HISTORY OF RAILROADS

FROM GEORGE STEPHENSON'S TIME DOWN TO THE PRESENT DAY.

The Beginnings of What Is Now One of the Most Important Factors in Modern Civilization—The Primitive Locomotive and Its Present Successor.

The story of George Stephenson's life affords one of the most striking and worthy examples of a self-made man, and the history of the marvelous enterprise which he evolved should be more than interesting to the vast number of people who are daily employed by, and others who, directly or indirectly, are dependent for a livelihood on our railways, whilst the thousands who daily enjoy our improved mode of traveling cannot fail to recognize their indebtedness to one whose noble character and praiseworthy perseverance should prove a stimulus to the youth of the present day to emulate his industry, thoroughness and thrift.

Newcastle-upon-Tyne will ever be justly and deservedly proud of the names of George and Robert Stephenson, and it is so closely identified with the early history of the railway system that I think it well to cherish in our midst the memories of those men whose names will always be associated with the commencement of that gigantic enterprise, which has done so much to enhance the great social, commercial and political interests of the country.

STEPHENSON'S ORIGIN.

In the quiet and secluded village of Wylam, in a lonely, humble and isolated cot, which I visited a short time ago, we identify the birthplace of George Stephenson, the colliery boy, who has made the world his debtor and made himself the benefactor, not only of individuals, but of nations. He was born on the 9th of June, 1781, about the time when Lord Cornwallis was shut up in Yorktown by Washington, and the American colonies were finally severed from the British empire. His first employment was that of a herd boy at two pence a day. But we will leave him during his earlier days attending the cows on Widow Ainslie's farm, birdnesting and modeling his clay engines by the side of Dewley Burn. His highest ambition was to be employed at one of the neighboring collieries, and his parents being poor we soon find him accompanying his father thither, where he started work as a "picker," to clear the coals of stones and dross, at six pence a day. Shortly afterwards he was engaged to drive the "gin" at Black Callerton colliery, and at fourteen years of age he was appointed assistant fireman to his father at Dewley. He was eighteen years of age before he learned to read, but there were no board schools in those days, and the disadvantages under which he labored, the many difficulties he had to contend with, and the dearth of means all tend to increase the credit due to him for the indomitable perseverance and determination with which he accomplished that task. This undauntedness was the characteristic feature of his life; it showed itself conspicuously in the persistent manner in which he so frequently was found taking his engine to pieces for the purpose of examining it and mastering its details. It also showed itself in another and very different form in the commendable way in which, when pressed to it, he fought and vanquished Ned Nelson, the colliery bully, at Black Callerton. Nelson left his work for a whole week to go into training, whilst Stephenson continued at his work as usual until the evening of the day appointed for meeting his challenger, when he very coolly and unconcernedly gave him a thrashing which he justly deserved, and no doubt afterwards profited by. There was no cowardly resourse to the pistol or the knife.

HIS MARRIAGE AND EARLY INVENTIONS.

On the 28th of November, 1802, he was married in Newburn church to Frances Henderson, to whom he was devotedly attached. I have visited the church, have examined the parish register, and seen both their signatures. Whilst living at Willington quay, on the banks of the Tyne, and working as a brakesman at the Ballast Hills, his only son, Robert, was born on the 6th of November, 1803. The Stephenson memorial schools are now erected upon the site where the house stood, and I have been afforded an opportunity of looking through those schools, and been privileged to examine a very neat model of the house in which George Stephenson lived and spent a great deal of his spare time in futile efforts to discover perpetual motion. Doubtless the efforts made in this direction, though unsuccessful in attaining the object desired, contributed in no small degree to mould and develop and strengthen his natural mechanical genius. He astonished the pitmen by attaching an alarm to the clock of the watchman, whose duty it was to call them early to their work [illegible] of the things, and gained the favor [illegible] by connecting the crank [illegible] with the [illegible]ke-jack and making it self-acting. He invented a lamp that would burn under water, it being supplied with air by means of a tube from the surface, taking this lamp into [illegible] used his friends by night, and the fish being [illegible] pond at [illegible] by the subaqueous illumination [illegible] quickly attracted [illegible] afforded considerable sport. [illegible] after the birth of his son his wife [illegible] he thus sustained a loss which [illegible] heavily upon him. He soon afterwards accepted the care of an engine at Montrose, and at this time he also had a strong desire to emigrate to America, but fortunately for his own country he was too poor to satisfy his longing to go abroad. He performed the journey to Montrose and back on foot. On his return he was drafted into the militia, and nearly all the money he had earned was spent in procuring a substitute. It was only whilst acting as brakesman at the West Moor colliery at Killingworth that his superiority as a workman became known and his abilities as an engineer recognized. A new pit was being sunk in the neighborhood called the High pit, and after the works had proceeded for some time all further progress was stopped by the men being drowned out. After altering the engine at the pit so as to make it pump up water, which had hitherto prevented the men working and entailed upon the owners great expense and loss, he was appointed engine-wright, and his fame soon begun to spread abroad. It was here that he, in conjunction with his son Robert, made the sun-dial which he always took such great pride in pointing out to visitors. I saw it not long ago; it still stands over the cottage door where he lived whilst working at Killingworth. In this cottage Stephenson invented the "Geordie" safety lamp, so valued by the colliers, and under the same roof he designed the locomotive which has revolutionized the world.

