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THE MOON INHABITED.

ASTRONOMICAL DISCOVERIES, LATELY MADE.

By Sir John Herschel, L. R. S., &c., &c.
AT THE CARE OF GOOD HOPE.

From Supplement to the *Kilmarnock* Journal, in which
it was first published.

NEW LUNAR DISCOVERIES.

Until the 10th of January, the observations were chiefly directed to the stars in the southern sky, in which, without the aid of the hydro-oxygen reflector, a countless number of new stars and nebulae were discovered. But we shall defer our correspondents' account of those to future pages, for the purpose of no longer withholding from our readers the more generally and highly interesting discoveries which were made in the lunar world. And for this purpose, too, we shall defer Dr. Grant's elaborate mathematical details of the corrections which Sir John Herschel has made in the best tables of the moon's tropical, sidereal, and synodic revolutions; and of these phenomena of the syzygies on which a great part of the established lunar theory depends.

It was about half past nine o'clock on the night of the 10th, the moon having then advanced within four days of her liberation, that the astronomer adjusted his instruments for the inspection of her eastern limb. The whole immense power of his telescope was applied, and to its focal image about one half of the power of its microscope. On removing the screen of the latter, the field of view was covered throughout its entire area, with a beautifully distinct and even vivid representation of basaltic rock. Its color was a greenish brown, and the width of the columns, as defined by their interstices on the canvass, was invariably twenty-eight inches. No fracture whatever appeared in the mass presented, but in a few seconds a shelving pile appeared of five or six columns wide, which showed their figure to be hexagonal and their articulation similar to those of the basaltic formation at Stalla. This precipitous shelf was precisely covered with a dark flower, "precisely similar," says Dr. Grant, "to the Papaver Rhoeas, or rose-pew of our subalpine coniferous fields; and this was the first organic production of nature in a foreign world, ever revealed to the eye of man."

The rapidity of the moon's ascension or rather of the earth's diurnal rotation, being nearly equal to five hundred yards in a second, would have effectually prevented the inspection or even the discovery of objects so minute as these, but for the admirable mechanism which constantly regulates, under the guidance of the sextant, the required altitude of the lens. But its operation was found to be so consummately perfect, that the observers could detain the object upon the field of view for any period they might desire. The specimen of lunar vegetation, however, which they had already seen, had decided a question of too exciting an interest to induce them to retard its exit. It had demonstrated that the moon has an atmosphere constituted similarly to our own, and capable of sustaining organized, and therefore, most probable, animal life. The basaltic rocks continued the inclined canvass plane, through three successive diameters, when a verdant declivity, of great beauty, appeared, which occupied two more. This was preceded by another mass of nearly the former height; at the base of which they were at length enabled to perceive that novelty, a lunar forest.

"The trees," says Dr. Grant, "for a period of ten minutes, were of one unvaried kind, and unlike any I have seen except the largest class of yews in the English churchyards, which they in some respect resemble. These were followed by a level green plain, which as measured by the painted circle on our canvass, of forty-nine feet, must have been more than a half a mile in breadth; and then appeared as fine a forest fire, as ever I have seen cherished in the bosoms of my native mountains. Weighed with the long continuance of these, we greatly reduced the magnifying power of the microscope, without eclipsing either of the reflectors, and immediately per-

