any material is unfitted for use when it is so far distorted by overstraining that it cannot recover, or, technically speaking, when its elastic limit has been exceeded. The elastic limit of the best grades of iron is just about half the breaking-weight, or from 25,000 to 30,000 pounds per inch. A poor iron will often show a very fair breaking-strength, but, at the same time, will have a very low elastic limit, and be entirely unfit for use in a bridge. A piece of iron of very inferior quality will often sustain a greater load before breaking than a piece of the best and toughest material, for the reason that a tough but ductile iron will stretch before giving way, thus reducing the area of section, while a hard but poor iron will keep nearly its full size until it breaks. A tough and ductile iron should bend double,