CHAPTER V.

THE ROMANCE OF THE MOON.

A spectator endowed with infinite power of sight, and placed at the unknown centre round which gravitates the universe, would have seen myriads of atoms filling all space during the chaotic epoch of creation. But by degrees, as centuries went on, a change took place; a law of gravitation manifested itself which the wandering atoms obeyed; these atoms, combined chemically according to their affinities, formed themselves into molecules, and made those nebulous masses with which the depths of the heavens are strewed.

These masses were immediately animated by a movement of rotation round their central point. This centre, made of vague molecules, began to turn on itself whilst progressively condensing; then, following the immutable laws of mechanics, in proportion as its volume became diminished by condensation its movement of rotation was accelerated, and these two effects persisting, there resulted a principal planet, the centre of the nebulous mass.

By watching attentively the spectator would then have seen other molecules in the mass behave like the central planet, and condense in the same manner by a movement of progressively-accelerated rotation, and gravitate round it under the form of innumerable stars. The nebulae, of

which astronomers count nearly 5,000 at present, were formed.

Amongst these 5,000 nebulae there is one that men have called the Milky Way, and which contains eighteen millions of stars, each of which has become the centre of a solar world.

If the spectator had then specially examined amongst these eighteen millions of stars one of the most modest and least brilliant, a star of the fourth order, the one that proudly named itself the sun, all the phenomena to which the formation of the universe is due would have successively taken place under his eyes.

In fact, he would have perceived this sun still in its gaseous state, and composed of mobile molecules; he would have perceived it turning on its own axis to finish its work of concentration. This movement, faithful to the laws of mechanics, would have been accelerated by the diminution of volume, and a time would have come when the centrifugal force would have overpowered the centripetal, which causes the molecules all to tend towards the centre.

Then another phenomenon would have passed before the eyes of the spectator, and the molecules situated in the plane of the equator would have formed several concentric rings like that of Saturn round the sun. In their turn these rings of cosmic matter, seized with a movement of rotation round the central mass, would have been broken up into secondary nebulae--that is to say, into planets.

If the spectator had then concentrated all his attention on these planets he would have seen them behave exactly like the sun and give birth to one or more cosmic rings, origin of those secondary bodies which we call satellites.

Thus in going up from the atom to the molecule, from the molecule to the nebulae, and from the nebulae to the principal star, from the principal star to the sun, from the sun to the planet, and from the planet to the satellite, we have the whole series of transformations undergone by the celestial powers from the first days of the universe.

The sun seems lost amidst the immensities of the stellar universe, and yet it is related, by actual theories of science, to the nebula of the Milky Way. Centre of a world, and small as it appears amidst the ethereal regions, it is still enormous, for its size is 1,400,000 times that of the earth. Around it gravitate eight planets, struck off from its own mass in the first days of creation. These are, in proceeding from the nearest to the most distant, Mercury, Venus, the Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Between Mars and Jupiter circulate regularly other smaller bodies, the wandering débris, perhaps, of a star broken up into thousands of pieces, of which the telescope has discovered eighty-two at present. Some of these asteroids are so small that they could be walked round in a single day by going at a gymnastic pace.

Of these attendant bodies which the sun maintains in their elliptical orbit by the great law of gravitation, some possess satellites of their own. Uranus has eight, Saturn eight, Jupiter four, Neptune three perhaps, and the Earth one; this latter, one of the least important of the solar world, is called the Moon, and it is that one that the enterprising genius of the Americans means to conquer.

The Queen of Night, from her relative proximity and the spectacle rapidly renewed of her different phases, at first divided the attention of the inhabitants of the earth with the sun; but the sun tires the eyesight, and the splendour of its light forces its admirers to lower their eyes.

The blonde Phoebe, more humane, graciously allows herself to be seen in her modest grace; she is gentle to the eye, not ambitious, and yet she sometimes eclipses her brother the radiant Apollo, without ever being eclipsed by him. The Mahommedans understood what gratitude they owed to this faithful friend of the earth, and they ruled their months at 29-1/2 days on her revolution.

The first people of the world dedicated particular worship to this chaste goddess. The Egyptians called her Isis, the Phoenicians Astarte, the Greeks Phoebe, daughter of Jupiter and Latona, and they explained her eclipses by the mysterious visits of Diana and the handsome Endymion. The mythological legend relates that the Nemean lion traversed the country of the moon before its apparition upon earth, and the poet

Agesianax, quoted by Plutarch, celebrated in his sweet lines its soft eyes, charming nose, and admirable mouth, formed by the luminous parts of the adorable Selene.

But though the ancients understood the character, temperament, and, in a word, moral qualities of the moon from a mythological point of view, the most learned amongst them remained very ignorant of selenography.

