

ration to the blast at all, the conclusion must be the very reverse of his theory. It has been ascertained that, if an engine be deprived of its blast pipe, the rate of evaporation will be reduced to about one-fifth; but from the few experiments instituted under this head, it would appear that under ordinary circumstances, when the blast is in action, its effect on the rate of evaporation varies as the fourth root of the velocity.

Before concluding these observations, we ought to offer some remarks on the particular circumstances under which the narrow gauge experiments were made. The following extracts from Mr. Gooch's report are not a little surprising "*The engine was on each occasion placed at Darlington over a powerful stationary blast for the purpose of getting very hot water in the tender and a bright fire to start with.*" By these means, the water in the tender was raised to 180°. In the experiments with goods trains, "*the engine was placed over the blast, and remained there an hour and a half. The tender containing warm water was taken from another engine and attached to the regular tender, and men were provided to bucket the water from one tender to another as the train was moving.*" Mr. Gooch plaintively observes that this contrivance would have been of great use in the broad gauge experiments.

The love of philosophical accuracy displayed by the conductors of the narrow gauge experiments precludes the supposition that *they* sanctioned these devices, which must therefore be attributed to the subordinate officers of the railway. But, at all events, they sufficiently account for the circumstance that the narrow gauge engines got rid of more water for each pound of coke (although they generally did less work for each pound of coke) than the broad gauge engines. It is, of course, more easy in the dead of winter to boil water previously raised to a temperature of 180° than water originally at the temperature of the atmosphere.

We must guard ourselves against the supposition that the experiments prove decisively the superiority of the broad gauge engines. In fact, they prove *nothing*. They were so few and so improperly conducted that no trustworthy conclusion can be derived from them. They ought to have been repeated several times over, under the superintendence of disinterested persons, whose object was—not to get up a series of showy results—but to exhibit as nearly as possible, the *ordinary* working of either kind of engines. However, the observations here made will have, at least, one good effect: they will enable the reader to appreciate the philosophy given in evidence before public commissions on engineering questions, and to estimate the value of the experiments authoritatively sanctioned.

Civ. Eng. & Arch. Journal.

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*Extracts from "Observations on the Western Trade," in reference to the proposed Hudson River Railroad. By WM. H. GRANT, Civil Engineer.*

I have obtained from Legislative documents, the yearly statements of the "*Assessed value of Real and Personal Estate in the city of*

New York," from 1815 to 1845, inclusive, and arranged them in the following table.

*Chronological Table of the Assessed value of Real and Personal Estate in the City of New York, from 1815 to 1845, inclusive.*

1815	\$81,636,042	Close of the last war with Great Britain.	
1816	82,074,200		
1817	78,895,735		
1818	80,245,091		
1819	79,113,061		
1820	69,539,753		
1821	68,285,070		
1822	71,289,144		
1823	70,940,820		
1824	83,075,676		
1825	101,160,046	Completion of the Erie Canal.	
1826	107,477,781		
1827	112,211,926		
1828	114,019,533		
1829	112,526,016		
1830	125,288,518		
1831	139,280,214		} Completion of the Ohio Canal, from Cleveland on Lake Erie to Portsmouth on the Ohio river; distance 307 miles.
1832	146,302,618		
1833	166,495,187		
1834	186,548,511		
1835	218,723,703		
1836	309,500,920		
1837	263,747,350		
1838	264,152,941		
1839	266,882,430		
1840	252,135,515	} Completion of the Western Railroad, in connexion with the Boston and Worcester, and the Albany and West Stockbridge Railroads, extending from Boston to Albany; 200 miles.	
1841	252,194,920		
1842	237,806,901		
1843	229,229,077		
1844	236,727,143		
1845	239,995,517		

Running the eye over this table, it will show, at the first glance, its striking aptitude as an index to the growth and prosperity of the city of New York.

The three principal eras are strongly marked.

I have already alluded to the stationary position she held from the close of the war to the completion of the Erie canal, in 1825, while Pennsylvania was monopolizing the western trade, which is so strongly exemplified by this table; and also, to her sudden start in wealth and rapid increase from that time onward to 1840, about the period of opening the Western railroad.

