BRIDGE MATERIALS.

LXXX. Having discussed the general principles and relative characters and merits of different plans and forms of bridge trusses, and their proper proportions, particular and general, the question as to the best materials for the purposes of bridge construction may properly be considered.

We have seen that the materials of a bridge truss are principally subjected to two kinds of action, that of tension, and that of compression. Lateral, or transverse action should be avoided in the principal parts and members of the truss.

It is obvious then, that those materials best calculated to resist these kinds of force respectively, should, when practicable without sacrifice of economy, be employed in the situations where those forces are respectively exerted. For instance, when the diagonals act by tension, the upper chord (or the arch, in case of the arch truss), and the verticals, should be composed of the material best adapted to the sustaining of a compressive force, while the lower chord and the diagonals, should be of the best material for sustaining tension.

Wood and iron are the only materials that have been employed in the construction of bridge superstructures to an extent worthy of notice; and it seems reasonable to conclude that on these we must place our dependence.

Cast iron resists a greater compressive force than any other substance whose cost will admit of its being used as a building material. Steel has a greater power of resistance, but its cost precludes its employment as