

I

In the blink of an eye, as rapid as thought, faster than an arrow, my balloon had already risen so high that I was overlooking the whole of Paris, the least parts of which my gaze embraced, and the smallest details of which it followed.

My head was spinning slightly; my heart was beating with a kind of anxiety, and my temples were quivering under the friction of the air, but my energy and my will rendered me master of all my faculties. I leaned over to the right and to the left; everywhere, there were faces, eyes fixed on my carriage. I wanted to judge the merit of my invention right away, and I applied the brake. Immediately, like a docile horse, the balloon slowed down. I pressed harder on the mechanism, and the balloon stopped. I was then assured of the power of my discovery; I thanked God. At the same time, I got rid of a few pounds of ballast, and left the aerostat to its own devices. It launched toward the zenith again, like a wild thoroughbred mare.

There was no more propitious time for traveling thus.

The air was pure, the sky blue streaked with white, promising a splendid day. The spring sun, eager to complete the flourishing of nature revived, was shining with all its brilliance. The bells of Notre-Dame were ringing for some occasion or other, and the bells of several other churches replied merrily. The echoes of the Marne resounded in the distance to the formidable roar of the cannons of the Polygone de Vincennes. In the opposite direction, the Camp-de-Mars appeared as a large white sheet covered with a multitude of ants hurrying about their work; they were the regiments of the Armée de Paris, carrying out maneuvers. The sound of their fanfares rose and faded away, often extinguished by rapid gusts of wind. The Seine sparkled between its two granite banks, speckled by the boats at its quais. The obelisks of stone, bronze and lead, domes, towers, steeples, campaniles, columns, arches, triumphant gates, piers, minarets, cupolas and pyramids appeared to me in perfect clarity, with a thousand streets crawling around their bases like serpents.

The eye and the ear were not yet losing anything of what was happening in the seething crucible, the molten crater, that I had beneath me. I could make out all the squares, and the movement of the busy and noisy crowds within the squares. The murmur that those countless breasts exhaled, and the rumble of vehicles, combined with the rocking of human waves, growling dully like a continual bass-line. Around the palais, in the middle of the squares, on a hundred avenues within and outside the city, the trees, the lawns, the spinneys and the clumps of versant bushes were like emeralds framed by the golden tints of innumerable buildings. It was a truly unrivaled scene, an unparalleled agitation, an inimitable noise, a frightful harmony.

I saw and heard everything I have just described sharply and rapidly—as rapidly as you can think it, more rapidly than I can say it. In a situation like mine, sensation and observation are very swift.

My balloon rose up with ever-increasing rapidity. I soon measured an altitude of 900 meters.

For the benefit of those who do not know how the distance one is from the ground is accurately measured, I ought to say that it is done with the barometer. Given that a column of air, at sea level, weighs as much as twenty-eight inches of mercury, one can see that the shorter that column of air becomes, the lighter it is—which causes of mercury of a barometer to decrease as one rises into the sky, whether in an aerostat or climbing a high mountain. It is, therefore, child's play to count the degrees of one's ascent.

An immense horizon appeared to my gaze: Saint-Cloud and its palais, Versailles and its two towns, Meudon and the château that crowns it, Corbeil and the islets of its shores, the old tower of Montlhéry, the ruins of Etampes, the ancient church of Saint-Denis, the sunken bastions of Pierrefonds, and the straight lines of the railways with their gigantic leviathans, the golden ribbons of capricious fluvial navigation, the silver threads of a thousand steams, woods, towns, meadows, hills, villages, valleys, mountains. And the circle limiting my gaze was still increasing, to the extent that I recognized, by turns, Saint-Germain, where Louis XIV saw the light of day; Poissy, which saw Saint Louis baptized; Mantes, where William the Conqueror was wounded; Rambouillet, where François I died; Fontainebleau, which heard the sobs of the veterans of the old guard at the adieux of the immortal emperor; Compiègne, which received the first États-Généraux; Noyon, which saw kings

crowned; and Beauvais, with its memories of Jeanne Hachette;¹ and Amiens, whose citadel was built by Henri IV; and Rouen, the old Norman capital, every street of which still retains some chiseled and sculpted jewel, marvelous work that causes archeologists to pale; and Blois, with its château full of illustrious shades and memorable dramas; and Tours, swimming in the waters of the Loire, which waters the garden of France; and Orléans, on whose ramparts my imagination still saw Jeanne d'Arc's plume and Fleur-de-Lys banner.

