

The upper transition or mountain limestone in England is particularly metalliferous; the principal ores are those of lead and zinc; they occur commonly in veins. Nearly all the lead obtained from the English mines is found in the mountain limestone. Ores of copper sometimes occur in this limestone.

Many of the fossil organic remains, both in the upper and lower transition rocks, are of genera that are not found in the secondary limestones. Some of the upper beds seem almost entirely composed of encrinites: madrepores and corallites occur abundantly in the middle part of this formation.

*Quartz Rock*.—Rocks composed entirely of crystalline grains of quartz, sometimes occur among primary and transition mountains. Certain causes appear to have operated locally, and separated the quartz and felspar of granite into masses of considerable size. The quartz rock in the county of Wicklow I observed to be formed of what is called *greasy quartz*, similar to that in numerous veins in the mica slate, near its junction with granite in the adjacent mountains, and is probably cotemporaneous with the veins. According to Dr. Mac Culloch, the quartz rock in many parts of the Highlands, presents evident indications of being composed of fragments and rounded pieces again united, and is in fact a quartzose greywacke or grit. Part of the Lickey Hill, near Bromsgrove, is composed of granular quartz; and similar beds occur near the village of Hartshill, in Warwickshire, between Atherstone and Nuneaton. Quartz rock, as distinguished from quartzose gritstone, is an inconsiderable formation, and may with more propriety be referred to the Transition, than to the Primary Class.

*Jasper*.—This mineral is of rare occurrence as a constituent part of beds, or of mountain masses; it differs little from a siliceous flinty slate, but is generally coloured red, brown, or yellow, and is opaque. It contains a large portion of the oxide of iron in its composition. The beds of shale in coal mines that have taken fire, are sometimes converted into a substance in every respect resembling jasper. There are beds of jasper of considerable magnitude in some parts of the Appennines, covered by rocks of serpentine. In some situations, beds of slaty jasper alternate with slate, to which rock they appear to bear the same relation as flinty slate. Lydian stone, which is a black siliceous flint slate, is by some geologists called black Jasper. The only bed of Jasper that I have seen among the English rocks, occurs associated with beds of manganese ore, at Dodscombeleigh in Devonshire. Jasper sometimes occurs in veins, and forms nodules in basaltic rocks. There can be little doubt that jasper has been, in many instances, formed by subterranean heat, acting with great intensity on beds of argillaceous shale containing iron.

*Hornblende Rock* and *Greenstone*.—Hornblende rock has been described as associated with primary rocks, it also occurs in the lower transition rocks. Transition hornblende presents no variety of