TESTING.

As to the utility of testing individual pieces of work during manufacture, opinions differ, but it is unquestionably a wise procedure, in the case of welds in main tension bars, as imperfections of workmanship and material (if any exist), undiscernible by the eye, will be very apt to be developed under strain. To avoid injury, it is advisable that this proving should not be carried beyond say nine tenths of the elastic limit; thus a bar with an elastic limit of 20,000 lbs. per square inch should not be tested much beyond 18,000 lbs. After erection, all bridges should be tested with loads approaching as near as possible the maximum loads for which they were designed. Railroad-bridges are very readily tested, but highway-bridges can only be tested at considerable expense. Pig-iron, or paving-blocks when convenient, are probably the best artificial loads that can be used, as they are readily handled and distributed. An excellent, though expensive, method of testing, and one of universal application, is to distribute gravel in a uniform layer over the whole area of roadway, and of such thickness as to equal the load which the bridge was designed to carry. Inasmuch as the weight of gravel and earth varies according to locality and degree of moisture when excavated, before a proposed test is made, a cubic foot of the testing material must be weighed to determine the proper thickness to be put on the bridge. In order to judge the result properly, means must be used to measure the deflection