Paris was no longer anything but a miniature to my eyes; and the horizon, while still broadening, shrank in such a manner that after a quarter of an hour it was no more to my gaze than an immense painting charged with the most various colors. However, as the atmospheric layers that I was traversing produced the effect of a magnifying-glass, I discovered a new, charming and picturesque viewpoint with every passing moment, but reduced to proportions too delicate for me to be able to recognize or analyze its beauties. All sound had ceased; the rumors of the earth could no longer reach me. I looked down on Creation without being part of it.

It became easy to recognize the rotundity of the Earth from the point I had reached. At my nadir, which as the Earth's summit, the globe was subsiding, showing a gentle and graceful declivity that was becoming increasingly pronounced. It even seemed to me that I might see it rotating beneath my feet, and that countries and seas were offered to the investigations of my ardent curiosity—but no, as it rotated, it drew me along in its movement, and I still only saw the same aspects. My God, how beautiful they were, and how great and sublime your works seemed!

My balloon was so docile and its helm so effective that, as I have just said, it moved neither to the right nor the left as it rose above the Earth, but always followed the movement of the globe. As no breeze was blowing, I still found myself above Paris. I wanted to alter that monotonous progress then, and, having departed to study the unknown, I gave my machine such a thrust that the rapidity of my ascension became frightful.

In spite of the limpidity of the atmosphere, soon I could only see the Earth as an enormous green, gray and gilded mass. I could no longer make out anything of urban or rural locations. On the other hand, I began to sense various disagreeable impressions. I was cold—very cold, at first—and then the cold was succeeded by a sort of numbness; and when I tried to pass my hand over my cheeks, in order to warm them up, it seemed to me that my face was enormous in its volume. I looked at my hands; they seemed swollen; I took out my mirror and contemplated myself; my nose, eyes and entire head were swollen and puffed up. Blood was running from my nostrils. After a few minutes of rather pronounced malaise, like the commencement of asphyxia, however, I found myself returned to my normal state. Even so, I wrapped myself in my reefer jacket, and, my stomach feeling very desirous of food, I breakfasted with a hearty appetite.

I had just finished emptying a bottle of Graves when, darting a glance at the barometer, I saw that I had arrived at a height of three thousand meters. I brought my apparatus into play, for I was in a mood to brave any danger, and under the pressure of my machine the balloon bounded magnificently, and rose up rapidly to four thousand, to five thousand, to six thousand meters...

You would doubtless like to know what the blessed apparatus was that could make an aerostat leap in that manner, like a thoroughbred mare under the spur. I would certainly tell you, for I trust you, my young readers, in spite of the aspersions that people are pleased to cast upon the looseness of certain tongues; but, on the one hand, if I published my secret thus, it would lose its first and most essential quality, mystery; and on the other, although simple to manufacture, the mechanism can only be understood when seen, when it is working before one's eyes. I'm not refusing, however, to show it to you. Come to my house at any time when you're passing through my neighborhood; I'll be glad to have the opportunity to be agreeable to you by playing it in your hands and making it work in your presence.

The barometer soon marked seven and eight thousand meters—the same height as the Himalayas. There was therefore nothing very extraordinary as yet, you see, since there are mountains on our terrestrial globe that rise up to twenty-six thousand feet. So I used my invention and the balloon redoubled its speed. I reached ten thousand meters, then eleven, then twelve, etc.

¹ Jeanne Laisné earned her nickname (Jeanne the Axe) when she cut down a Burgundian flag raised on the ramparts of Beauvais during a 15th-century siege and allegedly turned the tide of the battle. Driou wrote a book about her, published in 1875 under the Valentin Fréville pseudonym.

I will spare you an account of the various impressions of temperature to which I was subjected. I will only say that the sun became much smaller to my eyes, but much redder, and infinitely less warm, by reason of the scant air that remained above me to bring me its rays. I will add that the blue of the sky faded away and that, the higher I climbed, leaving the greater mass of air beneath me, the more the blue that the atmosphere ordinarily gives to the firmament, being beneath my feet at the height where I was, faded away, giving way to a blackness that, in truth, did not delight either the gaze or the imagination.

It is not sufficient to expect a phenomenon to be unmoved by it. The finger of God and his power always make themselves felt when one is confronted with things with which one is not yet familiar. Thus, I knew the beautiful azure color of the firmament is due, not only to the mass of air, fifteen or sixteen leagues thick, that surrounds us, but also to the immense layers of water vapor that reflect the sun's rays conjointly with the air. I felt that water vapor as cloud, for my balloon was dripping with it and I was drenched by its humidity; I knew that, I tell you, from physics and from *Genesis*, which tell us that God, separating the waters from one another, placed some on high and made the oceans with others. I knew that, and I was moved.