MAN OF NOBLE NATURE AND HERCULEAN STRENGTH.

He was a man of noble nature and Herculean strength, possessed of a vigorous intellect, with original and expansive ideas. He at once realized the great advantages accruing from a sound education, and soon determined that his son Robert should not feel the same want which he had done, and accordingly appropriated what he could spare from his hard earnings at the colliery, together with what little he made in the evenings by repairing shoes and mending his neighbors' clocks and watches, to the education of his son, in order that he might not feel at the same disadvantage with his contemporaries that he felt he had been himself. He was never idle, but by close attention and keen observation constantly and assiduously applied himself to acquire a knowledge of mechanics and facts which formed the substratum of that power which enabled him so successfully to grapple with more important and momentous undertakings in after life. During the time Napoleon, with his army, was overrunning Italy, and by his numerous and brilliant victories exciting the enthusiasm of France and astounding the whole of Europe, while Nelson was proving the prowess of the navy on the sea, and Moore and Wellington were asserting the supremacy of their arms in the field, young Stephenson was quietly working and preparing to embark in a new enterprise destined to overrun the world with good, and to prove even more powerful than the sword in spreading civilization, more potent than despotism in effecting reforms.

EARLY ATTEMPTS.

Already numerous attempts had been made by various persons to adopt the steam engine for purposes of locomotion, but each singularly failed until the inventive genius of George Stephenson showed itself in a locomotive which he built at the West Moor colliery, and placed on the railway at Killingworth, on the 27th of July, 1814. It, however, worked but indifferently until the application of the steam-blast doubled its power and effected considerable saving in the cost of working. It was at this time that the fate of the locomotive was decided, and its supremacy over horse-power established, though there was yet much room for improvement, and the inventor continued to watch its working with eager anxiety, which resulted in each one he constructed being marked by improvement in design and an increment of power.

He also made frequent experiments in estimating the resistance by friction and gravitation which the engine with its load had to overcome, and was induced to alter the laying of the rails and the construction of the wheels so as to diminish it as much as possible and attain a far greater speed. Though there was still a prejudice against the adoption of the locomotive, it continued to work successfully and economically, and it is a strange fact that eight years elapsed before the construction of another railway for the transit of coal, and that was the Hetton railway, about eight miles in length, which was opened amid great rejoicings on the 18th of November, 1822. It was constructed under the superintendence of Stephenson, and intended to carry the coals from that rich colliery to the staithes on the Wear, near to Sunderland.

TIMOTHY HACKWORTH.

No doubt some important improvements in the locomotive must always be associated with the name of Timothy Hackworth, who was a natural and true mechanic of undoubted inventive genius, to whom the world is perhaps more indebted and owes more gratitude and honor than has often been ascribed to him. He was truly one of the pioneers of the railway locomotive, one of those who had to battle in comparative darkness, unaided by experience and unassisted by the light which science and mechanical knowledge have since shed abroad. Hackworth was Stephenson's most able and worthy contemporary and successfully introduced many improvements in the locomotive and was the first to adopt the more modern and sightly form. The importance of finding a new and more extensive market for the disposal of the coal from the collieries in the South Durham coal fields had for a long time been engaging the attention of certain gentlemen in that district. Some advocated making a canal from West Auckland to the river Tees, below Stockton. The objections to this scheme were manifold; the levels required for the locks necessitated a much longer route, and doubtless the difficulty of working them during the severe frosts in winter was not amongst the least of the objections set forth by its opponents; whilst the immense difference in expense was greatly in favor of the construction of a railway or tramroad.

