

# ADDRESS OF JOSHUA FIELD, ESQ., PRESIDENT,

TO THE  
ANNUAL GENERAL MEETING.

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JANUARY 16, 1849.

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I HIGHLY appreciate the kind expression of your thanks for very inadequate services; I am fully convinced of my inability to do justice to the position in which you placed me, and I receive your vote of thanks, ~~more as~~ a proof of your perception of my desire to perform the duties, than for the manner of their performance. On resigning the trust committed to me, I would offer my best thanks to the Vice-Presidents, Members, and Associates of the Council for their co-operation and strenuous support, as also to the Members of all classes of the Institution, and those Noblemen and Gentlemen who, being our visitors, have taken part in the discussions, and have given that frequent and numerous attendance which has characterized the meetings of the last Session, by which the chair was so well supported, and the objects of the Institution so well carried out. It has been highly gratifying not only to me, but to every well-wisher of the Institution, that the best feeling has prevailed at all our meetings, and the most perfect unanimity within the Council.

The subjects brought forward were for the most part of a practical character, and led to very interesting discussions, and it is to be hoped, that Members of all classes will not relax in the contribution of papers on subjects of general interest, particularly descriptions of works actually executed, demonstrating the difficulties that have been overcome. Such papers never fail to interest the meetings, whilst they are valuable examples for future practice, and record at the same time by whom, and in what manner, such works have been executed.

The report of the Council has given you a full detail of the state of the Institution, and of the proceedings during the last Session, so that it is unnecessary for me to make any remarks on that subject. In the financial statement, however, you have learned that there is

still a debt to be liquidated on the building account, to the amount of about £2500.

Although the total cost of repairing and fitting up this house, has considerably exceeded the sum at first contemplated, we have the satisfaction of possessing a good house, on a long lease, in substantial repair, admirably situated, and completely adapted in all its arrangements to the wants of the Institution.

The liquidation of this debt has anxiously occupied the attention of the Council, and I am happy to state, that without imposing a heavy burthen upon the Members, the object has been so far accomplished, that I may venture to say, the debt is nearly paid. This being arranged, it is hoped, that the publication of the Minutes of discussion will nearly keep pace with the meetings, and that country Members may be enabled, from a perusal of these records, to take the same interest, and receive the same advantages, as those who are resident in London.

The Obituary records the decease of several valuable Members, whose loss will be greatly felt. In addition to these gentlemen, the profession has lost another, who was considered a veteran and a hero in its ranks; I allude to Mr. George Stephenson, whose career could not be noticed in the Report, because he was not a Member of the Institution; he was, however, well known to us all, and not unfrequently joined in our discussions. He was also President of a kindred Society, "The Institution of Mechanical Engineers" at Birmingham. That Institution principally directs its attention to new inventions, in the mechanical and manufacturing processes, whilst the communications brought before us, are chiefly accounts of executed works in Civil and Mechanical Engineering. Thus, these two Societies embrace the whole science, and by combining their efforts, with mutual goodwill, and a perfect understanding, they may and do confer great benefits on the public.

Mr. Stephenson practised both as a Mechanical and a Civil Engineer, and attained equal eminence in both branches of the profession. The history of such a man, belongs not only to his own profession, but to the world, and even before his decease, several excellent Memoirs were published, which now possess deeper interest. I cannot, however, feel satisfied, that one who has acted such an important part in the great invention, or introduction of the period, and to which the attention of the most eminent Engineers has been so much devoted, for the last twenty years, and which has led to more important results, than any other discovery, either in ancient or modern times, should pass away without some special notice on

the part of this Institution. The Memoirs just alluded to depict the career of a man of remarkable natural genius, actuated by extraordinary mental and physical powers, combined with indomitable industry, perseverance, and integrity, and by the proper use of these powers, he is eventually seen to have overcome every difficulty, and to have raised himself from comparative obscurity, to the highest pinnacle of fame and fortune.

It is, however, in the important part he has acted in the railway system, that we are more particularly interested, and I am anxious to show how far he was concerned, in working out the great discovery, by which the success of that system has entirely depended.

The locomotive engine must be acknowledged to be the life-blood, or chief element, of the railway system, and those improvements which have imparted to it the wonderful velocity, now attained, deserve to be recorded. The first crude conception of the machine may be traced very far back; but the first authentic record of a full-sized locomotive engine, actually working, is about the year 1804; this engine was attached to a light open carriage, on the common road, and was exhibited at Lord's Cricket Ground; it was designed and constructed by Trevithick, who also made an engine about the same year, of different construction, which was employed on the Tredegar tram-road, for conveying minerals and iron, between the Tredegar iron-works and Newport, in South Wales. A short time afterwards another engine was tried in the neighbourhood of Newcastle-upon-Tyne. The subject was shortly after taken up by Stephenson and others, and engines were built, adapted for working on edge rails at the Wylam Colliery. Improvements were slowly introduced, and eventually locomotives, somewhat more in accordance with the present system, were generally used on the Stockton and Darlington Railway.

