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Ririro

IMAGINATION OVER KNOWLEDGE

Thunder and Lightning

“By their clever researches, Franklin, de Romas, and many others have revealed to us the nature of lightning; they have taught us, in particular, that when its quantity is small, it leaps to meet one’s finger in bright, crackling sparks, without danger to the experimenter, and that all bodies containing it attract neighboring light substances, just as the kite-string attracted the straws in the experiment made by de Romas, and just as sealing-wax and rubbed paper attract the down of feathers. In short, they taught us that electricity is the cause of thunder.

“Now there are two distinct kinds of electricity, which are present in equal quantities in all bodies. As long as they are united, nothing betrays their presence; it is as if they did not exist. But, once separated, they seek each other across all obstacles, attract each other, and rush toward each other with an explosion and a flash of light. Then all is in complete repose until these two electric principles are again separated. The two electricities, therefore, supplement and neutralize each other; that is to say, they form something invisible, inoffensive, inert, that is found everywhere and is called neutral electricity. To electrify a body is to decompose its neutral electricity, to disunite the two principles which, when mixed, remain inert, but, separated from each other, manifest their wonderful properties and

their violent tendency to recombination. Rubbing is one way of effecting the separation of the two electric principles, but it is far from being the only one. Every radical change in the inmost nature of a body also causes a manifestation of the two electricities. So



clouds, which are water changed into vapor by the sun's heat, are often found to be electrified.

"When two differently electrified clouds come near

together, immediately their contrary electricities run toward each other to recombine, and with a loud report there is a burst of flame that throws a bright and sudden light. This light is lightning; this burst of flame is a thunderbolt; the noise of the explosion is thunder. Finally, the electric spark can dart from a cloud electrified in one way to a spot on the ground electrified in the other.

"Generally you know a thunderbolt only by the sudden illumination it produces and the crash of its explosion. To see the thunderbolt itself you must overcome an unwarranted fear and look attentively at the clouds, the center of the storm. From moment to moment you can see a dazzling streak of light, simple or ramified, and of very irregular sinuous shape. A glowing furnace, metals at white heat, have not its brilliancy; the sun

alone furnishes a comparison worthy the sovereign splendor of the thunderbolt."

"I saw the thunderbolt," put in Jules, "when it struck the big pine the day of the storm. For a moment I was blinded by its brightness, as if I had looked the sun full in the face."

"The next storm," said Emile, "I will watch the sky to see the ribbon of fire, but on condition that uncle is there. I should not dare to alone; it is so terrible."

"I, too," added Claire, "will do my best to overcome my fear, if Uncle is only there."

"I will be there, my children," their uncle promised them, "if my presence reassures you, for it is a most imposing sight, that of a stormy sky set on fire by lightning and full of the rumbling of the thunder. And yet, when from the bosom of the clouds there comes the dazzling flash of the thunderbolt and the whole region echoes with the crash of the explosion, a foolish fear dominates you; admiration has no further place in your mind, and your terrified eyes close at the magnificence of the electrical phenomena of the atmosphere, proclaiming with so much eloquence the majesty of the works of nature. From your heart, congealed with fear, there comes no outburst of gratitude, for you do not know that at this moment, in the flashes of lightning, the uproar of the shower, of the thunder, and of the unchained winds, a great providential act is being accomplished. Thunder, in fact, is far more the cause of life than of death. In spite of the terrible but rare accidents that it causes, it is one of the most powerful means that nature employs to

render the atmosphere wholesome, to clear the air we breathe of the deadly exhalations engendered by decay. We burn straw and paper torches in our rooms to purify the air; with its immense sheets of flame the thunderbolt produces an analogous effect in the surrounding atmosphere. Each of those lightning flashes that make you start with fear is a pledge of general salubrity; each of those claps of thunder that freeze you with fear is a sign of the great work of purification that is operating in favor of life. And who does not know with what delight, after a storm, the breast fills itself with pure air, when the atmosphere, purified by the fires of the thunderbolt, gives new life to all that breathe it! Let us beware then of a foolish terror when it thunders, but lift up our thoughts to Mother Nature, from whom the thunder and the lightning have received their salutary mission.

"The thunderbolt, like everything in this world, plays a part in accord with the general well-being; but, again, like everything else, it can, in fulfilling the hidden purposes of an all-seeing Mother Nature, cause here and there a rare accident that makes us forget the immense service it renders us. Let us, then, calmly examine the danger that a thunderbolt exposes us to. Let us remember above all that a thunderbolt by preference strikes the most prominent points of ground, for it is there that the opposite electricity, attracted by that of the storm-cloud, is present in greatest abundance, ready to unite with that which attracts it."

"The two electricities seeking reunion do their utmost to meet," said Claire, to fix the facts in her mind. "That

of the ground, in its effort to reach the cloud, gains the top of a tall tree; that of the cloud, on its side, is impelled downward toward the tree. Then comes the moment when the two electricities, still attracting each other but no longer having a road open for their peaceful reunion, rush together with a crash. Then the streak of fire can't help reaching the tree. Is that it, Uncle!"

"My dear child, I could not have put it better myself. That is why, in fact, high buildings, towers, steeples, tall trees, are the points most exposed to fire from heaven. In the open country it would be very imprudent, during a storm to seek refuge from rain under a tree, especially a tall and isolated one. If the thunderbolt is to fall in the neighborhood, it will preferably be upon that tree, which forms a high point where the electricity of the ground accumulates, to get as near as possible to that of the cloud attracting it. The sad and deplorable instances every year of persons struck by lightning are for the most part confined to the imprudent who seek shelter from the rain under a tall tree."

"If you had not known about these things, Uncle," Jules here remarked, "we should have been killed the day of the storm, when I wanted to get under the tall pine-tree."

"It is very doubtful whether the thunderbolt, in destroying the tree, would have spared us. It is impious boldness to expose one's self to peril without a motive, and then to throw upon Providence the task of extricating us from our perilous situation. Heaven will

help him who helps himself. We helped ourselves by fleeing from the dangerous tree, and we arrived home safe. But to help oneself effectively requires knowledge; so, to impress these things well on your mind, I emphasize once more the danger that, in time of storm, lurks in high towers, steeples, lofty buildings, and, above all, in tall and isolated trees. As for other precautions that are commonly recommended, such as not to run, in order not to cause a violent displacement of the air, and to shut the doors and windows in order to prevent a draught, they are of no value whatever: the direction taken by the thunderbolt is in no way affected by the air-currents. Railway trains, which run at high speed and displace the air with so much violence, are not more exposed to lightning than objects at rest. Every-day experience is a proof of it."

"When it thunders," said Emile, "Mother Ambroisine hurries to shut all the doors and windows."

"Mother Ambroisine is like a great many others who believe they are safe as soon as they cease to see the peril. They shut themselves up so as not to hear the thunder nor see the lightning; but that does not in the least lessen the danger."

"Then there are no precautions to be taken!" asked Jules.

"In the usual circumstances, none, unless it be this precaution: to be of good heart."

"To protect tall buildings, more menaced than others, we use a lightning-conductor, a wonderful invention due to Franklin's genius. The lightning-conductor is composed of a rod of iron, long, strong, and pointed, fastened to

the top of the building. From its base starts another rod, also of iron, which runs along the roofs and walls, where it is fastened with staples, and plunges into damp ground or, better still, into a deep well of water. If a thunderbolt falls, it strikes the lightning-conductor, which is the nearest object to the cloud as well as the best suited to the electric current on account of its metallic nature. Besides, its pointed form has much to do with its efficacy. The bolt that strikes the metal lightning-conductor follows it and is dissipated in the depths of the earth without causing any damage."