In 1832, it will be seen, an additional impulse was given to the trade by the Ohio canal, opening an important avenue to Lake Erie. From 1825 to 1840 and '41, it shows, in an unerring and demonstrative manner, the constant and unchecked increase of the wealth of New York.

In 1841, the assessed value of real and personal estate in the city was \$252,194,920,—it had ranged higher in 1836 and the three years following, during the inflated period, when every species of property

obtained a fictitious value,—but it is \$33,000,000 higher than in 1835, and shows an annual increase of 8 per cent. for the last preceding ten years, and of  $9\frac{1}{2}$  per cent. for each year from 1825. It may be regarded as a fair and substantial valuation for that time. And what follows from this period? It stops here as firmly as if the city had been visited by some fearful calamity.

This may appear somewhat incredible; but cast the eye back again upon the column of figures, and trace it down; there is no longer the steady increase; there is an actual diminution; follow it down to 1845, and there is a falling off since 1841 of \$12,000,000! There is nothing fallacious about it. There are the figures.

The ascending ratio no longer holds good, but it is actually inverted; instead of increasing at the rate of  $9\frac{1}{2}$  per cent., or 8 per cent. per annum, *the value of real estate has declined at the rate of nearly  $1\frac{1}{2}$  per cent. per annum from 1841 to the present time!*

New York, for the first time in sixteen years, has received a check in her career. Worse: for the first time in her whole history she has retrograded.

Her positive loss has been \$12,000,000, which has been absolutely abstracted from her wealth. Let us continue the ratio of increase for the ten years preceding 1841, of 8 per cent. per annum, the lowest possible ratio that could be applied, and see what her valuation *should* have been in 1845. An annual increase of 8 per cent. on the sum of \$252,194,920, the valuation in 1841, makes \$332,818,880. The difference between these two sums is, in round numbers, *eighty-one millions of dollars, which is the loss she has practically sustained in the last four years; an amount greater than her whole wealth two years previous to the completion of the Erie canal, and equal to one-half of the entire wealth she has accumulated since it has been in operation.*

These are facts that every man can investigate for himself. They may appear incredible, and doubtless would be held so, were not the evidence, “clear as proof of holy writ,” at hand. They are stubborn and startling *facts*, that must be looked full in the face; they cannot be evaded.

I could mention a number of instances in which they have been stated to men of intelligence and high business qualifications, who have received them with the most positive unbelief and incredulity; and I believe it is not presumptuous to say that half of the active capital held in the city of New York, is held by persons unconscious,—if not of their real existence, of their extent and consequences.

What! is it to be believed that New York, with her great resources, her enterprising population and fertile soil, her unrivalled natural advantages, is for a moment to pause in her proud career? New York, with her magnificent bay and harbor, her boasted Hudson, and her “grand Canal,” with the connected system of internal improvements embracing 700 miles of artificial navigation,—to retrograde in her giant progress, and to sink annually for four years \$3,000,000, instead of accumulating  $10\frac{1}{2}$  millions, which is but the average rate of increase for 16 years previous to 1841? No; it is idle to talk of it; it is absurd, and contrary to all experience and all habits of thinking and

observation. Mathematical demonstration will scarcely prove rigorous enough to establish it on the minds of half a million of people, whose every interest, great or small, is opposed to it.

Our "Grand Canal," truly! why it has been made subservient, with our whole canal system, and our line of railroads from Albany to Buffalo, to the city of Boston; our internal resources, industry, and capital, and even our merchants, mechanics, and farmers, have become tributary to her.

Look about the land,—in our populous towns, villages, and hamlets along the thoroughfares to the west, to the north, and into the interior,—and see if you do not find the enterprising New Englander established there, fresh from Boston, with his wares and manufactures, and merchandize, and "notions" of all descriptions, and competing successfully with our citizens. Look at the manufacturing establishments springing up from Massachusetts capital, and even railroads projected and carried into operation by it on our own soil, all tending to the same end—to build up Boston at the expense of New York. Look at the trains of the Western railroad as they depart from the depot at East Albany, and see if they are not loaded down and groaning under the burden of our own products and the products of the west, carrying our merchants and the merchants from distant States, that formerly thronged to New York, rapidly and en masse to the city of Boston. See them return with similar burdens, and sending them far and near, scattering them broadcast throughout the country, to the exclusion of the legitimate trade of New York. And this too, while the channels of competition are all open, and the Hudson river is offering its superior navigation of 150 miles against 200 miles of railroad, over mountains and on unparalleled grades.

