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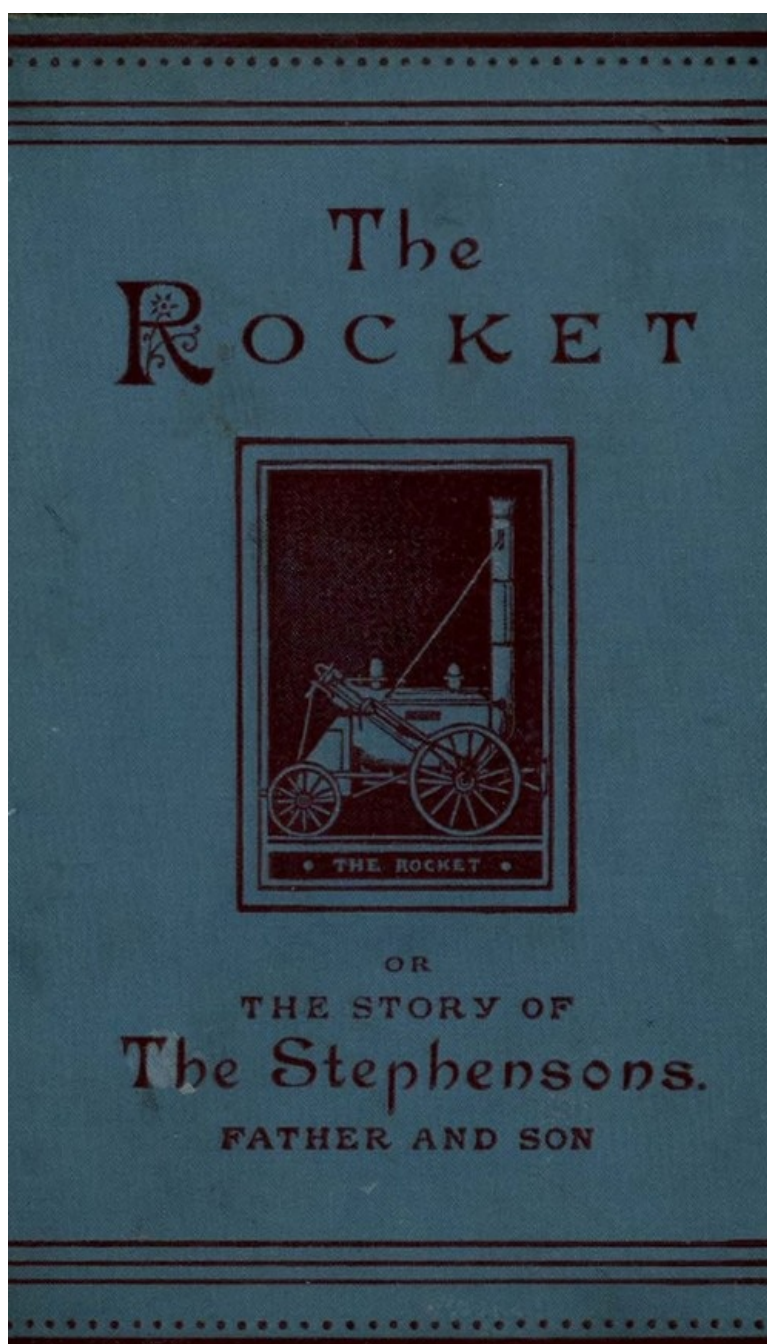
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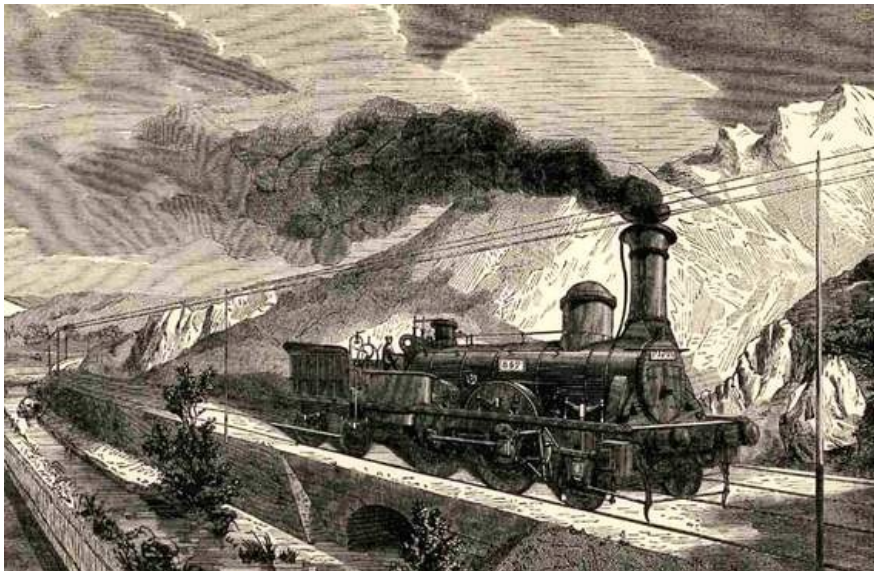
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*** START OF THE PROJECT GUTENBERG EBOOK THE ROCKET: THE STORY OF THE STEPHENSONS, FATHER AND SON ***



Front Cover



A LOCOMOTIVE AND TENDER.

THE ROCKET.

THE STORY OF THE STEPHENSONS,

Father and Son.

BY

H. C. KNIGHT,

AUTHOR OF "NO GAINS WITHOUT PAINS," ETC.

WITH TWENTY-SIX ENGRAVINGS

London:

T. NELSON AND SONS, PATERNOSTER ROW.
EDINBURGH; AND NEW YORK.

1897

Preface.



brief book for the boys. God gives you work to do in the world. He gives you honourable work. There is much done that is mean and dishonourable. Depend upon it, *that* is not His. In the beginning of your work, character grows *out* of it; as you go on, your character goes *into* it. Therefore the Bible declares that "God, without respect of persons, judgeth according to every man's work." We judge in the same way. This little book will show you how much the practice of the virtues, the humbler virtues, has to do with making good work.

But keep ever in mind that these virtues, however useful and important for your work in this world, have no *saving* power in them—they form no plea for the favour of God; the key which unlocks the door of Heaven is not found among them. Like the young man in the Gospel, you may have the loveliness of every natural virtue, and yet be lost.

As sinners in the sight of God, you need the atoning blood of the Redeemer; you need repentance and faith in that blood. Make Jesus Christ, therefore, the corner-stone of your character; on *that foundation build* your character. Cultivate the graces of the Gospel. Baptize the virtues with your Saviour's love. A noble Christian manhood can only be attained by the slow and steady endeavours of a heart fixed on God, and a hand diligent and delighting in the work He has given it to do.

Contents.

I. LIFE AMONG THE COAL PITS,	9
II. MENDING AND MAKING—LITTLE BOB,	19
III. WHO BEGAN RAILROADS?—"PUFFING BILLY,"	30
IV. TWO CITIES THAT WANTED TO GET NEAR EACH OTHER—A NEW FRIEND,	38
V. HUNTING UP HIS OWN WORK—AN ENTERPRISING QUAKER—WHAT WAS THE RESULT?	46
VI. THE TWO CITIES TRYING AGAIN—BUGBEARS,	58
VII. GRAPPLING WITH DIFFICULTIES—THE BOG—A PUZZLE—THE PRIZE OFFER,	72
VIII. ROBERT'S RETURN—A CURIOUS ENCOUNTER—THE PRIZE ENGINE,	86
IX. OPENING OF THE NEW ROAD—DIFFICULTIES VANISH—A NEW ERA,	102
X. THE STEPHENSON CENTENARY—HONOUR TO WHOM HONOUR IS DUE,	121

List of Illustrations.

LOCOMOTIVE AND TENDER,	<i>Frontispiece</i>
EARLY WORK,	10
A SAFETY LAMP,	11
BIRTHPLACE OF GEORGE STEPHENSON,	12
AT SCHOOL,	17
MENDING THE CLOCK,	21
THE SUN-DIAL,	29
GEORGE STEPHENSON'S FIRST ENGINE,	35
"PUFFING BILLY,"	36
THE VISIT TO "PUFFING BILLY,"	44
THE TWO STRANGERS,	50
A TALK ABOUT RAILWAYS,	54
SURVEYING AT NIGHT,	63
CHAT MOSS,	74
GOOD SERVICE,	81
A CURIOUS ENCOUNTER,	87
SECTION OF THE FIRST BOILER IN USE,	92
SECTION OF A TUBULAR BOILER,	93
THE FAILURE,	95
TUBES OF A MODERN ENGINE,	96
THE "ROCKET,"	97
OPENING THE LINE,	104
WHOLESOME REPROOF,	115
LATER DAYS OF GEORGE STEPHENSON,	116
VICTORIA BRIDGE, MONTREAL,	118



THE ROCKET.

CHAPTER I.

LIFE AMONG THE COAL PITS.



hat useful little fellow is this, carrying his father's dinner to him at the coal-pit? He takes care, also, of his little brothers and sisters, keeping them clear of the coal-waggons, which run to and fro before the cottage door. Then he is seen tending a neighbour's cows. Now, he is moulding mud engines, putting in hemlock sticks for blow-pipes; besides cutting many a good caper, and uttering all sorts of drolleries for the benefit of other little boys, who like himself swarm round, too poor to go to school, if school there were—but schools there were none.

The boys called him "Geordie Steve."

A lad is wanted to shut the coal-yard gates after work is over. Geordie offers his services and gets the post, earning by it twopence a day. A neighbour hires him to hoe turnips at fourpence. He is thankful to earn a bit, for his parents are poor, and every little helps. He sees work ahead, however, more to his taste. What? He longs to be big enough to go and work at the coal-pits with his father. For the home of this little fellow, as you already perceive, is in a coal region. It is in the coal district of Newcastle, in the north-eastern part of England.



EARLY WORK.

I suppose you never visited a colliery? Coal is found in beds and veins under ground. Deep holes are made, down which the miners go and dig it out; it is hoisted out by means of steam-engines. These holes are called shafts. The pit-men have two enemies to encounter down in the coal-pits—water, and a kind of gas which explodes on touching the flame of a candle. The water has to be pumped out; and miners are now provided with a lamp, called a safety-lamp, which is covered with a fine wire gauze to keep the gas away from the flame.



SAFETY LAMP.

The coal is brought up from the pit in baskets, loaded on waggons running on tram-roads, and sent to the sheds. Tram-roads were a sort of wooden railway. A colliery is a busy and odd-looking spot.

Geordie's family lived in one room—father, mother, four boys, and two girls. Snug quarters, one would think; but the working-men of England at that time had smaller wages and poorer homes than they now have—for Geordie was born in 1781, in the little village of Wylam, seven miles from Newcastle, and his full name is George Stephenson.



BIRTHPLACE OF GEORGE STEPHENSON.

James, an elder brother, is "picker;" and by-and-by George is old enough to be a picker too, going with his father and brother to their daily tasks, like a man. To clear the coal of stones and dross is their business. There are a number of pits around, and each one has a name,— "Dolly Pit," "Water-run Pit," and so on.

I do not know how long he was picker, but we next find him driving a gin-horse, at a pit two miles off, across the fields. Away he goes in the early morning, gladdened all along by many bird songs. George and the birds are fast friends. He knows where their nests are in the hedgerows, and watches over them with fatherly affection. At home he has tame birds, whose pretty, knowing ways are the wonder of the neighbourhood. For many years a tame blackbird was as much one of the family as George himself, coming and going at pleasure, and roosting at night over his head. Sometimes it spent the summer in the woods, but was sure to come back with cold weather, to share his care and crumbs through the winter.

George, too, had a famous breed of rabbits; and as for his dog, it was one of the most accomplished and faithful creatures in the district. In fact, the boy had an insight into dumb-brute nature, as we shall find he had into other things, that gave him power over it—a power which he never abused, but used kindly and well.

George next rose to be assistant fireman with his father, at a shilling a day. He was fourteen, but so small of his age that he used to hide when the inspector came round, lest he should be thought too small for his wages. If small in body, he was large in heart, intent in all things to *do his best*. And this made his work so well done, that it could not escape the notice of his employers. When he went to the office on Saturday night to receive his wages, double pay was given him—twelve instead of six shillings! George could scarcely believe in his good luck. When he found it was really no mistake, he took the money and rushed out of the office, exclaiming, "I am now a made man for life!"

George rapidly shot ahead of his father, a kind old man, who always stayed fireman, while his boy climbed one round after another up the ladder of promotion. At seventeen we find him plugman. What duty is that? A plugman has charge of a pumping-engine, and when the water in the pit is below the suction-holes, he goes down the shaft and plugs the tube, in order to make the pump more easily draw. The post required more skill and knowledge of machinery than any he had filled before, and he proved himself equal to it.

Indeed, he loves his engine as he loves his birds. It is a pet with him. He keeps it in prime order. He takes it to pieces, and cleans it, and studies it; pries into the whys and wherefores, and is never satisfied until he understands every spring and cog of the machinery, and gets the mastery of it. You never find him idling away his time. In leisure moments he is at his old kink, moulding clay engines, and putting new thoughts into them.

He wished to know the history of engines, and how they were thought out at first. Somebody told him about Watt, the father of steam-power, and that there were books which would satisfy his curiosity. Books! what good would books do poor George? He cannot read. Not read? No. He is eighteen, and hardly knows his letters. Few of the colliers did. They were generally an ignorant, hard-working, clannish set of men, whose pay-day was a holiday, when their hard-won earnings were squandered at cock-fights and in ale-houses.

If one was found who *did* read, what a centre of light was he! At night the men and boys gathered around him, when, by the light of his engine fire, he would give them the news from an old newspaper, or a scrap of knowledge from some stray magazine, or a wild story from an odd volume; and on these

occasions no one listened with more profound attention than George.

Oh! it was so wonderful to read, he thought. It was to open the gates into great fields of knowledge. Read he must. The desire grew upon him stronger and stronger. In the neighbouring hamlet of Welbottle, old Robin Cowens taught an evening school.

"I'll go," cried George.

"And I too," echoed Tommy Musgrove, a fellow-workman, quite carried away by George's enthusiasm.

