

In Italy the Carboniferous and Permian rocks are so closely related and so similar that it is doubtful to which system some of the intermediate portions should be assigned. At Monte Pizzul in the Carnic Alps, the lower strata contain *Productus giganteus* and *P. semireticulatus*, while the highest are characterized by numerous forms of *Fusulina*, *Fenestella*, etc.²³⁰ In other parts of the same region lower strata of the age of the Culm of Germany have been described by Stur and Stache.

Russia.—Over a vast region of the east of Europe Carboniferous limestones, sandstones, shales, and thin coal-seams are spread out almost horizontally. They unite the marine and terrestrial types of sedimentation so characteristic of the north of Britain. In the central provinces of Russia, the Moscow basin or coal-field of Tula, said to occupy an area of 13,000 square miles, lies conformably on the Old Red Sandstone or Devonian system, and contains limestones full of Carboniferous Limestone fossils, and a few poor seams of coal. In the south of the empire, the coal-field of the Donetz, covering an area of 11,000 square miles, contains 60 seams of coal, of which 44, having a united thickness of 114 feet, are workable. Again, on the flanks of the Ural Mountains, the Carboniferous Limestone series has been upturned and contains some workable coal-seams. It would appear, therefore, that this particular type of mingled marine and terrestrial strata of Carboniferous age, occupies a vast expanse under later formations in the east of Europe. Since so much of the Russian development of the Carboniferous system consists of limestone, it is interesting to find that it contains many of the familiar fossil species of the Carboniferous Limestone of Western Europe. Thus in the Ural region, according to Prof. Tschernyschew, the Carboniferous system may be divided into five zones, of which the lowest, a limestone containing *Productus giganteus*, *P. striatus*, *Chonetes papilionacea*, etc., and the next a limestone with *Spirifer mosquensis*, may be regarded as corresponding to the typical Carboniferous Limestone of the west. The three upper zones, viz. those of (a) *Syringopora parallela*, *Spirifer*

Verrucano," Leipzig, 1892. The metamorphism of Carboniferous and Permian rocks in the Alps of Savoy is described by P. Ternier, Bull. Carte Geol. France, ii. 1891, p. 367.

²³⁰ A. Tommasi, Boll. Soc. Geol. Ital. viii. p. 564; C. F. Parona and L. Bozzi, op. cit. ix. pp. 56, 71.