

augite - schist, sericite - lime - phyllite, quartzite and kiesel-schiefer. As intermediate grades between these crystalline masses and the ordinary clastic strata, he observed quartz-conglomerates, with a crystalline schistose matrix, or with albite crystals, and quartzites with sericite or mica. He concluded that while these crystalline rocks present the most complete analogies with those of the Alps, Silesia, Brazil, etc., they are yet so intimately bound up alike petrographically and stratigraphically with strata containing Devonian fossils, and into which they pass by semi-crystalline varieties, that they must be considered as of Devonian age. Subsequently K. Koch proposed to regard the crystalline schists of the Taunus as Cambrian (Huronian),<sup>66</sup> and they have been indicated on the Geological Survey map as Cambrian or Silurian. But the fact that a conformable sequence can be traced from undoubted fossiliferous Devonian strata downward into these crystalline schists makes it immaterial what stratigraphical name may be applied to them. They are almost certainly Devonian, as Lossen described them, and, in any case, they are unquestionably the metamorphosed equivalents of what are elsewhere ordinary sedimentary strata.

Scandinavia is mainly composed of crystalline schists which have been assigned to the so-called Archæan system. That some portions of them cannot be of so ancient a date was shown some years ago by Törnebohm in the uplands of Sweden. More recently similar deductions have been drawn from a study of the development of the rocks in Norway. At the Hardanger Fjord the following order of succession was established in 1875 and 1877 by W. C. Brögger:<sup>67</sup>

Crystalline schists (diorite-schists, hornblende-schists, garnetiferous mica-schists, true gneisses, etc.), the whole series becoming more and more crystalline toward the higher beds.	
Greenish micaceous schists (phyllites). This and the overlying group must be several thousand feet thick.	
Impure white marble (probably orthoceratite limestone).....	30 feet
Blue quartz-sandstone.....	100 "
Black, little altered alum-schist, with Dictyograptus band.....	150 "

This section confirmed the early conclusion of Naumann that the great series of crystalline schists of the Norwe-

<sup>66</sup> See Lossen's reply, Z. Deutsch. Geol. Ges. xxix. 1877, p. 341. He argues convincingly against the supposition that these can be original chemical deposits of Cambrian age. (See also Renard, Bull. Mus. Roy. Belg. i. p. 31, note.)

<sup>67</sup> "Die Silurischen Etagen 2 und 3 im Kristiania Gebiet," p. 352. The Swedish work of Törnebohm is referred to in Book VI. Part I. note 47.