ceived that we had been insensibly descending as it were, a mountainous district of highly diversified and romantic character, and that we were on the verge of a lake, or island sea; but of what relative locality or extent, we were yet too greatly magnified to determine. On introducing the feeblest achromatic lens we possessed, we found that the water whose boundary we had just discovered, answered in general outline to the Mare Nubium of Riccioli, by which we detected that instead of commencing, as we supposed, on the eastern longitude of the planet, some delay in the elevation of the great lens, had thrown us on the axis of the equator. However, as she was a free country, and we not attached to any particular province, and moreover, since we could at any moment occupy our intended position, we again slid our magic lenses to survey the shores of the Mare Nubium. Why Riccioli so termed it, unless in ridicule of Cleopatra, know not; for fairer shores never angel coasted on a tour of pleasure. A beach of brilliant white sand, and girl with wild castellated rocks, apparently of green marble varied at clays occurring every two or three hundred feet, with grotesque blocks of chalk or gypsum, and feathered and festooned at the summits with the clustering foliage of unknown trees, moved along the bright wall of our apartment until we were speechless with admiration. The water, wherever we obtained a view of it, was nearly as blue as that of the deep ocean, and broke in large white billows upon the stand. The action of very high tides was quite manifest upon the face of the cliffs, for more than a hundred miles; yet, diversified as the scenery was during this and a much greater distance, we perceived no trace of animal existence, notwithstanding we could command at will a perspective or a foreground view of the whole. Mr. Holmes, indeed, pronounced some white objects of a circular form, which he saw at some distance in the interior of a cavern, to be bona fide specimens of large cornu ammonis; but to me they appeared merely large pebbles, which had been chafed and rolled there by the tides. Our close of animal life was not yet to be rewarded.

Having continued this close inspection nearly two hours, during which we passed over a wide tract of country, chiefly of a rugged and apparently volcanic character; and having seen few additional varieties of vegetation, except some species of lichen, which grew every where in great abundance, Dr. Herschel proposed that we should take out all our lenses, give a rapid speed to the panorama, and search for some of the principal valleys known to the astronomers, as the most likely method to reward our first nights observation with the discovery of animated beings. The lenses being removed, and the effulgence of our unutterably glorious reflectors left undiminished, we found, in accordance with our calculations, that our field of view comprehended about twenty-five miles of the lunar surface, with the distinctness both of outline and detail which could be procured of a terrestrial object at the distance of two and a half miles; an optical phenomenon which you will find demonstrated in note 5. This afforded us the best landscape views we had hitherto obtained, and although the accelerated motion was rather too great, we enjoyed them with rapture.

Several of those famous valleys which are bounded by lofty hills of so perfectly conical a form as to render them less like works of nature than of art, passed the canvass before we had time to check their flight; but presently a train of scenery met our eye, of features so entirely novel, that Dr. Herschel signalled for the lowest convenient gradation of movement. It was a lofty chain of obelisk-shaped, or very slender pyramids, standing in irregular groups, each composed of about thirty or forty spires, every one of which was perfectly square, and as accurately terminated as the finest specimens of Cornish crystal. They were of a faint black hue, and very resplendent. I now thought that we had assuredly fallen on productions of art; but Dr. Herschel remarked that if the Lunarians could build thirty or forty miles of such monuments as these, we should ere now have discovered others of a less equivocal character. He pronounced them quartz formations, of probably the wine colored amethyst species, and promised us, from these and other proofs which we had obtained of the powerful action of the laws of crystallization in this planet, a rich field of mineralogical study. On introducing a lens his conjecture was fully confirmed: they were monstrous amethysts, of a diluted claret-color, glowing in the intensest light of the sun! They varied in height from sixty to ninety feet, though we saw several of a still more incredible altitude. They were observed in a succession of valleys divided by longitudinal lines of round breasted hills, covered with verdure and nobly undulated; but what is more remarkable, the valleys which contained these stupendous crystals were invariably barren, and covered with stones of a ferruginous hue which were probably iron pyrites. We found that these curiosities were situated in a district elevated about half a mile above the valley of Mare Fecundatus, of Mayer, and Riccioli; the shores of which soon lay in

view. But never was a name more inappropriately bestowed. From Dan to Beersheba all was barren, barren—the sea board was entirely composed of chalk and flint, and not a vestige of vegetation could be discovered with our strongest glasses. The whole breadth of the northern extremity of this sea, which was about three hundred miles, having crossed our plane, we entered upon a wild mountainous region abounding with more extensive forests of larger trees than we had before seen—the species of which I have no good analogy to describe. In gentle contour they resemble our forest oak; but they were much more superb in foliage, having glossy leaves like those of the laurel, and tresses of yellow flowers which hung, in the open glades, from the branch to the ground.

