

THE FIRST BOOK OF  
WATER



*Written and illustrated by*

*Jo and Ernest Norling*







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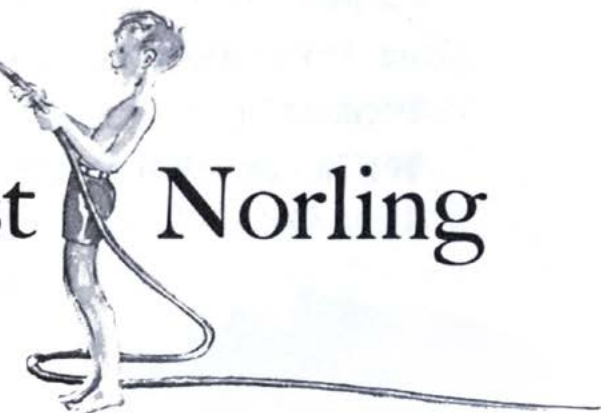


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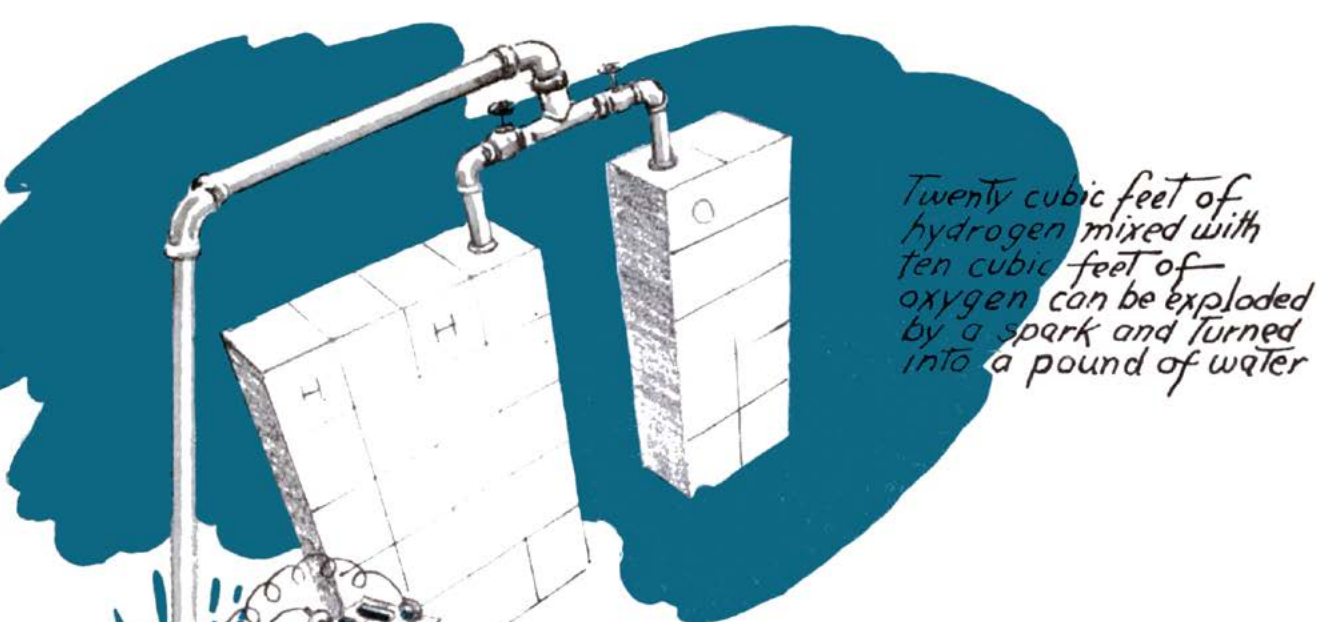
## NOW HERE, NOW THERE !

