

attention to the erosion effected by running water, their researches lacked a scientific basis. Guettard had already laid hold of the main principles of ablation and erosion when he, in 1774, set forth the "degradation" of mountains and the whole earth surface. Targioni also explained surface conformation upon true principles; while Eber was such an ardent believer in Guettard's views that he drew accurate panoramas of the Swiss Alps in order that posterity might be enabled to recognise subsequent changes in surface conformation. On the other hand, De Maillet and Buffon attributed the excavation of valleys to the action of submarine currents during the retreat of the ocean and the emergence of islands and continents. These views were afterwards upheld by Cuvier, De Saussure, and Werner, and recur in some measure in the early editions of Lyell's *Principles*.

Pallas thought the destruction of mountains and the formation of valleys was associated with intermittent local floods, and this explanation found favour with Buckland, Sedgwick (1825), Daubeny (1831), Élie de Beaumont (1829), and many others. This theory gave support to the "diluvialists," who taught that the Mosaic flood was the final and grandest event in a series of inundations, and that which had mainly shaped the present surface conformation of the globe. It is interesting to remember that Buckland introduced the term *denudation* to express the scouring and hollowing of the continents which he attributed to the action of a universal flood.

But the more natural principles inculcated by Guettard and Targioni steadily made their way as the number of geological observations increased. Hutton and Playfair, by their admirable treatment of the subject, opened up this field of research upon scientific lines. In France and England, during the early decades of the nineteenth century, Montlosier and Poulett-Scrope explained the origin of many valleys solely as a result of the erosive activity of streams, and this was the view supported by Von Hoff and Kühn in Germany. In 1829 Murchison and Lyell together wrote an essay "On the Excavation of Valleys," in which they showed their appreciation of the potency of river erosion. This explanation then came to be currently accepted; at the same time it is freely admitted that many valleys owe their primary origin to tectonic causes.

Lyell was the first to investigate the work done by erosion within a definite period of time. Upon the basis of the