These mountains passed, we arrived at a region which filled us with utter astonishment. It was an oval valley, surrounded, except at narrow openings towards the south, by hills, red as the purest vermillion, and evidently crystallized; for wherever a precipitous chasm appeared—and these chasms were very frequent and of immense depth—the perpendicular section presented conglomerated masses of polygon crystals evenly fitted to each other, and arranged in deep strata, which grew darker in color as they descended to the foundations of the precipice. Innumerable cascades were bursting from the breasts of every one of these cliffs, and some so near their summits, and with such great force, as to form arches many yards in diameter. I never was so vividly reminded of Byron's simile, "the tale of the white horse in the revelations." At the foot of this boundary of hills was a perfect zone of woods surrounding the whole valley, which was about eighteen or twenty miles wide, at its greatest breadth, and about thirty in length. Small collections of trees of every imaginable kind, were scattered about the whole luxuriant area; and here our magnifiers blest our panting hopes with specimens of conscious existence.

In the shade of the woods, on the south eastern side, we beheld continuous herds of brown quadrupeds, having all the external characteristics of the bison, but more diminutive than any species of the bosgenus in our natural history. Its tail was that of our bison; but in its semicircular horns, the hump on its shoulders, the depths of its dewlap, and the length of its shaggy hair, it closely resembled the species to which I compared it. It had however one widely distinctive feature, which we afterwards found common to every lunar quadruped we have discovered—namely, a remarkable fleshy appendage over the eyes, crossing the whole breadth of the forehead and united to the ears. We could most distinctly perceive this hairy veil, which was shaped like the upper front outline of the cap known to the ladies as Mary Queen of Scots cap, lifted and lowered by means of the ears. It immediately occurred to the acute mind of Dr. Herschel, that this was a providential contrivance to protect the eyes of the animal from the great extremes of light and darkness to which all the inhabitants of our side of the moon are personally subjected.

The next animal perceived would be classed on earth as a monster. It was of a bluish lead color about the size of a goat, with a head and beard like him, and a single horn, slightly inclined forward from the perpendicular. The female was destitute of the horn and beard, but had a much longer tail. It was gregarious, and chiefly abounded on the acclivities of the woods. In elegance of symmetry it rivalled the antelope, and like him, it seemed an agile sprightly creature, running with great speed, and springing from the green turf with all the unaccountable antics of a young lamb or kitten. This beautiful creature afforded us the most exquisite amusement. The mimicry of its movements upon our white painted canvass, was as faithful and luminous as that of animals within a few yards of a camera obscura, when seen pictured upon its tympan. Frequently when attempting to put our fingers upon its beard, it would suddenly bound away into oblivion, as if conscious of our earthly impertinence; but then others would appear, which we could not prevent nibbling the herbage, say or do what we would to them.

On examining the centre of this delightful valley, we found a large branching river, abounding with lovely islands, and water birds of numerous kinds. A species of grey pelican was the most numerous; but a black and white crane, with unreasonably long legs and bill, were also quite common. We watched their piscivorous experiments a long time, in hopes of catching sight of a lunar fish; but although we were not gratified in this respect, we could easily guess the purpose with which they plunged their long necks so deeply beneath the water. Near the upper extremity of these islands, we obtained a glimpse of a strange amphibious creature of a spherical form, which rolled with great velocity across the pebbly beach, and was lost sight of in the strong current which set off from this angle of the island. We were compelled, however, to leave this prolific valley unexplored, on account of clouds which were evidently accumulating in the lunar atmosphere, our own be-

ing perfectly translucent. But this was itself an interesting discovery, for more distant observers had questioned or denied the existence of any humid atmosphere in this planet.