Foremost amongst those in favor of a railway was Edward Pease, of Darlington. Through his perseverance and influence with his friends and relations a company was formed, the preliminary surveys made, and an application made to Parliament for an act to sanction the laying of a tramroad between Witton Park and Stockton. This act was, however, lost, chiefly through the influential opposition of the Duke of Cleveland, Earl of Darlington, owing to the proximity of the projected line to one of his fox covers. Another session was lost through the death of George III; whilst Parliament was assembled in 1820.

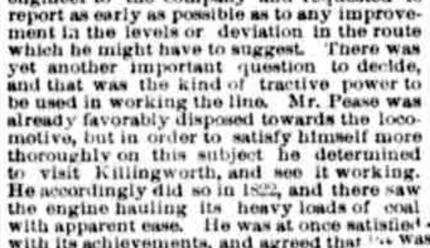
THE FIRST PUBLIC RAILWAY.

But the promoters of this line were men of a character not easily to give in or succumb to the first defeat, and accordingly to Parliament they went again. Their efforts were this time rewarded with success, the bill passed, and the royal assent was given to the Stockton & Darlington railway, the first public railway in the world, on the 19th of April, 1821.

The opposition, both in and out of Parliament, was powerful and varied, and not without effect in increasing the difficulties and retarding and delaying the object of the promoters. A little time after the passing of this act George Stephenson, in company with his friend Nicholas Wood, called on Edward Pease in Darlington, and offered his services in constructing the new line. So pleased was Mr. Pease with his appearance and outspoken manner, and so favorably did the two impress him with their account of the working of the locomotive at Killingworth, that he undertook to bring his application before the directors, and so ably did he support it that George Stephenson was appointed engineer to the company and requested to report as early as possible as to any improvement in the levels or deviation in the route which he might have to suggest. There was yet another important question to decide, and that was the kind of tractive power to be used in working the line. Mr. Pease was already favorably disposed towards the locomotive, but in order to satisfy himself more thoroughly on this subject he determined to visit Killingworth, and see it working. He accordingly did so in 1822, and there saw the engine hauling its heavy loads of coal with apparent ease. He was at once satisfied with its achievements, and agreed that it was the best and easiest method of conveying heavy loads from one place to another, and he pleaded its merits with such admirable tact that it was decided to give it a fair trial, and the second act for the Stockton and Darlington railway, obtained in 1823, contained a clause empowering the use of locomotive engines for the conveyance of passengers as well as merchandise.

MAKING THE FIRST ROAD.

Soon after his appointment as chief engineer George Stephenson removed from Killingworth to Darlington, and at once proceeded in a business-like manner to make the line, with his son Robert and John Dixon as his assistants. With occasional opposition, and after numerous obstacles were overcome and many difficulties surmounted, it was at length satisfactorily completed; and amidst the prejudice of its opponents, the great anxiety and eager expectation of its supporters, and with becoming stir and rejoicing on the part of those interested, was duly opened for public traffic on the 27th of September, 1825. That day marks an epoch in the history of the world from which date future events.



There is an erroneous idea prevalent in America, due, doubtless, to some anachronism in record, that the Liverpool & Manchester was the first railway built. It was *not*. The celebration of the jubilee of the opening of the Stockton & Darlington railway took place in the quiet "Quaker town" of Darlington, on the 27th and 28th of September, 1875, and was on a scale of grandeur and magnificence which became the greatness of the occasion. Representatives of all the principal railways in the world were present.

Darlington will always be known as the birthplace of railways, and must ever be prominently chronicled in the page of railway history, and the honored name of Pease as well as Stephenson, will always be interwoven with early records of the marvelous enterprise which they so fondly fostered and worthily helped to mature. May she long continue to be proud of her position, and hand down to posterity, gilded on her escutcheon, and defended by truth, the names of those men who bore the heat and burden of the day during the many vicissitudes which beset the railways when struggling into existence. In the quiet burial grounds at Darlington there lies more of the dust of the railway pioneers than in any other place on the face of the globe.

THE SECOND PUBLIC RAILWAY.

