tinents. The science of earth-sculpture has been developed from the very beginning. Stratigraphical geology has been largely improved. And in palæontology an immense number of the most striking and interesting of fossil forms have been brought to light. Among them may be specially mentioned those which have proved of critical importance as evidences of the truth of organic evolution—the toothed birds of the Western American cretaceous deposits, the lizard-like bird or bird-like feathered lizard of the Solenhofen slates, Marsh's remarkable series of ancestral horses, Cope's beautiful reconstruction of the fossil progenitors of existing camels. Monkeys certainly, anthropoid apes clearly, man doubtfully, have been detected in the fossil state. India, Australia, Canada, the United States have been explored and surveyed, geologically and palæontologically; and the exploitation of the far West in particular has not only added immensely to our knowledge of life in past times, but has also revolutionized our conceptions as to the gradual growth and development of continental areas, and the occasional vast scale of volcanic phenomena. The permanence of all great continents and oceans is now a proved truth of geology. It has been reinforced and extended from a totally different point of view by Alfred Russel Wallace, whose masterly works on the *Geographical Distribution of Animals* and on *Island Life* have immense geological as well as biological implications.

In pure biology, besides the grand advance implied in the establishment of the doctrine of descent with modification, and its subsidiary principles of survival of the fittest and sexual selection, profoundly important minor results have also been attained in many directions. Embryology in the hands of Von Baer and his successors, notably Kowalevsky and Balfour, has acquired prime importance as an instrument of geological research. Comparative osteology in the hands of Owen, Huxley, Gaudry, and Busk, has given us new views of the relationships between vertebrate animals. The pedigree of fishes, amphibians, reptiles, birds, and mammals, has been worked out with a considerable degree of fulness from the hints supplied us by the amphioxus, the ascidian larva, the facts of embryology, and the numerous recent discoveries of intermediate or arrested organisms, recent and extinct. Invertebrate zoology has been rescued from chaos and partially reduced to temporary and uncertain order. Botany, at once the dullest and the most alluring of all sciences, has been redeemed from the vicious circle of mere classificatory schemes, and vivified by the fresh and quickening breath of the evolutionary spirit. The new morphology has revolutionized our ideas of vegetal homologies; the new physiology has fastened all its attention on the adaptations of the plant to its natural environment. The fascinating study of the mutual relations between flower and insect in particular, set on foot before the dawn of our epoch by Christian Sprengel, but re-introduced to notice in recent times by Darwin's works on orchids and on cross fertilization, has been followed out with ardor to marvelous results by Hermann Müller, Axel, Delpino, Hildebrand, Lubbock, Ogle and others. Heer and Saporta have worked out in great detail the development of several fossil floras. Last of all, Herbert Spencer has cast the dry light of his great organizing and generalizing intelligence on the problems of heredity, genesis, variation, individuality, and the laws of multiplication. Fifty years ago biology was a mighty maze wholly without a plan. To-day the clue has been found to all its main avenues, and even the keys of its minor recesses are for the most part well within reach of the enlightened observer.

Even the actual gains in the number of new organisms added to our lists during the last half century are in themselves astonishing; and, strange to say, the species that bear