

and Dr. J. T. Berger, of German birth, who had been trained in Werner's school. Berger's description of the geology of N.E. Ireland, published in 1816, with a preface by Conybeare, has proved fundamental in the geological literature of that country, while the geological maps of Ireland, published by Richard Griffith in 1834 and 1838, afforded a complete general survey of the stratigraphy.

In Scotland, Robert Jameson (1774-1854), an enthusiastic pupil of Werner, tried to establish Neptunian doctrines. He founded a Wernerian Natural History Society in Edinburgh, wrote a *Text-book of Geognosy* upon Werner's principles, and was for fifty years Professor of Geology in Edinburgh University. He and his students made many valuable researches in Scottish mineralogy, petrography, and geognosy, but their biassed Wernerian view of the rock-formations prevented them from attaining any real insight into the complex stratigraphical relations of the sedimentary deposits in Scotland.

Hutton strongly opposed the Neptunian teaching of Jameson, which was contrary to all his experience in Scotland. On one occasion in 1783, when Hutton was on a visit to the Duke of Athole, he happened to observe red granite dykes near Glen Tilt, in the Grampians, penetrating black mica schist and limestone. He was so overjoyed at the sight that his companions could not understand what was the matter, and thought Hutton must have discovered a gold-mine in the rocks! Afterwards at Cat's Neck, Hutton saw dykes of trap-rock intruded in all possible directions through sandstone. These observations formed the basis of his paper "On Granite," wherein he proves that granite is frequently younger than sedimentary aqueous deposits. John MacCulloch brought subsequent confirmation of Hutton's views by showing that intrusive dykes of basalt, porphyry, granite, and other varieties of igneous rock, abound in the Western Isles of Scotland, and that the stratified deposits have been altered at zones of contact.

F. *Scandinavia and Russia*.—The first Scandinavian scholar who interested himself in the history of the earth was Urban Hiärne (1641-1724). His work, published in 1694, draws its conceptions of the earth's interior chiefly from Athanasius Kircher. While he recognised fossils as the remains of organisms, he