

NOTICE OF THE LIFE AND CHARACTER
OF THE LATE
GEORGE STEPHENSON,
FIRST PRESIDENT OF THE INSTITUTION OF MECHANICAL ENGINEERS;
Prepared, by desire of the Council,
BY J. SCOTT RUSSELL,
ONE OF THE MEMBERS OF THE COUNCIL.

“I wish I could address myself to the business of this evening with a feeling that the duty which you have devolved upon me were less inevitable, or more worthily performed. We have met to deplore the loss, not merely of one of the Founders of our Society, but, also, of a personal friend, whom we have long regarded with reverence and affection. Had these feelings of affection been alone regarded, perhaps our mournful silence would have formed the most expressive exponent of our grief; but the expression of our grief is the least of our duties. In our late President, England has lost one of her most distinguished men,—the world one of its great Benefactors.

"It is not as our President merely, standing as such at the head of the Mechanical Engineers of Britain, that the name of Stephenson will be known to posterity; he will be known to posterity as the presiding Genius of our times; for of this we may be firmly assured, that the times in which we live will be known to posterity as the era in which Railways and the Locomotive Engine were first introduced as elements of social progress. It will be recorded, that about the middle of the nineteenth century Locomotives first began to run upon Railways, and that George Stephenson, the President of the Institution of Mechanical Engineers, was the Man to whose original genius chiefly the world was indebted for the discovery.

"It is difficult for us, to whom the words Railway and Locomotive are household words, to us who live, move, and have our being among Railways and their manifold social results, to go back again, even in imagination, to the beginning of the twenty years ago when we were without them. So fast, indeed, we may be said to have lived through those twenty years; so much we have been able to travel over, and see, and learn, and do, that it seems longer to go back over these twenty years, than over centuries of the slower times that went before. We, who have each of us this day come our hundreds of miles to this meeting, and may still have to return hundreds of miles to our homes this night, will find it hard to believe in the records of perils, privations, and delays, which but a few years ago made a journey from Newcastle to Birmingham one of those serious undertakings of life which were anticipated with apprehension, and recollected with congratulation. We now do more work and see more society, acquire more knowledge, by personal observation, in one day of railway life, than we were wont to do in weeks of 'the good old time.' It will be necessary, however, to task our imaginations, and go back to the times before Stephenson, in order duly to appreciate the full value of the benefits which his labors have conferred upon us.

"It is not, however, alone with what George Stephenson *did*, that we are concerned; still more important it is for us to consider that George Stephenson *was*. His title to our gratitude is no doubt great; but his claim to our admiration, as a man, is still greater. As a plain labouring workman we first find him distinguished by his untiring industry, by his zeal for the interests of his employers, and by his steadiness, sobriety, and honesty. We next find him, after having mastered all the details and drudgery of his business, continually on the watch for improvements, cultivating habits of accurate observation, and spending every leisure moment in classifying and comparing the results of his own observation, and in deducing from them hints for future improvement. Did an accident occur in his mine, his whole thoughts were immediately directed to the means of preventing its recurrence. His business, in the humble capacity of a breaksmen, took him casually to the vicinity of a condensing steam engine, where the property of his master, through ignorance and mismanagement, was in danger of suffering serious damage. The young breaksmen had already carefully studied the nature of its parts, and thought over the principles of its construction; the regular engineer had been baffled in his remedies, and despaired of a cure; but the youthful breaksmen confided in the strength of his convictions and boldly undertook the task of refitting the machine; the stubborn engine became at once, in his hands, obedient and useful; he had discovered for himself the secrets of the steam engine; and at five and twenty the young coal-worker had become a Mechanical Engineer.

