acknowledged that this is a very short time for the
construction of a work of so great an extent—the longest
single span as yet accomplished—especially under the
difficulties experienced of procuring material from a
distance, and of obtaining skilled labour.

The whole of this difficult and hazardous achievement
was accomplished without a single failure or accident of
any kind. It was not executed under a contract, but
immediately under Mr. Keeler's directions. He was
fortunate in securing the services of Mr. E. F. Farrington
(formerly employed on the Cincinnati Bridge), as
superintendent of construction, during the most critical
and important part of the operations, and by him,
with the assistance of an intelligent and faithful body
of mechanics and labourers, the engineer's plans have
been carried out entirely to his satisfaction. The cost
of the bridge was about $22,000. sterling.

When the working plans were completed, and sub-
mited, in April, 1868, for the approval of the directors,
those gentlemen who had invested their money in this
enterprise, being all Americans, naturally desired to
have the opinion of the highest professional authority in
their own country of such a bold undertaking, and pro-
posed submitting the plans and calculations to the
Honourable W. J. M'Alpine. To this the engineer of
the work cordially assented, and had the satisfaction of
having them approved and confirmed by an engineer of
Mr. M'Alpine's varied experience and acknowledged
ability.

The inspection, required by the Charter from the State
of New York, was made by Judge Gardiner, on the
16th of January; that required by the Canadian Charter
was made by the Honourable H. H. Killalay, M.A.,
C.E., on the 25th of January, 1869.

Within a few months of its completion the Clifton
Bridge was subjected to the force of a storm of almost
unparalleled fury for a space of twelve hours. The wind
gathered up its forces in the long sweep of Lake Erie,
and struck the bridge nearly square upon its beam—the
course being S.S.W., bearing hardest on the Canadian
shore. The storm gradually increased in intensity until
one o'clock, when there came a shock which, it is sup-
posed, moved the two anchor stones on the S.W. quarter
to which the longest guys in that direction were at-
tached, one weighing 9 tons and the other 32 tons,
pulling them from their beds, and rolling them over
10 ft. nearer to the bridge. This power, be it remem-
bered, was exerted by a small wire rope only $\frac{1}{2}$ in.
in diameter, and of an ultimate theoretical strength of
only 10 tons. By the loosening of these two ropes, and
of another on the S.E. quarter, in a similar manner,
more play was given, and the wind had more effect
upon the platform; but from one o'clock until four, the
disturbance was not so great but that foot-passengers
and carriages continued to cross, although with much
difficulty in making head against the wind. During
this time the wind acted by impulses. It would haul for
a time, and then return with greater fury than ever.
At four o'clock it had reached its greatest strength,
when the longest guy on the S.E. quarter gave way at
the fastening, and then followed, in quick succession,
first, all the guys on the S.E., and then all the guys on
the S.W. quarter, up to within 200 ft. of the land.
Altogether, the platform was held in place by 58 guys
—30 on the upper or windward side, and 28 on the
lower side. Twenty-one of those on the windward side
gave way, including the three before mentioned as
having dragged their anchors, leaving only nine still
holding on that side, and extending out, as before stated,
200 ft. from either end. As the guys on the leeward
were slackened by the yielding of those on the wind-
ward side, none of them were broken. The middle of
the bridge immediately canted over about 3 ft. to leee-
ward, while the platform, being fixed at both ends, there
was accordingly that much twist in the framework.
The canting of the bridge exposed it more directly to the
action of the wind, and thereby caused the cables to
swerve so much more from their true positions. The
cradle form of the system accounts for this disturbance
of the level, for as the one to windward rises, the other,
being linked to it through the platform, must necessarily
fall, and thus throw the bridge so much out of level.

It will be seen that, after the partial yielding of the
guys, the platform was exposed directly to the action
of two disturbing forces; first, the weight of the guys on
the leeward side, and, second, the horizontal pressure
of the wind. These forces were met by two others that
belong to the bridge, first, the inherent strength and
stiffness—the whalebone toughness of the framed road-
way—and, second, the weight and strength of the
cables, their weight coming in play the moment they
were swayed from their normal positions. The weight
of the leeward guys alone was sufficient to depress the
lower side 10 in., and the guys and the power of the
wind together canted it about 3 ft., as before stated.

The vertical undulations of the roadway, after it had
been exposed in this manner to the full fury of the
wind, did not at any time exceed 18 in. This, for so
long a span, and so light a structure, must be considered
a very moderate departure from the true curve. It
must be directly attributed to the beneficial effect of the
series of hollow studs introduced between the cables and
the roadway at intervals of every 50 ft. from the centre,
while at the centre the cables themselves bear directly
upon the platform. By this arrangement the weight of
the central portion of the cables for 400 ft. becomes an
insistent weight to keep the bridge from moving; and
the cables themselves, weighing 81 tons, cannot easily