Water seems to have magic. Here it is and now it's gone! You see it and now you don't! It is water—now vapor—now a cloud! It falls from the sky! It's a pool on the ground! Now it's gone again! It runs down the river but the river is still full! It pours steadily into the great ocean, but the ocean never runs over! It appears at dawn as shiny drops of dew on the grass. Look again later and presto, the drops are gone! Now it has changed from a drop of water into a snow crystal! It's a piece of ice you can hold in your hand for a minute gone now, dripping through your fingers!

What is this water that keeps changing and moving about? We believe that many ages ago a piece of sun was thrown so far out into space that it formed a new planet we call Earth.

As Earth cooled, two kinds of gases united to make water. One of these gases is hydrogen. It is so light in weight that it is used to fill balloons so that they may rise high above the ground. The other gas is oxygen. Airmen carry tanks of it when they fly high into the stratosphere, for no one can stay alive where oxygen for breathing is scarce.





Chemists tell us that these two gases united in a certain way make water. They write water " $H_2O$ " to show that it is made of twice as much hydrogen as oxygen. Water is without color, although a large amount of it often reflects the color of the sky and shore. If there is any taste or odor, it belongs to something the water carries and not to the water itself. Water is tasteless!

## ON THE TOP AND UNDERNEATH

Water flows downward until stopped by something in its way. Then it spreads out, creeping into all the lowest places, until it finds a new path down or becomes high enough to flow over whatever is blocking its way. This spread-out water may be a small pool or a large lake, but





its surface is flat and is called the water level.

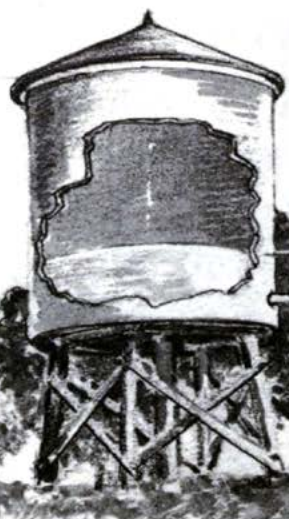
Water poured into a watering can fills up the spout to the same level as that in the main part of the can.



A fountain supplied with water from a tank will shoot up almost as high in the air as the water level in the tank.

When Mr. Smith dug his well, the water came out of the ground like a fountain. He called it a “flowing well” because the water didn’t have to be pumped up. A friend told him that such a well is called an artesian well. He said that its water comes underground from a higher point and is trying to reach its water level.

Water does not seem to be a bit solid, because you can dip your hand in it with hardly any effort, but its surface is held together by a force called surface tension.



*height of water in tank*







When you are learning to dive you know how a “belly flop” stings, so you practice in order to learn to hold your body correctly. A high diver knows that the water isn’t as easy to break into as it appears. When he strikes the surface at a high speed the water doesn’t part as quickly as he wishes, so he holds his hands to form a cutting edge to break the surface. His head and body follow through.

Some waterbugs stride about over this water surface as if it were ice. If you are very careful you can float a dry needle on the surface of water and you can see where the weight of the needle bends the surface down without breaking through.

Shake your hand in water, and air bubbles form. It is surface tension that holds the film of water around the little balls of air.

Water has buoyancy—an upward push. It can float anything on it that weighs less than the water that it displaces. Freddie’s rubber boat weighs seventy-five pounds.

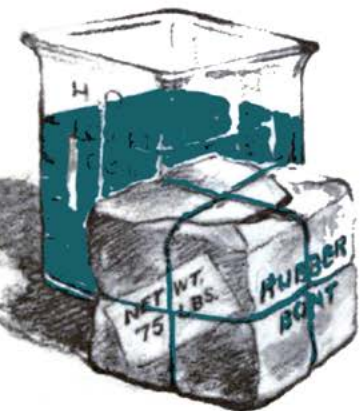


It is packed into a tight square bundle one foot high. A square bundle of water one foot high weighs sixty-two pounds. If Freddie put his packed boat in water it would sink because it is heavier than the same amount of water. But Freddie blows up his boat until it becomes twenty times bigger. It still weighs seventy-five pounds, while the water it displaces weighs over half a ton. Now it floats easily and carries Freddie and as many of his friends as can find room inside.