I knew that the heavy and elastic fluid matter that is called air bears down on every square foot of surface with a weight of two thousand pounds, with the result that an ordinary man of average strength really bears an enormous weight on his head. If he is not crushed, it is because the air in his body, incessantly renewed, maintains an equilibrium with the frightful burden that weighs upon him. Thus, I had seen the air in the vast body of an elephant pumped out, and the poor beast was immediately flattened beneath the weight of the exterior air, and died. I had also seen, on the other hand, the air around a bull pumped away; then the air enclosed with its body expanded vastly, to the extent that the animal, having become monstrous, also fell down dead.² I knew all that, and I wondered, with a certain emotion, what would happen if I was able to reach the limits of the atmosphere and no longer had anything above me.

Fortunately, as imagination extrapolated my ideas, less painful thoughts arrived to remind me of the poetic marvels of the air. I recalled that at the moment when the sun disappears over the horizon, without the presence of air, we would suddenly enter into the blackest night. How is it that that does not happen, and that, on the contrary, we enjoy daylight for some time yet? Why the twilight of dusk and the twilight of dawn? It is because, to prepare us for day and night, the delicate solidity with which the Creator has endowed that element causes it to bend and prolong the rays of light that escape the sun when they penetrate the atmosphere sideways.

I also told myself that air is the vehicle permanently disposed to transmit to us emanations gratifying the sense of smell; the messenger that brings us the sounds destined to inform us as to what is happening at a distance; a faithful monitor obligingly confiding to us what others are thinking; the zealous interpreter of harmony. Let a scream be uttered, a bell struck, a cannon fire, a trumpet sound, and suddenly, in one second, the air has transported the cry, the sound, the blast, the chord twenty four thousand feet, and the next second carries it an equal distance...

In the wake of that tirade I had begun another hymn in honor of breezes, winds, northerlies, southerlies, the sirocco, the simoom and the mistral, and varieties of air: calm, agitated, melancholy, sullen, furious, scorching or peevish, when, without my laying a hand on the apparatus, touching the brake or saying a word to my aerostat, it was gripped by a fit of ill-temper. Doubtless feeling damp, it performed a few pirouettes. Whether it was a desire to dry itself, to attract my attention, further water vapor or a current of air that had caused it to change course, I could not tell, but it took a few minutes to right itself.

It is said of Horace Saussure that during his ascent of Mont Blanc, when his guides, leaving the air beneath them, had reached the highest peak, the sky seemed so black to them that they recoiled in fear, thinking that an immense gulf had just opened up beneath their feet. Such was the impression that

² The protagonist could not, of course, have seen any such things, any more than he could have risen above eight thousand meters without suffering severely from oxygen deprivation; Driou does not seem to intend him to be an unreliable narrator, and his account of the history of aeronautics has been as accurate as could possibly have been expected, but he does occasionally resort to bare-faced lies, which compromise his authority as a popularizer of science, history and geography.

I suddenly had, on collecting myself in order to investigate the cause that had made my balloon behave turbulently.

The air was beginning to run out, and the aerostat had ceased climbing. It was rising slowly, ducking to the right and the left, swaying awkwardly.

I made my calculation; I must be thirteen leagues from the ground. That was too inauspicious a figure for me to stop. I activated the apparatus and the balloon resumed its progress, but like someone forced to advance without wanting to, reluctantly, under the lash of pressure...

If it had been endowed with sentiment, I would have thought that it was afraid.

That would not have been unreasonable; there were grounds to experience certain emotions.

Imagine that I was arriving at the final limits of the air, which was becoming increasingly rarefied—and as it is the conductor of light, the daylight was disappearing. I was entering into a region of darkness—frightful darkness, I assure you! There, above me, was space—but what space! An immense, immeasurable, endless black abyss black enough to make one recoil in fear. In addition, a glacial cold, a thousand times sharper, more bitter and biting than what one experiences coming out of a warm room to brave a December evening in a broad and spacious street open to the north. I was wrapped in cloaks and blankets, but I was shivering. Besides that, a sort of terror gripped me. Involuntarily, I closed my eyes...

In that state of mind, I raised my heart toward God, and invoked the Virgin, the guiding star; I thought about my mother, and then I thought about glory!

