lations during the different stages of conversion from pig iron to the refined bar. The process of rolling develops fibre by elongating these crystals, so that a bar of rolled iron may be likened to a bundle of metallic threads of different degrees of fineness, according to the number of times the iron from which the bar has been produced has been put through the rolls. It is the ends of such threads that one observes when a bar is suddenly broken off short, looking as previously described, but when the bar is slowly broken, the threads, having time to arrange themselves in a new position, draw out past each other and expose fibre. It follows from what has preceded that great judgment must be exercised in criticising the quality of iron from its fracture, for crystalline fracture does not in itself indicate poor iron, nor does a fibrous one good iron. However, if care is taken to fracture the bar to be tested, under different circumstances, a fair idea can be formed of its quality and fitness for special purposes. Another method of reading the quality of iron is known as the cold-bend test, which requires no expert knowledge to understand. It consists in simply bending unnicked the bar under examination, by repeated blows from a heavy sledge-hammer, over the corner of an anvil or its equivalent, until the two sides approach each other within a distance equal to the thickness of the bar. If the iron stands this treatment without showing any signs of fracture on the back of the bend, it can be rated as of the very best quality, possessing all the requirements for bridge purposes—namely, toughness, duc-