

flœtz sandstone of the Wernerians ; it has been confounded with our old red sandstone from this resemblance of names, and from the difficulty of discriminating between quartzose conglomerates nearly allied in external character ; but since the rock thus named in England is uniformly beneath the principal deposits of coal, and on the other hand the *rothe todte liegende* of Germany as constantly above them ; and since its character and composition closely agree with the conglomerates of Devonshire, which like it are associated with amygdaloidal and porphyritic trap, there is no reason for hesitating to refer it to the same epoch : we therefore consider it as included in the present series of formations.\*

\* Mr. Weaver in the very useful compilation before referred to, endeavours however to establish the claims of the *rothe todte liegende* to the greater antiquity of the English old red sandstone. His view of the subject is that the three formations associated in the great carboniferous series, namely, the old red sandstone, the carboniferous or mountain limestone, and the regular coal measures may be intermixed without any determined or constant order of superposition ; and he cites the division of the mountain limestone series in Northumberland, where its beds alternate with sandstone and shale, and present even near the bottom of the series, in two or three instances, thin seams or rather traces of coal. He therefore thinks it probable that the coal, which in England generally forms the upper member of this series, may in Germany as generally form the lower ; and he appears to be led to adopt this explanation principally from the occurrence of porphyritic and trapean rocks, in the *rothe todte* which correspond with those in the old red sandstone of Scotland.

It may be objected to this view, however, that it supposes a deviation from the general geological order of formations as deduced from a very wide induction ; and secondly, that it supposes it without necessity : for not only in our own islands, where it is a constant fact, but in the Netherlands also (the coal fields of which the author of this notice has personally examined,) the same order of superposition prevails ; the great coal deposit is always the upper member of the series ; the limestone deposit the central, and the old red sandstone the lowest. By most continental writers these latter rocks are however classed with the transition series, the old red sandstone being considered as a variety of greywacke, which has hitherto prevented our own writers from recognising this exact identity of arrangement ; and although it is indeed true that in Northumberland, traces of coal occur near the bottom of the limestone deposit and perhaps beneath it, still the general rule holds good there also : for the upper part of the series contained in that country, contains frequent and thick seams of coal, and in this part no limestone is found : then, after an interval of an intermediate character corresponding to the millstone grit and shale formation of Derbyshire, containing sandstone and shale with two or three thin beds both of limestone and coal, follows the great limestone deposit containing eighteen beds, many of them of considerable thickness, separated by shale and sandstone ; and lastly, the old red sandstone. This part of the series contains only two thin and unworkable seams of coal ; for the coal-beds which are found associated with limestone in the north of Northumberland, belong to the intermediate formation between the limestone and regular coal measures ; so that here there is in fact no exception to the general rule ; for all the workable coal is above the great central