author of the theory of igneous causation which was in this country opposed to that of Werner, sought and found this phenomenon in the Grampian hills, in 1785. This supposed verification of his system "filled him with delight, and called forth such marks of joy and exultation, that the guides who accompanied him were persuaded, says his biographer,[13] that he must have discovered a vein of silver or gold."[14]

Desmarest's examination of Auvergne (1768) showed that there was there an instance of a country which could not even be described without terms implying that the basalt, which covered so large a portion of it, had flowed from the craters of extinct volcanoes. His map of Auvergne was an excellent example of a survey of such a country, thus exhibiting features quite different from those of common stratified countries.[15]

The facts connected with metalliferous veins were also objects of Werner's attention. A knowledge of such facts is valuable to the geologist as well as to the miner, although even yet much difficulty attends all attempts to theorize concerning them. The facts of this nature have been collected in great abundance in all mining districts; and form a prominent part of the descriptive geology of such districts; as, for example, the Hartz, and Cornwall.

Without further pursuing the history of the knowledge of the inorganic phenomena of the earth, I turn to a still richer department of geology, which is concerned with organic fossils.

Sect. 3.—*Application of Organic Remains as a Geological Character.* —*Smith.*

Rouelle and Odoardi had perceived, as we have seen, that fossils were grouped in bands: but from this general observation to the execution of a survey of a large kingdom, founded upon this principle, would have been a vast stride, even if the author of it had been aware of the doctrines thus asserted by these writers. In fact, however, William Smith executed such a survey of England, with no other guide or help than his own sagacity and perseverance. In his employments as a civil engineer, he noticed the remarkable continuity and constant order of the strata in the neighborhood of Bath, as discriminated by their fossils; and about the year 1793, he[16] drew up a Tabular View of the

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[13] Playfair's *Works*, vol. iv. p. 75.
[14] Lyell, i. 90.
[15] Lyell, i. 86.
[16] Fitton, p. 148.