



Ririro

READ ANYWHERE, ANYTIME

The Atmosphere

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"If you pass your hand quickly before your face, you feel a breath blow on your cheeks. This breath is air. In repose it makes no impression on us; put in motion by the hand, it reveals its presence by a light shock that produces an impression of freshness. But the shock from the air is not always, like this, a simple caress. It can become very brutal. A violent wind, which sometimes uproots trees and overthrows buildings, is still air in motion, air that flows from one country to another like a stream of water. Air is invisible, because it is transparent and almost colorless. But if it forms a very thick layer through which one can look, its feeble coloring becomes perceptible. Seen in small quantities, water appears equally colorless; seen in a deep layer, as in the sea, in a lake, or in a river, it is blue or green. It is the same with air: in thin strata it seems deprived of color; in a layer several leagues in thickness, it is blue. A distant landscape appears to us bluish, because the thick bed of intervening air imparts to it its own color.

"Now air forms all around the earth an envelope fifteen leagues thick. It is the aërial sea or atmosphere, in which the clouds swim. Its soft blue tint causes the sky's color. It is in fact the atmosphere that produces the appearance of a celestial vault.

"Do you know, my children, what is the use of this aërial sea at the bottom of which we live as fish live in water?"

"Not very well," Jules replied.

"Without this ocean of air life would be impossible, plant life as well as animal. Listen. Chief of those imperious needs to which we are subjected are those of eating, drinking, and sleeping. As long as hunger is only its diminutive, appetite, that savory seasoning of the grossest viands; as long as thirst is only that nascent dryness of the mouth that gives so great a charm to a glass of cold water; as long as sleepiness is nothing more than that gentle lassitude that makes us desire the night's rest, so long is it the attraction of pleasure rather than the rude prick of pain that urges the satisfaction of these primordial needs. But if their satisfaction is too long delayed, they impose themselves as inexorable masters and command by torture. Who can think without terror of the agonies of hunger and thirst! Hunger! Ah! you do not know what it is, my children! Hunger! If you could have any idea of its tortures, your heart would be oppressed at the thought of the unhappy ones who experience it. Ah! my dear

children, always help those that are hungry; help them, and give, give; you will never do a nobler deed in this world."

Claire had put her hand before her eyes to hide a tear of emotion. She had observed a flash on her uncle's face that spoke from the depth of his heart. After a moment's pause Uncle Paul continued:

"There is, however, a need before which hunger and thirst, however violent they may be, are mute; a need always springing up afresh and never satisfied, which continually makes itself felt, awake or asleep, night or day, every hour, every moment. It is the need of air. Air is so necessary to life that it has not been given us to regulate its use, as we do with eating and drinking, so as to guard us from the fatal consequences that the slightest forgetfulness would cause. It is, as it were, without consciousness or volition on our part that the air enters our body to perform its wonderful part. We live on air more than anything else; ordinary nourishment comes second. The need of food is only felt at rather long intervals; the need of air is felt without ceasing, always imperious, always inexorable."

"And yet, Uncle," said Jules, "I have never thought of feeding myself with air. It is the first time I ever heard that air is so necessary for us."

"You have not given it a thought, because all that is done for you; but try a moment to prevent air entering into your body: close the ways to it, the nose and mouth, and you will see!"



Jules did as his uncle told him, shut his mouth and pinched his nose with his fingers. At the end of a moment, his face red and puffed up, the little boy was obliged to put an end to his experiment.

"It is impossible to keep it up, Uncle; it suffocates a person and makes him feel as if he should certainly die if it kept on a little longer."

"Well, I hope you are convinced of the necessity of air in order to live. All animals, from the tiniest mite, hardly visible, to the giants of creation, are in the same condition as you: on air, first of all, their life depends. Even those that live in the water, fish and others, are no exception to this rule. They can live only in water into which air infiltrates and dissolves. When you are older you shall see a striking experiment which proves how indispensable to life is the presence of air. You put a bird under a glass dome, shut tight everywhere; then with a kind of pump the air is drawn out. As it is withdrawn from the inside of the glass cage, the bird staggers, struggles a moment in an anguish horrible to see, and falls dead."

"It must take a lot of air," was Emile's comment, "to supply the needs of all the people and animals in the world. There are so many!"

"Yes, indeed; a great quantity is needed. One man needs nearly 6000 liters of air an hour. But the atmosphere is so vast that there is plenty of air for all. I will try to make you understand it.

"Air is one of the most subtle of substances; a liter of it weighs only one gram and three decigrams. That is very little: the same volume of water weighs 1000 grams; that is to say, 769 times as much. However, such is the enormous extent of the atmosphere that the weight of all the air composing it outstrips your utmost powers of imagination. If it were possible to put all the air of the atmosphere into one of the pans of an immense pair of scales, what weight do you think it would be necessary to put into the other pan to make it equal the air? Don't be afraid of exaggerating; you can pile up thousands on thousands of kilograms; if air is very light, the aërial sea is very vast."

"Let us put on a few millions of kilograms," suggested Claire.

"That is a mere trifle," her uncle replied.

"Let us multiply it by ten, by a hundred."

"It is not enough, the pan would not be raised. But let me tell you the answer, for in this calculation numerical terms would fail you. For the great weight I am supposing, the heaviest counterweights would be insignificant. New ones must be invented. Imagine, then, a copper cube, a kilometer in each dimension; this metallic die, measuring a quarter of a league on its edge, shall be our unit of weight. It represents nine thousand millions of kilograms. Well, to balance the weight of the atmosphere, it would be necessary to put into the other pan 585,000 of these cubes!"

"Is it possible!" Claire exclaimed.

"I told you so! Imagination vainly seeks to picture the stupendous mass of the layer of air wound like a scarf around the earth. Now do you know what relation it bears to the terrestrial globe—this ocean of air having a weight represented by half a million of copper cubes a quarter of a league each way? Scarcely what the imperceptible velvety down of a peach is to the peach itself. What, then, are we, materially, we poor beings of a day, who move about at the bottom of this atmospheric sea! But how great we are through thought, which makes game of weighing the atmosphere and the earth itself! In vain does the material universe overwhelm us with its immensity; the mind is superior to it, because it alone knows itself, and it alone, by a sublime privilege, has knowledge of its divine author."

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