Well, I confess, God, the Holy Virgin and my mother found me very sensitive, but glory and its aureole did not render any heat, and left me cold.

In any case, I had little time to meditate upon its advantages and fortunate results. It was necessary to think about maneuvering. In the darkness, which was gradually overtaking me, I judged that the balloon was no longer steering itself sagely and I resolved to tack.

When I had arranged matters so that I was no longer rising sensibly, but remaining at the height I had reached, while navigating in the ultimate atmospheric layer, instead of raising my gaze I lowered it.

Heaven and Earth be silent! Lend an ear, children of men. Never had a spectacle similar to the one that was given to me struck human eyes, because no others had come, as I had, to seek the marvels of God above the confines of the world.

Above me, as I have said, extended a thick, black, frightful funereal veil. Beneath me, however, swayed the prodigious globe of the atmosphere, enclosing the Earth at its center like a nucleus—and that indescribable globe was luminous, flamboyant with daylight, gilded by the rays of the sun, silvered by softer reflections, tinted scarlet here, mingled with opal there, rutilant with ruby fire in certain places, violet-tinged by amethyst elsewhere: in brief, offering throughout its immense and marvelous sphere those charming and delicious prismatic colors that the dawn, and especially the sunset, sometimes show us. Except that, what we see on Earth, at those melancholy hours so beloved by artists, when nature is so rich, so beautiful and so fantastic, when the horizon hides the sun, and the moon rises at the opposite point of the compass like a shield emerging from a furnace, and the blue pavilion of the sky lights up with myriad fires, was only a corner of the magical tableau that was offered to me.

How I would have liked to have someone beside me, then, capable of sensing those inappreciable splendors—but I was alone, alas. I became intoxicated nevertheless by the sublime contemplation into which I fell, and I adored, lovingly, the Creator, the Sovereign Being, eternal, immutable and infinite, the Being of Beings, the Author of Worlds.

What I saw was all the more admirable because, having risen further, attaining a distance of fifteen leagues, I was now only illuminated from below by the reflections of that magnificent globe, which was hanging heavily in that frightful black abyss, horribly black, against which I was swimming, towards which I was advancing. The summit of my aerostat was lost in obscurity, but the softest shades rendered its lower parts splendid, and the rigging seemed to be made of the purest gold, while the fabric had a purple gleam and certain stripes the richness of emerald green. Those colors, however, were weakening, and darkness soon became the queen and mistress of the region where I found myself.

This time, very evidently, the balloon was no longer rising at all.

A further surprise was reserved for me, however, and I entered into a long series of successive admirations, of which I ought to enter an account if my story is capable of interesting you.

In that obscure profundity—blacker, believe me, than the darkest night—I thought I saw a red dot. My eyes, fatigued by the cold and the various atmospheric impressions I had endured, were obliged to close rather frequently, and not to remain open for long. That made observation of the fiery point difficult. Nevertheless, by dint of effort, I fixed my gaze and I recognized that the dot, as red as a mass of iron emerging from the forge, was nothing other than the sun.

But it was no longer the sun whose rays reach us magnified by the refraction of the air, the magnificent sun that spreads light and serenity, which inspires delight, which fecundates and disseminates light over our globe like a marvelous chandelier. No, it was a sun, a powerful jet of fire, an incandescent sphere, a gigantic creation of the Supreme Will, but in relation to me, a poor wandering curiosity-seeker, it was an orb without heat, a star without radiance.

That burning red mass, as sinister as a conflagration, rolling slowly across the black background, had something terrible about it, which gripped me.

“So that’s it,” I said to myself, “the globe thirteen hundred and thirty thousand times larger than the Earth, of which *Genesis* relates the sudden birth, at the word of God, and which has already been hanging, at the same point in space for six thousand years. For sixty centuries already, the Earth has been rotating around that pivot, that marvelous center of worlds, at a distance of thirty-five million leagues; and, obedient to the order of the divine Lawmaker, the monstrous giant distributes its light and its life without resting for a moment, without losing a second on the route it must follow. Moving at eight million leagues an hour, the terrestrial sphere receives its beneficial gaze endlessly. What is it, though?”

Alas, on that question, I remained mute. Where is the scientist who could resolve a problem of which God alone knows the mystery and the secret? Nevertheless, equipped as I was with a fairly powerful telescope, and blackened lenses, I set about studying that globe, from whose burning fires I had much less to fear.