The Liverpool & Manchester was the next public railway that was made. Constant delays in the transport of goods, and consequent interruption to trade had awakened the manufacturers of Manchester and the merchants of Liverpool to the necessity and importance of seeking increased and improved means of communication between those thriving towns. Though the opposition was even fiercer than in the case of the Stockton & Darlington line, the projectors eventually succeeded in carrying a bill through Parliament, and the works were undertaken by Mr. Stephenson. One of the most prominent and interesting amongst the difficulties was that of carrying the line over Chat Moss, a treacherous floating bog about four miles in length and thirty-five feet in depth. It was on a section of the line under the care of his assistant, John Dixon, who afterwards became consulting engineer to the Stockton & Darlington company, and to whose humorous and instructive anecdotes it has often been my privilege and pleasure to listen. The tunnel at the Liverpool end and the viaduct over the Sankey Valley were also formidable undertakings in that day.

STEPHENSON PERSECUTED.

The works were all satisfactorily completed, and the railwry was opened with great eclat on the 15th of September, 1830, a day unfortunately marred by the melancholy accident resulting in the death of Mr. Huskisson, one of the principal promoters of the line. In Parliament Stephenson was ridiculed, abused and insulted both by counsel and committee, and his sanity was openly questioned. On the ground he was threatened and even molested, and at times his work was actually stopped by the prejudiced populace, and it was only by stratagems suggested by the undaunted courage and characteristic determination of the man that he was enabled to complete his survey, portions of which had to be done by aid of a lamp during the night. I have heard the late Mr. Dixon speak with pride of the success which attended this enterprise. During the construction of the line a large number of the directors were in favor of working it with stationary engines, and strenuously opposed the adoption of the locomotive, and when Stephenson thought the great scheme of his life about to be crushed, he observed to his son, "matter gives me no trouble; I can bend it to my purpose; it is mind which is my great difficulty. I cannot engineer that." Yet he afterwards succeeded in overcoming this difficulty, and the universe now yields to his early conviction of the future supremacy of the locomotive.

RAILWAYS IN DEMAND.

Prior to the opening of this railway all the heavy goods were conveyed between Liverpool and Manchester by means of three canals, and the passengers by ordinary stage coaches. The capabilities of the locomotive became more and more apparent as the prejudice which it at first evoked disappeared, and its utility and superiority as a motive power were obvious to the most indifferent and casual observer. Railways became in great demand, and even the most sanguine expectations of Stephenson were more than realized. All the principal manufacturing and seaport towns became connected by these iron roads; the North was joined to the South, and the East exchanged commodities with the West. They now spread like a vast network over the whole island. They have given an impetus to trade and a stimulus to commerce; they have increased our shipping and extended our docks; they have multiplied the number of our collieries and brought into requisition vast numbers of rolling mills and iron furnaces; they have raised up towns and created new works; they have opened out our mines and our quarries; they have brought the manufacturers into closer communication with the merchant; they save time and thereby make money; they have benefitted the agriculturalist and enhanced the value of the land whose owners first opposed them; they assist us in war and they help to preserve peace; they have improved our postal arrangements and developed our telegraph system; they give employment to hundreds of thousands, and they benefit millions.

May not we then truly say?

Lay down your rails, ye nations near and far,
Yoke your full trains to steam's triumphal car,
Link town to town, and in these iron bands
Unite the strange and oft embattled lands.
Peace and improvement round each train shall soar,
And knowledge light the ignorance of yore;
Men joined in amity shall wonder long
That hate had power to lead their fathers wrong,
Or that false glory lured their hearts astray
And made it virtuous and sublime to slay.

Amongst the numerous lines that were subsequently made, some of the largest and most formidable were constructed by George and Robert Stephenson. They both became eminent engineers, were much sought after, undertook heavy responsibilities, and amassed considerable fortunes. *Labor omnia vincit* was undoubtedly and unmistakably the insignia inscribed on their banner, and their works most gracefully illustrate and faithfully prove the truthfulness of the motto.

The first railway built in the United States was in Pennsylvania between Honesdale and Seelyville, connecting the waters of the Delaware and Hudson canals. On August 8, 1829, the locomotive "Stourbridge Lion" built at Stourbridge, in England, for the Delaware and Hudson canal company, and brought over by Horatio Allen, was first set in motion by that gentleman. I had the pleasure of meeting and hearing Mr. Allen speak at the Railroad Exposition in Chicago in 1883. He is now 84 years of age.

THE BELGIAN RAILWAYS.

