

(11.) *Bimana*, or two-handed, "comprehending (as Professor Low observes) a solitary genus, *man*, classed with the mammalia, by the relations of form and animal attributes, but raised far above them all by powers of mind which fit him to perform the functions for which he is destined. He alone is endowed with force of reason to know that the marvellous system of which he forms a part has been ordained by a Superior Power, and to believe that, when the frail fabric by which he is permitted to communicate with the external world shall have been resolved into its elements, the consciousness will be preserved to him of his former being."

We must reserve for our next paper some observations in reference to the much disputed question as to the origin of species in the animal kingdom, and the principal agents that concur in the production of varieties.

## ON THE APPLICATION OF SCIENCE TO AGRICULTURE.

No. 1.

### INTRODUCTORY REMARKS.

No circumstance indicates more decisively the progress of the physical sciences, than the aid which several of them have of late years proffered towards the improvement of agriculture. There can be no doubt in the minds of those capable of forming a correct opinion on the subject, that such help is not only attainable, but that the present condition of agriculture generally, and the state of several of the nations of the world particularly, urgently require it. Science can exert herself in no way more beneficial to the interests of society, than in aiding the productive powers of the soil. Let us see in what way this can be effected.

In the first place, it may be well to observe, that agriculture, even in its simplest conditions, is, in regard to its *rationale*, a very abstruse and complicated thing. The full explanation of its various phenomena, is far beyond the reach of the physical sciences in their present condition. Advances, it is true, are constantly being made; new facts are elicited; difficulties are explained, and improved modes of culture pointed out; and the period no doubt will come, when in the progress of discovery the important art of agriculture will occupy a distinguished place among the experimental sciences. It has been well observed by one of the greatest philosophers of the present age—Sir John Herschel—that "between the physical sciences and the arts of life there subsists a constant mutual interchange of good offices, and no considerable progress can be made in the one, without of necessity giving rise to

corresponding steps in the other. On the one hand, every art is in some measure, and may be entirely, dependent on those very powers and qualities of the material world, which it is the object of physical inquiry to investigate and explain."

We have said that agriculture is a complex subject, involving many considerations of deep scientific interest. It embraces questions relating directly to geology, chemistry, and to animal and vegetable anatomy and physiology. Take for example the soil. Whence is it derived? What occasions its numerous varieties? What are the constituents of which it consists? These are questions that must frequently occur to the mind of every intelligent and inquiring farmer; and they are questions most certainly to which geology and chemistry only can return a correct answer. It has been found by observation, that the crust of the earth consists of a series of rock formations, overlying each other, and differing in their mineralogical and chemical characters. The mineral constituents of soils have been derived from the disintegration of the rocks on which they rest—a process that is constantly going on by means of natural agents, both mechanical and chemical, aided in some degree by cultivation. There are instances of ancient drifts, where the materials of soils now existing were brought from great distances, but these are only slight exceptions to the general principle just stated. A correct geological map of a country or a portion of it, in which the various rock formations on which the soil rests are represented by the different colouring of the surface, is to the scientific farmer not only interesting, but may to some extent be made practically useful in relation to draining and general farm management. Then again as to the constituents of soils, including both organic and inorganic, it has been determined that the great diversity existing as relating either to mere mechanical condition, or power of fertility, depends upon the proportionate combination of those ingredients. Here chemistry comes to our aid by teaching us how to analyse soils, and thus determine both the nature and amount of the different substances of which they consist.

Further, the farmer, by mechanical operations, so disintegrates and pulverises the soil as to bring it into a suitable condition for the growth of plants, which serve as food to animals. What an astonishing series of changes is here presented. The living plant springing from a little inert seed that was deposited in the dead earth, and furnishing subsistence to the sentient and moving animal! These truly wonderful phenomena tax the highest present attainments of the chemist and physiologist for even a partial and imperfect explanation. But the farmer learns from these facts, that the plant can no more