Daubrée endeavored to illustrate the chemical action of rivers upon their transported pebbles by exposing angular fragments of felspar to prolonged friction in revolving cylinders of sandstone containing distilled water. He found that they underwent considerable decomposition, as was shown by the presence of silicate of potash, rendering the water alkaline. Three kilogrammes of felspar fragments made to revolve in an iron cylinder for a period of 192 hours, which was equal to a journey of 460 kilometres (287 miles), yielded 2·720 kilogrammes of mud, while the five litres of water in which they were kept moving contained 12·60 grammes of potash, or 2·52 grammes per litre.[122]

The mineral matter held in solution in river-water is, doubtless, partly derived from the mechanical trituration of rocks and detritus; for Daubrée's experiments show that minerals which resist the action of acid may be slowly decomposed by mere mechanical trituration, such as takes place along the bed of a river. But in sluggish streams the main supply of mineral solution is doubtless furnished by springs.

The proportion of mineral matter in river-water varies with the season, even for the same stream. It reaches its maximum when the water is mainly derived from springs, as in very dry weather and during frost; it attains its minimum in rainy seasons and after rain.[123] Its amount and composition depend upon the nature of the rocks forming the drainage-basin. Where these are on the whole impervious, the water runs off with comparatively slight abstraction of mineral ingredients; but where they are permeable, the water, in sinking through them and rising again in springs, dissolves their substance and carries it into the rivers.

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[122] "Geologie Experimentale," p. 271; Fayol, Bull. Soc. Geol. France, 3me ser. xvi. p. 996, postea, p. 652.

[123] Roth, "Chem. Geol." i. p. 454.