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CONCLUSIONS

Voltaire's interpretations of geological phenomena have not been analyzed before. Nevertheless, numerous critics have found his pilgrim story, his beliefs in an unchanging universe, and his negative attitude toward system-makers the product either of prejudice, ignorance, or his deistic beliefs. The purpose of this study was, therefore, to analyze first of all Voltaire's geological observations in the light of modern science and in the context of his time, and then to make a judgment.

My study has shown that Voltaire's negative attitude toward the theory of marine invasion of all the continents was based on his personal investigation in the neighborhood of Ferney. He compared the shells of some recently dead garden snails with fragments of fossil shells exposed on the banks of rivers and the shore of Lake Geneva. Thus Voltaire's opinion that the sea had not formed any mountains is directly related with his observation of a freshwater environment. Modern science confirms that the Chattian molasse which forms many of the little hills on the shores of Lake Geneva, and which crops out whenever a river crosses the fields between the Jura and the lake, is indeed a freshwater sandstone and contains the freshwater snail *Helix ramondi*. Voltaire's contemporaries believed that freshwater fossils were only found in very recently deposited tufa but not in older rocks such as molasse. Only a hundred years later, did Lyell make the distinction between freshwater and marine shells.

The opinion that the faluns of Touraine were merely a terrestrial or freshwater deposit, as stated first in 1767 in *La Défense de mon oncle* and repeated several times until 1777 in *Dialogues d'Evhémère*, reveals that Voltaire continued obstinately to believe only what he had observed himself. Unfortunately, the faluns he had sent for arrived in a pitiful state: a powdery mass of unrecognizable fragments of shells mixed with earth and one shiny shell which resembled fossil shells in the molasse at Ferney and garden snails. Modern geology tells that the faluns, according to their location, may contain marine, freshwater, terrestrial, or a mixture of all these fossil shells and that Voltaire was not mistaken. His contemporaries Réaumur, Fontenelle, Buffon and others were convinced that the faluns of Touraine had been deposited by the sea alone.

Further geological observations in the Jura Mountains such as glacial and karstic phenomena made Voltaire aware that the latest theories of the earth by Buffon or Maillet had not mentioned such geological features. The karstic phenomena, in particular, seemed to contradict Buffon's idea that rivers were able to erode mountains and transport all the detrital material to the sea. In the Jura Mountains

rivers dry out, disappear into caverns, and reappear later on, but they do not transport much sediment. Voltaire's geological observations show that he valued only what he could see, touch, taste, and measure, qualities which were going to be used by geologists in their description of rocks and minerals.

Analysis of Voltaire's various essays on geological subjects and remarks in other works reveals that this remarkable man remained interested in every aspect of this struggling new science until the end of his life. His skeptical and often negative attitude toward geological theories was due to two reasons: his mature age which made him disenchanted with the speculative nature of most contemporary works and the fact that geology as a science was then in its infancy. It did not begin to develop before Werner, Saussure, Hutton, and Pallas.

Although I have not treated Voltaire's attitude toward biology, I mentioned some of his reactions when they were combined with geology. In the eighteenth century, some naturalists believed in preformation of all living things, others thought that some combinations of atoms and the right conditions produced life spontaneously. Voltaire had to take sides in this controversy and chose to agree with Spallanzani who refuted Needham. Voltaire was, however, not a strict preformationist since he declared in the essay "Dieu" that he did not know how a germ comes to life.

In conclusion, Voltaire's attitude toward geology was not influenced primarily by metaphysical beliefs but it was based on personal investigation and his search for scientific truth. Analysis shows that Voltaire was ready to change when he found a new theory more plausible. For instance, he replaced Kircher's ideas on irrigation by the more modern concept by Halley. Apparently, he did not find a better theory of mountain-building than stated in *Mundus Subterraneus* and thus remained faithful to the view that mountains had existed since the beginning of the earth.