George Stephenson was consulted in laying out the Belgian railways; he was interviewed by the king and made knight of the order of Leopold in 1835; a similar honor was conferred upon his son in 1844. "Seest thou a man diligent in his business he shall stand before kings." In 1845 he was engaged to report as to the feasibility of the proposed Royal North of Spain railway from Madrid to the ports in the Bay of Biscay, Corrunna, Ferrol and Bilboa, but his report being unfavorable to the scheme it was ultimately abandoned. When engaged with his survey amongst the Spanish mountains he suffered hardships and caught cold, and whilst hastening to England he was seized with an illness which severely shook his already overtaxed constitution. George Stephenson was never ashamed of his humble origin. When on a visit to the North many years after he had won his laurels and raised himself to affluence, he one day observed to a friend: "I've been to Callerton, and I've seen the fields in which I used to pull turnips for two pence a day, and many a cold finger, I can tell you, I had." The same gentleman, referring to his having drank tea with him in his cottage at Killingworth, Stephenson remarked: "I built the oven in that cottage with my own hands, and now if I write a letter I get ten guineas for it, and if I give my opinion about a projected railway I receive 100 guineas." Upright and just in all his undertakings, his every action betokened greatness. He was noble both in thought and deed. He was of mild and genial disposition, with a cheerful countenance and pleasing manner; generous, free and open-hearted, with ever a kind word for those employed under him, all of whom readily recognized and acknowledged his power to control and direct them. Homely in habit and affectionate in disposition, he always gave kind advice to those who needed it, and always had a cheering word of encouragement for those in trouble; though he never failed to bestow blame or praise where due. By his kind words, and still kinder actions, he won the hearts of all; and was esteemed and respected alike by high and low. No man deserved more or sought less honor than he. The strong love for birds and animals evinced in his youth never forsook him, and latterly he took great pride and interest in the study and pursuit of horticulture.

INTEREST IN MECHANICS.

He took a lively interest in promoting and supporting mechanics' institutes, an interest no doubt stimulated and intensified by recollections of the great need he had felt for similar institutions during his early struggle to feed his insatiable longing for knowledge. He was several times offered knighthood by Sir Robert Peel, which he always modestly refused. He lived to see the railways become the king's highway, as he prophesied they would do, and died at his residence, Tapton House, on the 12th of August, 1848. He is buried in Trinity church, Chesterfield. The mantle of grief thrown over his remains was covered with the honors of a grateful and admiring people.

His name is writ on history's page,
And age shall proudly tell to age
The triumphs that he won.

STEPHENSON'S CENTENARY.

The 9th of June, 1881, was the centenary of his birth, when due honor and respect was paid to the memory of a great man, whose reputation needs no eulogy, the benefits of whose genius we will enjoy and the fruits of whose labors are daily increasing and extending. It is as the practical author and founder of the railway system that the name of George Stephenson is honored. In endeavoring to establish an improved means of communication between one place and another, which he foresaw was going to be the grand achievement of the locomotive, he was deserted by the profession of engineers, and he stood alone to plead its cause. But he feared not the result of his convictions. Alone he faced the ridicule of council and committee; he was jeered at and bantered by men whose education and professional knowledge no doubt afterwards caused them to blush when they found that the self-taught colliery boy was right and they were wrong.

Stephenson had an object in view which he attained; he prophesied results which have been accomplished. He fought the battle of the locomotive against overwhelming odds; he dispelled the fears of the public, averted the objections of his opponents, and obliterated the prejudice against railways with the same ease with which he leveled the hills or bridged the ravines which menaced their construction; and it is because of the successful outcome of his labors, the triumphant issue of his undaunted courage and faithful pursuit of his object that the name of George Stephenson will be borne on the wings of civilization to every new country that is subdued, as the railways open out and develop the various resources, and as the locomotive heralds the dawn of brighter times, the opening of fresh fields of labor, and proves the harbinger of commerce, enlightenment and continued prosperity.

HIS SON'S IMPORTANT WORKS.

Of his son Robert Stephenson's colossal works, some of the most important are the border viaduct over the River Tweed at Berwick; the Conway and Britannia tubular bridges over the Menai straits; the Victoria tubular bridge, about two miles in length, through which I have often crossed the St. Lawrence river at Montreal; and certainly, not least, his conception and design of that masterly and massive structure, the High Level bridge at Newcastle-on-Tyne. These I consider to be more fitting, more lasting and appropriate monuments of his skill than either the chisel of the sculptor or the pencil of the artist could possibly produce. He also constructed the railway between Alexandria and Cairo, in Egypt, 140 miles in length, and on which there are many engineering works of the most difficult character, including two tubular bridges, one over a branch of the Nile at Benha and the other crossing a very large canal at Birket el Sabre. The main line is intersected by the Nile, on which he constructed the largest steam ferry in the world, by means of which the entire train was carried across the river. The ferry is now superceded by a bridge designed by Robert Stephenson, in which there is the largest swing bridge ever built. Since the unfortunate and melancholy collapse of the Tay bridge, the Victoria one at Montreal may be considered the longest viaduct in the world.