Now they went to Robin's school three evenings a week. I do not know how it was with Tommy, but old Robin never had a better scholar than George; indeed, he soon outlearned his master! His schooling cost him threepence a week, and, poor as it was, put into his hand the two keys of knowledge, reading and writing.

These mastered, he longs to use them. Andrew Robertson opens an evening school nearer than Welbottle, and Andrew proposes to teach arithmetic, a branch George is anxious to grapple with next. "And he took to figurin' wonderful," said Master Andrew, speaking of his new scholar, who soon left his classmates far behind. And no wonder. Every spare moment to George was more precious than gold dust, and was used accordingly. When not on duty, he sits by his engine and works out his sums. No beer-shop ever enticed him to its cups; no cock-fight ever tempted him to be its spectator. He hated everything low and vulgar.



AT SCHOOL.

Andrew was proud of his pupil, and when George removed to another pit, the old schoolmaster shifted his quarters and followed him. His books did not damage his interest in business. Was the plugman going to stay plugman? No. Bill Coe, a friend of his advanced to be a brakeman, offered to show George. The other workmen objected. And one in particular stopped the working of the engine when George took hold of it; "for," he cried angrily, "Stephenson can't brake, and is too clumsy ever to learn."

A brakeman has charge of an engine for raising coal from a pit. The speed of the ascending coal, brought up in large hazel-wood baskets, is regulated by a powerful wooden brake, acting on the rim of the fly-wheel, which must be stopped just when the baskets reach the settle-board, where they are to be emptied. Brakemen were generally chosen from experienced engine-men of steady habits; and in spite of the grumbling of older colliers, envious perhaps at his rise, it was not long before George learned, and was appointed brakeman at the Dolly Pit. This was in 1801.

MENDING AND MAKING—LITTLE BOB.



George was now twenty—sober, faithful, and expert. Finding a little spare time on his hands, he took to cobbling to increase his gains, and from this source contrived to save his first guinea. To this greater diligence he was urged by his love for Fanny Henderson, a fine sweet-tempered girl, whom he shortly married, and began housekeeping in the upper room of a small cottage in Wellington, six miles from Newcastle. Happy were they in each other, and in their simple, industrious, and frugal habits; and when a little son was born to them, George, who loved birds, rabbits, and dogs so well, welcomed with all the tenderness of a father's heart the little Bobby.

Robert he was named, after the old fireman his grandfather.

Accidents, they say, will happen in the best-regulated families. Fanny's family was not an exception. One day the cottage chimney got on fire, and the neighbours, with friendly zeal, not only poured water enough down the chimney to put out a much bigger and more alarming fire, but enough to deluge the poor little home of the brakeman with soot and water, making a pitiful sight to the young husband when he reached it. His eight-day clock, the choicest bit of furniture the young couple had, was completely smothered by ashes. What was to be done? Sending it to a clock-maker for repairs was quite out of the question—it would cost too much.

"I'll try my own hand on it," said George. After righting everything else, he attacked the clock, took it to pieces, carefully cleaned it, put it together, set it, and it *ticked*—ticking on as faithfully and soberly as ever! The astonished neighbours sent him their clocks, and George became one of the most famous clock doctors thereabouts.

The young man's reputation for business soon won him a situation in Killingworth—the best and largest colliery in the region. But his brightened worldly prospects were soon clouded by a dark sorrow—the death of his young wife, after three happy years of married life. Poor George felt it deeply, which was perhaps one reason for accepting a situation in Scotland, hoping in a change of scene to change the mournful current of his thoughts.



MENDING THE CLOCK.

Leaving his little boy in kind hands, he set off to the north with his pack on his back, afoot and alone, for Montrose—a long journey in those days. Good wages he received, and good friends he no doubt made, for everybody loved his honest and generous character; yet by the end of the year he yearned to get back to the friends and scenes of his early days. It was not home in Scotland; for it is only home where the heart is. With his savings in his pocket—twenty-eight pounds—back he trudged to Killingworth; and not before his friendly presence was greatly needed to comfort his aged parents, plunged in debt and affliction. By a terrible accident his father had lost his eyesight. No longer able to work, and receiving little or no help from his other children, who were barely able to maintain themselves, the old couple had a hard battle with life. But George is back again; all will be righted. He paid off their debts, and removed them to comfortable lodgings beside his own. He has father, mother, and Bobby to look after, and is thankful and happy in doing it.

Those were dark days, however, for the working-men of England. War was draining the country of men and money. Taxes were high, wages low, bread scarce, and able-bodied men were liable at any

time to be impressed for the army or naval service. George himself was drawn; and go he must, or find a substitute. He found one, but it cost all he had to hire him.

Poor George was in straits. His spirits were much damped by the prospect of things around and before him. All business was in a discouraging condition. Some of his friends were about to emigrate to America, and he at one time nearly concluded to join them. It was a sore trial to the young man. He loved his English home; and bitter tears did he in secret shed as he visited old haunts—the fields and lanes and scenes of his boyhood—feeling and fearing that all too soon the wide Atlantic might roll between him and them. But the necessary funds for such an enterprise were not forthcoming. George gave it up, therefore, and went to work for what wages the times would allow. Better times would come.

The thing nearest his heart was to afford his little son an education. Keenly alive to his own early deficiencies and disadvantages, he determined to make them up in Robert. Every spare moment was of two-fold value to him, and all the work he could pick up he cheerfully did. Besides tinkering old clocks and cobbling old shoes, he took to cutting out the pitmen's clothes. Never was there such a fit, for George acted fully up to the principle that everything which was worth doing was worth doing well.

Busy as were his hands, his mind was no less busy, catching up and using every scrap of knowledge which came in his way. And it was a perpetual surprise to his fellow-workmen to see what a knack he had at bettering things. Everything improved in his hands. There was always progress on his track.

A new pit was opened at one of the collieries. Streams of water rushed in, which the most vigorous strokes of the pump could not lower. On the engine went pumping, pumping, pumping for a year, and the water continued to flow in, until it was nearly concluded to give up the pit as a failure. George's curiosity and interest were much excited, and always, on seeing the men, he asked how matters were coming on.

"Drowned out, drowned out," was the one and the same answer.

Over he went to the poor pit, as often as he could, to see for himself; and over he turned in his mind again and again the whys and wherefores of the failure.

"Weel, George," said his friend Kit one day, "what do you mak' o' her? Do you think you could doctor her?"

"Man," answered George, "in a week's time I could send you to the bottom."

The regular engineers were in high dudgeon with the forth-putting brakeman. What right had he to know how to cure an evil that had baffled them? His words, however, were reported at head-quarters; and the contractor was not long in hastening over to see if he could make his words good.

"Well, George," he said, "they tell me you think you can put that engine to rights."

"Yes, sir," replied the young man modestly; "I think I can."

As matters could be no worse, Mr. Dodds was ready to let him try; and George agreed, on condition that he should choose his own men to help him. The old hands were highly indignant, but there was no help for it. So they were ordered off, and George with his gang went on.

The engine was taken to pieces, examined, righted, and put together again. It was set to work. Did it go? Many a looker-on shook his head doubtfully, and prophesied in his inmost heart, "*No go.*" It pumped and pumped. The obstinate water found it had an antagonist that could master it. In less than two days it disappeared from the pit, and workmen were sent to the bottom. Who could gainsay George's skill?

Mr. Dodds, of course, was delighted. Over and above his wages he put a ten-pound note into the young man's hand, and engaged him to superintend his works for the future.

A profitable job was this.

The fame of this engineering exploit spread far and wide. As an engine doctor he took the lead, and many a wheezy old thing was brought him to cure. Envious engineers tried to put him down. But real merit cannot be put down. It is stern stuff.

George's cottage showed the bent of his tastes. It was like an old curiosity shop, full of models of engines, complete or in parts, hanging and standing round; for busy as he had need to be—eking out his means by engineering, by clocks, and by coats—the construction and improvement of machinery for the collieries was his hobby.

Likeness of taste drew a young farmer often to the cottage—John Wigham—who spent most of his evenings in George's society. John had a smattering of chemistry and philosophy, and a superior knowledge of mathematics, which made him a desirable companion. George put himself under his tuition, and again took to "figuring." Tasks set him in the evening were worked out among the rough toils of the day. And so much honest purpose did not fail to secure progress. Drawing was another new line of effort. Sheets of plans and sections gave his rude desk the air of mind-work somewhere. Thus their winter evenings passed away.

Bobby was growing up in a little thought-world by himself; for he could not fail to be interested in all that interested his father—that father always making his son the companion of his studies, and early introducing him into the curious and cunning power of machinery.

Ah, that was a proud day when little Bob was old enough, and knew enough, to be sent to the academy at Newcastle. He was thirteen. His father's means had happily been increased. The old engine-wright of the colliery having died, George Stephenson was promoted to the post, on the salary of a hundred

pounds a year. This was in 1812.

The new office relieving him from incessant hard work, and the necessity of earning a shilling by extra labours, he had more time for study and for verifying his plans of practical improvement; and the consequence was very considerable improvement in the machinery of the colliery to which he was attached.

Meanwhile Robert's education went on apace. The boy was hungry for knowledge, not only for himself, but to satisfy the voracious appetite of his father, and the no less keen one of John Wigham.

Robert joined a literary and philosophical society at Newcastle, whose fine library opened a rich storehouse of material. Here the boy spent most of his time out of school, storing his mind with principles, facts, and illustrations, to carry home on Saturday afternoon. Books also. The "Edinburgh Encyclopædia" was at his command. A volume of that at the cottage unfolded a world of wonders. But the library had some books too choice to be trusted away. How was Robert to get the gist of these home? His father had often said that a "good drawing and a well-executed plan would always explain itself;" and many a time he had placed a rough sketch of machinery before his son, and told him to describe it. Robert, therefore, when he could do no better, put his drilling to the test, and copied diagrams and drew pictures, thus taking many an important and perhaps rare specimen of machinery and science to Killingworth, for his father's benefit.

We can well imagine Saturday afternoon was as much a holiday to father as to son. Robert's coming was hailed with delight. John did not lag far behind. Some of the neighbours dropped in to listen to discussions which made the little room a spot of lively interest and earnest toil. A wide-awake mind allows nothing stagnant around it.



THE SUN-DIAL.

Among the borrowed books of the day was Ferguson's "Astronomy," which put father and son to calculating and constructing a sun-dial for the latitude of Killingworth. It was wrought in stone, and fixed over the cottage door; and there it is still, with its date, August 11, 1816—a year or two before Robert left school—a fair specimen of the drift of his boyish tastes.

WHO BEGAN RAILROADS?—"PUFFING BILLY."



familiar as it has become to us, who does not stop to look with interest at the puffing, snorting, screaming steam-horse? And who does not rejoice in the iron-rail, which binds together, with its slender threads, the north and the south, and makes neighbours of the east and the west?

"Who *began* railroads?" ask the boys again and again.

The first idea of the modern railroad had its birth at a colliery nearly two hundred years ago. In order to lighten the labour of the horses, the colliers laid straight pieces of wood into the road leading from the pit to the river, where the coal was discharged; and the waggons were found to run so much easier, that one horse could draw four or five chaldrons. As wood quickly wore out, and moreover was liable to rot, the next step was nailing plates of iron on the wooden rails; which gave them for a time the name of "plate-way roads." A Mr. Outram making still further improvements, they were called "Outram roads," or, for shortness' sake, "tram-roads;" and tram-roads came into general use at the English collieries.

"There's mischief in those tram-roads," said a large canal owner, foreseeing they would one day drive canal stock quite out of the market.

Improvements thus far had centred on the roads. To convoy heavy loads easier and faster was the point aimed at. Nobody had yet thought of self-going trains. Watt, the father of steam-engines, said steam-carriages might be built. He, however, never tried one, but rather left the idea to sprout in the brain of an old pupil of his, William Murdock, who did construct a very small one, running on thin wheels, and heated by a lamp. It was a curious success in its way, and set other minds thinking.

One of these was a tin-miner of Cornwall, Captain Trovethick, a friend of Murdock, who joined a cousin of his in getting a patent for building a steam-carriage. It was built, and an odd piece of machinery it was. It ran on four wheels over a common road, looked like a stage-coach, and delighted both the inventor and his friends.

They determined to exhibit it at London. While on its journey, driving it one day at the top of its speed, they saw a toll-gate in the distance. Not being able to check it in time, bump it went against the gate, which flew open in a trice, leaving the affrighted toll-man, in answer to their inquiry, "How much to pay?" only able to gasp out, "No—nothing to pay! Drive off as fast as you can! Nothing to pay!"

It reached London in safety, and was some time on exhibition. Multitudes flocked to see it, and some called it a fiery dragon.

"Ah," said Sir Humphrey Davy, very much interested in the invention, "I hope to see the captain's dragons on all the roads of England yet."

But the captain exhibited it only as a curiosity, the unevenness of the roads rendering it for all practical purposes a failure; and he had neither pluck nor genius enough to lay or clear a track for it himself. This was in 1803.

The idea, however, was in England, lodging itself here and there in busy brains; until, at last, a colliery owner in Newcastle, seeing the great advantage of having a locomotive on his tram-roads, determined to try what *he* could do. Accordingly, he had one built after the Cornish captain's model. It burst up at starting. Noways baffled, he tried again. The engine proved a clumsy affair, moved at a snail's pace, often got off the rails, and at length, voted by the workmen a "perfect plague," it was taken off. The unsuccessful inventor was called a fool by his neighbours, and his efforts an apt illustration that "the fool and his money are soon parted." In spite of failure, Mr. Blckett had faith that the thing *could* be done. He built a third, and ran it on the tram-road that passed by old Bob Stephenson's cottage door. And George at his colliery, seven miles off, as you may suppose, listened to every account of it with profound interest. Over he went, as often as he could, to see "Black Billy," as the locomotive was called—a rough specimen of machinery at best, doing very little service beyond what a good horse could do.

George carried "Black Billy" back in his mind to Killingworth, studying its defects, and laying plans to improve it. I do not know how long he was in coming to it, but he at length gave it as his opinion that he could make a better "travelling engine" than that.

