

smaller, or from small to larger, which the consideration of it offers. The following comparative representations may serve to give the reader to whom the subject is new some idea of these steps.

If we suppose the earth to be represented by a globe a foot in diameter, the distance of the sun from the earth will be about two miles; the diameter of the sun, on the same supposition, will be something above one hundred feet, and consequently his bulk such as might be made up of two hemispheres, each about the size of the dome of St. Paul's. The moon will be thirty feet from us, and her diameter three inches, about that of a cricket ball. Thus the sun would much more than occupy all the space within the moon's orbit. On the same scale, Jupiter would be above ten miles from the sun, and Uranus forty. We see then how thinly scattered through space are the heavenly bodies. The fixed stars would be at an unknown distance, but, probably, if all distances were thus diminished, no star would be nearer to such a one-foot earth, than the moon now is to us.

On such a terrestrial globe the highest mountains would be about an eightieth of an inch high, and consequently only just distinguishable. We may imagine therefore how imperceptible would be the largest animals. The whole organized covering of such a globe would be quite undiscoverable by the eye, except perhaps by colour, like the bloom on a plum.

In order to restore this earth and its inhabitants to their true dimensions, we must magnify them forty millions of times; and to preserve the proportions, we must increase equally the distances of the sun and of the stars from us. They seem thus to pass off into infinity; yet each of them thus removed, has its system of mechanical and perhaps of organic processes going on upon its surface.

But the arrangements of organic life which we can see with the naked eye are few, compared with those which the microscope detects. We know that we may magnify objects thousands of times, and still discover fresh complexities of structure; if we suppose, therefore, that we increase every particle of matter in our universe in such a proportion, in length, breadth, and thickness, we may conceive that we tend thus to bring before our apprehension a true estimate of the quantity of organized adaptations which are ready to testify the extent of the Creator's power.

4. The above statements are vast in amount, and almost oppressive to our faculties. They belong to the measurement of the powers which are exerted in the universe, and of the spaces through which their efficacy reaches (for the most distant bodies are probably connected both by gravity and light.) But these estimates cannot be said so much to give us any notion of the powers of the Deity, as to correct the errors we should fall into by supposing his powers at all to resemble ours.—by supposing that numbers, and spaces, and forces, and combinations, which would overwhelm us, are any obstacle to the arrangements which his plan requires. We can easily understand that to an intelligence surpassing ours in degree only, that may be easy which is impossible to us. The child who cannot count beyond four, the savage who has no name for any number above five, cannot comprehend the possibility of dealing with thousands and millions: yet a little additional development of the intellect makes such numbers manageable and conceivable. The difficulty which appears to reside in numbers and magnitudes and stages of subordination, is one produced by judging from our-

selves—by measuring with our own sound-line; when that reaches no bottom, the ocean appears unfathomable. Yet in fact, how is a hundred millions of miles a great distance? how is a hundred millions of times a great ratio? Not in itself: this greatness is no quality of the numbers which can be proved like their mathematical properties; on the contrary, all that absolutely belongs to number, space, and ratio, must, we know demonstrably, be equally true of the largest and the smallest. It is clear that the greatness of these expressions of measure has reference to our faculties only. Our astonishment and embarrassment take for granted the limits of our own nature. We have a tendency to treat a difference of degree and of addition, as if it were a difference of kind and of transformation. The existence of the attributes, design, power, goodness, is a matter depending on obvious grounds: about these qualities there can be no mistake: if we can know any thing, we can know these attributes when we see them. But the extent, the limits of such attributes must be determined by their effects; our knowledge of their limits by what we see of the effects. Nor is any extent, any amount of power and goodness improvable beforehand: we know that these must be great, we cannot tell how great. We should not expect beforehand to find them bounded; and therefore when the boundless prospect opens before us, we may be bewildered, but we have no reason to be shaken in our conviction of the reality of the cause from which their effects proceed: we may feel ourselves incapable of following the train of thought, and may stop, but we have no rational motive for quitting the point which we have thus attained in tracing the Divine perfections.

On the contrary, those magnitudes and proportions which leave our powers of conception far behind;—that ever-expanding view which is brought before us, of the scale and mechanism, the riches and magnificence, the population and activity of the universe,—may reasonably serve, not to disturb, but to enlarge and elevate our conceptions of the Maker and Master of all; to feed an ever-growing admiration of His wonderful nature; and to excite a desire to be able to contemplate more steadily and conceive less inadequately the scheme of his government and the operation of his power.—*Whewell*

OF ANIMAL FORMS.—It is surprising with what perverse ingenuity men seek to obscure the conception of a Divine Author, an intelligent, designing, and benevolent Being—rather clinging to the greatest absurdities, or interposing the cold and inanimate influence of the mere elements, in a manner to extinguish all feeling of dependance in our minds, and all emotions of gratitude.

Some will maintain that all the varieties which we see, are the result of a change of circumstances influencing the original animal; or that new organs have been produced by a desire and consequent effort of the animal to stretch and mould itself—that, as the leaves of a plant expand to light, or turn to the sun, or as the roots shoot to the appropriate soil, so do the exterior organs of animals grow and adapt themselves. We shall presently find that an opinion has prevailed that the organization of animals determines their propensities; but the philosophers, of whom we are now speaking, imagine the contrary,—that under the influence of new circumstances, organs have accommodated themselves, and assumed their particular forms.

It must be here remarked that there are no instances of the production of new organs by the union of