

CHAPTER XVII.

TYCHO.

At 6 p.m. the projectile passed the South Pole at less than thirty miles, a distance equal to that already reached at the North Pole. The elliptical curve was, therefore, being rigorously described.

At that moment the travellers re-entered the beneficent sunshine. They saw once more the stars moving slowly from east to west. The radiant orb was saluted with a triple hurrah. With its light came also its heat, which soon pierced the middle walls. The windows resumed their accustomed transparency. Their "layer of ice" melted as if by enchantment. The gas was immediately extinguished by way of economy. The air apparatus alone was to consume its habitual quantity.

"Ah!" said Nicholl, "sunshine is good! How impatiently after their long nights the Selenites must await the reappearance of the orb of day!"

"Yes," answered Michel Ardan, "imbibing, as it were, the brilliant ether, light and heat, all life is in them."

At that moment the bottom of the projectile moved slightly from the lunar surface in order to describe a rather long elliptical orbit. From that point, if the earth had been full, Barbicane and his friends could

have seen it again. But, drowned in the sun's irradiation, it remained absolutely invisible. Another spectacle attracted their eyes, presented by the southern region of the moon, brought by the telescopes to within half-a-mile. They left the port-lights no more, and noted all the details of the strange continent.

Mounts Doerfel and Leibnitz formed two separate groups stretching nearly to the South Pole; the former group extends from the Pole to the 84th parallel on the eastern part of the orb; the second, starting from the eastern border, stretches from the 65th degree of latitude to the Pole.

On their capriciously-formed ridge appeared dazzling sheets of light like those signalled by Father Secchi. With more certainty than the illustrious Roman astronomer, Barbicane was enabled to establish their nature.

"It is snow," cried he.

"Snow?" echoed Nicholl.

"Yes, Nicholl, snow, the surface of which is profoundly frozen. Look how it reflects the luminous rays. Cooled lava would not give so intense a reflection. Therefore there is water and air upon the moon, as little as you like, but the fact can no longer be contested."

No, it could not be, and if ever Barbicane saw the earth again his notes

would testify to this fact, important in selenographic observations.

These Mounts Doerfel and Leibnitz arose in the midst of plains of moderate extent, bounded by an indefinite succession of amphitheatres and circular ramparts. These two chains are the only ones which are met with in the region of amphitheatres. Relatively they are not very broken, and only throw out here and there some sharp peaks, the highest of which measures 7,603 metres.

The projectile hung high above all this, and the relief disappeared in the intense brilliancy of the disc.

Then reappeared to the eyes of the travellers that original aspect of the lunar landscapes, raw in tone, without gradation of colours, only white and black, for diffused light was wanting. Still the sight of this desolate world was very curious on account of its very strangeness. They were moving above this chaotic region as if carried along by the breath of a tempest, seeing the summits fly under their feet, looking down the cavities, climbing the ramparts, sounding the mysterious holes. But there was no trace of vegetation, no appearance of cities, nothing but stratifications, lava streams, polished like immense mirrors, which reflect the solar rays with unbearable brilliancy. There was no appearance of a living world, everything of a dead one, where the avalanches rolling from the summit of the mountains rushed noiselessly. They had plenty of movement, but noise was wanting still.

Barbicane established the fact, by reiterated observation, that the reliefs on the borders of the disc, although they had been acted upon by different forces to those of the central region, presented a uniform conformation. There was the same circular aggregation, the same accidents of ground. Still it might be supposed that their arrangements were not completely analogous. In the centre the still malleable crust of the moon suffered the double attraction of the moon and the earth acting in inverse ways according to a radius prolonged from one to the other. On the borders of the disc, on the contrary, the lunar attraction has been, thus to say, perpendicular with the terrestrial attraction. It seems, therefore, that the reliefs on the soil produced under these conditions ought to have taken a different form. Yet they had not, therefore the moon had found in herself alone the principle of her formation and constitution. She owed nothing to foreign influences, which justified the remarkable proposition of Arago's, "No action exterior to the moon has contributed to the production of her relief."

