tility, and elasticity. This test, of course, can not show uniformity, that being a matter depending on the number of workings as before explained, and independent of quality. The cold-bend test is severer on a square or flat bar than a round one, inasmuch as the fibres are very irregularly drawn out, being very much strained at the corners. Some very high-grade iron will even stand the cold-bend test where a screw-thread has been cut upon it, which is equivalent to numerous nickings.

The annexed cut represents the appearance of a flat and of a round bar after the cold-bend test.

It was explained, under the head of the Factor of Safety, that the elasticity of a material was simply its recovering power after the removal of an extraneous force, and that so long as the limit of its recovering power was not exceeded, no injury accrued to the material. This limit of elasticity varies considerably in the different grades of iron, and generally has a value about half the ultimate strength of the iron. After the limit is exceeded, permanent set occurs, and the value of the bar is destroyed. It is probable that a certain amount of permanent set takes place in iron even under the application of very light loads, say of two or three tons per square inch, but it is so inap-