

years after his death. He conceived that both fire and water<sup>1</sup> had been at work in forming the surface of the earth, and suggested that similar examinations of other localities<sup>2</sup> would be required in order to arrive at general conclusions. Such were subsequently supplied by Werner, de Saussure, Pallas, Hutton, Cuvier, and William Smith, before the systematic exploration of the whole globe became in the nineteenth century one of the tasks of geological science. A few years after the publication of Leibniz's speculations, which pointed to an accumulation of local observations as the means of arriving at a history

des pierres où se trouvent des empreintes de poissons ou de plantes qui ne sont point du pays, médailles incontestables du déluge," &c., &c. How very much Leibniz was—in this as in many other ideas—in advance of his age can be seen from his correspondence with the Swiss naturalist Scheuchzer of Zürich: "Merentur Alpes vestrae, si quis alius Europæ locus, hanc eruditi inquilini curam et cæteros montes utili exemplo præbunt, quem admodum magnitudinæ vincunt. . . . Germanorum nostrorum non ea est diligentia quam vellem: itaque Historias regionum naturales habemus nullas, cum Angli Scotique nobis egregiis exemplis præiverint" (quoted by Guhrauer in the note referred to). An interesting reference is made in § xvii. of the 'Protogæa' to the use of the microscope, then only recently invented, and largely used by Leuwenhoek in connection with the examination of the formation and crystals of the celebrated "Baumann cave": "Et velim microscopia ad inquisitionem adhiberi, quibus tantum præstitit sagax Leuwenhoekii diligentia, ut sæpe indignè humanæ ignaviæ,

quæ aperire oculos, et in paratam scientia possessionem ingredi non dignatur." A very fair account of the contents of the 'Protogæa' is given in W. D. Conybeare's 'Report on the Progress . . . of Geological Science' in the first volume of Brit. Assoc. Reports, p. 366, &c.

<sup>1</sup> 'Protogæa,' § iv.: "Donec quiescentibus causis atque æquilibrium consistentior emergeret status rerum. Unde jam duplex origo intelligitur firmorum corporum; una, cum ab ignis fusione refrigererent, altera cum reconcrescerent ex solutione aquarum. Neque igitur putandum est lapides ex sola esse fusione. Id enim potissimum de prima tantum massa ac terræ basi accipio."

<sup>2</sup> Ibid, § v.: "Hæc vero utcumque cum plausu forte dici possint de incunabilis nostri orbis, seminaque contineant scientiæ novæ, quam Geographiam naturalem appelles. . . . Et licet conspirent vestigia veteris mundi in præsentis facie rerum, tamen rectius omnia definient posteris, ubi curiositas mortalium eo processerit, ut per regiones procurrentia soli genera et strata describunt."