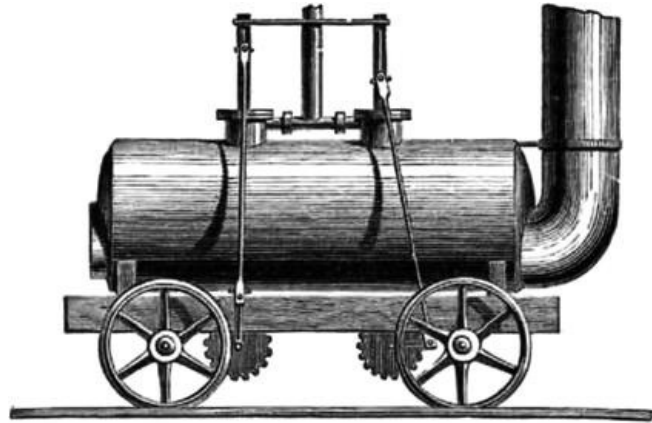
Tidings came to Killingworth about this time that the trial of a new engine was to take place on a certain day at Leeds, and George did not lose the chance of being present. Though the engine moved no faster than three miles an hour, its constructor counted it a success. It proved, however, unsteady and unreliable, and at last blew up, which was the end of it.

What did George think then? He more than ever wanted to try *his* hand at the business. Lord Ravensworth, knowing enough of Stephenson to have faith in him, hearing of this, advanced means for the enterprise. Good tools and good workmen were alike wanting; but after much labour, alteration, and anxiety, in ten months' time the engine was completed and put on the railway, July 25, 1814.

Although the best yet made, it was awkward and slow. It carried eight loaded waggons of thirty tons weight at a speed not above four miles an hour. The want of springs occasioned a vast deal of jolting, which damaged the machinery, and at the close of a year's trial it was found about as costly as horse-power.

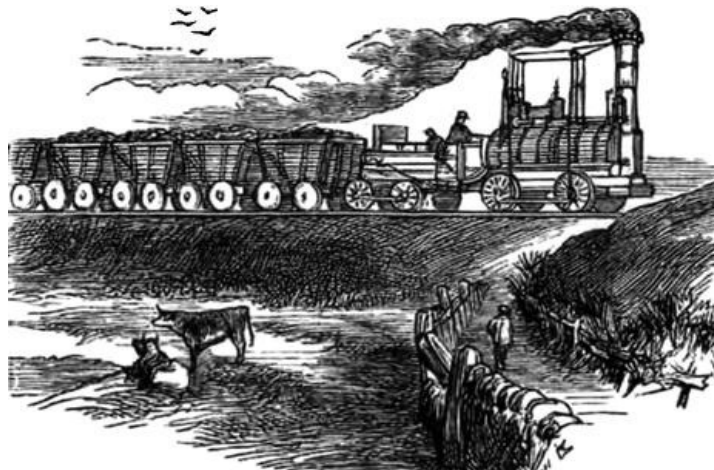
How to increase the power of his engine? that was the puzzling question which George studied to answer. He wrestled with it day and night, and at length determined to try again. In due time another

was built, "Puffing Billy," which most persons looked upon as a marvel; but, shaking their heads, they prophesied it would make a terrible blow-up some day. "Puffing Billy," however, went to work, and worked steadily on—a vast advance on all preceding attempts. It attracted little or no attention outside the narrow circle of the collieries. The great men of England did not know that, in a far-off nook of the realm, there was slowly generating a power, under the persistent thought of an humble working-man, which before many years would revolutionize the trade of the kingdom, and create a new source of wealth.



GEORGE STEPHENSON'S FIRST ENGINE.

"Puffing Billy," in fact, humble as its pretensions were, has proved to have been the type of all locomotives since.



"PUFFING BILLY."

Had George Stephenson satisfied himself? No. His evenings were chiefly spent at home with his son Robert, now under him in the colliery, studying and discussing together how to evoke the hidden power yet pent up in "Puffing Billy." The son was even more sanguine than his father, and many an amendment had "Billy" to undergo to satisfy the quick intellect and practical judgment of the youth.

Mr. Stephenson, delighted with Robert's scientific tastes and skill, and ever alive to the deficiencies of his own education, was anxious to give him still further advantages. For this purpose he took him from a promising post at the colliery, and sent him to the University of Edinburgh.

Here he enjoyed a six months' course of study; and so well prepared was he for it by his well-formed habits of application and thinking, that he gained in six months as much as many a student did in three years. Certain it was his father felt amply repaid for the draft it made on his purse, when Robert reappeared at the cottage, in the spring, with a prize for successful scholarship in mathematics. He was eighteen then.

TWO CITIES THAT WANTED TO GET NEAR EACH OTHER—A
NEW FRIEND.

Manchester, thirty miles north-east of Liverpool, is the great centre of the cotton trade in England. Its cloths are found in every market of the world. Cotton coming to Liverpool is sent to the Manchester mills; and the goods which the mills turn out are returned to Liverpool to be shipped. The two cities, therefore, are intimately connected by constant intercourse and mutual interest.

Two water communications existed between them; one by the rivers Mersey and Irwell, the other by the famous Bridgewater Canal, which did an immense business at an enormous profit. But the Manchester mills were fast outgrowing these slow and cumbersome modes of travel. Liverpool warehouses were piled with bales of cotton waiting to go, and the mills at Manchester had often to stop because it did not come. Goods also found as much difficulty in getting back. Merchants and manufacturers both grumbled. Business was in straits. What was to be done? Carting was quite out of the question. Canal owners were besought to enlarge their water-power. No, they would do nothing. They were satisfied with things as they were. Their dividends were sure.

But want demands supply; need creates resources. Something *must* be done to facilitate the transit of goods between the two cities. What? Build a tram-road, or *rail-road*. Nobody, however, but a very fast man would risk his good sense by seriously advising a rail-road. Solid men would certainly shun him. A tram-road was a better understood thing. The collieries had used small pieces of them for years. A tram-road then. Business men put their heads together and began earnestly to talk of a tram-road.

William James, a rich and enterprising man, entered heartily into the project, and undertook to make surveys for a suitable route. And not long after a party of surveyors was seen in the fields near Liverpool. Their instruments and movements excited attention. People eyed them with anxiety; suspicions were roused; the inhabitants became alarmed. Who were they, making such mysterious measurements and calculations on other people's land? A mob gradually gathered, whose angry tones and threatening gestures warned the surveyors of a storm brewing over their heads. Wisely considering that flight was better than fight, they took themselves off, and by-and-by turned up farther on.

The landowners, who might be supposed to have known better, told the farmers to drive them off; and the farmers, with their "hands," were only too ready to obey. They stationed themselves at the field gates and bars with pitch-forks, rakes, shovels, and sticks, and dared the surveyors to come on. A poor chain-man, not quite so nimble as his pursuers, made his leap over a fence quickened by a pitch-fork from behind! Even women and children joined the hue and cry, pelting the strangers with stones and dirt whenever they had a chance. The colliers were not behind the farmers in their foolish hostility. A stray surveyor was caught and thrown into a pit.

At a sight of the theodolite their fury knew no bounds. That unoffending instrument they seemed to regard as the very Sebastopol of the enemy, to seize and destroy which was to win the day. The surveyors, therefore, were obliged to hire a noted boxer to carry it, who could make good his threats on the enemy. A famous fighter among the colliers, determined not to be outdone, marched up to the theodolite to capture it. A fist-and-fist fight took place; the collier was sorely beaten, but the rabble, taking his part against the poor instrument, pelted it with stones and smashed it to pieces.

You may well suppose that surveying under such circumstances was no light matter. What was the gist of the hostility? It is hard to tell. The canal owners might have had a hand in scattering these wild fears; fears of what, however, it is not so easy to find out. There was nothing in a simple horse rail-road, or tram-road, as it is called, to provoke an opposition so bitter from the people. It was a *new thing*; and new things, great improvements though they may be on old ones, often stir up a thousand doubts and fears among the ignorant and unthinking.

Nor did the project generally take among those who would be most benefited by it. Mr. James and his friends held public meetings in all the towns and villages along the way; enterprising men in Liverpool and Manchester talked it up, and tried to create a public interest; but there was a holding back, which, while it checked all actual progress in the enterprise, did not cause it to be altogether given up. The time had not come; that was all.

Mr. James had a secret leaning towards the use of steam on the new road. He would have immediately and unhesitatingly advocated a rail-road run by locomotives. But that was out of the question. The public were far behind that point, and to have openly advocated it would have risked his judgment and good sense in the opinion of the best men. Therefore Mr. James wisely held his tongue. But hearing of the Killingworth locomotives, and of a collier who had astonished the natives by his genius, he determined to make a journey to Newcastle, and see the "lions" for himself.

Stephenson was not at home. "Puffing Billy" was; and "Billy" puffed in a way that took Mr. James's heart at once. He seemed to see at a glance "Billy's" remarkable power, and was struck with admiration and delight. "Here is an engine," he exclaimed, "that is destined before long to work a complete revolution in society."

The image of "Puffing Billy" followed him home.

"Why," he wrote to Stephenson's partner in the patent, "it is the greatest wonder of the age, and the forerunner, I believe, of most important changes in the modes of travel in the kingdom."

A few weeks later he made another visit to Killingworth, taking his two sons with him. "Puffing Billy" was at work, as usual.

The boys were frightened at the sight of the snorting monster; but Stephenson encouraged them to mount, with their father, and see how harmless and manageable the monster was.

The second visit was even more gratifying than the first.

"Mr. Stephenson," said James, "is the greatest practical genius of the age. His fame will rank with that of Watt."

Mr. James lost all hesitation now about speaking his mind. "Puffing Billy" had driven the backwardness out of him, and he was willing, at all hazards, boldly to advocate rail-roads and the steam-horse. No more tram-roads; steam or nothing. This was in 1821.

Mr. James entered heart and soul into the new idea of the age. On his return to Liverpool, it was everywhere his theme; and wherever he had influence, he tried to stir up men's minds to the benefits and blessings puffing out in "Puffing Billy."



THE VISIT TO "PUFFING BILLY."

Stephenson rejoiced in such a friend. It was just what he and "Billy" most needed—somebody to introduce them into the great world. And Stephenson and his partner offered him a share in the profits of whatever business he could secure to them.

But what can one man, or a few men, do in an enterprise like this, depending upon the verdict of that important power, Public Opinion? And Public Opinion had not yet made up its mind to it.

A thousand difficulties bristled in the way. There were both the indifference of friends and the opposition of enemies at home. In addition to this, a violent opposition was foreseen in Parliament, which it needed all the strength and courage of a united constituency to meet.

Under these discouraging circumstances, there were not enough men of pluck to push the matter through.

So everything about the new road went by the board. It was laid on the shelf, at least for the present, and Liverpool and Manchester trade jogged on as before.

HUNTING UP HIS OWN WORK—AN ENTERPRISING
QUAKER—WHAT WAS THE RESULT?

It appears strange to us that so simple a thing as the laying of a rail seems to be should have taken years of thought and experiment to do it. Nothing looks easier to prepare than the straight, smooth track of a railway, such as we now see in use; and yet it was only arrived at by slow steps through two hundred years.

In pondering upon the powers of "Puffing Billy," George Stephenson saw that the efficiency of locomotives must, in a great measure, depend on what kind of roads they had to run upon. Many were sanguine that steam-carriages would some day come into use on common roads. After a long series of experiments, George Stephenson said, "No; the thing wouldn't pay." For a rough surface seriously impairs the powers of a locomotive; even sand scattered upon the rails is sufficient to slacken, and even stop an engine. The least possible friction is desirable, and this is found on the smooth rail.

Could they ever be laid uphill, or on "ascending gradients", as the scientific term is? No; as nearly level as possible, Stephenson's experiments showed, was the best economy of power. Then how to get rid of the jolts and jars and breakages of the rails as they were then laid. He studied and experimented upon both chairs and sleepers, and finally embodied all his improvements in the colliery railway.

"Puffing Billy" was in every respect a most remarkable piece of machinery, and its constructor one of the most sagacious and persistent of men. But how was the public, ever slow in discovering true merit or accepting real benefits, to discover and appreciate them? Neither influence, education, nor patronage had Stephenson to command mind and means, or to drive his engine through prejudice, indifference, and opposition, to profit and success.

But what he could not do, other men could do, and did do. Find a hook, and there is an eye to fit it somewhere. Yes; there were already men of property and standing alive with the new idea. While he worked, they talked—as yet unknown to one another, but each by himself clearing the track for a grand junction.

One of these men was Edward Pease, a rich Quaker of Darlington, who, his friends said, "could look a hundred miles ahead." He needed a quicker and easier transit for his coals from the collieries north of Darlington to Stockton, where they were shipped; and Mr. Pease began to agitate, in his mind, a railroad. A company for this purpose was formed, chiefly of his own friends, whom he fairly talked into it. Scarcely twenty shares were taken by the merchants and shipowners of Stockton, whose eyes were not open to the advantage it would by-and-by be to them. A survey of the proposed road was made, when to the indifference of the many was added the opposition of the few. A duke was afraid for his foxes! Shareholders in the turnpikes declared it would ruin their stock. Timid men said it was a new thing, and that it was best to let new things alone. The world would never improve much under *such* counsel. Edward Pease was hampered on all sides. Nobody convinced him that his first plan was not the right one by all odds; but what can a man do in any public enterprise without supporters? So he reluctantly was obliged to give up his rail-road, and ask Parliament for liberty to build a tram-road—horse-power instead of steam-power: he could seem to do no better, and even this was gotten only after long delay and at considerable cost.

Among the thousands who carelessly read in the newspapers the passage through Parliament of the Stockton and Darlington Act, there was one humble man whose eye kindled as he read it. In his bosom it awakened a profound interest. He went to bed and got up brooding over it. He was hungry to have a hand in it; until at last, yearning with an irrepressible desire to do his own work in the world, he felt he must go forth to seek it.

One night a couple of strangers knocked at the door of Edward Pease's house in Darlington, and introduced themselves as two Killingworth colliers. One of them handed the master of the mansion a letter of introduction from a gentleman of Newcastle, recommending him as a man who might prove useful in carrying out his contemplated road.

To support the application, a friend accompanied him.

The man was George Stephenson, and his friend was Nicholas Wood. It did not take long for Edward Pease to see that Stephenson was precisely the man he wanted.



THE TWO STRANGERS.

"A railway, and not a tram-road," said Stephenson, when the subject was fairly and fully opened.

"A horse railway?" asked Pease.

"A locomotive engine is worth fifty horses," exclaimed Stephenson; and once on the track, he launched out boldly in its behalf.