The sun then appeared to me paler than to the naked eye, but, at the same time, I saw clouds of fire burning on its surface, which seemed to be melting together, drawing apart, drawing together, dissolving into one another and being reborn. Their tenuousness, however, did not prevent me from distinguishing the nucleus of the star. I thus perceived dark patches, irregular in shape, which seemed to be moving over its surface. Each patch, surrounded by a penumbra, had a luminous border, whose light was brighter than that of the rest of the sun. Extremely variable in their form, their number and their position, I was able to count up to fifty of them. A few months earlier, at the Paris Observatory, I had found seven at the most; that difference in number, already noted by Galileo, shows that the sun offers different faces, variously maculated, and that was how it was determined that it rotates on its axis in twenty-five days.

What struck me most forcibly during that serial study was the enormous size I recognized in the patches. According to the calculation that I was able to make, rapidly, some of them had four or five times the diameter of the Earth. But what seemed to me to be more positive in the sun’s nature, and which I report here, is that the center of the sun had a light much more intense than the edges of its disk.

Does not all this indicate that there are at the surface of the enormous mass of fire lively effervescences of which volcanoes only offer a feeble suggestion? I could not say so for sure, but one is naturally led to conclude that the sun is a sea of fire from which the summits of various mountains emerge, which form the black patches in the midst of the flaming ocean, or a globe in combustion strewn with volcanoes, which, emitting a darker glare, create the impression of those patches, various in size and shape.

How, then, does it not consume itself? That is what people ask, with good reason, and a question I put to myself.

My response was this:

“It is probable that if the sun does not purge itself in the continual emission of its rays, it is because it enjoys, as chemistry has proved of certain substances, the faculty of warming its surroundings and spreading light around it, without ever diminishing itself. A grain of musk can perfume an apartment without losing any of its tiny mass, torrents of odorant matter incessantly escaping it for many years.”

Monsieur Dominique-François Arago, whose recent loss France and the scientific world mourned, comes to mind; I recall that in a conversation I had with him, the famous astronomer explained to me that the sun is a dark body, but surrounded by two atmospheres, the inner one bright and blazing, the second dark but diaphanous, which allows us to see the other, illuminating us with the emission of its luminous rays. Then the patches on the disk would merely be glimpses of the nucleus, which reach us when it is affected by atmospheric currents powerful enough to traverse and momentarily part the luminous inner atmosphere.

Meanwhile, my balloon was floating at the surface of the ultimate limits of the atmosphere, and I had finished with the sun when my attention was drawn elsewhere. As the globe of fire that I had just been studying and admiring slowly descended and was about to disappear behind the horizon of the atmosphere that served me as a throne, I judged that night had already fallen. I looked at my watch, and could scarcely see what time it was, but on engaging the chimes, I counted four. It was difficult to hear the sounds, the air being so thin in the region where I was. I was also having difficulty breathing.

Suddenly, beneath my feet but at a great depth, there was a muffled noise, whose reverberations reached me nevertheless, arriving like the final echo of a tempest.

My balloon was subject to oscillations whose effects were communicated to my gondola; then calm returned. Shortly afterwards there was a further agitation, accompanied by dull explosions. At first I was able to count them, for at each blast I felt a strange tremor in my rib-cage, but almost immediately, a prolonged, powerful and terrible rumble, like the sound of a cataract or the roar on the sea, resounding in the inferior regions of the atmosphere.

It was, undoubtedly, a storm that had burst beneath me—at what distance or depth I truly did not know; but that slow, dull noise that extended as far as the surface of the atmosphere was nothing other than a violent tempest and its thunderclaps. I remembered that in the morning, before quitting Paris, when the sun had scarcely rise, there was already one of those stifling warmth that prognosticate a hot day and often, for the evening, a disorder of the elements. Since then, I had no doubt, a thunderstorm had passed over the terrestrial regions. It must be terrible, to judge by the violence with which even those much-enfeebled echoes reached me.

I confess that there was a certain charm in sensing myself being rocked in that manner by the tempest, at a distance at which its fury was not to be feared. The upper atmosphere, through whose layers I was drifting, was like a slumberous sea agitated by a bad dream, a kind of nightmare, stirring but with difficulty, leadenly, in spite of itself, under the effort of an interior pressure lifting it up, as a monstrous leviathan might before appearing at its surface. My balloon bobbed up and down, twirled and tossed, shaking the gondola and plunging its crest into the darkness, only receiving at its base a feeble reflection of atmospheric glimmers that were about to be extinguished.