But more than all; see this *only* avenue to New York closed and hermetically sealed nearly one-third of the year, and the whole trade of the interior and the west, without stint or diminution, concentrating upon the city of Boston.

After this, say if the evidence these things furnish does not confirm and strengthen the humiliating fact, that New York has been shorn of her strength, has fallen from her high position, and in proportion as she has declined Boston has triumphantly risen.

But let us turn our attention to Boston and ascertain how the case actually stands with her. In 1841 the value of her real and personal estate was but \$98,000,000; it increased by regular gradation from that year to 1845 to \$135,000,000, making an advance, in the four years, of \$37,000,000. This is equal to  $9\frac{1}{2}$  per cent. annual increase, and equal to the highest rate New York has ever attained. If we take the rate of 8 per cent. at which New York advanced previous to 1841, and the rate at which she should have continued to advance, and add to it the rate of  $1\frac{1}{4}$  per cent. which shows her decline since, *it corresponds, within a fraction, with the actual per centage gain of Boston.* Her progress has been truly astonishing, considering her past history and comparatively slow and toilsome advance through a long series of years. It surpasses that of Philadelphia in her palmiest days, when the entire western trade was poured into her lap.

To show the influence the Western railroad has had in producing these results, let us look at the business it is doing. The bare receipts of the road for transportation were, in

1842,	\$ 512,688	1843,	\$ 573,882
1844,	753,752	1845,	813,480

For the last year they were \$813,480, a sum that would in itself enable a sagacious person to form a tolerably correct estimate of the value of the immense business to Boston, from which it is derived from transportation alone.

The number of tons of merchandize carried over the road from 1842 to 1845, averaged yearly 66,000, and was, in 1845, 93,392 tons. To assign a value to this amount of merchandize, approaching accuracy, is perhaps no easy matter, but still it may be approximated very closely.

The "total movement" on all the State canals during the last season, of articles similar to those transported over this road, included under the several heads of "Agriculture," "Manufactures," and "Merchandize," (excluding "products of the forest,") was 867,000 tons, the value of which, as officially ascertained and reported to the Legislature, was \$89,000,000. From this proportion the value of the 93,392 tons carried over this road is found to be *nine and a half millions*, which is, with great probability, very near the mark.

The "total movement" on the canals is made up of the amounts ascertained to have moved between the several collectors' offices, and for a greater distance; a large portion moving but a few miles, 5, 10, 20, 100, or 200 miles, as the case may be, and the remainder over the whole line; that is, over the Erie canal, or over one of the lateral canals and a part of the Erie canal. The amount that corresponds the most nearly with this total movement, in the statistics of the Western road, is the "number of tons carried one mile." This, for the year 1845, was 14,569,223 tons. The number of passengers carried over the road was 223,600.

The value of the trade, as before stated, of \$9,500,000, is exclusive of the benefits derived from this number of passengers carried annually to and from the city of Boston, forming business connexions, and extending and strengthening her commercial intercourse with the merchants, and producing, and consuming classes of the west.

That Boston duly appreciates these results, and attributes them to the true source,—whatever may be the opinion of New York, or her indifference to the fact—no one can doubt, who gives her credit for ordinary intelligence. She has already contemplated and taken measures to construct a double track to the Western railroad, an improvement demanded by the rapidly increasing business upon it.

All her energies are directed and centered upon the vantage ground she has gained, with a fixed resolution to make the most of the position her superior enterprize alone has given her. She has wisely estimated the value of an uninterrupted access at all seasons of the year with the west, which the progress of trade and the spirit of the age have alike rendered indispensable, and her citizens are fully sensible

of the triumph they have gained over the ice-bound Hudson. Daily experience and the most familiar and ordinary business transactions afford them practical illustrations of its importance.