It must be observed, that up to this time, locomotives were of a rude and cumbrous construction, having a cylindrical boiler, with a fire-place inside, and a single longitudinal flue through it, terminating in a short chimney, upon which the fire wholly depended for its draught. From a boiler of this construction very little steam could be obtained, and a speed of about eight miles an hour absorbed all that could be generated, although the fire was so intense, that the flame generally extended beyond the top of the chimney, which was of course frequently red hot. Such was the condition of the locomotive when the Manchester and Liverpool Railway was projected, and although locomotive power was intended to be used, the maximum speed contemplated was only 12 miles an

hour ; had not a new discovery been made, and a new life given to the locomotive, the Manchester and Liverpool Railway would simply have been employed in conveying bales of cotton and other goods, in the transit of coal, from the collieries to the shipping port, as other railways had previously been engaged.

At this period, however, a simple but most important improvement was introduced in the system of generating the steam ; this was effected, by substituting for the single central tube, a cluster of longitudinal tubes of smaller diameter, between the fire-box and the chimney, through which the flame traversed, thereby vastly increasing the generating surface ; and in order to obtain sufficient draught through these tubes, the steam, after passing from the cylinder, was conveyed to a perpendicular pipe in the base of the chimney, thus occasioning a powerful ascending current in the chimney ; by this means an intense heat was obtained, steam was plentifully raised, and with this singular and unlooked-for advantage, that the faster the engine worked, the more the fire was urged, and thus the generation of steam was enabled to keep pace with the increased speed.

This was the real origin of the present railway system ; and when this combination of the tubes, and the blast pipe was tried in the "Rocket" prize engine, on the Manchester and Liverpool Railway, the speed attained astonished every one, and completely altered the character of the whole enterprise. Instead of carrying goods, for which the railway was originally constructed, passengers only were conveyed, for some time, and the unexpected speed obtained, and the great passenger traffic which naturally followed, made that line the model upon which the present extensive railway system has been based.

"The Novelty," an engine by Braithwaite and Ericson, which also entered into the competition, had its fire urged by a blast of air through the grate ; it also attained a considerable speed, but the simplicity and efficiency of the steam-blast and tubes was so obvious, as to decide the universal practice in their favour.

The system is now firmly fixed, and such is the importance of this adjunct, that if the best locomotive of the present day had its blast-pipe removed, it would not travel at above one-third of its actual speed. It is stated, that Mr. H. Booth, the then Secretary of the Manchester and Liverpool Railway, suggested the use of tubes in the locomotive boilers, to increase the evaporative surface. Clusters of tubes, having water within them, had been previously used for boilers, and the waste steam from the engine had

also been turned into the chimney, sometimes for the purpose of conveniently disposing of it, in stationary engines, and also because it was said, even in Trevithick's time, to consume the smoke; but the "Rocket" was the first locomotive engine in which the tubes, with the fire passing through them, were used in conjunction with the blast-pipe in the chimney, to improve the draught.

This important and admirable combination was designed and executed by Mr. Stephenson, but great credit for working out the details must unquestionably be accorded to Mr. Robert Stephenson, who, at the period this triumph was achieved, was actively engaged with his Father, and he has subsequently introduced improvements, both in the principle and the manufacture of locomotives, which render his engines as nearly as possible perfect.

If, in endeavouring to pay this slight tribute to the late George Stephenson, it be considered, that I have dwelt too long upon this happy combination of the tubes and the steam blast, I must be pardoned, for it is really to this combination, that the success of the whole system must be attributed; and I do not find this important point sufficiently noticed in any history of the progress of railways.

It is not to be expected, that in our days, we shall again see such an unusual combination of circumstances, and of wants of the times, as those which developed the career of George Stephenson; but inasmuch as the acquisition of knowledge is now easier, and more channels are open for the beneficial display of that knowledge, the younger Members of the profession should be incited by his example, to attempt the perfecting of what he and others have so worthily introduced, and carried to a certain point. Fame and emolument may be theirs if they labour; and they have in the meetings of this Institution a fair field, where their labours will be quietly examined, and the public will fully appreciate the decision.

I cannot conclude without again offering my warmest thanks to the Council, the Officers, and the general body of Members, for their support during the past year, and expressing a hope that the ensuing Session may be more brilliant than any of its predecessors, and that the labours of the Institution may be universally appreciated and acknowledged.

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