Rocks vary greatly in fragility, and break very differently under the same circumstances. Some, as the shales and argillaceous sandstones, yield to pressure by bending or by becoming compressed or stretched; or, like a friable sandstone, become adapted to the pressure as might a bag of corn, by a readjustment of the grains. But the more solid sandstones, having less mobile elements, become divided into blocks, unless the pressure at work is of the extremest slowness; and compact limestone, the most brittle of rocks when pure, breaks into smaller blocks, and sometimes into multitudes of them. The fractures due to stretching or tension are often large in the summit portion of an anticline, and especially when the beds consist of the harder or more brittle rocks. If a stratum of limestone is made up of pure and impure (argillaceous) layers, the former may be broken into columns when the latter are sparingly broken. Only a slight torsion from unequal pressure or support is needed for these results. The scenery of the Rocky Mountain region, and especially of the Colorado Cañon, illustrates finely these various differences in fragility. It is dependent upon the columnar fronts of many of the harder alternating layers for much of its architectural effect.

It has been stated that the flexures in strata are those of a warped sheet. But while the coat-sleeve loses its flexures on straightening it, strata could not be restored to their original condition, because of the great stretching and slipping on one another of the beds in one part, and of the compression in others. Proofs of the stretching and compression are afforded by the *deformation* of fossils, as illustrated in the chapter on mountain-making. (See page 370.) The smallest of fractures that have geological importance are those of the constituent grains or crystals of a crystalline rock, which are generally so minute as to be detected only by microscopic investigation. They sometimes indicate a flowing of the material, lava-like, before it had cooled, or contraction during cooling, or some progressing change of form through pressure.

Faults are displacements along fractures. When a coal-bed is not continuous across a plane of fracture, but has its continuation at some higher or lower level, a *fault* exists; and such faults often occasion much trouble to miners. There may be a few inches or less of *displacement*, or a few feet; but the larger faults of mountain-making regions are sometimes 10,000 to 20,000 feet.

In Figs. 106, 107, *ft* is the course of a fracture, and *a* to *b* the amount of displacement. In Fig. 106 the part to the right has slipped down against the opposite wall, or there is a *downthrow;* and this downthrow is in the direction of the dip (or the *hade*, in miners' language) of the fracture-plane. In Fig. 107, the reverse is the case; there is an *upthrust* along this plane. One is an *overthrow* or *downthrust fault*, the other an *upthrust fault*. The angle of dip in the fault-plane is here near 60°; but it may be from 0° to 90°.

In Fig. 108 a block of the formation has slipped down between two fracture planes; moreover, the resistance or friction has produced a bending of the layers on one side. Reverse the figure, and another condition in faulted