"Come over to Killingworth and see my 'Puffing Billy,'" said George; "seeing is believing." And Mr. Pease, as you may suppose, was quite anxious to see a machine that would outride the fleetest horse. Yet he did not need "Puffing Billy" to convince him that its constructor knew what he was advocating, and could make good his pledges. The good Quaker's courage rapidly rose. He took a new start, and the consequence was that all other plans and men were thrown aside, and Stephenson was engaged to put the road through much in his own way.

The first thing to be done was to make an accurate survey of the proposed route. Taking Robert with him, who had just come from college, and who entered as heartily into the enterprise as his father, with two other tried men, they began work in good earnest. From daylight till night the surveyors were on duty. One of the men going to Darlington to sleep one night, four miles off, "Now, you must not start from Darlington at daybreak," said Stephenson, "but be here, ready to begin work, at daybreak." He and Robert used to make their home at the farm-houses along the way, where his good-humour and friendliness made him a great favourite. The children loved him dearly. The dogs wagged their approving tails at his approach. The birds had a delighted listener to their morning songs, and every dumb creature had a kind glance from his friendly eye.

But George was not quite satisfied. He wished Mr. Pease to go to Killingworth to see "Puffing Billy," and become convinced of its economical habits by an examination of the colliery accounts. He promised, therefore, to follow George thither, along with a large stockholder; and over they went in the summer of 1822.

Inquiring for Stephenson, they were directed to the cottage with a sun-dial over the door. George drove his locomotive up, hoisted in the gentlemen, harnessed on a heavy load, and away they went. George no doubt showed "Billy" off to the best advantage. "Billy" performed admirably; and the two wondering stockholders went home enthusiastic believers in locomotive power.

A good many things had to be settled by the Darlington project. One was the width of the gauge; that is, the distance between the rails. How wide apart should they be? Stephenson said the space between the cart and waggon wheels of a common road was a good criterion. The tram-roads had been laid down by this gauge—four feet and eight inches—and he thought it about right for the railway; so this gauge was adopted.

One thing which hampered Stephenson not a little was the want of the right sort of workmen—quick-minded, skilful mechanics, who could put his ideas into the right shape. The labour of originating so much we can never know. He had nothing to copy from, and nobody's experience to go by. Happily he proved equal to his task. We can readily imagine his anxiety as the work progressed. Hope and fear must have in turn raised and depressed him. Not that he had any doubts in regard to the final issue of the grand experiment of railroads. They *must* go!

Dining one day at a small inn with Robert, and John Dixon, after walking over the route, then nearly completed—"Lads," he said, "I think you will live to see the day when railroads will be the great highway for the king and all his subjects. The time is coming when it will be cheaper for a working-man to travel on a railway than to walk on foot. There are big difficulties in the way, I know; but it will surely come to pass. I can hardly hope to live to see that day, much as I should like to do so; for I know how slow all human progress is, and how hard it is to make men believe in the locomotive, even after our ten years' success in Killingworth."

While the father roughed it through, Robert's health failed. His close application to business made sad inroads upon a frame naturally more delicate than his father's; and an offer to go out and superintend some mining operations in South America was thankfully accepted, in the hope that a sea-voyage and

less exciting labours might restore him.



A TALK ABOUT RAILWAYS.

Robert shortly sailed; and his father pushed on alone, with that brave spirit which carried him through many a darker hour.

On the 27th of September the Stockton and Darlington Railway was finished and opened. A great many came to see the new mode of travelling, which had proved a fruitful subject of talk, far and near, for many months;—some to rejoice; some to see the bubble burst; some with wonder, not knowing what to think; some with determined hostility. The opposition was strong: old England against young England; the counter currents of old and new ideas.

The road ran from Stockton to Darlington, a distance of twelve miles, and thence to the Etherly collieries—in all, thirty-two miles.

Four steam-engines were employed, and two stationary engines to hoist the train over two hills on the route. The locomotives were of six-horse power, and went at the rate of five or six miles an hour. Slow as this was, it was regarded with wonder. A "travelling engine" seemed almost a miracle. One day a race came off between a locomotive and a coach running on the common highway; and it was regarded as a great triumph that the former reached Stockton first, leaving the coach one hundred yards behind.

The road was built for a freight road, to convey lime, coal, and bricks from the mines and kilns in the interior to the sea-board for shipment abroad. Carrying passengers was not thought of. Enterprise, however, in this direction took a new start. A company was soon formed to run two coaches on the rails between Darlington and Stockton by horse-power. Each coach accommodated six inside passengers, and from fifteen to twenty outside; was drawn by one horse; and went at the rate of nine miles an hour.

"We seated ourselves," said a traveller of those days, "on the top of the 'Defence' coach, and started from Stockton highly interested with the novelty of the scene and of this new and extraordinary conveyance. Nothing could be more surprising than the rapidity and smoothness of the motion." Yet the coach was without springs, and jerked and jolted over the joints of the rails with a noise like the clinking of a mill-hopper.

"Such is the first great attempt to establish the use of railways," writes a delighted editor, "for the general purposes of travelling; and such is its success, that the traffic is already great, and, considering that there was formerly no coach at all on either of the roads along which the railroad runs, quite wonderful. A trade and intercourse have arisen out of nothing, and nobody knows how."

Such was their small and imperfect beginning, we should say, now that railroads, improved and perfected, have fulfilled Stephenson's prediction uttered in the little inn, and have become the great highways of the civilized world.

THE TWO CITIES TRYING AGAIN—BUGBEARS.



ne, two, three years passed by, and the Liverpool and Manchester project started up again. It was not dead, it had only slept; and the three years had almost worn out the patience of both merchants and manufacturers. Trade between the two cities must have speedier and easier transit. Trade is one of the great progressive elements in the world. It goes ahead; it will have the right of way; it will have the right way—the best, safest, cheapest way of doing its business. Yet it is not selfish; its object is the comfort and well-being of men. To do this, it breaks down many a wall which selfishness has built up, it cuts through prejudices, it rides over a thousand "can't be's" of timid and learned men; for learned men are not always practical. They sometimes say things cannot be done, when it only needs a little stout trying to overcome difficulties and do them.

A learned man once said that crossing the Atlantic by steam was impossible.

"For the good of the race, we must have something truer than wind and tougher than sails," said Trade. And it was not many years before ships steamed into every port.

"Carriages travelling at twelve, sixteen, eighteen, twenty miles an hour! Such gross exaggerations of the power of a locomotive we scout. It can never be!" cries a sober Quarterly.

"You may scout it as much as you please," rejoins Trade; "but just as soon as people need a cheaper, pleasanter, swifter mode of travel, it will be *done*." And now the railway carriages thread the land in their arrowy flight.

"The magnetic telegraph! a miserable chimera," cries a knowing statesman. "Nobody who does not read outlandish jargon can understand what a telegraph means."

"You will soon find out," answers Trade. And now it buys pork by the hundred barrels, and sells grain by the thousand bushels; while armies march and fleets sail at its bidding. Treaties are signed at its word; and the telegraph girdles the world.

You see Trade is a civilizer; and Christian civilization makes all the difference in the world between Arabs and Englishmen.

Liverpool merchants were now fairly awake. "What is to be done?" was the question. Something. Could there be a *third* water-line between the two cities? No; there was not water enough for that.

Would the Bridgewater Canal increase its power and reduce its charges? No.

A tram-road or a rail-road, then. There was no other alternative.

Mr. James, who was so much interested before, had failed and left the country. When he left, he said to his friends, "When you build a road, build a railroad, and get George Stephenson to do it."

The Darlington and Stockton enterprise could not fail to be known at Liverpool; and a drift of opinion gradually began to set in strongly in favour of the railway. People talked about it in good earnest.

"A railway!" cried the canal owners. "It is absurd; it is only got up to frighten us; it will slump through, as it did before." They were easy.

"Let us go to Darlington and Killingworth and see for ourselves," said the merchants; and four gentlemen were sent on a visit of inquiry. They went first to Darlington, where the works were in vigorous progress, though not done. It was in 1824, the year before they were finished. Here they met Stephenson. He took them to Killingworth to see "Puffing Billy."

Seeing was believing. "Billy's" astonishing feats won them completely over; and they went back to Liverpool warm for a railroad. Their clear and candid report convinced merchants, bankers, and manufacturers, who gave a verdict in its favour. Public opinion was now coming over.

Books were opened for funds. There was no lack of subscribers. Money was ready. To be sure of the *safety* of locomotive power, a second deputation was sent to Killingworth, taking with them a practical mechanic, better able to judge about it than themselves. The man had sense enough to see and to own that while he could not insure safety over nine or ten miles an hour, there was nothing to be afraid of slower than that. Then a third body went. The enterprise required caution, they thought.

Yes, it did.

Having decided upon steam-power, the next thing was to secure the right sort of man to carry on the work. Stephenson was that man. His energy and ability were indispensable. Before trying to get a charter from Parliament, the route needed to be surveyed again, and a careful estimate of expenses made.

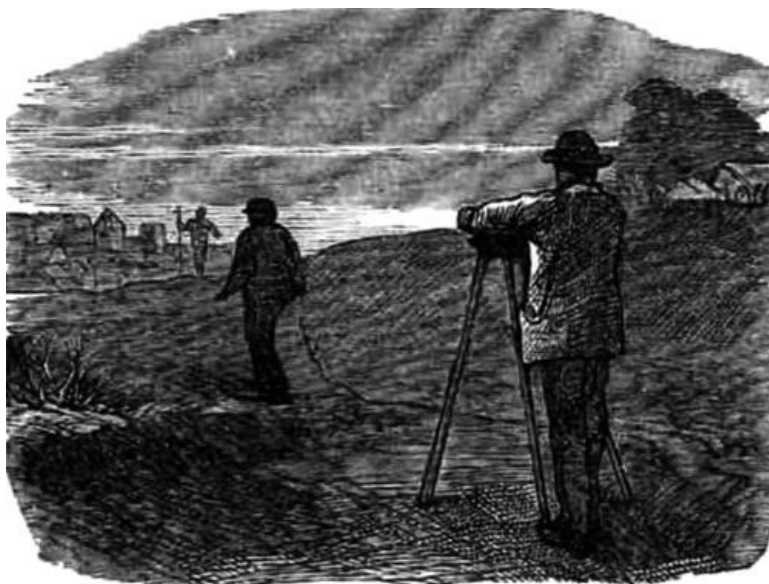
The Stockton road done, Stephenson was free to engage in this new enterprise; his success in that proving his principles true on a larger scale.

The canal owners now took alarm. They saw there was a dangerous rival, and they came forward in the most civil and conciliatory manner, professing a wish to oblige, and offering to put steam-power on their canals. It was too late. Their day had gone by.

You know the violent opposition made to a former survey. How would it be again? Did three years scatter the ignorance out of which it grew? Ah, no. There was little if any improvement. The surveyors were watched and dogged by night and by day. Boys hooted at them, and gangs of turbulent men

threatened them with violence. Mr. Stephenson barely escaped duckings, and his unfortunate instruments capture and destruction. Indeed, he had to take with him a body-guard to defend them. Much of the surveying had to be done by stealth, when people were at dinner, or with a dark lantern at night.

When dukes and lords headed the hostility, you cannot wonder that their dependants carried it on. One gentleman declared that he would rather meet a highwayman or see a burglar on his premises than an engineer; and of the two he thought the former the more respectable! Widows complained of damaged corn-fields, and gardeners of their violated strawberry-beds; and though Stephenson well knew that in many cases not a whit of damage had been done, he paid them for fancied injuries in the hope of stopping their tongues.



SURVEYING AT NIGHT.

A survey made under such circumstances must needs have been imperfect; but it was as good as could be made. And no time was lost in taking measures to get a Bill before Parliament.

A storm of opposition against railways suddenly arose, and spread over every corner of the kingdom. Newspapers and pamphlets swarmed with articles crying them down. Canal and turnpike owners spared no pains to crush them. The most extraordinary stories were set afloat concerning their dangers. Boilers would burst, and passengers be blown to atoms; houses along the way would be burned; the air would become black with smoke and poisoned by cinders; and property on the road would be stripped of its value.

The Liverpool and Manchester Bill, however, got into Parliament, and went before a Committee of the House of Commons to decide upon it, in March 1825.

First, its friends had to show the *necessity* of some new mode of travel between the two cities; and that it was not difficult to do.

But when it came to asking for liberty to build a railway and run a locomotive, the matter was more difficult to manage. And to face the tremendous opposition rallied against it, the pluck of its friends was severely tried.

The battle had to be fought inch by inch.

Stephenson, of course, was the chief witness for locomotives. But what headway could he, an uneducated Northumbrian mechanic, make against members of Parliament, backed by all the chief engineers of the kingdom? For very few had faith in him; but those few had strong faith. He was examined and cross-examined. They tried to bully him, to puzzle him, to frighten him. On the subject of locomotives his answers were clear. He declared he could drive an engine, and drive it safely, at the rate of twelve miles an hour!

"Who can believe what is so notoriously in the teeth of all experience?" cried the opposition; "the witness is a madman!"

Famous engineers were called on the stand. What had *they* to say? One declared the scheme a most wild one. He had no confidence in locomotives. They were affected by wind and weather; with difficulty were kept on the track, and were liable to constant accidents; indeed, a gale of wind would render it impossible to start a locomotive, either by poking the fire or keeping up the steam till the boiler should burst: they could never be relied on.

The proposed route had to cross an ugly quagmire, several miles in extent, called Chat Moss, a very shaky piece of land, no doubt; and here the opposition took a strong stand. "No engineer in his senses," cried one, "would think of going through Chat Moss. No carriage could stand on the Moss short of the bottom."

"It is absurd to hold out the notion that locomotives can travel twice as fast as stage-coaches," said another; "one might as soon trust himself to a rocket as to the mercy of a machine going at that rate."

"Carriages cannot go at anything like that speed," added another; "if driven to it, the wheels would only spin on their axles like a top, and the carriages would stand stock-still!"

So much for learned arguments against it.

Then came the dangers of it. "The dumb animals would never recover from the sight of a locomotive; cows would not give their milk; cattle could not graze, nor horses be driven along the track," cried the opposition.

"As to that," said Stephenson, "come to Killingworth and see. More quiet and sensible beasts cannot be found in the kingdom. The farmers *there* never complain."

