, boiler explosions would not have been as numerous as they now are. With the additional experience of another year they feel compelled to take one other step in advance, and they have come to the conclusion that the time has arrived when the Government should enforce the periodical inspection of all steam boilers. They are convinced that explosions might be, and ought to be, prevented; that competent inspection is adequate for this purpose, and that any well-organised system of inspection extended throughout the entire country would practically extinguish boiler explosions, and save the greater part of the seventy-five lives now annually sacrificed thereby.

A paper on the same subject was read by Mr. E. B. Marten, C.E., and the discussion was taken upon both communications. The speakers were Sir William Fairbairn, Mr. Siemens, Sir Joseph Whitworth, Messrs. Hawksley, Bramwell, Rigby, Longridge, Gray, Mallet, Sir William Armstrong, and the President. In summing up, the President remarked that many accidents were attributable to the dishonest construction of boilers. English habits seemed to kick against anything like Government interference, but such accidents as had arisen from boiler explosions should be put an end to as forcibly as possible—like stamping out the smallpox or the cattle plague, notwithstanding vulgar prejudices—if necessary, by an iron hand. The Government should pass a law making the inspection of boilers compulsory.

On Mechanical Stoking.—Messrs. James Smith and J. and T. Vicars, Liverpool. The paper is too long to reproduce here, but we may mention, in reference to the method described in it, that Mr. L. E. Fletcher, C.E., of the Steam Users' Association, remarked that he had witnessed some very carefully-conducted trials with the apparatus as against very careful hand-firing, and that he could testify that the furnace was perfectly smokeless, and in every respect attained good results.

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ERRATA.—Page 391, col. 2, the asterisk referring to first foot-note should have been placed after the word "feet," line 33—Page 393, col. 2, line 5 from bottom, for "Cyclus" read "Cyclas"; line 2 from bottom, for "Surg." read "Surv."—Page 408, col. 2, Contents, for "G. D. De Rance" read "C. E. De Rance."—Page 423, col. 2, line 34 from bottom, for "this" read "their"; line 6 from bottom, for "Gaskell's" read "Quekett's"—Page 424, col. 1, line 30 from bottom, for "*gradatium*" read "*gradatim*"; col. 2, line 4, for "Loca" read "Local"; line 6, for "this" read "the"; line 5 from bottom, for "Darwin's" read "Damon's"—Page 425, col. 1, line 5, for "conjuvat" read "conjurat"; line 8 from bottom, for "*Ajax* or" read "*Ajax* of"; col. 2, line 28, for "which" read "who"—Page 426, col. 1. line 13, for "war" read "woe"; line 34 from bottom, for "knotgrass, cowgrass" read "knotgrass *s.* cowgrass"; line 24 from bottom, for "*porcena*" read "*porcina*"—Page 427, col. 1, line 1, for "Bichamp" read "Béchamp"; line 17 from bottom, for "may come when" read "may, when"; col. 2, line 35, for "inhalistic" read "vitalistic"; line 36, for "useful" read "vital"; line 37, for "involve" read "resolve"; line 39, for "ordered" read "resolved."