

size of the different members of the structure. Still less can we excuse the man who not only guesses, but who, in order to build cheaply, persistently guesses on the wrong side.

It will, of course, be understood, when it is said that bridge-building may be called a science, that it can only be so when in the hands of an engineer whose judgment has been matured by wide experience, and who understands that no mechanical philosophy can be applied to practice which is not subject to the contingencies of workmanship. There are many bridges which will stand the test of figures very well, and which are nevertheless very poor structures. The general plan of a bridge may be good, the computations all right, and yet it may break down under the first train that passes over