However that may be in its actual condition, this world was the image of death without it being possible to say that life had ever animated it.

Michel Ardan, however, thought he recognised a heap of ruins, to which he drew Barbicane's attention. It was situated in about the 80th parallel and 30° longitude. This heap of stones, pretty regularly made, was in the shape of a vast fortress, overlooking one of those long furrows which served as river-beds in ante-historical times. Not far off rose to a height of 5,646 metres the circular mountain called Short,

equal to the Asiatic Caucasus. Michel Ardan, with his habitual ardour, maintained "the evidences" of his fortress. Below he perceived the dismantled ramparts of a town; here the arch of a portico, still intact; there two or three columns lying on their side; farther on a succession of archpieces, which must have supported the conduct of an aqueduct; in another part the sunken pillars of a gigantic bridge run into the thickest part of the furrow. He distinguished all that, but with so much imagination in his eyes, through a telescope so fanciful, that his observation cannot be relied upon. And yet who would affirm, who would dare to say, that the amiable fellow had not really seen what his two companions would not see?

The moments were too precious to be sacrificed to an idle discussion. The Selenite city, whether real or pretended, had disappeared in the distance. The projectile began to get farther away from the lunar disc, and the details of the ground began to be lost in a confused jumble. The reliefs, amphitheatres, craters, and plains alone remained, and still showed their boundary-lines distinctly.

At that moment there stretched to the left one of the finest amphitheatres in lunar orography. It was Newton, which Barbicane easily recognised by referring to the *Mappa Selenographica*.

Newton is situated in exactly 77° south lat. and 16° east long. It forms a circular crater, the ramparts of which, 7,264 metres high, seemed to be inaccessible.

Barbicané made his companions notice that the height of that mountain above the surrounding plain was far from being equal to the depth of its crater. This enormous hole was beyond all measurement, and made a gloomy abyss, the bottom of which the sun's rays could never reach. There, according to Humboldt, utter darkness reigns, which the light of the sun and the earth could not break. The mythologists would have made it with justice hell's mouth.

"Newton," said Barbicané, "is the most perfect type of the circular mountains, of which the earth possesses no specimen. They prove that the formation of the moon by cooling was due to violent causes, for whilst under the influence of interior fire the reliefs were thrown up to considerable heights, the bottom dropped in, and became lower than the lunar level."

"I do not say no," answered Michel Ardan.

A few minutes after having passed Newton the projectile stood directly over the circular mountain of Moret. It also passed rather high above the summits of Blancanus, and about 7.30 p.m. it reached the amphitheatre of Clavius.

This circle, one of the most remarkable on the disc, is situated in south lat. 58° and east long. 15° . Its height is estimated at 7,091 metres. The travellers at a distance of 200 miles, reduced to two by the

telescopes, could admire the arrangement of this vast crater.

"The terrestrial volcanoes," said Barbicane, "are only molehills compared to the volcanoes of the moon. Measuring the ancient craters formed by the first eruptions of Vesuvius and Etna, they are found to be scarcely 6,000 metres wide. In France the circle of the Cantal measures five miles; at Ceylon the circle of the island is forty miles, and is considered the largest on the globe. What are these diameters compared to that of Clavius, which we are over in this moment?"

"What is its width?" asked Nicholl.

"About seventy miles," answered Barbicane. "This amphitheatre is certainly the largest on the moon, but many are fifty miles wide!"

"Ah, my friends," exclaimed Michel Ardan, "can you imagine what this peaceful orb of night was once like? when these craters vomited torrents of lava and stones, with clouds of smoke and sheets of flame? What a prodigious spectacle formerly, and now what a falling off! This moon is now only the meagre case of fireworks, of which the rockets, serpents, suns, and wheels, after going off magnificently, only leave torn pieces of cardboard. Who can tell the cause, reason, or justification of such cataclysms?"

Barbicane did not listen to Michel Ardan. He was contemplating those ramparts of Clavius, formed of wide mountains several leagues thick. At

the bottom of its immense cavity lay hundreds of small extinct craters, making the soil like a sieve, and overlooked by a peak more than 15,000 feet high.

