the concordance is everywhere deceptive, and that between the schists and the fossiliferous series of formations there is really a great hiatus.[71] When the fossil-bearing intercalations are examined they are themselves found to be metamorphosed. The Jurassic limestones have been marmarized, and the shales have become lustrous sericite-schists in which belemnites and other fossils are recognizable. The Triassic rocks have been in like manner rendered crystalline, and present Secondary crystals of albite, quartz, mica, tourmaline, garnet, etc. The Carboniferous strata, when their age can be determined by inclosed fossils, consist of dark anthracitic bands, which have undergone less alteration than the adjacent schists.[72] But the extraordinary way in which many of the plants in the Alpine Carboniferous rocks have been distorted indicates the enormous shearing which these rocks have undergone.[73] At Vernayaz, near Martigny, the Carboniferous strata can hardly be separated from the schists;[74] and, indeed, had Carboniferous plants not been found in them the idea would probably never have occurred to any one to draw a line between them. At the well-known locality of Petit Cœur, the plants so abundantly and admirably preserved in black schist have had their original substance replaced by a white hydrous mica.[75]

A detailed investigation of the geotectonic and petrographical relations of these intercalated Carboniferous bands was carried out in 1882 by the late Mr. Stur, Director of the Austro-Hungarian Geological Survey, and Baron von Foullon.[76] On the northern border of the Styrian Alps near Leoben a group of crystalline schists 10,000 to 13,000 feet

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[71] Professor Lory believed that in the Western Alps there is a conformability and even gradation between the true crystalline schists and the Palæozoic and Secondary rocks. He regarded the crystalline character of the latter as an original feature dating from the time of deposition. See his résumé in the Report of the London meeting, 1888, of the International Geological Congress, and the views of M. Michel-Lévy in the same Report.

[72] It is well known that carbonaceous strata can be recognized across zones of contact-metamorphism, when the normal characters of the ordinary strata above and below them have been destroyed. This is well seen in the case of the black graptolitic shales of the south of Scotland, and, still more strikingly, in those of Christiania. See Brögger's memoir cited on p. 1030.

[73] See Heer's "Flora Fossilis Helvetiæ" (Steinkohlen Flora), plate iv. fig. 1; v. figs. 1, 3; viii. figs. 1, 2; xiii. fig. 1, etc.

[74] Favre, "Recherches geol." ii. p. 351. The same fact is admitted by Lory to be often true elsewhere (Bull. Soc. Geol. France, ix. 1881, p. 653).

[75] Favre, op. cit. iii. p. 192.

[76] Jahrb. Geol. Reichsanst. xxxiii. 1883, pp. 189, 207. See also Toula, Verh. Geol. Reichsanst. 1877, p. 240.