Then, as I lowered my gaze to fathom the inferior air, which was getting dark, I saw serpentine streaks of fire running through its depths, at an immeasurable depth; the entire vaporous globe was tinted with a thousand exquisite, indescribable gleams; explosions reached my ears; then the somber, gray, discolored tone returned, soon losing its rosy, scarlet, luminous transparency to become dark again, to be furrowed again by lighting, running as worms of fire run over blackened paper completing its consumption by flame, and were extinguished once again.

Finally, the rumors of storm and tempest slackened, scarcely murmuring, and ceased entirely. Then a profound obscurity extended its funereal veil, even over those parts that a sort of twilight had colored mutedly.

I was hungry; I ate. Frankly, the pâté that I had bought in the Passage de l'Opéra tasted good. Monsieur Rollé undoubtedly did not suspect that the chicken and the ham with which I was equipped had flown toward the stars to be eaten beyond the clouds. I drank, likewise with a pleasure far superior to that which I would have experienced on the ground, a flask of rum, whose generous effect was to renew my vigor and curiosity, for which I was thankful.

My frugal dinner had come to an end when I rubbed my eyes, in order to assure myself that I was not the victim of an illusion.

During a part of the day, since I had reached the highest regions of the atmosphere, I had thought that I had seen tiny, almost imperceptible points of light scintillating in the black background of the firmament. I had imagined that, by dint of examining and observing the sun, my gaze was rediscovering its flames even in the darkness. But this time, the hour undoubtedly being more propitious, and the sun's fiery globe falling beyond the atmospheric horizon, there was no more doubt

that I was distinguishing other luminous bodies, pale in color, the number and position of which I was soon able to determine. Almost at the same time, at distances that seemed to me to be fabulous, so minimal was their light, I recognized other stars, infinite in number, of the same redness as the sun, appearing as dots, but much smaller dots, in infinite space.

By their disposition, the figures they formed and the color of their fires, I recognized the fixed stars, those other suns which, strewn in space in their thousands, illuminate other worlds and proclaim the power of the Creator.

With the naked eye, as on Earth, I was only able to count twelve or thirteen hundred in our hemisphere, but with the aid of the telescope, it became easy for me to discover an infinite number of them, as had Herschel, who found more than fifty thousand of them in the space of a few degrees. And yet, the nearest one to our sphere is several millions of leagues away. That is Sirius, the beautiful star that shines on the horizon in the month of August.

I rediscovered all the constellations we know and love, the Zodiac constellations first: Aries, Taurus, Gemini, Cancer, Leo and Virgo, then visible, and Libra, Scorpio, Sagittarius, Capricorn, Aquarius and Pisces, hidden for the moment beyond the horizon. Then there were Ursa Major, Draco, Lyra, Cassiopeia, Coma Berenices, Corona Borealis, Delphinus, Antinous,³ Andromeda, Orion, Triangulum—all our beautiful boreal constellations were displayed to me.

From my balloon, even more so than from the ground, that distribution of stars did not appear to me to be made at hazard. It seemed to me to be organized in such a way as to form systems, which we call constellations, of which God alone has the secret.

They all had the same fire; it was the fire of the sun, a reddish fire, which emitted a mobile flame producing a scintillation. But by reason of the brightness of some, I obtained a better explanation of why they are divided into stars of the first, second and third magnitude, and why others have been given the name of nebulas; doubtless these differences originate from their greater or lesser distance.

The thought occurred to me that from Adam, the first human created, to us, those stars had faithfully maintained the same positions—but my astronomical studies then reminded me that, not only had they moved in such a way as to change the positions they occupied at the moment of creation, as the diagrams left to us by Hipparchus and other ancient astronomers assure us, but that modern observations attest that the relationships between several of them have been troubled in a visible manner. It is thus conclusively proven that these variations are sometimes sudden and sometimes periodic, and affect their color as well as their position.

In 1572, Tycho Brahé discovered one of that sort in Cassiopeia. Perfectly round, of a splendor equal to that of Venus, the star remained visible even by day. Its light then diminished by degrees, having excited admiration for more than fifteen months.

In 1604, in Cor Serpentis, another star that suddenly appeared offered astonishing variations, and disappeared again after several months.

I did not linger long in the study of these points of fire, in spite of all the pleasure I had had in rediscovering them—a pleasure similar to that one finds when one encounters an old friend in a foreign land.