The moon being now low on her descent, Dr. H. inferred that the increasing refrangibility of her days would prevent any satisfactory protraction of labor, and our minds being actually fatigued with the excitement of the high enjoyments we had partaken, we mutually agreed to call in the assistants at the lens, and reward their vigilant attention with congratulatory bumper of the best "East India particular." It was not, however, without regret that we left the valley of the red mountains, which in complement to the arms of our royal patron, we denominated "the valley of the Unicorn;" and it may be found in Blunt's map, about midway, between the Mare Fecundatus, and the Mare Nectaris.

The nights of the 11th & 12th being cloudy, were unfavorable to observation; but on those of the 13th and 14th, further animal discoveries were made of the most exciting interest to every human being. We give them in the graphic language of our accomplished correspondent:

"The astonishing and beautiful discovery which we had made during the first night's observation, and the brilliant promise which they gave of the future, rendered every moonlight hour too precious to recommend to the deprivation occasioned by these two cloudy evenings; (see the last number) and they were not borne with strictly philosophical patience, notwithstanding our attention was closely occupied in subraces to the twenty-four feet lens, which we perceiving the erection of additional props and found had somewhat vibrated in a high wind that arose on the morning of the 13th. The night of the 13th (January) was one of pearly purity and loveliness. The moon ascended the firmament in gorgeous splendor, and the stars, retiring around her, left her the unrivalled queen of the hemisphere. This being the last night but one, in the present month, during which we should have an opportunity of inspecting the western limb, on account of the liberation in longitude, which would thence immediately ensue, Dr. Herschel informed us that he should direct our researches to the parts numbered 2, 11, 26, and 29 in Blunt's map, and which are respectively known in the modern catalogue by the names of Endymion, Cypripedes, Languens, and Petavius. To the careful inspection of these, and the regions between them and the extreme western rim, he proposed to devote the whole of this highly favorable night. Taking then our twenty-five miles breadth of her surface upon the field view, and redrawing it to a slow movement, we soon found the first very singularly shaped object of our enquiry. It is a highly mountainous district, the lofty chains of which form three narrow ovals two of which approach each other in slender points, and are united by one mass of hills of great length and elevation; thus presenting a figure similar to that of a long-skein of thread, the bows of which have been gradually spread open from their connecting knot. The third oval looks also like a skein, and lies as if carelessly dropped from nature's hand in connection with the other; but that which might finally be supposed as having formed the second bow of this second skein, is cut open, and lies in scattered threads of smaller hills, which cover a great extent of level territory. The ground plan of these mountains is so remarkable that it has been accurately represented in almost every lineal map of the moon that has been drawn; and in Blunt's, which is the best, it agrees exactly with my description. Within this grasp, as it were, of the broken bow of hills last mentioned, stands an oval shaped mountain enclosing a valley of an immense area, and lying on its western ridge, a volcano in a state of terrific eruption. To the northeast of this, across the broken bow, or what Mr. Holmes called "the vagabond mountains," the largest and last of which is marked F in the catalogue, and fancifully denominated the Mare Mortuum, or more solemnly the "Lake of Death." Induced by a curiosity to divine the reason of so sombre a title, rather than by any more philosophical motive, we here first applied our hydro-oxygen magnifiers to the local range of the great lens. Our twenty-five miles portion of this great mountain circus, had comprehended the whole of its area, and of course the two conical hills which rise within it about five miles from each other; but although this breadth of view had heretofore generally presented its objects as if seen within a terrestrial distance of two and a half miles, we were in this instance, unable to discern these central hills with any such degree of distinctness. There did not appear to be any mist or smoke around them, as in the case of the volcano which we had left in the south west, and yet they were comparatively indistinct upon the canvass. On sliding in the gas light lens the mystery was immediately solved. They were old craters of extinct volcanoes, from which still issued a heated though transparent exhalation that kept them in an apparently stationary or trembling motion, most amenable to examination.