"Thus early were the results of his self-education manifest. He had mastered the discoveries of Watt. It is true, indeed, his whole life had been one of discovery;

but as yet he had discovered no more than those who had gone before him. His had been the best of all education,—the education which a truth-loving mind, working its way among dead matter, and wrestling with the laws of nature, receives directly from nature herself,—an education far more profound and prolific than words, books, or lectures can ever impart. He had learned the laws of nature at first hand, and by experience; he knew partially what the true properties of matter were; he felt that what they were, was exactly what they ought to have been; and however indefinitely he might be able to give reasons to others for his belief, yet one of the most valuable results of his practical self-education was to give him that implicit confidence in his own right understanding of nature, which carried him so boldly through the herculean undertakings of his future life. The whole first years of his early life were, in this way, one continued chain of discovery. Who can tell the pleasure, or weigh the profit, which such an education bestows on the simple and correct student,—compared to the formality of written dissertations, and the dryness of second-hand knowledge.

“As yet, we have had said he discovered nothing new; but he was now on the eve of making a discovery, the reputation of which has enobled the name of one of our greatest chemical philosophers. A mechanic, James Watt, had already anticipated the philosophers Cavendish and Lavoisier in the analysis of water; and another was now about to anticipate Sir Humphrey Davy in the invention of the Safety Lamp.

“That Stephenson was the original inventor of the Safety Lamp is now happily beyond doubt. Like most other inventions which seem to make their appearance in several places simultaneously, at the moment when the want of them has come to be deeply and generally felt, the Safety-Lamp seems to have started into being at the same moment, nearly, in London and Newcastle. Stephenson and Davy had both discovered the principle on which they proposed to proceed, before either had made the lamp; *but Stephenson's was made and used the first*. That Stephenson first invented the lamp admits of no doubt, however much the question may remain as to how far Davy may not also be entitled to the merit of equal originality: priority to Stephenson no one can justly lay claim.

“It is as a professional Engineer and a practical Mechanic that we here have chiefly entrusted to us to do justice to the memory of our distinguished president. But we should do violent injustice to our own feelings if we were to pass altogether without notice his social character and private life. It is well for us all to recollect, that mere eminence as mechanics, or mechanical inventors, is not enough in the social world to make us either command the love or respect of our fellows. It is as *men*, chiefly, that we respect one another; it is moral character and social virtue for which we chiefly love each other. It has, indeed, been remarked, by some, on the character of our profession, that the continual struggle with tough, hard, and refractory substances, which form the business of the engineer, has the effect of communicating a hardness of character, an obstinacy of disposition, and a rigidity of temper, to men of our craft, which does not add to their excellence as members of society. It must be remembered, however, as a palliative for such faults, where they exist, that every *Inventor* is at first in a *minority of one*; all the rest of the world is, for the time, against him; and it is often only by a long and hard fight that he at last succeeds in converting his minority into a majority.

"Invention is, therefore, a battle with the world ; and it is not easy, always, for the inventor to again consider with complacency his enemies in the field, and to adopt them as his companions in the closet. The antagonism between the inventive man and the sceptical world is apt to extend itself to the social state. But Stephenson was, happily for himself and the world, a man endowed with no common share of the endowments which make the intercourse of life useful to himself and delightful to his friends. His energies had been sufficient to carry him through much opposition without cooling the ardour of his affections, originally warm and genial, and, above all, without chilling the enthusiasm, or closing the openness of disposition, which characterized the sanguine youth. In his latter days he was distinguished for the childlike simplicity of his character, for the transparency of his intentions, for the singleness of his purposes, and for the straightforward manly honesty of his conversation and dealings. If he could hate an enemy, he never masked his antipathy by hypocrisy ; but he was a warm and earnest friend.

"Greatly, however, as Stephenson's name will continue to be distinguished among us as the inventor of the safety-lamp, and as a youthful mechanic of wonderful shrewdness and sagacity, it is as the first constructor and chief inventor of Locomotives and Railways that he will be known to posterity. It is in this capacity that he has conferred on society blessings which are rapidly extending to the widest limits of civilization, and which already cover Europe and one half of America. The introduction of railways is the great distinguishing event of the thirty years peace ; and to them must principally be attributed the strong bonds of amity which are continually drawing nations closer and closer together ; it is to railways, and the unity of international interests arising from them, that we are indebted for maintenance of that peace, unbroken for thirty years, and for the very remarkable events we are now witnessing in the existence of a *casus belli* in the heart of Europe, and yet of the invincible reluctance of the great powers to supply the fuel for a general war. The peace of Europe will now, we may trust, by the progress of railways and the consequent multiplication of intercourse, be rendered as substantial as the peace of the nations of the heptarchy of England ;—for we have nearly reached that period of railway intercourse, when the capitals of different nations of Europe are not separated so far from one another, either in the length of time, or in the rarity and peril of intercourse, as were the five capitals of the Anglo-Saxon kingdoms of our ancestors : Canterbury, York, and Gloucester were then more distant than are now London, Berlin, and Vienna.