Robert Stephenson was offered knighthood by Earl Grey, but politely declined the honor. He was president of the Institute of Civil Engineers, London, during the years 1856 and 1857. He was an M. A. of Durham university and D. C. L. at Oxford. He became M. P. for Whitby in 1847, and held the seat until the time of his death. He died in London, a comparatively young man, on the 12th of October, 1859. His country learned and acknowledged his great worth, and he now sleeps amongst the illustrious of England's dead within the sacred precincts of Westminster Abbey. The sterling qualities of the father were mirrored in the character and career of the son, and are reflected in the pages which record the history of both.

THE EARLY DAYS OF RAILROADS.

When the first railway was opened the public was far from seeing its importance. Of all the great revolutions of the age the greatest is that which began at Darlington in 1825. Turnpike roads and canals are alike antiquated; even the Mississippi and the St. Lawrence, much more the Ohio, the Danube or the Ganges, have lost or are losing their importance as highways of trade; and travelers in civilized countries hardly ever dream of spending a single day on the roads of fifty years ago. As regards men of business, the old stage coach has long since sunk into desuetude, though, perhaps, to the followers of Mr. Ruskin, to pleasure-seekers and those to whose energies the world is in no way indebted for any advancement, improvement or benefit, it may possibly yet be a preferable mode of conveyance. By our improved mode of traveling we are freed from the dangers of the highwayman, and are protected from the inclemency of the weather; we are enabled to journey much greater distances in considerably less time; we can admire a far greater extent of country, and are afforded more frequent opportunities of change of air. Thus we gain health, enjoyment, comfort and time.

The primitive looking engine, with its top gear, built at Killingworth in 1814, is now superseded by the majestic looking machine so familiar to us to-day. A locomotive with its tender then weighed only ten tons; some of our more modern ones weigh as much as 75 tons. It was then feared that the locomotive could not be built powerful enough to draw a load up an incline of 1 in 300—they now haul heavy loads up a gradient of 1 in 30. The rails in that day were "fish-bellied," and weighed only 28 pounds per yard: they are now double-headed and weigh about 85 pounds per yard, and steel ones are as quickly superseding iron ones as iron superseded wood. The original gauge (taken from the cart ruts) of 4 feet 8½ inches is uniformly adopted on all the important lines in England, though it varies in other countries. The gauge of railways in Ireland is 5 feet 3 inches; in India it is 5 feet 6 inches, and in America it varies from 4 feet 8½ inches to 6 feet. The gauge of railways on the continent is mostly the same as the English railways, only the Spanish gauge being 5 feet 6 inches, creates a break with the French railways, perhaps of political importance and significance, though commercially inconvenient. The timidly allotted rate of 8 miles an hour in 1825 is now eclipsed by

THE LIGHTNING-LIKE SPEED

we now travel—60 miles an hour. Instead of occupying twelve days in traveling between Edinburgh and London, honorable members of Parliament may to-day breakfast with comfort in Edinburgh, or even farther north, and the same evening take part in the debate in the House of Commons. Tiberius is said to have traveled 200 miles in two days, and thus caused consternation. To-day we can travel more than half that distance in as many hours.

Before we can look for increased speed, since railways are becoming so perfected and traffic so rife, I think one of the most important questions that will have to occupy the attention of our engineers is the duplicating of the trunk lines, in order that the passenger and merchandise traffic may be worked upon independent roads, thus reducing the danger of collision and securing far greater safety to life. Of our modern railways I think the most wonderful and difficult to construct are the metropolitan underground lines. The ingenuity displayed in avoiding the sewers, the myriads of gas pipes and preserving the foundations of existing buildings, at the same time maintaining the necessary levels for stations, is amazing and worthy of all praise. There are at present over 35 miles of this system of railways annually circulating about 75,000,000 passengers in and around London. Perhaps the latest advancement and greatest novelty in rapid transit is evidenced in the

NEW YORK ELEVATED RAILWAYS.

