

CHAPTER VIII.

AT SEVENTY-EIGHT THOUSAND ONE HUNDRED AND FOURTEEN LEAGUES.

What had happened? What was the cause of that singular intoxication, the consequences of which might prove so disastrous? Simply carelessness on Michel's part, which Nicholl was able to remedy in time.

After a veritable swoon, which lasted a few minutes, the captain, who was the first to regain consciousness, soon collected his intellectual faculties.

Although he had breakfasted two hours before, he began to feel as hungry as if he had not tasted food for several days. His whole being, his brain and stomach, were excited to the highest point.

He rose, therefore, and demanded a supplementary collation from Michel, who was still unconscious, and did not answer. Nicholl, therefore, proceeded to prepare some cups of tea, in order to facilitate the absorption of a dozen sandwiches. He busied himself first with lighting a fire, and so struck a match.

What was his surprise to see the sulphur burn with extraordinary and almost unbearable brilliancy! From the jet of gas he lighted rose a flame equal to floods of electric light.

A revelation took place in Nicholl's mind. This intensity of light, the physiological disturbance in himself, the extra excitement of all his moral and sensitive faculties--he understood it all.

"The oxygen!" he exclaimed.

And leaning over the air-apparatus, he saw that the tap was giving out a flood of colourless, savourless, and odourless gas, eminently vital, but which in a pure state produces the gravest disorders in the constitution. Through carelessness Michel had left the tap full on. Nicholl made haste to turn off this flow of oxygen with which the atmosphere was saturated, and which would have caused the death of the travellers, not by suffocation, but by combustion.

An hour afterwards the air was relieved, and gave their normal play to the lungs. By degrees the three friends recovered from their intoxication; but they were obliged to recover from their oxygen like a drunkard from his wine.

When Michel knew his share of responsibility in this incident he did not appear in the least disconcerted. This unexpected intoxication broke the monotony of the journey. Many foolish things had been said under its influence, but they had been forgotten as soon as said.

"Then," added the merry Frenchman, "I am not sorry for having

experienced the effect of this captious gas. Do you know, my friends, that there might be a curious establishment set up with oxygen-rooms, where people whose constitutions are weak might live a more active life during a few hours at least? Suppose we had meetings where the air could be saturated with this heroic fluid, theatres where the managers would send it out in strong doses, what passion there would be in the souls of actors and spectators, what fire and what enthusiasm! And if, instead of a simple assembly, a whole nation could be saturated with it, what activity, what a supplement of life it would receive! Of an exhausted nation it perhaps would make a great and strong nation, and I know more than one state in old Europe that ought to put itself under the oxygen régime in the interest of its health."

Michel spoke with as much animation as if the tap were still full on. But with one sentence Barbicane damped his enthusiasm.

"All that is very well, friend Michel," he said, "but now perhaps you will tell us where those fowls that joined in our concert came from."

"Those fowls?"

"Yes."

In fact, half-a-dozen hens and a superb cock were flying hither and thither.

"Ah, the stupid!" cried Michel. "It was the oxygen that put them in revolt."

"But what are you going to do with those fowls?" asked Barbicane.

"Acclimatise them in the moon of course! For the sake of a joke, my worthy president; simply a joke that has unhappily come to nothing! I wanted to let them out on the lunar continent without telling you! How astounded you would have been to see these terrestrial poultry pecking the fields of the moon!"

"Ah, gamin, you eternal boy!" answered Barbicane, "you don't want oxygen to make you out of your senses! You are always what we were under the influence of this gas! You are always insane!"

"Ah! how do we know we were not wiser then?" replied Michel Ardan.

After this philosophical reflection the three friends repaired the disorder in the projectile. Cock and hens were put back in their cage. But as they were doing this Barbicane and his two companions distinctly perceived a fresh phenomenon.

Since the moment they had left the earth their own weight, that of the bullet and the objects it contained, had suffered progressive diminution. Though they could not have any experience of this in the projectile, a moment must come when the effect upon themselves and the

tools and instruments they used would be felt.

Of course scales would not have indicated this loss of weight, for the weights used would have lost precisely as much as the object itself; but a spring weighing-machine, the tension of which is independent of attraction, would have given the exact valuation of this diminution.

It is well known that attraction, or weight, is in proportion to the bulk, and in inverse proportion to the square of distances. Hence this consequence. If the earth had been alone in space, if the other heavenly bodies were to be suddenly annihilated, the projectile, according to Newton's law, would have weighed less according to its distance from the earth, but without ever losing its weight entirely, for the terrestrial attraction would always have made itself felt, no matter at what distance.