The steel used to build a battleship weighs thousands of tons and would sink if it were in one bundle. Built into a ship, it weighs less than a water battleship the same size, so it floats.

Your body is a little heavier than the water it displaces, but you can float if you keep your nose above water for breathing and help a bit by pushing with your feet and hands.

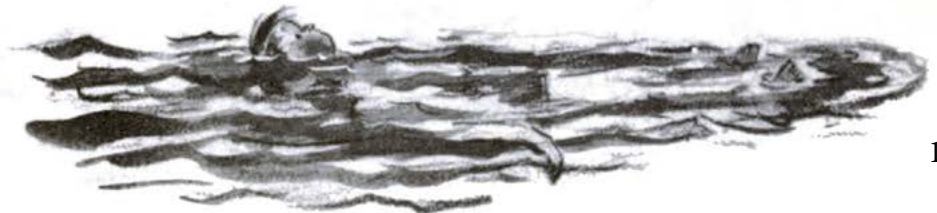


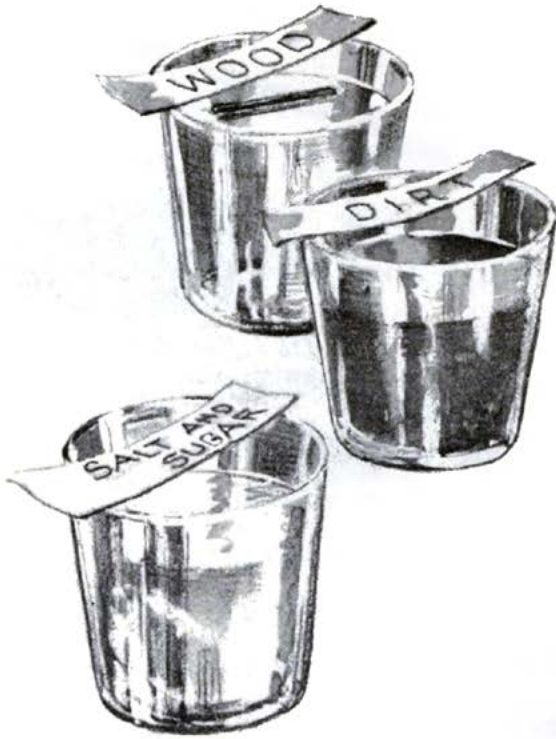


Salt water is heavier than fresh water, so you find it easier to float in the ocean than in rivers and lakes.

If you want to see for yourself that salt water has more buoyancy than fresh water, just put an egg into a glass of water. The egg will sink to the bottom. Now stir in two tablespoonfuls of salt and watch the egg rise and float.

Try another experiment. Take three glasses and fill each one part full of water. Drop a chip of wood into the first glass. It will float and keep on floating unless, after a longer time than you will care to wait, it becomes so water-soaked that it is heavy enough to sink. Old logs and boards that have stayed in the water for years now lie under water.





Into the second glass of water stir a spoonful of dirt. As long as you stir it to keep the water moving, the dirt is mixed throughout the liquid but not dissolved. Scientists say it is carried in suspension. Let the water stand quietly and the dirt is dropped to the bottom.

Into the third glass stir a little salt and sugar. They will dissolve and stay dissolved even though the water is quiet. Scientists say they are carried in solution. If you pour out the water, the sugar and salt go with it. But if you let the glass stand in a warm, sunny place, the water will evaporate, leaving the sugar and salt mixed in the bottom of the glass. In this way water dissolves and mixes many substances.

Water carries many things. It floats objects on its surface as it does logs. It carries particles of material in suspension as it does dirt. It carries minerals, such as salt, in solution.

