The Gleaner:

AND NORTHUMBERLAND SCHEDIASMA.

[Volume V] *Nec aranearum sane texus ideo melior, quia ex se fila gignunt, nec noster vilior quia ex alienis libamus ut apes.* [No. 23.

MIRAMICHI, TUESDAY MORNING, FEBRUARY 11, 1834.

THE GLEANER.

Useful and Entertaining Knowledge.

FROM WHEWELL'S BRIDGEWATER TREATISE.

ON THE VASTNESS OF THE UNIVERSE.

The aspect of the world, even without any of the peculiar lights which science throws upon it, is fit 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, wellbeing, 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 so carefully provided for as his;—the sun, the clouds, the winds, all attending, as it were, on those organized beings;—a host of benificent energies, unwearied by time and succession, pervaiding 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 anything which we could in any degree have imagined. But the view of 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 our 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 others, 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 82 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 crowd some parts of the heavens is truly marvellous. Dr. Herschel calculated that a portion of the milky way, about 10 degrees long and 2 1-2 broad, contained 258,000. In a sky so occupied the moon would eclipse 2000 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 or a 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 dilute light, like bright clouds, hence called *nebulæ*. Some have supposed (as we have noticed in the last book) that such nabulæ 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 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 farther the endless and admirable contrivances and adaptions 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 wellbeing of these countless species of creatures; we shall have some impression of the benificence 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 smaller, or from small to large, 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 the 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 1-10th 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 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 process 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 adaptions which are ready to testify the extent of the Creator's power.

3. The other numerical quantities which we have to consider in the phenomena of the universe are on as gigantic a scale as the distances and sizes. By the rotation of the earth on its axes, the parts of the equator move at the rate of a thousand miles an hour, and the portions of the earth's surface which are in our latitude, at about six hundred. The former velocity is nearly that with which a cannon ball is discharged from the mouth of a gun; but, large as it is, it is inconsiderable compared with the velocity of the earth in its orbit about the sun. The latter velocity is sixty-times the former. By the rotatory motion of the earth, a point of its surface is carried sometimes forward and sometimes backward with regard to the annual progression: but in consequence of the great predominance of the latter velocity in amount, the former scarcely affects it either way. And even the latter velocity is inconsiderable compared with that of light; which comparison, however, we shall not make; since, according to the theory we have considered as most probable, the motion of light is not a transfer of matter but of motion from one part of space to another.

The extent of the scale of density of different substances has already been mentioned; gold is twenty imes as heavy as water; air is eight hundred and thirty times lighter, steam 1,8000 times lighter than water; the luminiferous ether is incomparably rarer than steam: and this is true of the matter of light, whether we adopt the undulatory theory or any other.

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, or any obstacle to the arrangements which his plan requires. We can easily understand that 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 developement 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 ourselves—by measuring with our own sounding 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 anything, 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 improbable before hand: 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 evergrowing admiration of His wonderful nature; and to excite a desire to be able to contemplate more steadily and conceive less inadequately the scheme of government and the operation of his power.

FROM BELL'S BRIDGEWATER TREATISE.

WHY THE ORANG-OUTANG DOES NOT SPEAK.

I have been asked by men of the first education and talents whether any thing really deficient had been discovered in the organs of the orang-outang to prevent him from speaking! The reader will give me leave to place this matter correctly before him. In speaking, there is first required a certain force of expired air, or an action of the muscles of respiration; in the second place, the vocal chords on the top of the wind-pipe must be drawn into accordance by their muscles, else no vibration will take place, and no sound issue; thirdly, the open passages of the throat must be expanded, contracted, or extended by their numerous muscles, in correspondence with the condition of the vocal chords or glottis; and these must all sympathize before even a simple sound is produced. But to articulate that sound, so that it may become a part of a conventional language, there must be added an action of the pharynx, of the palate, of the tongue and lips. The exquisite organization for all this is not visible in the organs of the voice, as they are called: it is to be found in the nerves which combine all these various parts in one simultaneous act. The meshes of the spider's web, or the cordage of a man-of-war, are few and simple compared with the concealed filaments of nerves which move these parts; and