But in the case with which we are dealing, a moment must come when the projectile would not be at all under the law of gravitation, after allowing for the other celestial bodies, whose effect could not be set down as zero.

In fact, the trajectory of the projectile was between the earth and the moon. As it went farther away from the earth terrestrial attraction would be diminished in inverse proportion to the square of distances, but the lunar attraction would be augmented in the same proportion. A point must, therefore, be reached where these two attractions would

neutralise each other, and the bullet would have no weight at all. If the volumes of the moon and earth were equal, this point would have been reached at an equal distance between the two bodies. But by taking their difference of bulk into account it was easy to calculate that this point would be situated at $\frac{47}{52}$ of the journey, or at 78,114 leagues from the earth.

At this point a body that had no principle of velocity or movement in itself would remain eternally motionless, being equally attracted by the two heavenly bodies, and nothing drawing it more towards one than the other.

Now if the force of impulsion had been exactly calculated the projectile ought to reach that point with no velocity, having lost all weight like the objects it contained.

What would happen then? Three hypotheses presented themselves.

Either the projectile would have kept some velocity, and passing the point of equal attraction, would fall on the moon by virtue of the excess of lunar attraction over terrestrial attraction.

Or velocity sufficient to reach the neutral point being wanting, it would fall back on the earth by virtue of the excess of terrestrial attraction over lunar attraction.

Or lastly, endowed with sufficient velocity to reach the neutral point, but insufficient to pass it, it would remain eternally suspended in the same place, like the pretended coffin of Mahomet, between the zenith and nadir.

Such was the situation, and Barbicane clearly explained the consequences to his travelling companions. They were interested to the highest degree. How were they to know when they had reached this neutral point, situated at 78,114 leagues from the earth, at the precise moment when neither they nor the objects contained in the projectile should be in any way subject to the laws of weight?

Until now the travellers, though they had remarked that this action diminished little by little, had not yet perceived its total absence. But that day, about 11 a.m., Nicholl having let a tumbler escape from his hand, instead of falling, it remained suspended in the air.

"Ah!" cried Michel Ardan, "this is a little amusing chemistry!"

And immediately different objects, weapons, bottles, &c, left to themselves, hung suspended as if by miracle. Diana, too, lifted up by Michel into space, reproduced, but without trickery, the marvellous suspensions effected by Robert-Houdin and Maskelyne and Cook.

The three adventurous companions, surprised and stupefied in spite of their scientific reasoning, carried into the domain of the marvellous,

felt weight go out of their bodies. When they stretched out their arms they felt no inclination to drop them. Their heads vacillated on their shoulders. Their feet no longer kept at the bottom of the projectile. They were like staggering drunkards. Imagination has created men deprived of their reflection, others deprived of their shadows! But here reality, by the neutrality of active forces, made men in whom nothing had any weight, and who weighed nothing themselves.

Suddenly Michel, making a slight spring, left the floor and remained suspended in the air like the good monk in Murillo's Cuisine des Anges. His two friends joined him in an instant, and all three, in the centre of the projectile, figured a miraculous ascension.

"Is it believable? Is it likely? Is it possible?" cried Michel. "No. And yet it exists! Ah! if Raphael could have seen us like this what an Assumption he could have put upon canvas!"

"The Assumption cannot last," answered Barbicane. "If the projectile passes the neutral point, the lunar attraction will draw us to the moon."

"Then our feet will rest upon the roof of the projectile," answered Michel.

"No," said Barbicane, "because the centre of gravity in the projectile is very low, and it will turn over gradually."

"Then all our things will be turned upside down for certain!"

"Do not alarm yourself, Michel," answered Nicholl. "There is nothing of the kind to be feared. Not an object will move; the projectile will turn insensibly."

"In fact," resumed Barbicane, "when it has cleared the point of equal attraction, its bottom, relatively heavier, will drag it perpendicularly down to the moon. But in order that such a phenomenon should take place we must pass the neutral line."

"Passing the neutral line!" cried Michel. "Then let us do like the sailors who pass the equator--let us water our passage!"

A slight side movement took Michel to the padded wall. Thence he took a bottle and glasses, placed them "in space" before his companions, and merrily touching glasses, they saluted the line with a triple hurrah.