"How all this was early brought about, how much George Stephenson had to do with it, is now too familiar to every mind to need repetition. You all know how he early got permission from Lord Ravensworth and the proprietors of the Killingworth collieries to make an iron substitute for the horses which drew his coal waggons ; how he succeeded in driving teams of waggons some six miles an hour ; but all of you who recollect these huge unweildy-looking monsters of that early time, and especially those who, like myself, then had to do with them, must remember how little we dreamed of seeing these clumsy affairs go 10 or 20, much less 50 or 60 miles an hour. Indeed, whether we look at the railway or the machine, both would have immediately been smashed to pieces had any force accelerated their speed to 10 miles an hour. It was never dreamed of, except by one dreamer, who believed in 10, 20, 50, and 100 miles an hour, and who had recently determined to do it.

"The two inventions which have been combined to produce the modern Railway system may be said to be, the malleable iron rails and the locomotive engine. These were the two elements of high velocity,—each of which formed the absolute condition of the existence of the other. Without the system of laying a continuous wrought-iron rail, the notion of a velocity of 50 miles an hour could not have been entertained; and without the locomotive engine, such an expensive line could never have proved remunerative.

"Most of us can remember when the idea of laying wrought-iron bars of 50, 70, or 90 lbs. weight per yard, for continuous miles, was an expense so utterly beyond the conception of the time, as not to be entertained for a moment; and this for an obvious reason, that no particular amount of traffic would have paid for it. I think I am warranted in saying, that no amount of traffic which horses, merely, could convey along a line of modern railway could yield a remunerative return, unless, perhaps, under peculiar circumstances, which are exceptional; I am therefore, I think, safe in saying, that the wrought-iron railroad was essentially dependent on the locomotive engine.

"But that the modern locomotive engine could not subsist without the wrought-iron rail and its multifarious appendages of chains, keys, locks, sleepers, switches, crossings, sidings, and turntables, is too evident to need proof. Without the smoothness of the rail, the engine would be jolted to pieces, and without the easy motion which it gives, the engine could not be made to draw a sufficient profitable load to pay; and further, unless made of wrought-iron, it would be impossible to attain the high speed of the locomotive without imminent danger. It therefore appears that the continuous wrought-iron railway and the locomotive engine were inventions intimately related to each other, and each a condition of the other's success. To Stephenson we are indebted for the chief features of improvement in both. It was the joint perfection of the road and the engine which created the Liverpool and Manchester line, and all the progeny of that wonderful and gigantic experiment; an experiment whose complete success now bears incontrovertible testimony to the genius of the man.

"There are several lessons which the life of Stephenson should enforce upon us, the members of a profession which he advanced, and of a society which he so materially assisted in founding, and in the promotion of which he took a constant and deep interest. Indeed, we cannot cast even a hasty glance back over the events of his life, without perceiving that the foundation of our Society was an act most appropriate to the termination of a career so arduous and successful. Let us endeavour to define some of those objects, and then consider how we can best accomplish them.

