

granite as had been supposed, but of "Secondary" limestone containing numerous marine fossils. Ramond also drew attention to the presence of horizontal and inclined strata, and to the fan-shaped form in which the inclined strata were often arranged.

Johann von Charpentier (1786-1855), the son of Wilhelm von Charpentier (p. 38), travelled as a young man for four seasons in the Pyrenees (1808-12). The geological work which he published in 1823 was for a long time the standard work upon these mountains. The younger Charpentier agreed with Palassou and Ramond regarding the parallel trend of the strata along a definite strike, and demonstrated that the sedimentary strata slope away from the granite core of the chain. He established for the first time that there was a transverse fault through the whole breadth of the chain between Montrejeau and Perpignan, the eastern part of the chain having been displaced to the north relatively to the western portion.

As a student and follower of Werner, Charpentier, like Palassou, supposed that the aqueous deposits had consolidated in their inclined position, and gave no credence to ideas of subsequent uplift and disturbance. He distinguished eight formations, in ascending order—granite, mica schist, primitive limestone, transitional limestone, red sandstone, Alpine limestone, and Jura limestone, ophite and terrigenous deposits (Tertiary and Diluvium). Charpentier gave little attention to the fossils, therefore not infrequently made blunders with respect to the age of the stratigraphical deposits. For example, Charpentier's "primitive" limestone corresponds to Silurian and Devonian formations; his "transitional" limestone, containing belemnites and ammonites, corresponds to the Jurassic formation; his "Alpine" limestone to Cretaceous and Lower Tertiary rocks. In spite of these shortcomings, Charpentier's work was one of the most important of his time.

Occasional observations had been made on the "Paris Basin of Deposits" by Guettard, Desmarest, and others; Lamanon gave special attention to the beds of gypsum near Paris, and rightly regarded them as the deposits of a fresh-water lake. De la Métherie had attributed them to volcanic origin. Lamanon, however, found fossil specimens of a fresh-water mollusc in the interstratified marls, and in the gypsum bones of terrestrial mammals different from those of living