The plain around had a desolate aspect. Nothing so arid as these reliefs, nothing so sad as these ruins of mountains, if so they may be called, as those heaps of peaks and mountains encumbering the ground! The satellite seemed to have been blown up in this place.

The projectile still went on, and the chaos was still the same. Circles, craters, and mountains succeeded each other incessantly. No more plains or seas--an interminable Switzerland or Norway. Lastly, in the centre of the creviced region at its culminating point, the most splendid mountain of the lunar disc, the dazzling Tycho, to which posterity still gives the name of the illustrious Danish astronomer.

Whilst observing the full moon in a cloudless sky, there is no one who has not remarked this brilliant point on the southern hemisphere. Michel Ardan, to qualify it, employed all the metaphors his imagination could furnish him with. To him Tycho was an ardent focus of light, a centre of irradiation, a crater vomiting flames! It was the axle of a fiery wheel, a sea-star encircling the disc with its silver tentacles, an immense eye darting fire, a nimbo made for Pluto's head! It was a star hurled by the hand of the Creator, and fallen upon the lunar surface!

Tycho forms such a luminous concentration that the inhabitants of the

earth can see it without a telescope, although they are at a distance of 100,000 leagues. It will, therefore, be readily imagined what its intensity must have been in the eyes of observers placed at fifty leagues only.

Across this pure ether its brilliancy was so unbearable that Barbicane and his friends were obliged to blacken the object-glasses of their telescopes with gas-smoke in order to support it. Then, mute, hardly emitting a few admiring interjections, they looked and contemplated. All their sentiments, all their impressions were concentrated in their eyes, as life, under violent emotion, is concentrated in the heart.

Tycho belongs to the system of radiating mountains, like Aristarchus and Copernicus. But it testified the most completely of all to the terrible volcanic action to which the formation of the moon is due.

Tycho is situated in south lat. 43° and east long. 12° . Its centre is occupied by a crater more than forty miles wide. It affects a slightly elliptical form, and is inclosed by circular ramparts, which on the east and west overlook the exterior plain from a height of 5,000 metres. It is an aggregation of Mont Blancs, placed round a common centre, and crowned with shining rays.

Photography itself could never represent what this incomparable mountain, with all its projections converging to it and its interior excrescences, is really like. In fact, it is during the full moon that

Tycho is seen in all its splendour. Then all shadows disappear, the foreshortenings of perspective disappear, and all proofs come out white--an unfortunate circumstance, for this strange region would have been curious to reproduce with photographic exactitude. It is only an agglomeration of holes, craters, circles, a vertiginous network of crests. It will be understood, therefore, that the bubblings of this central eruption have kept their first forms. Crystallised by cooling, they have stereotyped the aspect which the moon formerly presented under the influence of Plutonic forces.

The distance which separated the travellers from the circular summits of Tycho was not so great that the travellers could not survey its principal details. Even upon the embankment which forms the ramparts of Tycho, the mountains hanging to the interior and exterior slopes rose in stories like gigantic terraces. They appeared to be higher by 300 or 400 feet on the west than on the east. No system of terrestrial castrametation could equal these natural fortifications. A town built at the bottom of this circular cavity would have been utterly inaccessible.

Inaccessible and marvellously extended over this ground of picturesque relief! Nature had not left the bottom of this crater flat and empty. It possessed a special orography, a mountain system which made it a world apart. The travellers clearly distinguished the cones, central hills, remarkable movements of the ground, naturally disposed for the reception of masterpieces of Selenite architecture. There was the place for a temple, here for a forum, there the foundations of a palace, there the

plateau of a citadel, the whole overlooked by a central mountain 1,500 feet high--a vast circuit which would have held ancient Rome ten times over.

"Ah!" exclaimed Michel Ardan, made enthusiastic by the sight, "what grand towns could be built in this circle of mountains! A tranquil city, a peaceful refuge, away from all human cares! How all misanthropes could live there, all haters of humanity, all those disgusted with social life!"

"All! It would be too small for them!" replied Barbicane simply.