"Well," asked one, "suppose, now, one of those engines to be going along a railroad at the rate of nine or ten miles an hour, and that a cow were to stray upon the line and get in the way of the engine; would not *that*, think you, be a very awkward circumstance?"

"Yes," answered Stephenson, with a droll twinkle in his eye; "very awkward indeed—for *the cool!*"

The fellow, as you may suppose, backed off.

The danger in other respects was thus dwelt on: "In addition to the smoke and the noise, the hiss and the whirl which locomotive engines make, going at the rate of ten or twelve miles an hour, and filling the cattle with dismay, what," asked an honourable member, "is to be done with all those who have advanced money in making and mending turnpikes? What with those who may still wish to travel in their own or hired carriages, after the fashion of their forefathers? What is to become of coach-makers and harness-makers, coach-masters and workmen, inn-keepers, horse-breeders, and horse-dealers? Iron would be raised one hundred per cent., or more probably exhausted altogether! The price of coal would be ruinous. Why, a railroad would be the greatest nuisance, the biggest disturbance of quiet and comfort, in all parts of the kingdom, that the ingenuity of man could invent."

Not content with belittling his engine, they could not stop short of abusing Stephenson himself. "He is more fit for Bedlam than anywhere else," they cried; "he never had a plan—he is not capable of making one. Whenever a difficulty is pressed, as in the case of a tunnel, he gets out of it at one end; and when you try to catch him at that, he gets out at the other."

"We protest," they said, "against a measure supported by such evidence and founded upon such calculations. We protest against the Exchange of Liverpool striding across the land of this country. It is despotism itself."

What had the friends of locomotive power to say?

"We beseech you," they pleaded to the Committee, "not to crush it in its infancy. Let not this country have the disgrace of putting a stop to that which, if cherished, may in the end prove of the greatest advantage to our trade and commerce. We appeal to you in the name of the two largest towns in England; we appeal to you in the name of the country at large; and we implore you not to blast the hopes that this powerful agent, Steam, may be called in for the purpose of aiding land communication: only let it have a fair trial, and these little objections and private prejudices will be done away."

Flaws were picked in the surveys, and the estimate of costs based on them. The surveys, quite likely, were imperfect; indeed, how could they be otherwise, when every mile of the line had to be done at the risk of life?

The battle lasted two months, and a very exciting one it was. It was skilfully and powerfully carried on. Who beat?

The opposition. The Bill was lost.

Matters looked dark enough. Judging from appearances, the enterprise was laid on the shelf, and the day of railways long put off. As for poor Stephenson, his short day of favour seemed about gone. His being called a madman, and regarded as a fool, as he had been by the opposition, was not without its effect upon his newly-made friends. Their faith in him sensibly cooled. But he did not lose faith in himself, not he. He had waited long for the triumph of his engine, and he could wait longer. A great blessing to the nation was locked up in it he well knew; and the nation would have it some time, in spite of everything.

Was the enterprise a second time to be abandoned?

No, no. Taking breath, its friends again started to their feet. "Never give up," was their motto, for they were in earnest. They rallied, and met in London to consult what to do next.

Mr. Huskisson, a member of Parliament for Liverpool, came into the meeting and urged them to try again—to try at the next session of Parliament.

"Parliament must, in the end, grant you an Act," he said, "if you are determined to have it." And try they determined to, for a horse railroad at least.

For this purpose another and more careful survey had to be made.

Stephenson was left out. A *known* man must be had. They meant to get surveyors and engineers with well-established reputation to back them up. Stephenson was too little known. He had no fame beyond a little circle in one corner of the kingdom. How did he feel to be thus thrown in the back-ground? George was not a man to grumble; he was too noble to complain. In fact, you see, he was ahead of the times; too far ahead to be understood and appreciated. He could afford to wait.

Two brothers of the name of Rennie were appointed in his stead. In time the new survey was finished; the plans drawn, and the expenses reckoned up. Changes were made in the route. Ill-tempered landowners were left on one side, and every ground of complaint avoided that could be.

The new Bill was then carried to Parliament, and went before the Committee in March the next year. The opposition was strong, indeed, but less furious. Much of its bitterness was gone. It made a great show of fears, which the advocates of the Bill felt it was not worth while to waste words in answering. They left it to the road to answer them. Build it, and see.

Mr. Huskisson and others supported it in a strong and manly tone; and after a third reading, the Bill passed in the House of Commons. So far, so good. It then had to go to the House of Lords. What would befall it there? The same array of evidence on both sides was put forward. The poor locomotive engine, which had proved such a bugbear in the House of Commons, was regarded as quite a harmless affair by most of the lords; and the opposition made such poor work in showing off its dangers, that no plea in its behalf was called for. They were satisfied, they said; and the Bill passed almost unanimously. Victory! victory!

The victory cost more than twenty thousand pounds! For a first cost it looked large. But nothing worth doing can be done without effort, and effort made *in faith*. Nothing done, nothing have.

GRAPPLING WITH DIFFICULTIES—THE BOG—A
PUZZLE—THE PRIZE OFFER.

he real work was now to be done. Hopes and fears had yet to be verified.



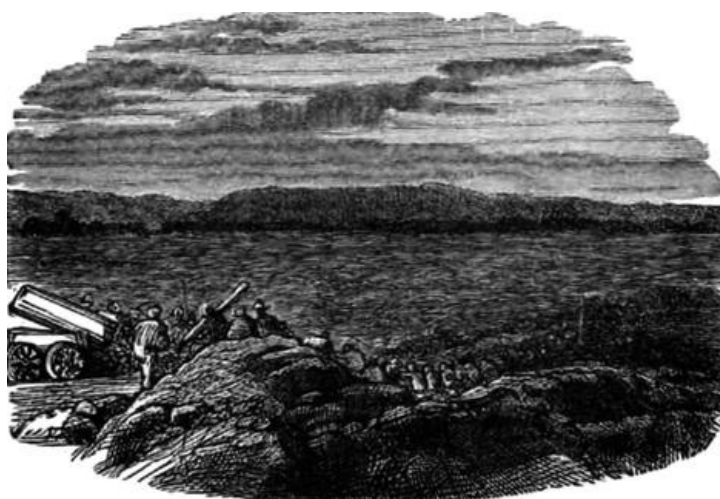
At the first meeting of the directors, a man to put the enterprise through was to be chosen. Who? The Rennies were anxious to get the appointment. They naturally expected it. They had made the survey, and their name had had weight in getting the Act of Parliament. But they could not superintend the details of the work. They had other enterprises on foot.

Stephenson, no doubt, was *the* man. The directors felt him to be so. No one could long be with him without feeling his power. Besides, what he had done had been ably done. At the risk of offending the Rennies and their friends, they chose him, and the result proved the wisdom of their choice.

On receiving the appointment, he immediately moved to Liverpool, and the work began in good earnest. It was a stupendous undertaking for those days. Chat Moss had to be filled in, sixty-three bridges built, excavations made, tunnels cut, and all the practical details carried out, with very little past experience to profit by. Neither was the kind of labour well understood, nor was there that division of labour between contractors and engineers which relieves one man of too heavy a responsibility. In fact, tools and men had to be made; and Stephenson had to make both!

The great quagmire was first grappled with. "No man in his senses would undertake to make a road over Chat Moss," opposers said in Parliament; "that were to undertake the impossible." Stephenson, however, meant to try. Formidable it certainly was. Cattle ploughing on farms bordering the bog, where it ran underneath the tilled land, had to wear flat-soled boots in order to keep their hoofs from sinking down into the soft soil.

The proposed route ran four miles across it, and the way had to be drained and filled in with sand and gravel. The drainage tasked their ingenuity to the utmost, and almost baffled the workmen. After that was in some degree accomplished, waggon-load after waggon-load of earth was thrown on for weeks and weeks: but it only sank into the mire and disappeared—not an inch of solid footing seemed gained; and on they went, filling and filling, without apparently having made the least impression on the Moss,—the greedy bog only cried out for more.



CHAT MOSS.

Stephenson's men began to have their doubts. The opposition might have judged more correctly after all. They asked him what he thought. "Go ahead!" was his answer. By-and-by the directors began to have *their* fears. It looked to them like a very unpromising job. So it was. After waiting and waiting in vain for signs of progress, they called a meeting on the edge of the Moss, to see if it were not best to give up. The bog, they were afraid, might swallow up all their funds, as it had done everything else. Stephenson lost not a whit of his courage. "Go ahead!" was his counsel. He never for a moment doubted of final success. And considering the great outlay already made, they wisely gave in to him.

Monstrous stories were afloat of the terrible accidents taking place there. Every now and then the stage drivers brought into Manchester the astonishing news of men, horses, carts, and Stephenson himself submerged and sunk for ever in the insatiable quagmire! Time corrected one only to publish another. Newsmongers were kept in a state of delightful excitement, and tea-table gossip was spiced to suit the most credulous and marvel-loving taste, until the Moss was conquered, as conquered it was acknowledged to be, when, six months after the directors had met to vote to leave it to its original unproductiveness, they were driven over it on a smooth and secure rail to Manchester!

Another tough job was tunnelling Liverpool—excavating a mile and a third of road through solid rock. Night and day the boring, blasting, and hewing were kept in vigorous execution. Sometimes the miners were deluged with water, sometimes they were in danger of being overwhelmed by heavy falls

of wet sand from overhead. Once, when Stephenson was gone from town, a mass of loose earth came tumbling on the heads of the workmen, frightening them, if nothing more. On his return they were in a most refractory state, complaining of the dangers, and stoutly refusing to go back to work. Wasting no time on words, Stephenson shouldered a pick-axe, and called for recruits to follow. Into the tunnel he marched, and the whole gang after him. Nothing more was heard of fears, and the work went bravely and steadily on.

Besides laying out all the work, Stephenson had to make the tools. All the waggons, trucks, carriages, switches, crosses, signals, were planned and manufactured under his superintendence, besides meeting and providing for a thousand exigencies constantly occurring in a new enterprise like this, giving full scope to all the sagacity, invention, and good-humour which naturally belonged to him.

The expenses of the road were heavy, and money was not always forthcoming. If the works lagged in consequence of it, the hopes of the directors fell; so that Stephenson's energies were taxed to the utmost during the four years of the work; and he showed, what observation and history both teach us, that efficient men are men of *detail* as well as men of great plans.

Remember this, boys—for we sometimes despise little particulars and the day of small things—that the secret of effective doing lies not only in making wise plans, but in filling up the minutest parts with promptness and fidelity. There must be detail, to achieve any great and good work. If you would possess the fruits of learning, you must get them by the toil of daily drudgery. If you undertake to become rich, you must not despise the small gains and little economies by which a fortune is made. If you would obtain a noble Christian manhood, you must not neglect hourly self-restraint, watchfulness, and prayer, or the daily exercise of those humbler virtues and godly industries which make the woof of character.

Stephenson strikingly illustrated the practical force of this principle. The minutest detail of every plan in this new enterprise was thought out and carried on by himself, or under his direct supervision. Both in summer and winter he rose early. Before breakfast you might find him on a morning round, visiting the extensive workshops where the machines and tools were made; or perhaps Bobby is brought to the door, and mounted on this his favourite horse, he is off fifteen miles to inspect the progress of a viaduct—a ride long enough to whet the appetite for a tempting breakfast, one would think. But nothing tempts him from his frugal habits: he eats "crowdie"—and that made by himself—which is nothing more or less than oatmeal hasty-pudding and milk. Again he is off, inspecting the labours of his men all along the line from point to point, pushing the works here, advising there, and inspiring everywhere. Bobby is a living witness that one beast, at least, is not to be scared by a locomotive. He can face the snorting monster without so much as a shy step, or a prick of the ears. *He afraid!* not Bobby.

Returning home, pay-rolls are to be examined, perhaps, when every item of expense must be accounted for; or drawings are to be made, or directions given, or letters written.

Several young men were received into his family to be trained for engineers. A second wife—frugal, gentle, and friendly—superintended his household. Their evenings were passed in study and conversation, brightened by the genial humour of the remarkable man whose genius drew them together, and whose good-tempered pleasantries relieved the heavier tasks of mind and body. The compendium of all his instruction was,—Learn for yourselves, think for yourselves, master principles, persevere, be industrious, and there is no fear for you. It is an indication of the value of these instructions, that every young man trained under him rose to eminent usefulness. "Ah," he sometimes said, on relating a bit of his own early history, "you don't know what work is in these days." And yet work is work all the world over.

In spite of the best Stephenson could do, the directors, looking at their unproductive capital, and not fully comprehending all the difficulties to be overcome, sometimes urged greater despatch.

"Now, George," said Friend Cropper one day, "thou must get on with the railway; thou must really have it opened by the first of January next."

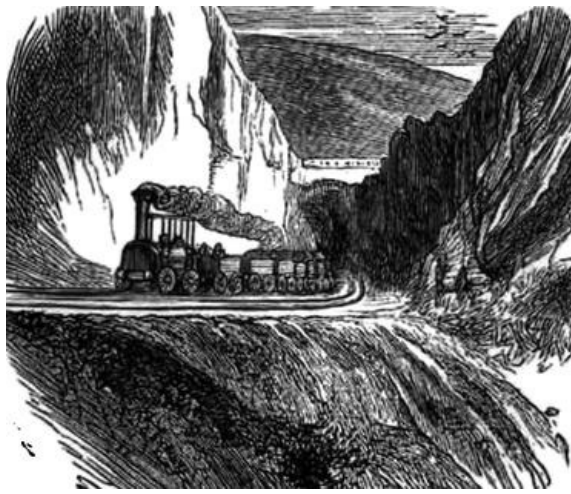
"Consider the heavy nature of the works, sir," rejoined George, "and how much we have been delayed by want of money, to say nothing of the bad weather. The thing is impossible."

"Impossible!" cried Cropper. "I wish I could get Napoleon to thee; he would tell thee there is no such word as 'impossible.'"

"Tush!" exclaimed George, "don't tell me about Napoleon. Give me men, money, and material, and I'll do what Napoleon couldn't do—drive a railroad over Chat Moss."

He might have retorted more significantly by asking the directors what *they* meant to do; for Liverpool was tunnelled and Chat Moss railed before they could agree what kind of power to put on it. There were some who insisted upon using horse-power; but the majority thought that was out of the question. Meeting after meeting was held, debate followed debate, and the whole body became more and more puzzled as the road itself neared completion.

