

and upheld the newly-founded doctrine of descent. And the tenth edition of the *Principles*, published in 1866, contains an excellent account of the leading principles of Darwin's work and its bearing upon scientific thought. The chapter on the geographical distribution of plants and animals, upon which Lyell had spent considerable care in earlier editions, had to be completely re-written in the light of Darwin's theory. As it now stands, this chapter presents a wealth of fine observations and geological conclusions, and is an admirable model of the scientific treatment of a subject. The extinction of species is explained through changes both in the organic and inorganic world, the appearance of new species is attributed to the modification of progenitors.

In the eleventh edition, Lyell summarised in a special chapter the chief features of his work, *On the Age of the Human Race*, which had been published in 1863. In Lyell's opinion, all human races and sub-races had sprung from a uniform prototype which had originated in one area of the globe. All the early human remains gave evidence that the state of culture of the first ancestors of mankind had been extremely low; and he saw no reason for assuming that man had taken origin through any other agency than the working of those universal laws which had determined the origin of species in the plant and animal kingdoms generally.

In the fourth volume of the *Principles*, afterwards adapted as the *Elements of Geology*, Lyell followed the precedent of Deshayes and Bronn in his sub-division of the Tertiary deposits. He calculated the percentage of living molluscan species present in the successive groups of the Tertiary strata, and upon the percentages fixed a definite basis of sub-division into Eocene, Miocene, and Pliocene formations. Lyell drew his account of pre-Tertiary formations for the most part from the text-books of Conybeare and De la Beche. He applied the term of *primary* formations to the plutonic rocks and the crystalline schists. Lyell opposed the idea that any fundamental distinction existed between plutonic and volcanic rocks, and assumed that granitic and other coarse-grained crystalline rocks might still be in course of formation at great depths below the surface, and under the enormous pressure of super-incumbent rocks. He showed that granite had been intruded at various geological epochs, and was by no means invariably the oldest rock, as the Wernerian school had taught. Lyell