

land, and these changes are subordinate to the nature of the country through which streams and rivers pass. Torrents descending from mountains have a great erosive power, and the same is the case with rivers which flow over soft or sandy ground; both spread out on the plains and transport to the sea immense quantities of alluvial matter. The sediment from rivers is not transported to great distances, for matters in suspension are arrested by the movements of the sea; the bed of the ocean is not in consequence filled up so rapidly as one would think, but the places near the coasts are loaded with sandy materials, and it is here that the greatest modifications take place. He rejects the view that the sediment brought to the Black Sea by rivers could have had any considerable effect in filling up that sea and causing it to overflow. Strabo likewise attributed an active part to the winds in all the changes taking place at the surface of the globe. To the combination of all these forces he attributes what has, since his time, been called the sculpturing of the continents.¹

Seneca² says: In virtue especially of its persistence and continuity, water acts on the solid bodies which constitute the land by dissolving and disintegrating them, and even transporting them, sometimes far from their place of origin. All rocks, even the hardest, are penetrated by water, which dissolves them at least partially. Seneca attributes the solvent action to the presence of a gas (*spiritus*); thermal springs possess the power of dissolving minerals in the highest degree. Among those which resist the least, he enumerates salt, sulphur, nitre, alum, bitumen, and lime. The matters dissolved by water are deposited again, and this precipitation is especially abundant when the waters are thermal and gaseous. He likewise explains the formation of calcareous tufas. He points out that the saline substances, held in solution by the aqueous element, may be absorbed by earthy layers, which in a way serve as a natural filter. What has just been said upon the chemical action of water shows that Seneca had clearly recognised those hydrothermic phenomena which play so important a role in geology.

Seneca's ideas regarding the mechanical action of water are not less just. The hardest rocks are not able to resist the repeated force exercised by a drop of water, and the erosive effects of water are most pronounced when the forces in play are those of rivers and the currents and waves of the sea, as may be observed in the beds of rivers and on bold coasts; everywhere on the land, water is to be seen victoriously attacking and destroying rocks. Its chemical effects often precede the mechanical action; this last finds its work half completed. Streams and rivers transport at all times, but especially during floods, clay, sand, and rocks picked up from the layers which they traverse. The erosive power of waves is, however, even

¹ See H. Fischer, Ueber einige Gegenstände der physischen Geographie bei Strab, als Beitrag zur Geschichte der alten Geographie, Wernigerode, 1879.

² Born a few years B.C.