

part feebly represented in central and western Europe, some of the conspicuous forms being species of *Phylloceras*, *Lytoceras*, *Amaltheus*, *Oxynotoceras*, *Arietites*, *Psiloceras*, and *Schlotheimia*. At Adneth, in Salzburg, this facies has been long studied. In the Hierlatz Mountains of the Salzkammergut the Lias is represented by massive white and pink limestones with abundant brachiopods. Yet with these calcareous deposits there are also developed along the southern borders of Bohemia and eastward in Hungary, sandy and argillaceous strata containing so much vegetation as to afford in some places beds of coal.<sup>88</sup> The Alpine Lias, in spite of these variations of character and organic contents, shows here and there some of the distinctive ammonite zones, so that it can be placed in comparison with that of the rest of Europe. It lies conformably on and passes down into the Rhætic series.

The equivalents of the English Lower Oolites or "Middle Jura" of the Continent have been detected in both the western and eastern Alps, but are not well developed there. In the west, where they are about 1300 feet thick, they consist of limestones, shales, and clays with calcareous nodules, which form regular alternations. Ammonites, especially of the genera *Phylloceras* and *Lytoceras*, abound, together with *Posidonia*. The zones of *Amm.* (*Harpoceras*) *Murchisonæ*, *A.* (*Harpoceras*) *concavus*, *A.* (*Sonninia*) *Scwerbyi*, *A.* (*Sonninia*) *Romani*, *A.* *humphriesianus* (*Coeloceras subcoronatum*), *A.* (*Parkinsonia*) *Parkinsoni*, and *A.* (*Oppellia*) *fuscus* have been recognized.<sup>89</sup>

The Oxfordian and Corallian divisions of the Jurassic system, or Callovian, Oxfordian, and Sequanian formations are in general feebly represented in the Alpine region; but the Upper Oolites or Kimeridgian and Portlandian series attain a large development. It is this higher part of the system which in the Alps specially presents the Tithonian facies already referred to. Above the zone of Ammonites (*Oppellia*) *tenuilobatus* (*Aspidoceras acanthicum*) comes a mass of strata consisting of a lower group of reddish well-bedded limestones so full of *Terebratula diphya* (*janitor*) as to be named the "Diphya-limestone"; and of an upper thick-bedded or massive light-colored limestone (Stramberg limestone, from Stramberg in Moravia). The limestones are often crowded with cephalopods, of which a large number

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<sup>88</sup> Neumayr, *Abhand. k. k. Geol. Reichsanst.* 1879.

<sup>89</sup> Haug, *Bull. Cart. Geol. France*, No. 21, 1891.