

through them. They contain numerous impressions of leaves and stems of trees, and are extensively worked for fuel, whence the name of the formation.

In several places, layers of trachytic tuff are interstratified, and in these tuffs are leaves of plants identical with those found in the brown-coal, showing that, during the period of the accumulation of the latter, some volcanic products were ejected.

Mr. Von Decken, in his work on the Siebengebirge,* has given a copious list of the animal and vegetable remains of the freshwater strata associated with the brown-coal. Plants of the genera *Flabellaria*, *Ceanothus*, and *Daphnogene*, including *D. cinnamomifolia* (fig. 169, p. 191), occur in these beds, with nearly 150 other plants, if we include all which have been named from the somewhat uncertain data furnished by leaves. They are referred for the most part to living genera, but to extinct species. Among the animal remains, both vertebrate and invertebrate, many are peculiar, while some few, such as *Littorinella acuta*, Desh., help to approximate these strata with some of the upper freshwater portions of the Mayence basin. The marine base of the Mayence series consists of sandy strata closely allied, in geological date, as we have already seen, p. 190, to the Limburg group, called Upper Eocene in this work. But in regard to the Rhenish freshwater deposits near Bonn, so large a proportion of the plants, insects, fish, batrachians, and other fossils, are such as have been met with nowhere else, that we cannot as yet assign to them a very definite place in the chronological series. They were undoubtedly formed during that long interval of time which separated the Nummulitic from the Falunian tertiary formations, so that they are newer than the Middle Eocene, and older than the Miocene strata of our Table given at p. 104. The classification of the deposits belonging to this interval must still be regarded as debatable ground, very different opinions being entertained on the subject by geologists of high authority. Should a passage be eventually made out from the tertiaries of the north of Germany, on which the labors of M. Beyrich have thrown so much light, to the faluns of the Loire, by the discovery of beds intermediate in age and paleontological characters, the best line of demarcation that we can adopt is that proposed by M. Hébert, according to which all the Limburg beds, the Grès de Fontainebleau, the lower part of the Mayence basin, and the Hempstead beds of the Isle of Wight (see p. 192), are classed as Lower Miocene, while the Faluns rank as Upper Miocene. Between these formations there is still so vast an hiatus, that I have thought it inexpedient, for reasons before explained, to unite them under a common name.†

* Geognost. Beschreib. des Siebengebirges am Rhein. Bonn. 1852.

† While this sheet was passing through the press, a valuable paper on the Brown-Coal and other deposits of the Mayence Basin, by William J. Hamilton, Esq., P. G. S., has been published (Geol. Quart. Journ., vol. x. p. 254), in which the question of classification above alluded to is discussed. Whatever termi-