But it has been seen in the progress of our investigations as to the action of load upon the different parts of the truss, that counter-diagonals are required in one or two panels on either side of the centre, and there, they can not be safely omitted. But, beyond the point where the weight of structure acting on the mains, begins to over-balance the effects of unequal and variable load upon the counters, I do not consider the advantages of Counter-diagonals to be sufficient to warrant their use.

In the case of Rail-road trains, gliding smoothly over bridges of ordinary spans, a quarter or a half of an inch more or less of deflection, is of slight importance, while, in bridges for ordinary carriage travel, the only objection to it is, that it slightly increases the degree of vibration produced by successive impulses, as of the trotting of animals, in time with the natural vibrations. Now, counter-bracing tends to shorten the intervals of the natural vibrations by diminishing their extent; but cannot destroy the liability to vibration; and the alteration of interval produced, may as often bring the vibrations higher in tone with the gait of a trotting horse, as otherwise. In certain cases the effect would be one way, and in others, the opposite; & in general, the only result would be, to diminish the extent of motion; by one quarter, or less.

Such is the result of the best reasoning and science that I have been able to bring to bear upon the subject of Counter-bracing.