As the live load is accompanied with impact and vibration, and four-fifths of the strain comes from it, it is but prudent to take this into account.*

In proportioning the different parts of our bridges, the strain per square inch is diminished; or in other words, the strength of each part is increased in proportion to its nearness to its work. As the panel system is fully strained by the passage of each locomotive, it should have greater strength than the chord system, which can only get its maximum strain when the whole length of the bridge is covered with locomotives, which in practice seldom occurs on spans longer than 100 feet. The bolts which support the floor system, being subject to accidental shocks, have the greatest strength of all. This is merely following out in practice the principle of "uniformity of strains." Inasmuch as the strength of an iron bridge (like that of an iron chain) is measured by the strength of its weakest part, it follows that the structure in which this principle is most accurately carried out will be the strongest, while the purchasers of the bridge will not be compelled to pay for useless iron, which diminishes instead of adding to its strength. On the other hand, if bridges are too light, they will show this defect by excessive vibration under a passing train. This fault, we believe, our bridges cannot be charged with. We furnish diagrams of strains, giving the actual dimensions of each part, and the calculated strains.

We have given fourteen plates, in which are shown all the different kinds of iron bridges occurring in ordinary practice. Each style of bridge is distinguished by a letter and number.

Persons requiring bridges will please follow the following directions:

1. Give the letter and number of figure for the general style of bridge required, and the length of spans between centres of piers, and width of piers, if any are built.

2. State whether the bridge is at right angles or on a skew. If the latter, give the angle included between line of piers and axis of bridge.

3. Give the height of bottom of rail above bed of stream.

4. State whether the railway company will themselves build the lower staging up to the track-level, or not.

5. If not, give the depth of water, and whether the nature of the bottom requires piles, or not.

6. If a viaduct be required, it will be better to send a cross-section of the valley, indicating such points as require a fixed length of span,—such as streams, roads, etc.

If railway companies prefer to erect the iron-work themselves, we will furnish a competent person to superintend the erection, and guarantee the work coming together with exactness. It will generally be found more satisfactory that we should erect the bridge and lay the track upon it ready for use, the company furnishing ties and rails and the timber and other materials for staging.

With the above-mentioned data furnished, we can quote prices, by return of mail, to any one who wants bridges, and can construct the bridges in as short a time as any other bridge-builders can do. We wish it particularly understood that our cash rates are uniform to all persons alike; modified only by the amount of work ordered. We can always execute an order for a number of bridges for a less price each than for a single one, on account of the reduplication of parts lessening the cost of manufacture, and the less cost of erection, for various obvious reasons.

We will make special plans and estimates to suit any required case, but wish to point out that there will be a marked economy insured, both in cost and in time, by selecting one of our regular styles of bridge, as per plan and specification, as we have now on hand a large stock of dies and patterns which are applicable to them.*

The following is a list of the iron railway and other bridges and viaducts that we have built, or are building, since our connection with the Phoenix Iron Company; also, of the railways and their officers for whom they were built, and to whom we would respectfully refer parties desirous of further information as to our capacity:

* See extract from Railroad Gazette, describing competition for new bridges in the Dominion of Canada.