that by this means considerable pieces of a cliff are from time to time dislodged.

(iv.) The waves make use of the **loose detritus** within their reach to break down cliffs exposed to their fury. Probably by far the largest amount of erosion is thus accomplished. The blows dealt against shore-cliffs by bowlders, gravel, and sand swung forward by breakers, were aptly compared by Playfair to a kind of artillery.[274] During a storm upon a shingly coast we may hear, at a distance of several miles, the grind of the stones upon each other, as they are dragged back by the recoil of the waves which had launched them forward.[275] In this tear and wear, the loose stones are ground smaller, and acquire the smooth round form so characteristic of a surf-beaten beach. At the same time, they bruise and wear down cliffs against which they are driven. A rock, much jointed, or from any cause presenting less resistance to attack, is excavated into gullies, creeks, and caves; its harder parts standing out as promontories are pierced; gradually a series of detached buttresses and sea-stacks appears as the cliff recedes, and these in turn are wasted until they become mere skerries and sunken surf-beaten reefs (Fig. 167). The surface of the beach is likewise ground down. The reality of this erosion and consequent lowering of level is sometimes instructively displayed where a block of harder rock serves for a time to protect the portion of rocky beach lying beneath it. The block by degrees comes to rest on a growing pedestal, which is eventually cut round by the waves, until the overlying mass,

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[274] "Illustrations of the Huttonian Theory," sec. 97.

[275] For a graphic account of the heavy roll of the bowlders and thundering of the billows as heard in a mine under the sea during a storm, see J. W. Henwood, Trans. Roy. Geol. Soc. Cornwall, v. p. 11.