"In the first place, then, one of the great objects of our Society is the encouragement of mechanical invention and the promotion of scientific improvement. Thus it becomes our duty to supply to this generation a great want, chiefly felt by Stephenson in his early career. The unhappy moments of his youth were those in which his inventions encountered the opposition of prejudice and interest, and when his propositions were decried because of their very originality,—because they were new, strange, unheard of, and, therefore, contrary to verified opinion. What he wanted and could not find in his youth, this Society presents to the youthful genius of this generation,—an enlightened, unprejudiced, and first ordeal, where every youthful inventor, every mechanic of original talent, every proposer of that which is new and promises to be useful, will find a body of experienced practical

men, to whom the country looks up as her wisest men, ready and willing to listen to the plans, to test the proposals, to weigh the value, and to award the praise and approbation to which the rising Stephensons of this generation may aspire; but which the old Stephenson could no where find, and in the want of which he was compelled to expend many years of vigour and energy in obscurity and penury. Let us see that in our hands no youthful genius, however little known, shall find his genius obscured, or his energies discouraged, eclipsed, or extinguished. If I rightly interpret the feelings of this Society, they would hail with welcome any discovery, and cooperate heartily and disinterestedly in giving to the world its benefit, and to genius its honors and rewards.

"Another circumstance must have greatly impaired the means of usefulness of Stephenson in his early life, and one that he most deeply felt,—viz., the want of knowing that which other men were doing, and had done before him, in subjects allied to those in which he was occupying his mind. Thus much we know with certainty, that no man was more happy to communicate, in after life, to others the abundant stores of practical knowledge he had accumulated, and that no one felt a more kindly interest in the inventions and plans of younger men, or was more disposed to promote their interest and forward their views. Let us regard it as a part of his legacy so to impart, liberally, to all younger members of the profession, what more knowledge or greater experience may have enabled us to acquire. After all, there is no tribute more gratifying to the members of our profession than the due appreciation by each other of that which each of us may have done to advance the interests, and increase the resources of mechanical science.

"It would not be fair to the character of our late President to omit from our recollection the very large and original views which he entertained on general science. It has been too common in our profession to place science and practice in opposition to one another; as if true science and hard practice could possibly be opposed. If science mean that which is carefully ascertained, and accurately defined, and truly demonstrated,—then it is impossible that any sound practice can possibly stand in opposition to, or independent of, it. If practice mean the knowledge which is founded on the actual facts and experience of intelligent men, it is impossible to see how the largest amount of that knowledge possessed by any one man can differ from the extensive and generalised facts in which science embodies the experience of all mankind. Stephenson is a remarkable freedom from this prejudice. He was eminently a practical man. He wrought early, and much, with his own hands. He had wrestled with matter, and knew all its qualities by feeling it and pushing it and pulling it, by cutting and filing and chipping it. He had hammered it hot and hammered it cold, he had melted it and moulded it, planed it and sawn it, broken it across, pulled it asunder, and twisted it round. He knew its action and its reaction, its inertia and its momentum, its *vis mortua* and its *vis una*. His was a supremely practical and personal acquaintance with the laws and property and phenomena natural to matter, whether solid or liquid, fluid or gaseous, mineral or aerial, more than any man who has ever risen to eminence. Stephenson was entitled to rank as a consummately practical man. But was he not equally, or more, a scientific than a practical Engineer? Was there ever a bolder theorist than he was? Were there ever more daring scientific speculations than those wild flights in which his genius delighted to break forth? In chemistry, in vegetable physiology, in vital mechanism, in electricity, in galvanism, in the theories of the gases, on the inert constitution of matter, and of heat, and even

on the mechanism of the mind itself, he had deeply thought, profoundly read, and boldly and fearlessly speculated. Every step in his life was the realisation of what had before been a theory. It is true he was not educated early in the rudiments of science, at school or at college; but what of that? what is life but a great school? Is not the press our school, and necessity our school of invention? Stephenson read and studied science;—he was not ignorant, but he was self-taught. Before he became a great man he had studied profoundly, and he does not appear to have ventured on any construction or invention, before having accurately, and generally truly, calculated by the principles of science, its probable and actual results. In all his works, Stephenson exhibits to us embodiments, eminently practical, of the profoundest principles of mechanical science. Let the men among us who desire to emulate him most, endeavour to combine, in the greatest degree, the truest science with the soundest practical sense. These are not times in which any of us can afford to dispense with any science, or any practice, that it may be in his power to obtain.

