

made by Sir James Hall more than half a century ago, and by the attentive study of granitic veins, which has contributed so largely to the establishment of modern geognosy. Sometimes the erupted rock has not transformed the compact into granular limestone to any great depth from the point of contact. Thus, for instance, we meet with a slight transformation—a penumbra—as at Belfast, in Ireland, where the basaltic veins traverse the chalk, and, as in the compact calcareous beds, which have been partially inflected by the contact of syenitic granite, at the Bridge of Boscampo and the Cascade of Conzocoli, in the Tyrol (rendered celebrated by the mention made of it by Count Mazari Peucati).* Another mode of transformation occurs where all the strata of the compact limestone have been changed into granular limestone by the action of granite, and syenitic or dioritic porphyry.†

I would here wish to make special mention of Parian and Carrara marbles, which have acquired such celebrity from the noble works of art into which they have been converted, and which have too long been considered in our geognostic collections as the main types of primitive limestone. The action of granite has been manifested sometimes by immediate contact, as in the Pyrenees,‡ and sometimes, as in the main land of Greece, and in the insular groups in the Ægean Sea, through the intermediate layers of gneiss or mica slate. Both cases presuppose a simultaneous but heterogeneous process of trans

* Humboldt, *Lettre à M. Brochant de Villiers*, in the *Annales de Chimie et de Physique*, t. xxiii., p. 261; Leop. von Buch, *Geog. Briefe über das südliche Tyrol*, s. 101, 105, und 273.

† On the transformation of compact into granular limestone by the action of granite, in the Pyrenees at the *Montagnes de Rancie*, see Dufrenoy, in the *Mémoires Géologiques*, t. ii., p. 440; and on similar changes in the *Montagnes de l'Oisans*, see Elie de Beaumont, in the *Mém. Géolog.*, t. ii., p. 379–415; on a similar effect produced by the action of dioritic and pyroxenic porphyry (the *ophite* described by Elie de Beaumont, in the *Géologie de la France*, t. i., p. 72), between Tolosa and St. Sebastian, see Dufrenoy, in the *Mém. Géolog.*, t. ii., p. 130; and by syenite in the Isle of Skye, where the fossils in the altered limestone may still be distinguished, see Von Dechen, in his *Géognosie*, p. 573. In the transformation of chalk by contact with basalt, the transposition of the most minute particles in the processes of crystallization and granulation is the more remarkable, because the excellent microscopic investigations of Ehrenberg have shown that the particles of chalk previously existed in the form of closed rings. See Poggend., *Annalen der Physik*, bd. xxxix., s. 105; and on the rings of aragonite deposited from solution, see Gustav Rose in vol. xlii., p. 354, of the same journal.

‡ Beds of granular limestone in the granite at Port d'Oo and in the Mont de Labourd. See Charpentier, *Constitution Géologique des Pyrénées*, p. 144, 146.