There are now four parallel lines of elevated railway running north and south through the principal avenues of the city, covering a total length of about 40 miles. The project was organized in 1872, but the first of the present system of lines was only opened in 1878. The rolling stock consists of 210 engines and 650 passenger cars. The rails are at an elevation of about 22 feet above the thoroughfare, and portions of it are built as a deck bridge, in which instance the running load produces a compressive strain, and other parts are built as a through bridge, when the strain becomes of a tensile nature. Where the lines pass from one street to another at right angles the degree of curvature is necessarily very quick, and to a stranger forms a noticeable and rather startling feature in the route. At one place in the upper part of the city the elevation is 80 feet, and it is here that the line describes a very graceful S-shaped curve. On this portion of the road I notice increased stability is secured by rigidly bracing and tieing each alternate span so as to virtually form a skeleton pier, giving a steadier and much safer bearing to the girders of the other spans and adding strength and elegance to the gossamer-like structure. Nearly 90,000,000 passengers are annually carried on the elevated railways, yielding a revenue of over $6,000,000. The making of the electrical railway between Portrush and the Giant's Causeway, in Ireland, marks a new era in the history of locomotion; and though it is an exceedingly difficult task as yet to even estimate the probable results, it must be admitted that electricity is destined to play a most prominent part as a motor power in the future.

THEN AND NOW.

By the progress of railway enterprise we may estimate the advancement of all our social and commercial reformers. The few miles of railway originated in Darlington have grown into the almost fabulous number of 230,000 miles in Europe and America alone. The railways in England to-day comprise over 18,000 miles, and are worked by 13,250 locomotives, and 450,123 carriages and other vehicles, with an annual working expenditure of $160,500,000. They have a paid-up capital of $3,650,000,000, and they annually carry 600,000,000 passengers, and about 220,000,000 tons of produce and merchandise, and yield a gross annual revenue of $308,900,000. In 1877 the revenue reached nearly $315,000,000, and increased 50 per cent. since 1868. In Europe there are 102,900 miles of railroad, viz.: Germany, 19,000; Great Britain, 18,000; France, 17,000; Russia, 15,100; Austria, 11,550; Italy, 5,000; Spain, 3,800; Belgium, 2,450; Switzerland, 1,700; Holland, 1,300; in other states, 8,000 miles. They have indeed made rapid and unparalleled progress. In America, in face of the magnificent water communication which nature has favored this country, there are to-day about 128,000 miles (different measurement) of railway, opening out and developing its vast and varied resources. Invested in these roads are about $8,000,000,000. On this continent they may be said to connect the Atlantic with the Pacific. Our railways know no boundaries; they span the mighty chasm and cross the broad expansive river; they penetrate to the interior of the earth, and climb to the summit of mountains; indeed, the haunts of the locomotive are in every direction. It annihilates distance. It has already disturbed the peaceful seclusion of the Mormon settlers in Utah and Salt Lake City, and it carries the hopeful adventurer over the gorges of the Yosemite Valley to the once rich gold fields of California. The railway navvy is already at work in China, but the future of the enterprise in that populous country I dare not anticipate.

A line is projected through the Euphrates Valley, and it may yet be the lot of some of us to hear the shrill shriek of the locomotive as it breaks the sacred silence of the Holy Land. Railways will yet be the mode of carrying Orientalists to Jerusalem and Babylon, and conveying the antiquary to the ruins of Nineveh. Only in to-day's paper I read of a proposed horse-railway from Jerusalem to the Mount of Olives.

It is no doubt easier to review the past than to anticipate the future; but let us hope that the advancement in our railway system will at least equal if it does not exceed, the improvements made since its initiation in 1825. I think we will not go far wrong if, in contemplating the objects around us, we aim at the progress of art and science. We live in the age of progress, and may say—

Blessings on science, and her handmaid steam:
They make Eutopia only half a dream,
And show the fervor of capacious souls,
Who watch the ball of progress as it rolls,
That all as yet completed or begun,
Is but the dawning that precedes the sun.

CHARLES MACNAY.

August 11, 1886.

THE COST OF CRIME.

The Magnitude of the Burden the Nation Has to Carry.

From the International Record.

No doubt there are many who think that interest in the care of the the criminal and the unfortunate is an idle sentiment, more creditable to the heart than to the head of him who feels it, or at least that this is a matter with which men in ordinary life have no concern. The growth of a spirit of indifference to the whole subject is promoted by our system of local self-government and divided authority. If the budgets for the support of institutions devoted to the care of these classes could be consolidated, and the actual amount of the drain upon the people of the country which they involve were known, popular interest in them would receive a sudden impulse. It is pitiable to think that human nature is so gross that financial considerations have more weight than any other. But inasmuch as dollars and cents are a universal language intelligible to everybody, we will try to give our readers some idea of the magnitude of the burden which the nation has to carry by reducing it to a money standard.

