FROM THE
American Railroad Journal,
January 28th, 1871.

The Newark Bay Pivot Draw Bridge.  
By Mr. C., Editor American Railroad Journal: 

Dear Sir:—In my article of the 16th inst., criti-
cising the Criticism of Mr. T. C. Clarke, I did not 
allude to the breaking of the Newark Bay Pivot 
Draw Bridge, feeling conscious that no one ac-
quainted with the circumstances would attribute 
it to a fault in its construction. The unfair ali-
sion to it, however, by Mr. Clarke, renders it 
necessary for me to do so.

Reaching the scene of the disaster very soon 
after it occurred, I will state what I believe to 
have been the cause, which is as follows:

The track rails, in the long line of pile treating 
approaching the Draw had contracted (from the 
very cold weather) so as to leave a space of three 
or more inches between it and the end of the 
bridge, and, as a consequence, the locomotive 
being driven at a reckless rate of speed (which 
was demonstrated by the effects produced), its 
track wheels first sunk in the depression caused 
by the three inch space, and then jumped forward 
the lengths of the left ones allighting on the 
top of the rails and, after passing on some six 
or eight feet turned to the left, running off of the 
eight feet of the shorter cross ties, (between the 
ends and central part of the bridge the cross ties are 
but eight feet long, with the exception of one 
long one for each panel; the panels being about 
18 ft. long,) jumped several spaces of about 18 ft., 
in the clear, each, breaking all of the long cross 
ties in its course, when it knocked a post out of 
the centretrusts; the right wheel, in the mean-
time, breaking off the shaft of the pinion of the 
turning motor.  

Some part of the locomotive next 
contact in contact with the cap of the pivot, which 
weighs some 1,700 lbs., making an indentation in 
it about 3/16th inches long, and from 3/4 to 3/4 of 
an inch deep, after which it is supposed the 
engine plunged into the centretrusts, causing that 
part of the structure to buckle and go down with 
the locomotive.  

The plunging of the engine truck 
must necessarily have jerked back the lock bolts 
of the Draw, and the last blow of the locomotive, 
doubtless, knocked the ends some few inches out 
of line, in which condition it is said to have been 
found.  

On my arrival at the bridge the East end 
was resting on the East abutment, the part near 
the pier though submerged, being still held in 
position by the counter-diagonal-suspension-bolts. 
The Western half of the bridge was yet in posi-
tion, and, although minus a post, a platform car 
heavily loaded with lumber was safely pushed 
over it.

Owing to the grade line of the railroad being 
located so very near the surface of the water, the 
bridge has frequently been endangered.  
On one occasion a schooner was run into it at the rate of 
8 or 9 knots an hour. It was, of course, consid-
erably injured on the one side; but in about 
one hour, the opposite track was made passable for 
the trains. The schooner, however, fared worse, 
the bowsprit and forecast being broken short off 
even with the hull, and a clean sweep made back 
to the main mast. At the point of fracture the 
bowsprit measured 16x18 inches square, and the 
foremast 18 inches in diameter (it was 8 sided) 
and both of good sound pine timber.

On another occasion, when the “Communipaw,” 
one of the largest ferry boats in New York harbor 
was passing by, it struck and made a short 
bend in one of the main-suspension-diagonal 
bolts, giving it a set from which it did not recov-
e; the tensile strain on the rod at the time being 
full 40,000 lbs.

The very short space of time (only two weeks) 
for which R. H. Rierson, Esq., the Superintendent 
the railroad, was enabled to get the bridge in 
running order again, notwithstanding the exceed-
ing cold weather of the time, and the very exposed 
situation, was truly extraordinary, and reflects 
great credit upon his untiring energy.

It is impossible for any iron truss bridge to 
stand such a blow. If such a force were applied to 
the outside of a bridge of 200 ft., or 300 ft. span, 
it would knock it entirely off its bearings. On 
one occasion I was present when a locomotive 
collided with the rear end of a coal train, knock-
ing 12 heavily loaded cars off the track. What 
folly, then, for a man to talk of sletermin coastal 
trains, already under a heavy compressive strain, resisting force. No; our only safety 
consists in having our buildings made abundantly 
strong for sustaining the moving load, and care of 
the track rails well guarded with additional 
rails spiked inside, similar to the manner in which 
the safety switches and frogs are protected, at 
also the short curves of street railways.