“I will now venture upon an illustration of the advantage of uniting high science with extensive practice, which has often occurred to me as an excellent illustration of Mr. Stephenson’s scientific knowledge, and also as an illustration of the advantage he would have derived, as a practical man, from having been still more profoundly scientific than he was. Stephenson, we know, invented the fish-bellied rail, and a great invention it was thought in its day. The Liverpool and Manchester Railway was opened with it. It was an invention to give, with a small addition of metal to the under middle side of the rail, nearly double the strength, and this it successfully accomplished. But here he stopped short: he had not science enough to see, that by making the wrought-iron bar in long lengths, stretching over a number of blocks, or sleepers, he had brought it into a new condition, to which a much higher rule was applicable;—he neglected the difference between a rail having a joint at every chair, and one having only a joint at every fifth or sixth chair; had he perceived that, he would have invented the parallel rail, and would have learned that the joint chairs require to be nearer together than those removed from the joint by a fixed proportion. The fish-bellied rail was a failure. It was the result of science; but of science of which there was not enough. It was also the result of practice; but of practice under different conditions. It was reserved for Mr. Buck, a profoundly scientific pupil of Stephenson’s, to develop the true science of the wrought-iron rail. Where not a little science had failed, a little more made the invention perfect. Let us learn from this to be always trying to obtain a little more science, as well as a little more practice, than we have got,—remembering that Stephenson continued his education of himself to his dying day.

“The best testimony, however, which Mr. Stephenson has borne to the value of scientific education for a practical man, is to be found in the course he adopted for the training of his son to our profession. The assiduity with which he laboured at clock-making, the cleaning of watches, or any other industry, in the intervals of his regular business, in order that he might be able to afford to him those blessings of education of which he himself so deeply felt the want, is one of the most charming features in his character. His most earnest desire, in early difficulty, was to give Robert all those precious thoughts and truths which he himself only acquired late and too labouriously. And how admirably his plan succeeded, his son’s unclouded successes, both as a Mechanical and a Civil Engineer, are the

evidence to us, as indeed they were the subject of just pride to himself, who never spoke of his son without strong emotions of joy and pride. There are none of us who will question either the justice of his pride or the soundness of his plan of education.

"It is one of the peculiarities of genius to inspire those within its influence with some of its own fire. This was peculiarly the case with Stephenson. Nearly all the present ornaments of our profession have been his pupils. He was the founder of a school of eminent engineers, who in England, Europe, and India, are now extending, amongst all portions of the human race, the blessings of those great bonds of civilization and social intercourse which he first fabricated. It is to his labours, and theirs, that this country owes the addition of £200,000,000 to its productive wealth, the opening up of a host of new branches of industry, the quickening and invigorating influence of rapid and cheap intercourse; and to him that the poor everywhere owe the blessings of cheapened coal, and the facilities of social enjoyment and healthful recreation.

"In this brief notice of the chief features and character of our late president, which I have thus imperfectly, although most earnestly, sketched amid the bustle of business, I have dwelt mainly upon such features and characteristics as were peculiarly interesting or instructive to us, as members of an institution founded, in a great measure by himself, for professional purposes. I have regarded, therefore, chiefly his professional character; but I cannot conclude without expressing an earnest wish, that his life as a man, exhibiting the beauty and excellence of his character in all its cheering aspects, as a boy, as a workman, as an engine-man, as a viewer, as an engine builder, as an improver of mineral railways, as the engineer of the Liverpool and Manchester Railway, should be written by some one who has leisure to collect from his many friends all their recollections of him, while they remain fresh and accessible. I should desire also to see a detailed account given of his progress, his difficulties and his means of success in any one of his labors. This would be a most valuable and instructive work; and I do not know on whom it should devolve more properly to see such a work executed faithfully and judiciously than on this society, whom he made the favoured recipients of his knowledge and experience, and who ought to consider themselves as his literary and scientific executors, to whom the world may naturally look to see justice done to the memory of one of England's greatest men, the founder of our railway system and of the Institution of Mechanical Engineers."

The memoir, which, both at the close and during the time of reading, elicited expressions of admiration, having been read, the CHAIRMAN said, he presumed it would be unnecessary to put it to the vote, that the members return their best thanks to Mr. Scott Russell, for his very able memoir. The vote was carried with acclamation.

