

upheaval of the Alps, and was covered by the advance of over-thrust masses from the south.

Studer distinguished a *Jura* and a *Sub-Alpine* band of deposit. The former is limited to the north-western and northern parts of the Jura chain, and consists of a lower marine division with fossils which agree with those of the Mainz basin, and an upper series of fresh-water limestones and marls, whose Mammalian remains were identified by H. von Meyer as Upper Miocene. This *Jura* band of deposit, according to Studer, presents a continuation of the Tertiary basin in the Upper Rhine provinces. In the *Sub-Alpine* band the Tertiary deposits begin with *lower fresh-water* formations, which continue towards the south-west into the Rhone Valley; they consist of red marls and Molasse sandstones with beds of brown-coal, and contain an exceedingly rich flora (cf. O. Heer, p. 371). The lists of fossils which Studer enumerated prove that he comprised strata of dissimilar age within these lower deposits. The fresh-water formations are succeeded by *marine molasse*, sandstones charged with bivalve shells, and nagelfluë of varied constitution. The marine fauna of this second member in the sub-Alpine band is compared by Studer with Miocene faunas, and he adds that it displays certain affinities with the Italian Pliocene. The third member is an *upper fresh-water* series, the sandy, marly, and calcareous rocks which have been so long famous for the fossils contained in them at Oeningen. These were made known by Scheuchzer, and were the subject of the admirable researches by Braun, Heer, and K. Mayer.

The identifications of the Mollusca in Studer's work were for the most part the work of K. Mayer. This indefatigable palæontologist has continued throughout his long career to describe and compare the Swiss Tertiary fossils, and to draw up synchronous tables showing their precise correspondence with the faunas of other Alpine and extra-Alpine localities. The first of these tables appeared in 1857, wherein Mayer sub-divided the Swiss series into eleven palæontological zones. The first five of these (*Garumnien*, *Suessonien*, *Londonien*, *Parisien*, and *Bartonien*) are assigned to the Eocene; the *Ligurian* stage contains the Flysch, the Upper Nummulite formations of Biarritz, the Montmartre gypsum, etc. Mayer places the Swiss representatives of *Tongrien* and *Aquitaniën* in the Oligocene epoch; the *Helvetien* and *Tortonien* in the Miocene; and the *Astien* in the Pliocene epoch.