Some kind of machine; but *what?*—ah, that was the question. You would naturally have thought, "A locomotive, of course." But no; since Parliament opposition raged against it, steam had lost ground in the public estimation, and it was very slow in getting back to favour. Locomotives, or "travelling engines," as they were called, were hid in a cloud of doubts,—and more than ever since the Parliament debates. "They were dangerous, they were frightful, they could never go fast enough,—their utmost speed would not be ten miles an hour." Some of the most distinguished engineers would give no opinion of them at all. They had none. It was certainly hard to patronize them in spite of their indifference, and possibly their sneers. Certainly, if the poor locomotive depended on their verdict, its fate was sealed.



GOOD SERVICE.

One staunch friend remained. Stephenson stood faithfully by "Puffing Billy," puffing away in his far-off Northumberland home. He never flinched advocating its principles, and urged the directors to try one on the road. They at last ordered one to be built,—one that would be of service to the company, and no great nuisance to the public. It was built, and excellent service it did, drawing marl from the cuttings and excavations to fill up the bogs and hollows. Nevertheless, it settled nothing, and convinced nobody not already convinced.

Meanwhile the directors were deluged with projects, plans, and advice for running their road. Scheme upon scheme was let loose upon them;—some engines to go by water-power, some by gas, some by cog-wheels. All the engineering science in the kingdom was ready to engineer for them in its own way; but who among all could pronounce the best way, and upon the whole decide which was the right motive power?

A deputation was despatched to Darlington and Stockton to inspect the fixed and locomotive engines employed on that road; but the deputation came back differing so among themselves, that the directors were more puzzled than ever. Two professional engineers of high reputation were then sent, who, on their return, reported in favour of *fixed engines*—for safety, speed, economy, and convenience, fixed engines by all odds; reiterating again and again all the frightful stories of danger and annoyance charged upon steam. They proposed dividing the road into nineteen stages, of a mile and a half in length, and having twenty-one stationary engines at different points to push and draw the trains along. The plan was carefully matured.

Poor Stephenson! how did he feel? "Well," he said, with the calm earnestness of a man of faith, "one thing I know, that before many years railroads will become the great highways of the world."

Could the directors accept the project without consulting him? Again they met. What had he to say concerning it? Fight it he did. He dwelt upon its complicated nature, the liability of the ropes and tackling to get out of order, the failure of one engine retarding and damaging and stopping the whole line; a phase of the matter which did not fail to make an impression. The directors were moved. The rich Quaker, Cropper, however, headed the stationary-engine party, and insisted upon adopting it. "But," answered the others, "ought we to make such an outlay of money without first giving the locomotive a fair trial?" And Stephenson pleaded powerfully, as you may suppose, in its behalf. "Try it, try it," he urged; "for speed and safety there is nothing like it." And the words of a man with strong faith are strong words. "Besides," he said, "the locomotive is capable of great improvements. It is young yet; its capacities have never been thoroughly tested. When proper inducements are held out, a superior article will be offered to the public."

Never were directors in a greater strait. There was no withstanding Stephenson, for he knew what he was talking about. All the rest were schemers. At last one of the directors said, "Wait; let us offer a prize for a new locomotive, built to answer certain conditions, and see what sort of engine we can get."

That was fair. It was right his engine should be properly tested. All agreed; and in a few days proposals were issued for the building of one. There were eight conditions, two of which were that if the engine were of six tons weight, it should be able to draw twenty tons, at a speed as high as *ten* miles an hour. The prize was five hundred pounds.

The offer excited a great deal of attention, and many people made themselves merry at its expense. The conditions were absurd, they said; nobody but a set of fools would have made them: it had already been proved impossible to make a locomotive-engine go at ten miles an hour. And one gentleman in his heat even went so far as to say that if it ever *were* done, he would undertake to eat a stewed engine-wheel for his breakfast! As that condition was fully answered, it is to be hoped that he was generously relieved from his rash promise and his indigestible dish.

More candid minds turned with interest to the development of this new force struggling into notice. Stephenson felt how much depended on the issue; and the public generally concluded to suspend their verdict upon the proper working of railways, until time and talent gave them better means of judging.

ROBERT'S RETURN—A CURIOUS ENCOUNTER—THE PRIZE ENGINE.



ne step forward; yes, a great one too, Stephenson thought. His beloved locomotive was to have a chance of being properly introduced to the great English public, and he felt that it needed only to be known to be valued. The building of it was a matter of no small moment, and he wanted, above all things, a tried and skilful hand to superintend and put into its construction every conceivable improvement. It must be the best engine yet built.

Where should he find the right man? No one would answer like his son Robert, so Robert he determined to send for. Robert, you remember, went to South America three years before. There he had regained his health, and on receiving his father's letter, he made immediate preparations to return to England.



A CURIOUS ENCOUNTER.

On his way, at a poor little comfortless inn, in a poor little comfortless sea-port on the Gulf of Darien, where he was waiting to take ship, he met two strangers, one evidently an Englishman, who by his shabby appearance looked as if the world had gone hard with him. A fellow-feeling drew the young man towards his poor countryman, and on inquiry who should it prove to be but the old Cornwall tinner, Captain Trovethick, whose first steam-carriage had awakened so much curiosity in London nearly a quarter of a century before!

He had sown his idea to the winds. Others had caught it up, cherished it, pondered over it, examined it, dissected it, improved it, embodied it, and by patient study and persistent endeavour had reduced it to a practical force. And Robert Stephenson was now on his way to inaugurate it as one of the great commercial values of the kingdom, and of the world. The poor inventor, what had he done meanwhile? While others worked, had he slept? Oh no. He had tried an easier and a shorter cut to fame and fortune. You remember he left his "dragon," as some people called his locomotive, in London, quite careless what became of it, and went scheming and speculating in other things. Several years after, in a shop window, it attracted the attention of a French gentleman passing by. He was from Peru, and had just come to England to get a steam-engine for pumping water from some gold-diggings in the New World. Delighted with the model, he bought it for twenty guineas. Taking it with him to Lima, an engine was built on the plan of it, which worked admirably. The gentleman was then sent back to England to hunt up and bring out the inventor himself. The captain was found, and came forth from his obscurity into sudden notice and demand. The gentleman engaged him to make five pumping-engines according to his model; which he did, and shipped them to Lima, the captain himself soon following.

At Lima he was received with great honours and a public rejoicing. A guard of honour was appointed to wait on him; and, in view of the wealth he was supposed to be able to engineer from their mines, a massive silver statue of him, as the benefactor of Peru, began to be talked of.

Of course poor Trovethick thought his fortune made, and no doubt looked back with pity on his humble English life. Friends at home spread the news of his successes; and when they stated that the smallest estimate of his yearly income amounted to one hundred thousand pounds, no wonder he was pronounced a success! Tardier steps to fortune seemed tedious, and many of his old associates perhaps sighed over the wholesome toil of a slower-paced prosperity.

Years passed on, and the poor captain next turns up at Cartagena, penniless and pitiable! In crossing the country, he had lost everything. Forging rivers, penetrating forests, and fighting wild beasts, had left him little else than a desire to reach England again; and Robert Stephenson gave him fifty pounds

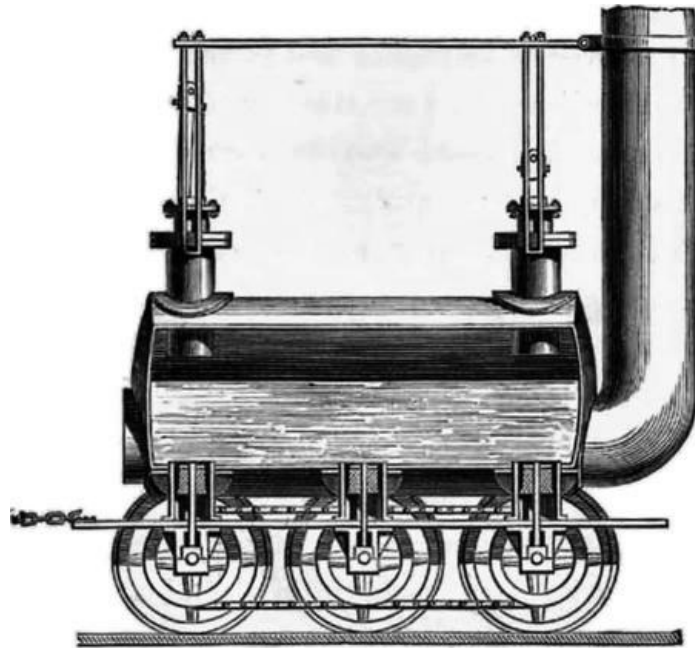
to get home with. Sudden fortunes are apt as suddenly to vanish, while those accumulated by the careful husbandry of economy, industry, and foresight reward without waste: so character is stronger than reputation—for one is built on what we are, the other on what we seem to be; and, like a shadow, reputation may be longer or shorter, or only a distorted outline of character. One holds out because it is real; the other often disappears because it is but a shadow.

Robert reached home in December 1827, right heartily welcomed, we may well believe, by his father, who was thankful to halve the burden of responsibility with such a son. To build the prize locomotive was *his* work.

Stephenson had long been a partner in a locomotive factory at Newcastle, which had hitherto proved a losing concern to the owners. There was little or no market for their article; but they struggled on, year after year, waiting for better times. Nobody saw better times but Stephenson. He saw them ahead, shooting through the gloomy clouds of indifference and prejudice. And now he calculated it was very near. So he sent Robert to Newcastle to take charge of the works there, and construct an engine that would make good all his words.

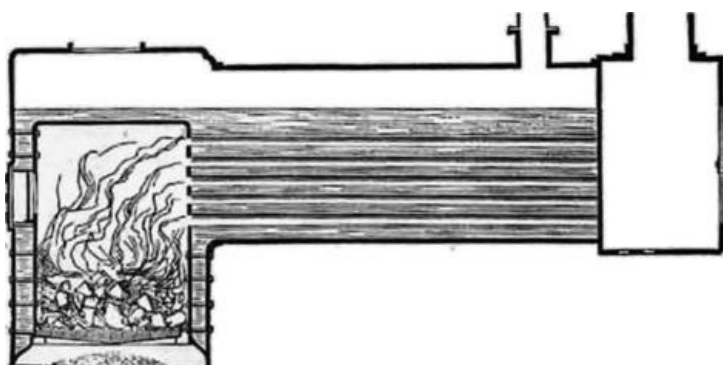
It was a critical moment, but he had no fears of the result. Robert often came to Liverpool to consult with his father, and long and interesting discussions took place between father and son concerning the best mode of increasing and perfecting the powers of the mechanism. One thing wanted was greater speed; and this could only be gained by increasing the quantity and the quality of the steam. For this effect a greater heating surface was necessary, and mechanics had long been experimenting to find the best and most economical boiler for high-pressure engines.

Young James, son of that Mr. James who, when the new Liverpool and Manchester route was talked of, was the first to discover and acknowledge George Stephenson's genius, made the model of an improved boiler, which he showed to the Stephensons. Perhaps he was one of the boys who went to Killingworth with his father to see the wonders of "Puffing Billy," and whose terrors at the snorting monster were only soothed by a pleasant and harmless ride on his back. Whether this gave him a taste for steam-engines we do not know. At any rate he introduces himself to our notice now with a patented model of an improved boiler in his hand, which Stephenson thinks it may be worth his while to make trial of. "Try it," exclaimed the young inventor—"try it, and there will be no limit to your speed. Think of thirty miles an hour!"



SECTION OF THE FIRST BOILER IN USE.

"Don't speak of thirty miles an hour," rejoined Stephenson; "I should not dare talk about such a thing aloud." For I suppose he could hardly forget how Parliament committees had branded him as a fool and a madman for broaching such beliefs.



SECTION OF A TUBULAR BOILER.

The improved boiler was what is called a multi-tubular boiler. You do not understand that, I suppose. An iron boiler is cast, six feet long, and three feet and a third in diameter. It is to be filled half full of water. Through this lower half there run twenty-five copper tubes, each about three inches in diameter, open at one end to the fire, through which the heat passes to the chimney at the other end. You see this would present a great deal of heating surface to the water, causing it to boil and steam off with great rapidity. The invention was not a sudden growth, as no inventions are. Fire-tubes serving this use started in several fertile minds about the same time, and several persons claimed the honour of the invention; but it was Stephenson's practical mind which put it into good working order and made it available. For he told Robert to try it in his new locomotive.

He did. The tubes were of copper, manufactured by a Newcastle coppersmith, and carefully inserted into the ends of the boiler by screws. Water was put into the boiler, and in order to be sure there was no leakage, a pressure was put on the water; when, lo, the water squirted out at every screw, and the factory floor was deluged! Poor Robert was in despair. He sat down and wrote to his father that the whole thing was a failure.

A failure indeed! Back came a letter by the next post telling him to "go ahead and try again!" The letter, moreover, suggested a remedy for the disaster—fastening the tubes into the boiler by fitting them snugly into holes bored for the purpose, and soldering up the edges. And it proved to be precisely what Robert himself had thought of, after the first bitter wave of disappointment had subsided. So he took heart and went to work again. Success crowned his efforts. A heavy pressure was put on the water, and not a drop oozed out. The boiler was completely water-tight.

This is precisely the kind of boiler now in use: some have fifty tubes; the largest engines one hundred and fifty.

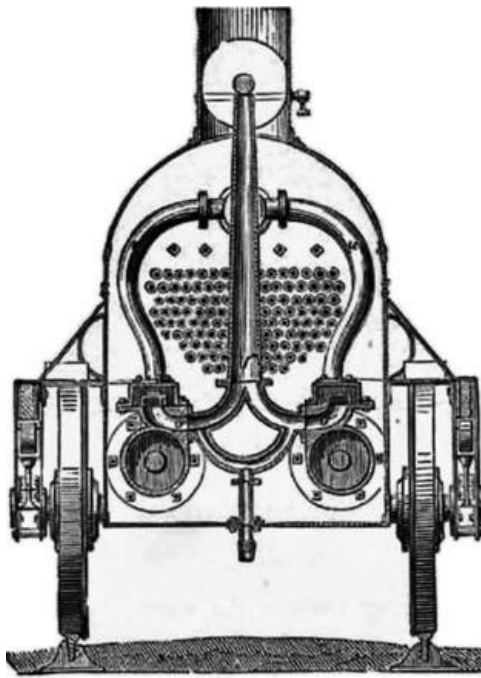


THE FAILURE.