What attracted my attention elsewhere was a spectacle for which our astronomers would give half their lives, if they did not have to do what I did—which is to say, to go and study cosmology above the observatory of the atmosphere.

In talking to you, my young readers, I fear that my language will not do justice to the great things I want to paint for you. To speak about the works of God, so great and so marvelous, would require a sublime language. Do not let my book slip from your hands in disgust, but be indulgent, and read on.

In the west, near the point abandoned by the sun, I discovered, white and luminous, a small star shining with all its glare. Higher up and closer to me, I distinguished a second, so pure and easy on the eye that I might have taken it for a meteor. I quickly recognized my error.

Those two charming globes were none other than the two inferior planets—which is to say, those placed between the Sun and the Earth, Mercury and Venus, to call them by name. Much smaller than Venus, Mercury, although thirteen million leagues from the Sun, floats in a extremely dense atmosphere, and Newton has calculated that its heat must be more intense than that of boiling water. I looked at it with the aid of the telescope; I was then able to assure myself that the planet was offering

³ The constellation Antinous has been abolished since 1854, its stars now being considered part of Aquila.

one side of its truncated crescent. As I knew already that the truncation in question was only repeated after twenty-four hours, I concluded easily that its rotation had that duration. I could also make out perfectly the mountains with which Mercury is studded; the height of some, according to calculation, might attain thirty thousand feet.

Much more beautiful, however, both paler and brighter, Venus attracted my particular attention. It certainly merits the name it bears, or those of Lucifer and Vesper, which the ancients gave it, or even that of the Shepherd's Star, with which the people gratify it. The first star that shines in the vault of the heavens when evening comes, Venus might well have made frightened farmers say: "Woe betide your lambs, shepherd of the hamlet; if you don't enclose them in the fold, the wolf will come..."

I contemplated it for a long time; it too, truncated in a part of its disk, advertised a rotation of twenty-four hours. It was easy to see and appreciate the enormous mountains covering it. It passed before the sun just as that star quit our dark hemisphere, forming a round black patch on its disk, but with points of light. Those points were nothing but rocky mountains, so shiny in the sun's fires that one might think them covered in snow. Venus is almost as large as the Earth. It travels at eighty-five leagues a minute, while the Earth travels at scarcely eighty—but little Mercury travels at an even more rapid pace, orbiting at a speed of forty thousand leagues an hour.

The further the sun went beneath the horizon, the more the blackness of the firmament was covered with a fine dust of scintillating dark red dots, over which the superior planets lit up.

Among the fixed stars I could see Aldebaran marvelously, the eye of the constellation Taurus, whose volume is more than a thousand times greater than the Sun's. Then there was Virgo's ear, Hydra's heart, the Vendageuse,⁴ and hot Sirius, the nearest star to the Earth—but I repeat, over the marvelous seed-bed of that fiery powder, the superior planets stood out, magnified by some mysterious prodigy of optics, but perfectly clear to the eye, trenchantly white in color, and establishing by virtue of that difference in color from the stars, the planetary system such as science delivers it to us.

I armed myself with my telescope, and immediately recognized Mars, the most eccentric of planets, for it has a very irregular motion.

In that regard, I recalled what was said of Georg Rheticus, a disciple of Copernicus, who, unable to explain that original motion of Mars, invoked his familiar spirit. According to Kepler, that genius seized Rheticus by the hair, raised him up to the ceiling, let him fall back to Earth, and said to him: "That's the motion of Mars!"

I deduced that Mars had an atmosphere, for a star that was in close proximity to it seemed to be obscured. I also detected patches, and a fairly noticeable flattening.

From Mars I passed on to Jupiter. What struck me first were the dark bands striping the planet. Jean-Sylvain Bailly—the unfortunate Bailly, killed in the Revolution of '93, who said to his murderers as he went to his death in a fine cold rain, "I'm shivering, but it's with cold"—claimed that these bands are seas more extensive in length than breadth, for, according to physics, water absorbs part of the light it receives. What astonishes me, however, is that I had learned that these bands were three in number, but I counted eight of them. At least there is one of them that is constant and very broad; it is a sort of threat river that traverses Jupiter in its torrid zone. I eventually distinguished, but with great difficulty, the four small moons that surround it.