Four hundred and fifty thousand insane, idiotic, deaf, blind, pauper or criminal inhabitants of the United States cost for their annual maintenance probably not less, on the average, than $175 each, directly or indirectly, or let us say $75,000,000 in the aggregate. Seventy-five million dollars is a per capita tax of $1.50 on every man, woman and child in America, which we pay almost without our knowledge. At 3 per cent. it is the interest on $2,500,000,000. And what is $2,500,000,000? When the census of 1880 was taken the national debt of the United States was $2,120,415,370. The investment in the debt did not equal the permanent investment in misfortune and crime represented in the returns of the defective, dependent and delinquent classes.

The total permanent investments by the railroad corporations, including construction, equipment, lands, stocks, bonds, telegraph lines, etc., were $5,182,445,806. Our investment in crime and misfortune was about half of that in railroads. The amount invested in railroads is about equivalent to the valuation of the yearly products of manufacturers, which was reported at $5,369,579,191. Were one-half of all the moneys received by manufacturers in any single year to be set apart as a special fund for the care of the criminal and unfortunate and invested at 3 per cent., the whole of the interest received would be absorbed. The value of farm products is not quite half that of manufactured articles; it is $2,447,538,658. The whole of the farm products of the United States for one year would not be more than sufficient for the creation of the fund suggested.

The assessed valuation of the state of New York in 1880 was $2,651,640,000, or no greater than the amount of capital required for the care of our unfortunates and criminals. The assessed value of the six New England states was $2,652,000,000. All of New England, with her cities, her mills and her banks, would not be more than enough to appropriate to this special purpose, if the capitalization of this expenditure were a necessity.

Beating a Hotel-Keeper.

From Henry Watterson's Letter to the Courier Journal.

A friend of mine the other day came to settle for his night's lodging at a bedbuggy little hole in the wall near the railway station here in Neufchatel called the Hotel des Alps. In addition to the charge for apartment, service, lights, &c., was the item "un dejeuner." I will put it into plain English that which followed:

"But I didn't order any breakfast."

"That was no fault of the house, Monsieur."

"Do you mean to tell me that you wish to charge me for breakfast I neither ordered or ate?"

"The breakfast was prepared all the same, monsieur."

"You pretend that you provide regular table d'hote breakfast every morning and charge for it whether your guests take it or not?"

"Yes, monsieur. See the menu? Here it is," and the firm, yet polite landlord produced his regular "a la carte." My friend turned it upside down. Then he carefully perused it. Then he said:

"How much of this do you serve as your regular breakfast?"

"Anything you like, monsieur."

"Very well. Receipt the bill, and, as I am to pay for a breakfast, please God I will eat it. Bring me a fillet of beef, with mushrooms, a half chicken grille, a rum omelet and a pint of Chablis. I shall wait over until the next train."

Mine host of the Hotel des Alps looked first stupefied and then disgusted, and, finally grasping the situation, he ran into his office, altered his bill in conformity with the facts, and, hurrying back, cried: "Here, monsieur, here is your bill, quite correct—six francs thirty-five centimes—and you will just have time to catch your train."

Civilization Marching Westward.

The civilization of the East, says the facetious Estelline (Dakota) *Bell*, is rapidly penetrating this country. Nowhere is it more noticeable than in a certain Dakota town near the Montana line, in which the leading hotel has the following posted conspicuously on the head of the bedstead in each room:

Guests Are Requested to
REMOVE THEIR SPURS
Before Retiring.

TWO VIEWS.

A woman walking the street adown
Saw at the casement glint the gown
Of a mother, meek, whose little son
Had died with his child joys just begun,
And it smote to her heart, for well she knew
What mother-love with a life may do;
And she said, "Poor soul! how sad that she
Should lose the child in his grace and glee!"
For she thought of her boy that lived to-day,
Though man grown now and far away.

But the woman there in the window seat
Looked with a smile, not sad, but sweet,
And touched with pity, to the place
Where she had marked the other's face;
And she said, "Poor soul! her child is lost,
For now he is only a man, sin-tossed!
But the boy I watched in his bright young day,
He bides in my heart a child for aye."

—*Richard E. Burton.*