riveting is employed, and one, too, that is so thoroughly concealed as to be impossible of detection, is the imperfect filling of the holes. The chances of such a serious defect increase with the number of the plates riveted together, and owing to the shrinkage of the hot driven rivet-heads, they bind so closely to the surfaces of the outer plates, that striking with a hammer to test "looseness" is a very fallacious test. The high strain under which rivet-heads are left through shrinkage in cooling is often shown by their apparent brittleness when cut off by a cold-chisel. They will at times snap off like a piece of glass under the first blow. A hand-driven rivet will very frequently drop out from its own weight, when once the head is knocked off, showing that the shank of the rivet shrinks away from the holes, and when this is not the case, they are as apt to retain their position through the distortion caused by unmatched plates as to a perfect filling of the holes. In Europe, where the riveted system has been developed to its utmost perfection, these inherent defects are recognized, as is shown by the great care with which their riveted work is manufactured, such as drilling the rivet-holes through the plates and pieces to be joined while clamped in position, and thus overcoming almost entirely the evil effects of drifting and distorted rivets. Power-riveting is largely employed, as by that mode alone there is any reasonable certainty of filled holes. Did American girder-shops pursue the European system, our riveted bridges would cost much more than they now do, and they would be proportionately better. To