Various other improvements were incorporated into the new engine, which, as you do not probably understand much about machinery, would not particularly interest you.

At last the new engine was finished. It weighed only four tons and a quarter—little less than two tons under the weight required by the offer of the directors. The tender, shaped like a waggon, carried the fuel in one end and the water in the other.

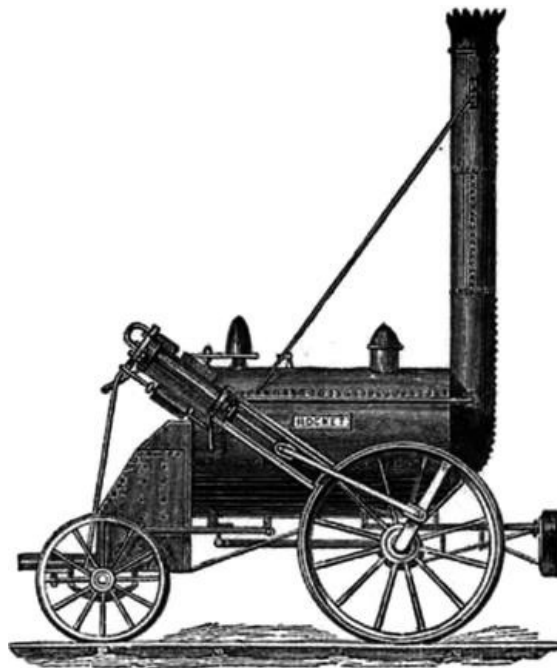
It was forthwith put on the Killingworth track, fired up, and started off. Robert must have watched its operations with intense anxiety. Nothing could have met his expectations like the new boiler. It in fact outdid his highest hopes. The steam made rapidly, and in what seemed to him then marvellous quantities. Away went a letter to Liverpool that very evening.



TUBES OF A MODERN ENGINE.

"The 'Rocket' is all right and ready," wrote the young man joyfully. That was the engine's name, "Rocket,"—on account of its speed, perhaps. "Puffing Billy" was quite cast into the shade.

It was shortly afterwards shipped to Liverpool, in good time for the grand trial.



THE "ROCKET."

The trial, rapidly approaching, elicited a great and general interest. The public mind was astir. The day fixed was the first of October. Engineers, mechanics, and scientific men, from far and near, flocked to Liverpool. The ground where the exhibition was to take place was a level piece of railroad two miles long, a little out of the city. Each engine was to make twenty trips, at a rate of speed not under ten miles an hour, and three competent men were appointed as judges.

Four engines were entered on the list,—the "NOVELTY," the "SANS-PAREIL," the "ROCKET," the "PERSEVERANCE."

Several others were built for the occasion in different parts of the kingdom, or rather projected and begun, but were not finished in time.

In order to afford ample opportunity for their owners to get them in good working order, the directors postponed the trial till October 6th. The day arrived, and a glance at the country around showed that an unusual occasion was drawing people together. Multitudes from the neighbouring towns assembled on the ground at an early hour. The road was lined with carriages, and a high staging afforded the ladies an opportunity of witnessing the novel race.

The "Novelty" and "Sans-pareil," though first on the list, were not ready at the hour appointed. What

engine was? The "Rocket." Stephenson, next on the roll, was called for by the judges, and promptly the little "Rocket" fired up at the call. It performed six trips in about fifty-three minutes.

The "Novelty" then proclaimed itself ready. It was a light, trim engine, of little more than three tons weight, carrying its fuel and water with it. It took no load, and ran across the course sometimes at the rate of twenty-five miles an hour. The "Sans-pareil" also came out.

The "Perseverance," not able to go faster than five or six miles an hour, withdrew from the contest. As the day was now far spent, further exhibition was put off till the morrow.

What exciting discussions must have taken place among rival competitors and their friends! What a scrutiny of the merits and demerits, the virtues and defects of opposing engines!

Before the appointed hour the next day, the bellows of the "Novelty" gave out; and as this was one of its merits—a bellows to increase the draught of the air-blast—its builders were forced to retire from the list.

Soon after, a defect was discovered in the boiler of the "Sans-pareil." Mr. Hackworth begged for time to mend it; as there was no time, his request could not be granted, and he too withdrew his claims.

The "Rocket" alone stood its ground. The "Rocket," therefore, was again called for. Stephenson attached to it a carriage large enough to hold a party of thirty, and drove his locomotive along the line at the rate of twenty-five and thirty miles an hour, to the amazement and delight of every one present.

The next morning it was ordered to be in readiness to answer the various specifications of the offer. It snorted and panted, and steamed over the race-ground in proud trim, drawing about thirteen tons weight. In twenty trips, backward and forward, its greatest speed was twenty-nine miles an hour—three times greater than Nicholas Wood, one of the judges, declared to be possible. Its average rate was fifteen miles—five miles beyond the rate specified for the prize. The performance appeared astonishing. Spectators were filled with wonder. The poor directors began to see fair weather; doubts were solved, disputes settled; the "Rocket" had cleared the track for them. There could no longer be any question how to run the road. George Cropper, who had steadily countenanced stationary engines, lifted up his hands exclaiming, "Stephenson has at last delivered himself!"

The two other locomotives, however, were allowed to reappear on the stage; but both broke down, and the "Rocket" remained victor to the last. It had performed and more than performed all it promised, fulfilled all the conditions of the directors' offer, and was accordingly declared to have nobly earned the prize—five hundred pounds.

But the money was little, compared with the profound satisfaction which the Stephensons felt at this public acknowledgment of the worth of their lifelong labours. George's veracity, skill, intelligence, had all been doubted, denied, derided by men of all classes. Even old friends turned against him, and thought his mind was crazed by "one idea." He had to struggle on alone; faithful to his convictions, patiently biding his time, yet earnestly pleading his cause on every suitable occasion. He had a blessing for the world; and he knew when it felt its want of it, it would have it. That time had come. The directors flocked around him with flattering congratulations. All shyness and coolness vanished. Friends were no longer few. The shares of the company immediately rose ten per cent. Men and means were at his disposal. George Stephenson was a happy man.

The "Rocket" had blown stationary engines to the winds. And Steam that day, on the land as well as on the water, took its place as one of the grand moving powers of the world.

OPENING OF THE NEW ROAD—DIFFICULTIES VANISH—A
NEW ERA.

here was no more waiting for work at the locomotive factory in Newcastle. Orders immediately arrived from the directors to build eight large engines for the new road, and all the workshops were astir with busy life. The victorious little "Rocket" was put on the road, and sensibly helped to finish it. Neither faith, nor men, nor means were now wanting, and the labour in every part went heartily on.

In June a meeting of the directors was held in Manchester, when the "Rocket" made a trip from Liverpool to that city with a freight and passenger train, running through in two hours. Chat Moss never quivered. And the directors, I dare say, would have been very glad to forget their disconsolate meeting on the edge of it, when they nearly voted themselves beaten by the bog, only Stephenson would not let them.

On the 15th of September 1830, there was to be a public opening of the road, and preparations were made at each end, and all along the way, for the grand event. The occasion awakened a deep and universal interest. It was justly regarded as a national event, to be celebrated with becoming honours. The Duke of Wellington, then Prime Minister, was present; also Sir Robert Peel, and Mr. Huskisson, whose stirring words had revived the drooping spirits of the directors after their defeat in Parliament, and whose influence had served to get their Bill successfully through at last. No one, perhaps, had watched the progress of the enterprise with deeper interest than Mr. Huskisson, or rejoiced more in the vanquishing of one difficulty after another to its final finishing. Great numbers came from far and near, who, assembling by the slow mode of travel of those days, took time accordingly.

Carriages lined the roads and lanes; the river was crowded with boats; and soldiers and constables had their hands full to keep the people from the track.



OPENING THE LINE.

The new locomotives, eight in number, having been carefully tested, steamed proudly up. The "Northumbrian," driven by George Stephenson, took the lead. Next the "Phoenix," under Robert's charge. The "North Star," by a brother of George. The "Rocket," and the rest, with their trains, followed. Six hundred persons were in this procession, flying at the rate of twenty-five miles an hour! Oh the wonder and admiration which the spectacle excited! These noble steam-horses, panting, prancing, snorting, puffing, blowing, shooting through tunnels, dashing across bridges, coursing high embankments, and racing over the fields and far away! England and the world never saw before a sight like that.

But the joy and the triumph of the occasion were destined to be damped by a sad disaster. At Parkenside, seventeen miles from Liverpool, the "Northumbrian," which carried the Duke and his party, was drawn up on one track, in order to allow the other trains to pass in review before them on the other. Mr. Huskisson had alighted, and, standing outside, was talking with the Duke, when a hurried cry of "Get in! get in!" went up from the bystanders. For on came the "Rocket," steaming at full speed. Mr. Huskisson, startled and confused, attempted to regain the carriage an instant too late: he was struck down, and the "Rocket" went over him.

"I have met my death!" exclaimed the unfortunate man; which, alas! proved but too true, for he died that evening.

A sad confusion prevailed. The wounded gentleman was lifted into the carriage, and the "Northumbrian" took him over the track home, a distance of fifteen miles, in about twenty minutes. So swiftly and easily done! The use rather than the abuse of the new power made the strongest impression.

The mournful accident threw a cloud over the occasion. The Duke wished to stop the celebration, and immediately return to Liverpool. Mr. Huskisson's friends joined with him in the wish. Others felt that Manchester should not be disappointed in witnessing the arrival of the trains, and that the accident might become magnified and misrepresented, and thus operate mischievously upon public sentiment in relation to railroads; the party therefore consented to proceed to their journey's end, but were unwilling to mingle in any of the rejoicings common to such occasions.

But the railroad needed no such demonstrations to publish or to prove its worth. It had within itself more substantial proof. Time was saved; labour was saved; money was saved. Coal, cotton, and every article of merchandise useful to men, could be carried cheaper, could be had cheaper than ever before; and, what was better, had in quantities sufficient to satisfy the industry and necessities of men. And with cheapness were combined comfort and safety. The first eighteen months, 700,000 persons were carried over the road, and not an accident happened!

But were not people frightened by the smoke, cinders, fire, and noise of the engines, as the opposition in Parliament had declared they would be? No, no. It was not long before everybody wanted land near the track; and land, therefore, near the road rapidly rose in value. The farmers who had driven the surveyors from their fields, now complained of being left on one side; and those who had farms near the station to rent, rented them at a much higher rate than ever before. Barren lots became suddenly profitable, and even Chat Moss was turned into productive acres!

In 1692, an old writer states, "There is an admirable commodiousness both for men and women of the better rank to travel from London, the like of which has not been known in the world; and that is, by stage-coaches, wherein one may be transferred to any place, sheltered from foul weather, with a velocity and speed equal to the fastest posts in foreign countries; for the stage-coaches called 'Flying-coaches' make forty or fifty miles a day."

An English paper, bearing the date of January 1775, has this advertisement: "HEREFORD MACHINE, in a day and a half, twice a week, continues flying from the Swan in Hereford, Monday and Thursday, to London."

In the Scriptures we find Isaiah, with prophetic eye, looking over the centuries to these later times and penning down: "Every valley shall be exalted, and every mountain and hill shall be made low; and the crooked shall be made straight, and the rough places plain;" and "swift passengers" are seen executing the world's affairs—no meagre description of the great means of intercourse in our day, the railway and the telegraph. The prophet saw in it a clearing of the way for the coming kingdom of the Redeemer, which is some time to spread over the whole earth as "the waters cover the sea." Men make good tools and instruments for themselves. They forget they are perfecting them for God also, who is using them, and who will use them, to make known the precious gospel of his Son, "peace on earth, and good-will to men."

What powerful preachers for the Sabbath are the railway and the telegraph, doing away with all necessity and every excuse for Sabbath travelling as they do! Long journeys and the most urgent business can be done between Sabbath and Sabbath, giving a rest-day to the nation. And this view of them is deserving of more and more regard.

The institution of the Sabbath was founded with the human race. It was meant to be the rest-day of the entire world. It was set up as a blessing: "The Lord blessed the Sabbath-day, and hallowed it." The bodies of man and beast need it. The muscles, bones, nerves, sinews, and brain cannot endure the strain of constant and uninterrupted work. It is the day for making up the waste of the animal frame caused by continual labour and excitement. Night rest is not enough. The God of Nature and of the Sabbath has fitted the one to the other.

When the knowledge of God had faded out of the earth, and he had chosen a people to restore and preserve it, besides a code of national laws particularly for them, he enacted from Sinai a code of moral laws for man. Among them was the rest-law of the Sabbath. It is the fourth commandment of the Decalogue, taught in all our Sabbath schools, pulpits, and homes: "Remember the Sabbath-day, to keep it holy: in it thou shalt do no work," man nor beast. Further, God promises a great reward to those who call "the Sabbath a delight, the holy of the Lord, honourable; not doing thine own ways, nor finding thine own pleasure, nor speaking thine own words, but delighting thyself in the Lord;" showing not only the rest-use of the Sabbath, but its soul-use, as a day of special intercourse with God.

"The Sabbath was made for man," says Jesus Christ; and the *Christian* Sabbath has incorporated into it the finishing of the great plan of our redemption, when Christ,

"Who endured the cross and grave,
Sinners to redeem and save,"

arose from the dead, according to the Scriptures. Thus it is appropriately called "the Lord's day;" the day when our worldly business is to be set aside, and when Christ presses his claims upon the hearts and consciences of men. It is a break in the hurrying whirl of this life's interests, to consider the solemn issues of eternity, and that atoning love which is mighty to save all who by repentance and faith accept its terms of mercy.

We find it was on the observance or desecration of the Sabbath that the prosperity of the Hebrew nation hung. "You bring wrath upon the nation," cried Nehemiah to the Sabbath-breaking traders. "This very profanation has been the cause of our disasters in times past." For Sabbath profanation leads to forgetfulness of God; and God left out, what becomes of man? Ruin stares him in the face. "The ungodly shall not prosper." What becomes of a nation? Ruin! They shall be left to their own doings. The French nation blotted out the Sabbath, and showed what it was *to be left of God*.

