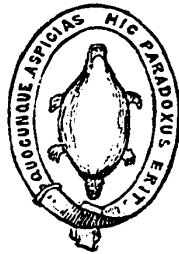


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THE  
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ART. I. *A few Remarks on the Nomenclature and Classification of Rock Formations in New Countries.* By  
J. B. JUKES, M.A., F.G.S.

HUMBOLDT in his "Personal Narrative" remarks, that a traveller in distant countries, however the climate, the nature of the vegetation, and the characters of the animals may vary, finds in the rocks none but old acquaintances,—that granite, gneiss, slate, and sandstone are the same in every portion of the globe. This remark is perfectly correct so far as the mineralogical or lithological characters of rocks are concerned: not only the rocks just named, but limestone, clay, basalt, and all the earthy masses to which the term "rocks" is given by the geologist, afford in all countries many varieties in texture, hardness, colour, or other qualities, but rarely have any character peculiar to one country or portion of the earth in particular. That peculiar variety of lime-

stone called chalk may, indeed, be mentioned as an exception, being, so far as is known, peculiar to Europe, and principally to its western portion. If, then, the classification and arrangement of rock formations depended on their mineral characters alone, the task would be equally easy and uninteresting; since it would be enough to enumerate the localities in which each variety of rock was to be found, and all would be done.

When, however, we come to look on the rocks which form the crust of the globe as a great series of documents, containing within them each the history of its own formation, and unfolding, when studied together, the wonderful story of the changes which have taken place upon the globe, the remark of Humboldt ceases to contain the whole truth; and the geologist, in approaching a new country, feels the same interest as the reader, when opening a new volume of a delightful story. The kind of stone, indeed, may be the same as that with which he is already familiar; but this is merely as it were the type or the paper of his book, the matter upon which the story is impressed, or the covering in which it is enclosed. By examining the included organic remains, and the several relations of the rocks among themselves, he expects to be made acquainted either with the history of a period altogether new to him, or at least of transactions contemporaneous with, and differing from, those he is already familiar with elsewhere.

It has frequently happened that travellers, in hastily passing through new countries, have trusted to mineral characters alone,—have spoken of meeting with old red sandstone, or mountain limestone, merely because they have found stone resembling that which is to be found in those formations in Europe. Geological classification has, indeed, so much altered,—its principles and practice have become so much more enlarged and general within

the last few years, that it may be pardoned to any one who has not made the science his professed study, if he err in the application of the one, or miss the true bearing of the other. So much, indeed, do long-used terms and easily gained ideas cling to our mouths and understandings, that even with professed geologists some igneous rocks, such as granite, syenite, or porphyry, are looked upon and spoken of as necessarily primary or very ancient, and mineral characters alone are used as sufficient to identify some aqueous formations. Not to adduce too many examples of error on these points, it may be sufficient to single out that of Devon and Cornwall. The granites and slates of these counties were, by common consent, looked upon as the most ancient rocks of England,—as, *par excellence*, the primary portion of our island. Some difficulty, however, was felt by many respecting the characters of the fossils which were procured near Plymouth and other places. In the year 1836, Professor Sedgwick and Mr. Murchison, at the meeting of the British Association at Bristol, declared their belief that the slates and limestones of Devon and Cornwall belonged to the Silurian formation. Further examination, however, induced them to modify their ideas; and, with the aid of a suggestion from Mr. Lonsdale, they have thrown an entirely new light on the subject. The slates and other rocks, provincially called *Killas*, belong to two consecutive but slightly unconformable formations: the upper portion contains impressions of plants, some black limestones with *Posidonia*, and a few beds of culm or anthracite, and is the representative of the carboniferous system; the lower portion is full of marine shells and corals, of a character intermediate between the fossils of the carboniferous and Silurian systems. It therefore occupies the place of the old red sandstone, and is now erected into a separate system which is called Devo-

nian. The granite cuts through, sends veins into, and alters both systems; it is therefore more modern than the carboniferous system, probably of the age of the *rothe todte liegende*, or lowest part of the new red sandstone. We have from these discoveries the following remarkable results. West Devon and Cornwall, instead of primary rocks, contain nothing older than the old red sandstone; their granite, instead of being the most ancient, is the most modern of their rocks. The old red sandstone, or Devonian system, consists, on the north of the Bristol Channel, of red sandstones, marls, and conglomerates; on the south, of yellow and variegated slates and limestones. The carboniferous system, in like manner, changes its usual character for that of a mass of roofing slates, with a few beds of dark limestones.

When now we find small portions of the earth exhibiting such great changes in the mineral structure of the same formations, and such great errors respecting the age of igneous rocks, in a country so well known as England, it behoves us to be especially cautious in our classification and nomenclature both of aqueous and igneous formations in countries widely distant from the localities whence our names and arrangements are drawn. The European geologist, in approaching distant countries, must loose his hold of much of his previously acquired knowledge; dismiss from his mind all the arbitrary and minute divisions to which he has been hitherto accustomed, and hold them at bay until he see whether or not they be applicable to the things he is now studying. He must at once fall back on the general principles on which all geological classification ought to be founded; and, guided solely by these, separate the rocks he meets with into those portions and divisions only which naturally belong to them. When each large portion of the globe shall have been examined, and its constituent portions