

**THE STORY BOOK  
OF THE FIELDS**

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The story book of the fields by J. H. Fabre

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**J. H. FABRE**

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*The Story-Book of the Fields*

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## CHAPTER I

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### ICE

WE have all seen a pump, and know something about its construction. There is a long leaden pipe which goes down into the well, and above that a short, thick pipe in which the piston rises and falls. This large pipe is the cylinder.

One very frosty morning we find the cylinder cracked from top to bottom. There is a hole the length of your finger, and a lump of ice projecting through it. How could the cold break this hard iron pipe? It was not the cold alone. There was something in the cylinder: there was water, and this water was changed into ice, which was imprisoned between the cylinder and the piston, unable to rise or fall. Now ice expands as it forms. It expands to such an extent that, if it happens to be imprisoned, it presses here, there and everywhere, and smashes the obstacle which prevents its



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expansion. So the cylinder is cracked because ice was formed inside it.

I can quote an experiment which will show the irresistible power of ice when it forms and expands in a closed space. What is stronger than a cannon? It is made of bronze, a metal almost as impregnable as iron. It weighs several tons and is more than a hand-breadth in thickness. A small bag of gunpowder and a cannon-ball which you could hardly lift are placed inside. The gunpowder is ignited, there is an explosion like a clap of thunder, and the iron cannon-ball is hurled for a league, and even farther. So you may judge of the resistance offered by this terrible machine.

Well, the power of the pressure of ice has been tried in a cannon. A cannon is filled with water; then its mouth is stopped with a solid plug of iron, screwed in so that it cannot give way. This cannon is exposed to the cold during a very severe winter's day. The water turns to ice, and soon the gun is cracked from end to end, the ice projecting through the crack. After this, how can we be surprised that the cylinder of a pump should be broken by the pressure of ice, when a cannon is rent as easily as a

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## *Ice*

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worn-out cloth? Moreover, this fracture, caused by the water freezing, is effected as quietly as possible. There is no explosion such as you might imagine, no fragments thrown out. Without any disturbance the metal is rent, and that is all. If you were astride on the gun you would have nothing to fear at the time of the rupture.

It is probable that you will not have the opportunity of seeing the bursting of a cannon by ice, but I can suggest another experiment. Take a bottle, fill it quite full of water, then cork it with a strong cork fastened by a string. Expose your bottle in the open air during a sharp frost. Sooner or later you will find it in pieces, broken by the pressure of the ice. Here again there is no danger. The fragments of the bottle are not thrown off. They adhere together, joined by the ice, or else they fall quietly to the ground.

In the new pump which has replaced the old one damaged by the cold, there is a tap quite at the bottom of the cylinder, and when a hard frost is expected the tap is turned to let the water escape. This is to prevent the ice from forming in the cylinder.

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Also, as the tap may be forgotten, during severe cold it is well to cover the cylinder with rags or straw, to preserve it from contact with the air and so prevent it from becoming too cold.