When an African prince sent an embassy to Queen Victoria with costly presents, and asked her to tell him in return the secret of England's greatness and England's glory, presenting him with a copy of the Bible, the Queen replied, "Tell your prince that *this* is the secret of England's greatness."

For all our institutions, all our civil and religious interests, we need the morality of the Bible, the conscience and the self-restraint which the Bible enjoins; and for this purpose we must vigorously support the institutions of the Bible. Foremost in the foreground is the Sabbath. It has come down to us through the ages, the great commemoration-day of a finished creation and a completed atonement, summoning men to call on the name of the Lord, and bless and praise his holy name.

On its observance the highest moral education of the people depends. Every railroad corporation is bound to be a Sabbath-keeping corporation. It *makes time enough* to do its work. The *nature* of its work demands responsible men. An immense amount of property is in its hands, requiring officers of scrupulous integrity to manage its interests. The gross receipts of eight railways terminating in London are over £200,000 a week.

It has the life and limbs of thousands upon thousands intrusted to its charge, at the mercy of its employés, engineers, firemen, brakemen, switchmen, the recklessness or unfaithfulness of any of whom may bring sudden death to scores, and plunge a nation into mourning. These men, to be *kept* the right men, need the Sabbath. To be honest, responsible, vigilant, true, God-fearing men, fit for their posts of duty, they *must have* the Sabbath.

Many roads are Sabbath-keeping. Some of those which do run on that day are poorly paid. Carrying the mail helps them out. They run, perhaps, for that purpose. But is it *necessary* to keep up Sabbath violation on our great routes in order to forward the mail? Does not the Saturday telegraph do away with that necessity? Every important item of business can be put through on the wires in time.

The side of the Sabbath is the side of God.

What became of George Stephenson and his son Robert? the boys will have the curiosity to ask.

George and Robert Stephenson took their rank among the great men of England—that class of great men who contribute to the true prosperity of the world, by giving it better tools to do its labour with. A good tool is a great civilizer. The more perfect the instrument, the better the work. The more perfect the instrument, the greater the number of persons benefited; for the sagacity necessary to invention and discovery, and the intelligence required to mature them, are large-hearted and broad-minded. They work for the many, not for the few.

The history of railways in England it is not my object to give you, and that enters largely into the remaining period of George Stephenson's life; you will find it fully detailed in Smiles's Life of him. He became rich and famous, yet he always preserved the simple habits and tastes of his early days. Though asked to dine at the richly-spread tables of lords and baronets, no dish suited his taste better than his frugal oat-meal "crowdie," and no cook served it better than himself. Kings and queens thought it a privilege to talk with him. Liverpool erected a statue of him. The King of Belgium knighted him. But he cared little for honours. When somebody, wishing to dedicate a book to him, asked what his "ornamental initials" were, "I have to state," replied he, "that I have no flourishes to my name, either before or after. I think it will be as well if you merely say, 'George Stephenson.'"

Young men beginning life often called upon him for advice and assistance. He hated show and foppery, and a weakness in that direction often got reproof. One day one came flourishing a gold-headed cane. "Put by that stick, my man," said Stephenson, "and I will talk with you."

"You will, sir, I hope, excuse me," he said on another occasion to a very gaily dressed youth; "I am plain-spoken, and am sorry to see a clever young man like you disfigured by that fine-patterned waistcoat and all these chains and fang-dangs. If I, sir, had bothered my head with these things when I was of your age, I would not have been where I now am."

Wholesome as were his reproofs, his counsel was as reliable, and his help as timely. From the mine of his own rugged experience he had gathered truths richer than grains of gold; and he never allowed any good opportunity to pass without insisting upon the practice of those homelier and sterner virtues which form the strong woof of character. When building a road between Birmingham and London, Robert walked twenty times over the entire route, illustrating the patient assiduity taught him by his father. No slipshod work could escape their eye. "*Neglect nothing*," was their motto. As a Killingworth collier he put his brains and his heart into his work. As a master-builder he put his conscience into it. All his work was honest, representing the actual character of the man.



WHOLESOME REPROOF.

When the rough and tumble of life began to subside, and he became a more stationary engine, with greater leisure for the enjoyment of his now ample home, his old love of birds, dogs, horses, and rabbits revived. There was not a bird's nest upon his grounds that he did not know, and he often watched the nest-building operations with a builder's interest; a blade of grass, a bit of bark, a nest of birds, an ant tugging for one poor grain, were all to his mind revelations of the wonderful mechanism and creative power of God.



LATER DAYS OF GEORGE STEPHENSON.

He died in August 1848, in the sixty-seventh year of his age.

Robert proved himself worthy of such a father. They were alike in character, intimately associated in the great engineering enterprises of their day, and bound to each other by the fondest affection.

George built roads, Robert bridges to run them over; for railroads have given birth to the most stupendous and splendid bridges the world ever saw. The famous Tubular Bridge over the Strait of Menai—connecting Holyhead with the mainland—and the High Level Bridge at Newcastle, built by him, are monuments of engineering skill. You often see pictures of them. The most remarkable work of his genius, however, is on the other side of the Atlantic Ocean.

It was desirable that the Grand Trunk Railway of Canada, terminating at Montreal, should be connected with the sea-board; and the road was accordingly extended from Montreal to Portland, Maine. But the river St. Lawrence, deep and broad, sweeping down its mighty current the waters and ice of the great lakes, broke the line and separated the road into two parts. The river must be spanned. A bridge must be built. It was a stupendous undertaking, but "Robert Stephenson can do it." Robert Stephenson did do it. It is thrown from Languire to a point half a mile below the city, a distance of nearly two miles. It is composed of twenty-four spans, and has three million feet of solid masonry in it. The road runs through iron tubes, sixty feet above the river, and the train is nine minutes going across. There are ten thousand tons of iron in the tubes. It was six years in building. It is called the Goliath of bridges; and is named the Victoria Bridge, in honour of Queen Victoria.



VICTORIA BRIDGE, MONTREAL.

Robert drafted, calculated, estimated, and superintended section after section of this immense work, and yet never visited the scene of labour! photographs were sent him of its progress step by step. It was finished December 1859, and opened with all the festal honours possible in that season of the year. At the entertainment given there was one toast—"Robert Stephenson, the greatest engineer the world ever saw"—followed by no cheers. A deep hush swept over the assembly.

For Robert Stephenson was dead. He died on the 12th of October, two months before the completion of the work, in the rich prime of a noble manhood. His death was looked upon as a public calamity; and England, with a true sense of his worth, laid him side by side with her most honoured dead. He was buried in Westminster Abbey, with her kings and queens, her princes and poets, her warriors and statesmen. The funeral procession was between two and three miles long; thousands lined the streets, and thousands pressed into the Abbey. Tickets were necessary in order to get entrance; and one of the most pressing applicants was an humble working-man, who years before had driven the first locomotive-engine from Birmingham to London, with Robert Stephenson at his elbow.

The humble Newcastle collier-boy crowned his life with honourable toil; and at his death a nation mourned a great man fallen.

THE STEPHENSON CENTENARY—HONOUR TO
WHOM HONOUR IS DUE.

George Stephenson was born on the 9th of June 1781.

The year 1881 was therefore the hundredth since his birth,—completed "the centenary;" and it occurred to many thoughtful and influential persons as a right thing to do that it should be marked by some special mode of public celebration. For the man born just one hundred years before had done a great work in his day; a work the full benefit of which we are only now beginning to enjoy.

England is not ungrateful to the memory of her distinguished sons, and keeps many anniversaries with a good deal of pomp and circumstance. She does not forget a Shakespeare and a Burns, or a Wellington and a Nelson; she loves to remember the establishment of the first printing-press, and the victories at Trafalgar and Waterloo. Such being the case, it cannot be denied that there was a peculiar fitness in her doing honour to "the Father of Railways,"—to the man whose successful patience, energy, and courage have so largely added to the national wealth and developed the national resources.

A century ago, when Stephenson was born, no one had dreamed of or imagined such a thing as railway traffic. That great idea was reserved for the brain of the son of a colliery engine tender; and we have seen in the foregoing pages under what discouragement, and in the face of what colossal difficulties, he conceived and carried it out. The steam-engine in use in his youth and manhood was a crude, awkward, and disjointed affair, always coming to grief, and incapable of any important work. The locomotive, as Stephenson found it, was nothing more than a clumsy stationary engine put on a clumsy truck, which rattled and shook as it crept along at the rate of four miles an hour, so that every moment it seemed about to tumble to pieces. And the railway on which it ran was not less imperfect; it was nothing more than a system of light thin rails, which rested, or at least were intended to rest, upon blocks of stone or rough wooden sleepers.

Stephenson, as we have seen, resolved upon reforming all this. He soon improved the track, giving it greater solidity and firmness; and then he turned to the engine, which he continued to perfect almost to the day of his death. There was much in the circumstances of the time to stimulate his activity. The coal trade was increasing largely, and those engaged in it were anxious to send their "black diamonds" over the country with all possible speed. They could no longer tolerate engines that rattled and jolted to and fro at the rate of only four miles an hour! They were ambitious, and wanted a speed of ten miles. Well, we know what Stephenson did: he invented an engine that attained fifteen miles an hour; and then, unrelenting and unrelaxing, he addressed himself to the task of extending—or, rather, creating—our railway system.

He succeeded: and now there are eighteen thousand miles of railway in England;^[1] and our ordinary trains make thirty miles, our express trains fifty and sixty miles an hour; and millions of men and women travel where formerly only hundreds went; and journeys that occupied a day and a night, like the journey from London to Exeter, are accomplished in half-a-dozen hours. Why, we leave London at ten, and reach Edinburgh at seven the same evening; a journey which, when Stephenson was born, could not be performed under a couple of days and nights!

¹: At the close of 1880 there were 17,700 miles, employing 300,000 persons, and 13,174 locomotives. In this vast net-work of iron roads a capital of not less than £70,000,000 is sunk, yielding an annual return of £30,000,000. Upwards of 600,000,000 journeys are made on the average every year.

So marvellous a tale reads like a romance from some Eastern fairy-book. Yet it is literally true, and the work has been done in the sight and memory of thousands of living men. Was it not a work which deserved "a centenary"?

And the man: did *he* not deserve it? If ever indomitable perseverance merited public applause, it was that of George Stephenson. We will say nothing more of the trials and labours of his early years; but even after he had made his engine, and undertaken to construct the first English railway, what obstacles he had to conquer, what difficulties to surmount! Both Houses of Parliament were against him; the world was against him. People were horrified at the thought of "turning the locomotive loose on the country." They drew dreadful pictures of the evil it would do. Families sitting by their own firesides, it was said, would not be safe. A runaway engine, twenty tons in weight, would dash through a whole line of houses, toppling them down one after the other like houses built of cards. How was such a monster to be controlled? A screw loose, or a wrong turn of the handle, and it would bound out of the control of its driver. Then, again, others would ask, who wanted to travel more than ten miles an hour? Who wanted to rush through the country at a rate which would take away the breath? Was it not "flying in the face of Providence"? Moreover, these new "trains" were to start exactly to the minute, and what could be more inconvenient? "It was the regular thing in those days to keep the carriage and four a whole hour waiting at the door, till every room of the house had been gone through several times to see that nothing was left behind."

But Stephenson was not to be daunted. Possessed with one great thought, he kept to it manfully, and laboured day by day and night by night with unsurpassable energy. Such a man—the author of so great a work—surely deserved a centenary.

And a noble centenary it was. Both at Newcastle and at Chesterfield—the two towns with which Stephenson was most closely connected—the day was observed as a holiday, and thousands took part in the different ceremonies.

At Newcastle, the streets of which were gaily decorated with tall Venetian masts covered with red cloth, and each surmounted by a trophy of flags,—with ornamental mottoes, wreaths and festoons of glossy foliage, and a brave show of banners and garlands, there was a grand procession of modern railway engines, which started from the Central Railway Station, and proceeded, amidst the cheers of thousands, to Wylam, George Stephenson's birth-place, eight miles distant. These engines, sixteen in number, were the finest modern science could construct: some of them had driving-wheels six feet in diameter, and outside cylinders which measured in diameter nearly a foot and a half. How bright they were with their shining copper and polished steel, and how the sunlight flashed from them as, linked together, they rolled along the iron way! On reaching Wylam they were placed for exhibition along with the five old original locomotives—namely, the Killingworth (the first that Stephenson ever made), the Hatton Colliery engine, the old Darlington engine, No. 1 Locomotive from Darlington, and Stephenson's old "Victor" from the North-Eastern Railway.

A special train followed, carrying the Mayors of Newcastle and other towns, with many persons of local celebrity. Opposite George Stephenson's birth-place it stopped; the Mayor of Newcastle alighted with his friends, and in honour of the day planted an oak-tree. The return journey was then made, and the engines we have named were thrown open to public inspection.

The next event was a procession of members of the corporations, public bodies, trade societies, and workmen of Newcastle, Gateshead, Jarrow, and South Shields, together with the miners of Northumberland and Durham—some 40,000 altogether—who, through the garlanded and bannered streets, marched to the town moor. There three platforms had been erected, from which the various trade representatives delivered appropriate addresses.

In the evening a grand banquet took place, at which the Mayor of Newcastle presided; and the day's festivities concluded with a brilliant display of fireworks.

At Chesterfield the public rejoicings, if necessarily on a less extensive scale, were not less cordial. Of course, there was a procession; there was also a special choral service in the parish church; and we read of a banquet, a concert, and a fireworks finale.

But all this was temporary,—belonged only to the day, and with the day passed away. So it was resolved to raise funds for the establishment of a permanent memorial, which, it is to be hoped, may be in existence, active and prosperous, when a bi-centenary and a tri-centenary in their turn come round. This will be a "Stephenson College of Physical Science," to be erected at Newcastle, at a cost of £20,000. And a Stephenson Scholarship Fund is also being raised, which will place the higher education within the reach of youths of Stephenson's social rank imitating Stephenson in his perseverance, energy, love of knowledge, and patient industry.

Transcribers note.

Spelling, Punctuation and Hyphenation have been kept as the original.

*** END OF THE PROJECT GUTENBERG EBOOK THE ROCKET: THE STORY OF THE STEPHENSONS, FATHER AND SON ***

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