Several astronomers, however, of ancient times discovered certain particulars now confirmed by science. Though the Arcadians pretended they had inhabited the earth at an epoch before the moon existed, though Simplicius believed her immovable and fastened to the crystal vault, though Tacitus looked upon her as a fragment broken off from the solar orbit, and Clearch, the disciple of Aristotle, made of her a polished mirror upon which were reflected the images of the ocean--though, in short, others only saw in her a mass of vapours exhaled by the earth, or a globe half fire and half ice that turned on itself, other savants, by means of wise observations and without optical instruments, suspected most of the laws that govern the Queen of Night.

Thus Thales of Miletus, B.C. 460, gave out the opinion that the moon was lighted up by the sun. Aristarchus of Samos gave the right explanation of her phases. Cleomenus taught that she shone by reflected light. Berose the Chaldean discovered that the duration of her movement of rotation was equal to that of her movement of revolution, and he thus explained why the moon always presented the same side. Lastly,

Hipparchus, 200 years before the Christian era, discovered some inequalities in the apparent movements of the earth's satellite.

These different observations were afterwards confirmed, and other astronomers profited by them. Ptolemy in the second century, and the Arabian Aboul Wefa in the tenth, completed the remarks of Hipparchus on the inequalities that the moon undergoes whilst following the undulating line of its orbit under the action of the sun. Then Copernicus, in the fifteenth century, and Tycho Brahe, in the sixteenth, completely exposed the system of the world and the part that the moon plays amongst the celestial bodies.

At that epoch her movements were pretty well known, but very little of her physical constitution was known. It was then that Galileo explained the phenomena of light produced in certain phases by the existence of mountains, to which he gave an average height of 27,000 feet.

After him, Hevelius, an astronomer of Dantzig, lowered the highest altitudes to 15,000 feet; but his contemporary, Riccioli, brought them up again to 21,000 feet.

Herschel, at the end of the eighteenth century, armed with a powerful telescope, considerably reduced the preceding measurements. He gave a height of 11,400 feet to the highest mountains, and brought down the average of different heights to little more than 2,400 feet. But Herschel was mistaken too, and the observations of Schroeter, Louville,

Halley, Nasmyth, Bianchini, Pastorff, Lohrman, Gruithuysen, and especially the patient studies of MM. Boeer and Moedler, were necessary to definitely resolve the question. Thanks to these savants, the elevation of the mountains of the moon is now perfectly known. Boeer and Moedler measured 1,905 different elevations, of which six exceed 15,000 feet and twenty-two exceed 14,400 feet. Their highest summit towers to a height of 22,606 feet above the surface of the lunar disc.

At the same time the survey of the moon was being completed; she appeared riddled with craters, and her essentially volcanic nature was affirmed by each observation. From the absence of refraction in the rays of the planets occulted by her it is concluded that she can have no atmosphere. This absence of air entails absence of water; it therefore became manifest that the Selenites, in order to live under such conditions, must have a special organisation, and differ singularly from the inhabitants of the earth.

Lastly, thanks to new methods, more perfected instruments searched the moon without intermission, leaving not a point of her surface unexplored, and yet her diameter measures 2,150 miles; her surface is one-thirteenth of the surface of the globe, and her volume one-forty-ninth of the volume of the terrestrial spheroid; but none of her secrets could escape the astronomers' eyes, and these clever savants carried their wonderful observations still further.

Thus they remarked that when the moon was at her full the disc appeared

in certain places striped with white lines, and during her phases striped with black lines. By prosecuting the study of these with greater precision they succeeded in making out the exact nature of these lines. They are long and narrow furrows sunk between parallel ridges, bordering generally upon the edges of the craters; their length varied from ten to one hundred miles, and their width was about 1,600 yards. Astronomers called them furrows, and that was all they could do; they could not ascertain whether they were the dried-up beds of ancient rivers or not. The Americans hope, some day or other, to determine this geological question. They also undertake to reconnoitre the series of parallel ramparts discovered on the surface of the moon by Gruithuysen, a learned professor of Munich, who considered them to be a system of elevated fortifications raised by Selenite engineers. These two still obscure points, and doubtless many others, can only be definitely settled by direct communication with the moon.

As to the intensity of her light there is nothing more to be learnt; it is 300,000 times weaker than that of the sun, and its heat has no appreciable action upon thermometers; as to the phenomenon known as the "ashy light," it is naturally explained by the effect of the sun's rays transmitted from the earth to the moon, and which seem to complete the lunar disc when it presents a crescent form during its first and last phases.

Such was the state of knowledge acquired respecting the earth's satellite which the Gun Club undertook to perfect under all its aspects,

cosmographical, geographical, geological, political, and moral.