Mr. GEACH rose and said, it was with melancholy satisfaction he begged to move, that they place on the minutes of their proceedings an expression of the regret they all felt at the loss of so excellent a man as their late friend, Mr. George Stephenson,—apart from his having been the President of this Institution. He

well recollected Mr. Stephenson, on the last occasion of their meeting, filling the place which Mr. M'Connell now so worthily occupied, in high spirits and in good health. The recollection of the circumstance cast a gloom over his feelings, and he was sure it would have the same effect on every member present. He had known Mr. Stephenson a shorter time, perhaps, than many of them; but he had known him well enough not only to entertain respect for him, but affection also. There was something so endearing about his manners, so open and kind, and so encouraging to all those less experienced than himself,—there was so much of kindheartedness about him, that no one could help entertaining for him a high respect. He would quite allow that his manners were sometimes rough,—he would quite allow that there were peculiarities in his character, which had to be considered as peculiarities; but he was quite sure those who knew him best considered that these very peculiarities gave him a greater claim on their regard. He was willing to allow that he had seen in Mr. Stephenson what in other men might subject them to criticism; but when it came from Mr. Stephenson, it came from a privileged person. Mr. Stephenson was proud of his own early life, and he never lost any opportunity of expressing it,—he never attempted to conceal that he came from the lowest grade of society, and had raised himself to his high station; and he ever evinced the same pleasure in meeting an associate of his early life, in humble circumstances, as he did to meet the peers of the realm, with many of whom he associated in later life. He had the same gratification on meeting one whom he had known in early life, or the son, or connection, of such a one, and in referring back to the time when they had struggled together through difficulties, as he did in referring to the occasion when he was taken by the hand by the highest in the land. Although oppressed with these recollections, he could not content himself without making the few remarks he had; and he now begged to move,—“That the members of this Institution desire to express their deep regret at the decease of their late President, George Stephenson, whose early support of the Institution so greatly contributed to bring it to its present state of prosperity and success.”

Mr. FOTHERGILL, in seconding the resolution, expressed his great sorrow that such a duty should devolve on him. After the

observations of Mr. Geach he should content himself with merely seconding the resolution, for he was sure that every one participated in the same feelings of deep regret. The resolution was put and carried unanimously.

The CHAIRMAN then rose and said, that immediately on hearing of the death of their late President, the Council met, at Manchester, and, after forwarding a letter of condolence to his widow, for the irreparable loss she had sustained, they resolved, that the best tribute they could pay to the late Mr. Stephenson's memory, and the best way in which they could testify their appreciation of his merits, besides at the same time the best selection of a future president they could make from among the eminent men of the day, would be to invite Mr. Robert Stephenson to become his father's successor, as president of this institution. The Council did so feeling assured that the members would entertain the same opinion. Accordingly, two of the Council were appointed a deputation to wait on Mr. Stephenson. Owing to an accident they were prevented from seeing Mr. Stephenson, but a most satisfactory and pleasing correspondence ensued, which would be read by one of the deputation. Afterwards it would be his duty to nominate Mr. Robert Stephenson, as the future president.

Mr. FOTHERGILL said, that Mr. Buckle and himself were the deputation appointed to wait on Mr. Stephenson; but for the reason stated by the Chairman, they had not been able to see him. They had, however, a correspondence, and Mr. Stephenson's reply did equal credit to his character as a man, and to his feelings as a dutiful son. He had not the letter with him; but the substance of it was, that, if elected, nothing would be wanting on his part to discharge the duties of the office in a manner satisfactory to the members, and that he would endeavour to watch over the interests of the Institution as earnestly as his lamented father had done.

The CHAIRMAN then begged to propose Robert Stephenson, Esquire, as President of the Institution. He felt certain that every member would agree with him, that a better choice could not be made. Mr. Robert Stephenson was a worthy son of a worthy father; and the Institution would gain additional lustre by having that gentleman as its President. The resolution was

seconded by Mr. Fothergill, and carried unanimously, amid every demonstration of satisfaction.

Mr. KINTREA, the Secretary, then read the following paper by Mr. John Jones, of Bristol :—