What would they say of the merchant, who, with an active competition around him, keeps his store open but six hours in the day, while others keep their's open nine? What would they say of the mechanic who labors in his shop but two hours to his fellow's three, and lounges away in idleness one-third of his valuable time? Or, what would they say of the capitalist who invests his funds but two-thirds of the year, and hoards them up during the remainder, without receiving a dividend or a return in any manner? They would say, that in one case, the man was wilfully blind and negligent of his best interests, and in the end would be reduced to poverty; and in the other, that industry and prompt attention to advantages open to all, would be sure to secure its deserved reward. Whether New York is passive and indifferent to these facts, or tardily realizes them and endeavors to practise the lessons they teach, Boston will keep on, profiting by her experience, and will retain in her grasp the advantages she has gained with a tenacity that will only yield in the greatest emergency.

Now it may be said, in answer to all this argument about the advance of Boston and the decline of New York,—“True, New York has lost in four years \$12,000,000, or you may call it \$81,000,000, if you choose, and Boston has gained \$37,000,000, but it is merely a temporary fluctuation that the times are subject to; New York will soon regain her position, and outstrip Boston with ease; and, besides, small losses do not affect her, her energies are recuperative, and she emerges from every disaster only to take a higher and prouder flight than her previous one.” But is not this a palpable fallacy in view of the actual facts?

New York *has* overcome and outlived great misfortunes; she has nobly risen from her ashes on one occasion and exhibited a renewed vigor and a brighter aspect after it, and she is now emerging (less rapidly) from a similar but less serious calamity. The conflagration of 1835 was a visitation such as few cities could survive, much less efface and repair in ten years; but how was New York situated to meet the blow? She was in the midst of unrivalled prosperity, and all the elements of her undiminished greatness conspiring to alleviate its consequences and raise her from the momentary depression it caused. Her resources were not then distracted or diverted from her, and the chasm made in her wealth was soon filled, and all went on as before. But should such a disaster occur now, how would she be prepared to meet it? Has she ever been placed in a condition similar to the present one? Her trade is departing from her at the rate of \$3,000,000 a year, and she has fallen back in 4 years \$81,000,000, instead of her wealth being at this time enhanced, as it should be, by that amount. She has experienced no reverses like this, or ever found herself in a dilemma such as it involves, yet she is to extricate herself from it with ease and unconcern!

How is it to be done? Is there some latent spring of revivifying and recreative power within her corporate limits that is to sustain and

prop her up in defiance of all extraneous influences? Is Boston to relax her efforts; or upon what tangible evidence does she rest for the great good fortune she anticipates? There may be some resources upon which she relies, not palpable to an unimaginative eye, but to plain practical common sense there is no other than the construction of the Hudson River railroad. If she will look to this, she will see the *means*, and if she will look to the west she will see the *substance* of her relief. The western trade, which has trebled her wealth and has been the real source of her vitality so long as the Erie canal was tributary to her, has been "tapped" by Boston, and the only way it can be recovered is to complete this railroad without delay, and open anew to her the great and commanding advantages she has temporarily resigned.

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### AMERICAN PATENTS.

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*List of American Patents which issued in the month of February, 1846,—with Exemplifications, by CHARLES M. KELLER, late Chief Examiner of Patents in the U. S. Patent Office.*

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1. For an *Improvement in the Straw Cutter*; Samuel G. Blackman, Norwalk, Connecticut, February 10.

The patentee says:—"My improvement is applicable only to that class of straw cutters which cut by means of knives attached to and radiating from the centre of a shaft or roller, and acting against the surface of a cylinder of wood, lead, or other substance. The object of my invention is to prevent cutting into this cylinder, and I effect it by suspending the boxes in which the journals of the cylinder work between helical springs, placed above and below, with temper screws that bear on the top of the upper springs, so that the surface of the cylinder can be regulated at pleasure to make the requisite pressure on the edges of the knives as they pass, and yet not sink so much between them as to injure the surface of the cylinder, and waste the power."

Claim.—"What I claim as my invention, and desire to secure by letters patent, is suspending the boxes on which the journals of the cylinder run between two sets of springs placed above and below, the upper set being regulated by temper screws or other analogous device, in combination with the roller of radial knives that cut against the surface of the cylinder as herein described."

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2. For *Improvements in Machinery for making Glazed Cotton Wadding*; Jeremiah Essex, Bennington, Vermont, February 10.

The first part of this invention consists "in ranging a series of carding engines, one behind another over an apron which has a continuous movement, so that the sliver or sheet of cotton from the second card is delivered on top of that from the first, the one from the