"The craters of both of these hills, as near as we could judge under this obstruction, were about fifteen fathoms deep, devoid of any appearance of fire, and of a nearly a yellowish white color throughout. The diameter of each was about three diameters of our painted circle, or nearly 550 feet; and the width of the rim surrounding them about one thousand feet; yet notwithstanding their narrow mouths, these two chimneys of the subterranean deep had evidently filled the whole area of the valley in which they stood with the lava and ashes with which it was encumbered, and even added to the height, if not indeed caused the existence, of the oval chain of mountains which surrounded it. These mountains, as subsequently measured from the level of some large lakes around them, averaged the height of 2800 feet, and Dr. Herschel conjectured from this and the vast extent of their abutments, which ran for many miles into the country around them, that these volcanoes must have been in full activity for a million of years. Lieut. Drummond, however, rather supposed that the whole area of this oval valley was but the exhausted crater of one vast volcano, which in expiring had left only these two imbecile representatives of its power. I believe Mr. Herschel himself afterwards adopted this probable theory, which is, indeed, confirmed by the universal geology of the planet. There is scarcely a hundred miles of her surface, not even excepting her largest seas and lakes, in which circular or oval mountainous ridges may not be easily found; and many, very many, of these having numerous indented hills in full volcanic operation, which are now more low than the surrounding circles, admit of no doubt that each of these great formations is the remaining of one vast mountain which has burnt itself out, and left only these wide foundations of its ancient grandeur. A direct proof of this is afforded in a tremendous volcano now in its prime, which I shall hereafter notice. What gave the name of 'The Lake of Death' to the annular mountain I have just described, was, I suppose, the dark appearance of the valley when it encloses, and which, to a more distant view than we obtained, certainly exhibits the general aspect of the waters on this planet. The surrounding country is fertile to excess; between this circle and No. 2 (Endymion) which we proposed first to examine, we counted not less than twelve hundred forests, divided by open plains, which waved in an ocean of verdure, and were probably parries like those of North America. In three of these we discovered numerous herds of quadrupeds similar to our friends, the bison, in the Valley of the Unicorn, but of much larger size; and scarcely a piece of woodland occurred in our panorama which did not dazzle our vision with flocks of white or red birds upon the wing.

"At length we carefully explored the Endymion. We found each of the three oval volcanic and sterile wilds, but without nest rich, throughout the level regions around them in every imaginable production of a bordering soil. Dr. Herschel has classified not less than thirty-eight species of forest trees, and nearly twice this number of plants, found in this tract alone, which are widely diffused at its base, and in more equatorial latitudes. All animals he classified nine species of mammals, and five of oviparous. Among the former is a small kind of marmoset, the color of the horned bear, and the biped beaver. The last resembles the beaver of the earth in every other respect than in its destination of a tail, and its invariable habit of walking upon only two feet. It carries its young in its arms like a human being, and moves with an easy gliding motion. Its limbs are contracted inferior and higher than those of any tribe of human savages, and from the appearance of smoke in nearly all of them, there is no doubt of its being acquainted with the use of fire. Still its head and body differ only in the points stated from that of the beaver, and it was never seen except on the borders of lakes and rivers, in which it has been observed to immerse for a period of several seconds."

[To be continued.]

A Movement.—We find the following notice in the paper:

"The Bulletin of the day recommends a splendid monument on the shore of Lake Erie to Perry. It is a noble thought."

Of course, it is a noble thought. They have been thinking and even talking these thirty years, about a monument to Washington. The corner stone of such a monument is even now decaying in this city. The nation never got so far as that. On green delat, and argued and discussed the economy of such measure, till they had expended in name own wages enough to build the monument, included the nation could not afford such a luxury—that the father of the country was buried in the *Annals* of the people, and there was marble enough there, without any additional supply. They raised their wages two billion a day and were none the wiser.

The cost of erecting the monument is estimated at \$3; Natchez \$300; New Orleans \$8.

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