of the Tertiaries near Turin. The "Lower" or "Baden Tegel," hitherto considered as the most ancient deposit on account of its situation, has a fauna perfectly analogous to that of Tortona and Saubrigdes, near Dax, and therefore standing next to the Subapennine period, and approaching the living Mediterranean fauna.

2. *Subdivisions of the Tertiaries.*—The Eocene fauna is eminently characterized by forms of tropical type, but which gradually disappear subsequently to the Oligocene period. The fauna of the Lower "Neogene" strata bears a subtropical ("Senegalian") aspect, gradually giving place to Mediterranean forms, which become decidedly prevalent in the uppermost strata. As the tropical fauna has its origin in the Eocene seas, so the subtropical fauna, which gradually passes into the Mediterranean fauna, has its origin in the seas of the Neogene period. The term "Neogene" is, in the first place, intended to remind us of the strict delimitation between Eocene and Miocene deposits, as it can be traced through the eastern half of Europe, at least; nor is it an obstacle against any further subdivision of these two chief systems of Tertiary deposits. In Europe, violent disturbances undoubtedly took place between the Eocene and the Neogene periods, the strata of the former being constantly unconformable to those of the latter, the Eocene beds being generally inclined, the Neogene strata always remaining in a horizontal position. This subdivision of the Tertiaries into two great systems has been lately confirmed by the investigations of the late Professor Bronn and Dr. Keferstein, who both examined the question from a zoological point of view, by comparing, as a whole, the faunæ of these two systems and of the Tertiaries in general.

[COUNT M.]

On the RED CLAYS *of the* TERRITORY *of* KRAKAU. By Prof. E. SUESS.

[Proceed. Imp. Geol. Instit. Vienna, December 6, 1864.]

THESE clays are of very different geological ages, and their careful distinction is absolutely necessary for getting an accurate insight into the strata overlying the Carboniferous Sandstone with workable coal-seams. This sandstone is grey, yellowish, and occasionally light-red, and frequently becomes arkose-like by containing numerous minute particles of felspar. Where it is not overlain by other strata, it passes immediately into the moveable sand of the heaths, by means (as it appears) of local weathering. Near Jaworzno it is overlain by a series of arenaceous and argillaceous strata, representing the Varigated Sandstone, and again covered by a deposit of shell-limestone. Beneath these strata dips a rather thick layer of dark-red clay; and a dark-yellow laminated sandstone, with siliceous cement, appears beneath this clay, which seems to rest on another of light-green colour; then follows a stratum, 4 feet thick, of very coarse-grained sandstone, passing gradually downwards into a fine-grained, loose, light-yellow and red-coloured sandstone, with veins and oval-rolled pieces of light-green clay, and with light-

coloured stripes and round spots strikingly resembling typical specimens of the varigated sandstones of North Germany. This rests again on alternating layers of yellow and dark-red sands and red clay, followed by boulders of reddish-yellow sandstone. Everywhere the red clay appears beneath the shell-limestone, and may be considered as a representative of the red "Werfen Slates" of the Austrian Alps. From Jaworzno to Gistrowice, the way leads from the Carboniferous sandstones, over the varigated sandstones and their red clay, upwards to the shell-limestone, and along a soft northward slope to the dolomite. A boring sunk beyond the dolomite led through about 60 feet of varigated clay, and beneath it through nearly 100 feet of bluish-grey plastic clay with crystals of gypsum. Among the fragments brought to light, silicified *Spongariæ* and fragments of *Belemites* were found, so that this clay may be considered as being a continuation of the Belemitic clay, intercalated between the oolites of the "Brown Jura" and the white limestones with *Ammonites biplex*. The "refractory clay," which has become an article of export, is quite as different from the red one as from the Belemitic clay. The strata sunk through in search of this clay are in descending order:—

	feet.
a. White Jurassic limestone	72
b. Clay	30
c. Compact quartzose sandstone	4½
d. Clay (not refractory)	12–18
e. White limestone in thin strata	36
f. Compact high-yellow sandstone with coloured boulders of quartz, and occasionally with loose sand	18–24
g. Bluish-grey clay (refractory)	2
h. Loose grey sands	12
i. Grey loam	6
k. Dolomite with *Cadmia*	—

The organic remains, extracted by these borings, were those of the "Brown Jura," probably from the yellow sandstone (*f*). As far as facts are stated at present, the refractory clay (*g*) and the loose sands (*h*) may be considered as being a rudimentary remainder of the Keuper, lately stated by Prof. Römer to occur in Prussian Silesia. [COUNT M.]