

times merging into more or less fissile shales. Of the argillaceous beds of the system the most remarkable are those of the Marl-slate or Kupferschiefer—a brown or black often distinctly bituminous shale, which in certain parts of Germany is charged with ores of copper. The limestone, so characteristic a feature in the “Dyas” development of the system, is a compact, well-bedded, somewhat earthy, and usually more or less dolomitic rock (Zechstein). It is the chief repository of the Permian invertebrates. With it are associated bands of dolomite, either crystalline and cavernous (Rauchwacke) or finely granular and crumbling (Asche); also bands of gypsum, anhydrite, and rock-salt. In certain localities (the Harz, Bohemia, Autun) seams of coal are intercalated among the rocks, and with these, as in the Coal-measures, are associated bituminous shales and nodular clay-ironstones. In Germany, France, the southwest of England, and the southwest of Scotland, the older part of the Permian system contains abundant contemporaneous masses of eruptive rock, among which occur diabase, melaphyre, porphyrite, and various forms of quartz-porphry.

Some of the breccias in the west of England contain striated stones, which, according to Sir A. C. Ramsay, indicate the existence of glaciers in Wales during the Permian period.<sup>244</sup>

The Permian system in the greater part of Europe, from the prevalent red color of its rocks, the association of dolomite, rock-salt, saliferous clays, gypsum, and anhydrite, and the remarkably impoverished and stunted aspect of its fauna, has evidently been deposited in isolated basins in which the

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<sup>244</sup> Quart. Journ. Geol. Soc. 1855, p. 185.