tons per square inch, or a tensile strain of twenty tons per square inch without decreasing or increasing more than one 625th part of its length. Now, will you believe that an iron viaduct costing for ironwork more than £70,000 has just been completed near Melbourne under the above specification?"

So far, from Professor Kernot's letter, and before going farther it will be well for me to make a few remarks for the benefit of your non-professional readers. First, as to Mr. Greene's condemnation of the bridge because a wind pressure of fifty-six pounds per square foot would overturn it, if not anchored to the piers, I would state that braced piers in America are proportioned for a wind pressure of thirty pounds per square foot when loaded with light box cars, and forty pounds when not loaded, the condition being stipulated that neither of these pressures produce tension in the windward posts of the piers; so, according to American practice, the structure condemned had a surplus of strength.

Next as to the specifications; if any one interested will consult my "Highway Bridges," pp. 25 and 26, or the Memoir, pp. 79 and 80, he will see what elaborate tests of materials are required by American engineers, and how crude and inadequate are those just quoted.

But to return to Professor Kernot's letter—he says—"Now what do you think of this for an eye-bar?"

There are hundreds of them in one of our largest structures, and each has to endure a working stress of forty tons. At what distance would your typical American engineer condemn it—100 yards or 100 miles?

"The only conclusion that I can come to is this, that our leading engineers don't grasp the first principles of bridge designing, and that they are ashamed to own their ignorance. They get on tolerably well when following precedent, when copying existing structures, but fail utterly as soon as they attempt anything original.

"Some time since I caused much stir by making some experiments on iron models and publishing the results. I send several copies of the pamphlet, and the only thing that will astonish you will be that such absurd designs as some that I experimented on should ever have been made. It seems almost beyond belief, but is nevertheless strictly and absolutely true, that Design A (see pamphlet) was worked out with most extreme care and deliberation by three of the most experienced and highly paid engineers in Australia, and yet by a most simple modification I gained nearly four-fold strength with less material and far less workmanship, as in Case B.

"Model C represents one of many hundreds of girders made to the