This influence of the attractions lasted scarcely an hour. The travellers saw themselves insensibly lowered towards the bottom, and Barbicane thought he remarked that the conical end of the projectile deviated slightly from the normal direction towards the moon. By an inverse movement the bottom side approached it. Lunar attraction was therefore gaining over terrestrial attraction. The fall towards the moon began, insensibly as yet; it could only be that of a millimetre (0.03937

inch), and a third in the first second. But the attractive force would gradually increase, the fall would be more accentuated, the projectile, dragged down by its bottom side, would present its cone to the earth, and would fall with increasing velocity until it reached the Selenite surface. Now nothing could prevent the success of the enterprise, and Nicholl and Michel Ardan shared Barbicane's joy.

Then they chatted about all the phenomena that had astounded them one after another, especially about the neutralisation of the laws of weight. Michel Ardan, always full of enthusiasm, wished to deduce consequences which were only pure imagination.

"Ah! my worthy friends," he cried, "what progress we should make could we but get rid upon earth of this weight, this chain that rivets us to her! It would be the prisoner restored to liberty! There would be no more weariness either in arms or legs. And if it is true that, in order to fly upon the surface of the earth, to sustain yourself in the air by a simple action of the muscles, it would take a force 150 times superior to that we possess, a simple act of will, a caprice, would transport us into space, and attraction would not exist."

"In fact," said Nicholl, laughing, "if they succeeded in suppressing gravitation, like pain is suppressed by anaesthesia, it would change the face of modern society!"

"Yes," cried Michel, full of his subject, "let us destroy weight and

have no more burdens! No more cranes, screw-jacks, windlasses, cranks, or other machines will be wanted."

"Well said," replied Barbicane; "but if nothing had any weight nothing would keep in its place, not even the hat on your head, worthy Michel; nor your house, the stones of which only adhere by their weight! Not even ships, whose stability upon the water is only a consequence of weight. Not even the ocean, whose waves would no longer be held in equilibrium by terrestrial attraction. Lastly, not even the atmosphere, the molecules of which, being no longer held together, would disperse into space!"

"That is a pity," replied Michel. "There is nothing like positive people for recalling you brutally to reality!"

"Nevertheless, console yourself, Michel," resumed Barbicane, "for if no star could exist from which the laws of weight were banished, you are at least going to pay a visit where gravity is much less than upon earth."

"The moon?"

"Yes, the moon, on the surface of which objects weigh six times less than upon the surface of the earth, a phenomenon very easy to demonstrate."

"And shall we perceive it?" asked Michel. "Evidently, for 400 lbs. only

weigh 60 lbs. on the surface of the moon."

"Will not our muscular strength be diminished?"

"Not at all. Instead of jumping one yard you will be able to rise six."

"Then we shall be Hercules in the moon," cried Michel.

"Yes," replied Nicholl, "and the more so because if the height of the Selenites is in proportion to the bulk of their globe they will be hardly a foot high."

"Liliputians!" replied Michel. "Then I am going to play the rôle of Gulliver! We shall realise the fable of the giants! That is the advantage of leaving one's own planet to visit the solar world!"

"But if you want to play Gulliver," answered Barbicane, "only visit the inferior planets, such as Mercury, Venus, or Mars, whose bulk is rather less than that of the earth. But do not venture into the big planets, Jupiter, Saturn, Uranus, Neptune, for there the rôles would be inverted, and you would become Liliputian."

"And in the sun?"

"In the sun, though its density is four times less than that of the earth, its volume is thirteen hundred and twenty-four thousand times

greater, and gravitation there is twenty-seven times greater than upon the surface of our globe. Every proportion kept, the inhabitants ought on an average to be two hundred feet high."

"The devil!" exclaimed Michel. "I should only be a pigmy!"

"Gulliver amongst the giants," said Nicholl.

"Just so," answered Barbicane.

"It would not have been a bad thing to carry some pieces of artillery to defend oneself with."

"Good," replied Barbicane; "your bullets would have no effect on the sun, and they would fall to the ground in a few minutes."

"That's saying a great deal!"

"It is a fact," answered Barbicane. "Gravitation is so great on that enormous planet that an object weighing 70 lbs. on the earth would weigh 1,930 lbs. on the surface of the sun. Your hat would weigh 20 lbs.! your cigar 1/2 lb.! Lastly, if you fell on the solar continent your weight would be so great--about 5,000 lbs.--that you could not get up again."

"The devil!" said Michel, "I should have to carry about a portable crane! Well, my friends, let us be content with the moon for to-day.

There, at least, we shall cut a great figure! Later on we shall see if we will go to the sun, where you can't drink without a crane to lift the glass to your mouth."