CABINET OF SCIENCE.

On the Vastness of the Universe.

1. The aspect of the world, even without any of the peculiar lights which science throws upon it, is fitted to give us an idea of the greatness of the power by which it is directed and governed, far exceeding any notions of power and greatness which are suggested by any other contemplation. The number of human beings who surround us—the various conditions requisite for their life, nutrition, well-being, all fulfilled; —the way in which these conditions are modified, as we pass in thought to other countries, by climate, temperament, habit;—the vast amount of the human population of the globe thus made up;—yet man himself but one among almost endless tribes of animals; —the forest, the field, the desert, the air, the ocean, all teeming with creatures whose bodily wants are as carefully provided for as his;—the sun, the clouds, the winds, all attending, as it were, on these organized beings;—a host of beneficent energies, unwearied by time and succession, pervading every corner of the earth;—this spectacle cannot but give the contemplator a lofty and magnificent conception of the Author of so vast a work, of the Ruler of so wide and rich an empire, of the Provider for so many and varied wants, the Director and Adjuster of such complex and jarring interests.

But when we take a more exact view of this spectacle, and aid our vision by the discoveries which have been made of the structure and extent of the universe, the impression is incalculably increased.

The number and variety of animals, the exquisite skill displayed in their structure, the comprehensive and profound relations by which they are connected, far exceed any thing which we could in any degree have imagined. But the view of the universe expands also on another side. The earth, the globular body thus covered with life, is not the only globe in the universe. There are, circling about our own sun, six others, so far as we can judge, perfectly analogous in their nature: besides our moon and other bodies analogous to it. No one can resist the temptation to conjecture, that these globes, some of them much larger than our own, are not dead and barren;—that they are, like ours, occupied with organization, life, intelligence. To conjecture is all that we can do, yet even by the perception of such a possibility, our view of the kingdom of nature is enlarged and elevated. The outermost of the planetary globes of which we have spoken is so far from the sun, that the central luminary must appear to the inhabitants of that planet, if any there are, no larger than Venus does to us; and the length of their year will be eighty-two of ours.

But astronomy carries us still onwards. It teaches us that, with the exception of the planets already mentioned, the stars which we see have no immediate relation to our system. The obvious supposition is that they are of the nature and order of our sun: the minuteness of their apparent magnitude agrees, on this supposition, with the enormous and almost inconceivable distance which from all the measurements of astronomers, we are led to attribute to them. If then these are suns, they may, like our sun, have planets revolving round them; and these may, like our planet, be the seats of vegetable and animal and rational life:—we may thus have in the universe worlds, no one knows how many, no one can guess how varied:—but however many, however varied, they are still but so many provinces in the same empire, subject to common rules, governed by a common power.

But the stars which we see with the naked eye are but a very small portion of those which the telescope unveils to us. The most imperfect telescope will discover some that are invisible without it; the very best instrument perhaps does not show us the most remote. The number which crowds some parts of the heavens is truly marvellous. Dr. Herschel calculated that a portion of the milky way, about ten degrees long and two and a half broad, contained two hundred and fifty-eight thousand. In a sky so occupied, the moon would eclipse two thousand of such stars at once.

We learn too from the telescope that even in this province the variety of nature is not exhausted. Not only do the stars differ in colour and appearance, but some of them grow periodically fainter and brighter, as if they were dark on one side, and revolved on their axes. In other cases two stars appear close to each other, and in some of these cases it has been clearly established, that the two have a motion of revolution about each other, thus exhibiting an arrangement before unguessed, and giving rise, possibly, to new conditions of worlds. In other instances again, the telescope shows, not luminous points, but extended masses of diluted light, like bright clouds, hence called *nebulæ*. Some have supposed that such nebulæ by further condensation might become suns; but for such opinions we have nothing but conjecture. Some stars again have undergone permanent changes, or have absolutely disappeared, as the celebrated star of 1572, in the constellation Cassiopea.

If we take the whole range of created objects in our own system, from the sun down to the smallest animalcule, and suppose such a system, or something in some way analogous to it, to be repeated for each of the millions of stars thus revealed to us, we have a representation of the material part of the universe, according to a view which many minds receive as a probable one; and referring this aggregate of systems to the Author of the universe, as in our own system we have found ourselves led to do, we have thus an estimate of the extent to which his creative energy would thus appear to have been exercised in the material world.

If we consider further the endless and admirable contrivances and adaptations which philosophers and observers have discovered in every portion of our own system, every new step of our knowledge showing us something new in this respect; and if we combine this consideration with the thought how small a portion of the universe our knowledge includes, we shall, without being able at all to discern the extent of the skill and wisdom thus displayed, see something of the character of the design, and of the copiousness and ampleness of the means which the scheme of the world exhibits. And when we see that the tendency of all the arrangements which we can comprehend is to support the existence, to develope the faculties, to promote the well-being of these countless species of creatures; we shall have some impression of the beneficence and love of the Creator, as manifested in the physical government of his creation.

2. It is extremely difficult to devise any means of bringing before a common apprehension the scale on which the universe is constructed, the enormous proportion which the larger dimensions bear to the smaller, and the amazing number of steps from large to