

however, showed that, from the character of the fish remains found in the "bone-bed" of the black shales, they had more palæontological affinity with the Trias than with the Lias. Subsequent research, particularly among the Rhætian Alps and elsewhere on the Continent, brought to light a great series of strata of intermediate characters between the previously recognized Trias and Lias. These results led to renewed examination of the so-called beds of passage in England (Penarth beds),¹⁵ which were found to be truly representative of the massive formations of the Tyrolese and Swiss Alps. They are therefore now known as Rhætic (sometimes as Infra-Lias), and are usually classed as the uppermost member of the Trias, but offering evidence of the gradual approach of the physical geography and characteristic fauna and flora of the Jurassic period.

The Rhætic (Penarth) beds occur as a continuous though thin band at the top of the Trias, throughout the British area. They extend from the coast of Yorkshire across England to Lyme Regis on the Dorsetshire shores.¹⁶ They occur in scattered patches up the west of England, and on both sides of the Bristol Channel, and they may be detected even in the north of Scotland. Their thickness, on the average, is probably not more than 50 feet, though it rarely increases to 150 feet. In the southwest of England, they consist of the following subdivisions in descending order:

White Lias—composed of an upper hard limestone (Sun-bed or Jew-stone, 6 to 18 inches), with *Modiola minima* and *Ostrea liassica*; and a lower group of pale limestones (10 to 20 feet) with the same fossils and *Cardium phillipianum* (rhæticum), *Monotis decussata*. The Cotham Stone or Landscape Marble (4 to 8 inches) is a hard compact limestone, with dendritic markings, lying at the base of these calcareous strata.

¹⁵ So named from their being well developed in the cliffs of Penarth on the Glamorganshire coast. Bristow, Brit. Assoc. 1864, sects. p. 50; Geol. Surv. Vertical Sections, sheets 47, 48.

¹⁶ Strickland, Proc. Geol. Soc. iii. part ii. p. 585; H. W. Bristow, Geol. Mag. i. 1864, p. 236; T. Wright, Quart. Journ. Geol. Soc. xvi. p. 374; C. Moore, op. cit. xvi. p. 483; xxiii. p. 459; xxxvii. pp. 67, 459; W. B. Dawkins, xx. p. 396; E. B. Tawney, xxii. p. 69; P. B. Brodie, p. 93; F. M. Burton, xxiii. p. 315; W. J. Harrison, xxxii. p. 212; P. M. Duncan, xxiii. p. 12; J. W. Davis, xxxvii. p. 414; E. Wilson, xxxviii. p. 451; H. B. Woodward, "Geology of E. Somerset and Bristol Coal-fields," Mem. Geol. Survey, p. 69; Proc. Geol. Assoc. x. 1888.