A very special attraction drew me toward Saturn, whose enormous mass is to the Earth's mass what ten thousand sixty hundred and ninety is to one. My telescope was scarcely aimed in its direction when I saw clearly the ring that circles it like a sash and extends outwards to form two handles between which I could see the black sky again. Veritably, before the works of God, humans must bow down; but what can one say to express a sufficient admiration in the face of the strange mystery of a planet surrounded by a moon serving it as a belt, leaving an immense interval between itself and the central body? And when one thinks that the ring is double, and that besides that richness of satellites the planet has seven moons, one is obliged to fall silent, for what can science stammer before all that dazzling grandeur?

I kept that astonishing prodigy under my gaze for a long time, thinking that it had a diameter of twenty-eight thousand leagues, that it was four hundred and thirteen million, six hundred and four

⁴ The Vendageuse is the name given by the French to the star interpreted by the ancients as Virgo's right hand.

thousand, five hundred and four leagues from the Sun, and that it requires twenty-nine years to go around that star—after which I passed on to Uranus.

That planet is six hundred and fifty-six million leagues from the Sun; it requires eighty four years to complete its orbit, even though it travels are three thousand seven hundred leagues a minute.

What shall I say about Ceres, Pallas, Juno and Vesta?

I was dazzled, and my eyes were weary.

That fatigue did not result from the effort that I was making to distinguish the heavenly bodies more clearly, for, as I have said, by virtue of a strange optical effect, which probably resulted from parcels of air between the planets, the stars and myself that were doubtless still sufficient, the volume of the globes that I was looking at was magnified prodigiously when I made use of my telescope. Or, if the parcels of air in question did not exist, I don't know what mysterious cause produced the effect of which I speak when I applied my eye to the telescope. What is certain is that I could see the stars with my lenses admirably well, and that our observations from the Earth's surface are infinitely less favorable. One might have thought that I had drawn several millions of leagues closer to the bodies I wanted to study. The fatigue, therefore, only came from the admiration I felt in the face of the marvels that had been unveiled to me.

I was only just beginning, however.

The Sun had finally been eclipsed by the Earth, which hid it, when my ear was struck by sounds so soft and harmonious that I thought a fresh breeze was getting up, which was causing an Aeolian harp to sing.

I remembered having been surprised in a vast and delightful garden in England, decorated with summer-houses and cottages, by a similar melody; I had hastened to run to the place from which the sweet chords were coming, but had only found, suspended from trees, square harmonic tablets over which two metal strings were extended with the aid of a bridge. Placed close together, these harps—called Aeolian because the wind alone causes them to vibrate—were responding to one another and producing the most delectable effect in that enchanting location. That harmony was perfectly explicable, for the strings, by virtue of the excitation of the air, especially when there was an abrupt variation in the atmospheric state, caused the notes to resonate in perfect harmony.

It was very evident, however, after rapid reflection, that there was no Aeolian harp in my vicinity or within range—for although Abbé Gattoni,⁵ the inventor of these tablets, had once had the fantasy of extending from one bell-tower to another seven strings representing the notes of the diachronic scale, resulting in an aerial concert that had delighted the leisure of the inhabitants of Milan, his native city, he was now dead, and no one after him would have had the idea of establishing a giant harp at such an altitude.

I listened with pleasure, for the harmony increased gradually, penetrating, exquisite and ineffable, but as if muted by a mysterious distance, but simultaneously so powerful that one might have taken it for Jehovah's celestial orchestra signing the glory of God by the voice of magical choirs of angels, cherubim and heavenly virgins.

In the grandeur of God's works, you see, there are things so sublime and superior to the human mind that to want to express them and depict them with the aid of our feeble resources is truly to diminish and degrade them—so I shall not try to describe my impressions to you. Besides, the marvel was immediately followed by another, which was no less appropriate to excite my enthusiasm.

To my left, toward the east, the horizon of the Earth, long but soft pale golden rays launched into the nebulous void, drawing away from the center that projected them. That center was still invisible, but it was approaching, for the circle of the radiation was increasing, and its gleam, brighter in the middle parts, came to caress my aerostat and my gondola with its topaz and opal tints.

What could this singular surprise, this astonishing apparition, be?

I did not have to wait long for the key to the enigma. The center of the golden radiation was still hidden by the enormous block of the terrestrial atmosphere, which received it in soft translucency, but it could not be long in appearing. Indeed, a globe of gold and ruby, like a round metal plate emerging from a furnace, soon rose, dominating the Earth and its immense atmosphere, and I recognized...the Moon, our beautiful Moon, our satellite, our planet's night star.

⁵ Cesare Gattoni did not invent the Aeolian harp, but he did build a gigantic one near Milan in 1783.