Indeed I think our first class railroad compa-
nies would be the gainer if they would also have 
such guards placed in all lines of trestle work, 
and high and steep embankments. A guard tim-
ber at two feet or so from the rail can be of little 
use, for if the wheels once leave the track, there 
is no knowing where the trucks may cause the 
locomotives or cars to plunge.

Guard rails, of the kind I have suggested as 
being the most efficient, were placed upon an iron 
bridge I erected several years ago for the Central 
Railroad Co. of New Jersey, over Middle Brook. 
On one occasion Col. James Moore, Chief En-
geineer, informed me that as a train of loaded coal 
cars were rapidly approaching the bridge, one 
of them got off of the track, but one of the guard 
rails drew the wheels of the car in, and confined 
them close to the track, so that the guard 
rails drew the wheels of the car in, and confined 
them close to the track, enabling it to pass safely 
over the bridge, after which the coupling brake 
and the car fell off. I know of no other bridge 
at the present time, which is guarded in a similar 
manner.

That Mr. Clarke has had some unusual advan-
tage for obtaining valuable information relative 
to the construction of iron bridges, I am well 
aware. Of the following resources Engineers and 
Builders do not generally avail themselves. Sev-
eral parties, myself among the number, were 
invited to prepare plans, and to offer bids for the 
construction of the Quincy Bridge. Having so 
prepared myself, the appointed time found us 
on our way to Quincy, where I soon met with 
other parties who had come for the same purpose. 
On the morning following our arrival we called 
at the office of the Engineer; upon being intro-
duced to Mr. C., made known our business, and after 
some conversation, left in his charge our plans 
and bids, as also all bills of materials, etc., for 
the purpose of enabling him to examine and re-
port to the Directors or Executive Committee his 
opinion regarding their respective merits.

Day after day we looked for that committee, 
but they did not make their appearance until the 
seventh day, and after delaying us two days 
longer (for the purpose, I suppose, of enabling 
Mr. C. and his assistant to copy all he could desire 
from detail drawings, diagrams of spans, bills of 
materials, etc.), we were informed that they 
would not decide at present, but would let us know 
by mail to whom the contract would be assigned.

Some months subsequently I met one of my 
competitors, and upon inquiring who received the 
contract, received this reply: “No one; it is being 
made at the "Detroit Bridge and Iron Works," 
(in which, we were told, one or more of the 
Quincy Bridge directors were heavily interested, 
and of which Charles Kellogg, of the late "reli-
able firm" of Kellogg, Clarke & Co., was Superin-
tendent). On asking whose plan had been adopt-
ed, the reply was, in substance, “I presume it is 
one furnished by Mr. Clarke, which he has been 
enabled to get up from the various plans we (the 
bidders) furnished for his inspection.”

It seems very strange that Mr. C. should, in 
publishing such a voluminous description of the 
Quincy Bridge as he did, have failed to describe 
by sectional drawings, etc., such an important 
part as the Post, and Pedestal on which it turns; 
as is always customary in works of the kind.

Such being at least one of the instances, to my 
knowledge of Mr. C.’s gaining valuable information, 
I charge him with ingratitude in making the 
statement he did, without knowledge of the facts, 
in regard to the Newark Bay Bridge disaster. I 
say ingratitude, because the information he 
received from myself alone, which cost me much 
labor and expense, and for which I received not 
even thanks, entitled me to, at least, a correct, 
and not a suppressed statement. There were no 
bridges under the ends of the Newark Bay Draw, 
but simply rollers, and the same were firmly 
secured with strong lock bolts in a manner similar 
to the Pivot Bridge of the Pennsylvania Railroad 
Co., over the Schuylkill at Philadelphia.

As there ought always, practically speaking, to 
be a space of from 3/4 to 3/4 of an inch at the 
shifting ends of all switches, turn tables and Pivot 
Bridges, there must of necessity occur some slight 
jar from passing trains.

Had Mr. C. not made an error in his calcula-
tions, the ends of his Quincy bridge would not 
have sunk so very much below the level of the 
track of the fixed spans as to require the use of 
“powerful cauls” which he says “My firm” 
are using to make further improvements in, for 
the Hudson River Bridge. A more simple 
arrangement ought to have answered for any slight 
depression.

I regret being obliged to allude to the Quincy 
Bridge, but as Mr. C. has seen fit to bring it be-
to the public in the manner he has, I consider 
it only justice to others as well as to myself, 
to state a few of the facts in regard to it, which he 
had omitted.

Hoping I have not trespassed too much upon 
your time and space, I remain very respectfully,

F. C. LOWTHORP.