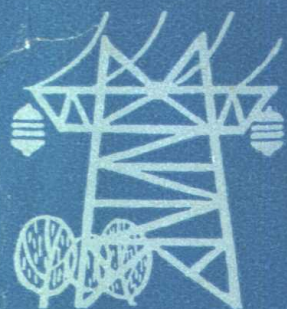


简易英汉对照科技丛书



水

WATER



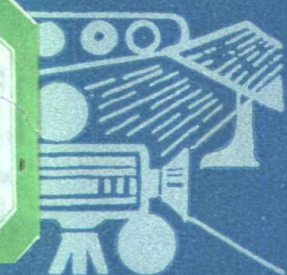
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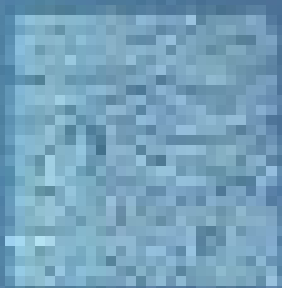
HEAT



光

LIGHT

四川人民出版社



水

WATER



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解 琪 译

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## INTRODUCTION

Water is very important to living things. Without water there can be no life on Earth. All animals and plants need water. Man also needs water. We need water to drink, to cook our food and to clean ourselves. Water is needed in offices, factories and schools. Where else is water needed?

Water covers about seventy percent of the Earth's surface. There is water in seas, rivers, lakes, springs and wells.

## TYPES OF WATER

When water falls to the Earth as rain, some of the water sinks into the Earth, until it is stopped by a layer of non-porous rock. Non-porous rock is firm and solid. Water collects above this layer and saturates the soil. The height of the water-saturated layer of soil depends on the amount of rain which has fallen recently. The water table is the line which separates the water-saturated layer of soil from the drier layer of soil above it.

When the water table rises to the surface of the ground, a spring is formed. Spring water usually has a lot of minerals dissolved in it. Water that has certain minerals dissolved in it is called hard water. Hard water does not mix well with

## 引 言

水对于生物是非常重要的。没有水，地球上就不可能有生命。所有的动物和植物都需要水。人也需要水。我们需要喝水，需要用水来煮食物和盥洗。办公室、工厂和学校都需要水。还有哪些地方需要水呢？

水约占地球表面积的百分之七十。海洋、河流、湖泊、泉和井里都有水。

## 水的种类

当水成为雨降落到地球上时，有一部分渗入地球，一直渗到一层非渗透性岩石上为止。非渗透性岩石是很坚固的。水就集存在这层岩石之上，并浸透了上面的土壤。水所浸透的那层土壤的高度，要视新近所降的雨量而定。地下水水位就是水所浸透的那层土壤与其上较干的那层土壤的分界线。

当地下水位升高到地面时，就形成了泉。泉水中一般都含有许多溶解了的矿物质。凡是含有某些溶解了的矿物质的水，就叫做硬水。硬水不能与肥皂很好地相溶合。这就是为什么用硬水和肥皂洗衣

soap. That is why it is difficult to wash our clothes with hard water and soap. We have to "soften" hard water before we can use it.

Sometimes a deep hole is dug in the ground to reach the water table. Water then flows into the hole forming a well.

On the Earth's surface there are many lakes and rivers. Lakes are deep hollows or basins which are filled with water. Rivers are channels of water which flow to the sea or to lakes. Most lakes and rivers get their water from rain and from springs.

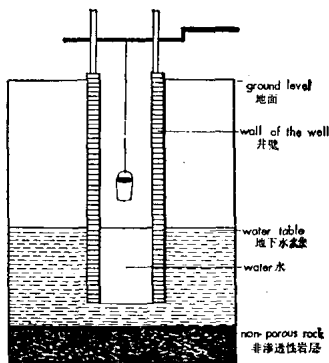
### Things to Do

You can make hard water by adding lime and then make it soft by adding washing soda. Add a little slaked lime to a jar full of water. Stir the mixture and filter it by pouring it through a piece of filter paper in a funnel into another jar. Pour half of the filtered liquid into an empty jar and add one tablespoon of washing soda. Then add the same amount of soap powder to both the jars. Shake them. Which jar produces more soap bubbles?



服很难洗的原故。在用硬水之前，我们必须先使它“软化”。

有时，人们在地上挖掘一个深深的洞，一直通到地下水水位处。于是水就流进了这个洞，形成了一眼井。



在地球表面上，有着许多湖泊和河流，湖泊是充满着水的深洼地或者盆地。河流即是水流入海洋或者湖泊的水道。大多数湖泊和河流里的水都来自雨水和泉水。

### 做实验

你在水里加石灰就可以制成硬水，然后再加进洗衣石碱又可以使它变软。在一个装满水的广口瓶中加一点熟石灰。搅动这个混合物，把它倒进一只漏斗，通过一张滤纸把它滤到另一个广口瓶里。把滤液的一半倒在一个空广口瓶里，加进一大汤匙洗衣石碱。然后，在这两个广口瓶里加进同样多的肥皂粉。摇摇它们。哪一个广口瓶里起的肥皂泡多？

## **WATER CAN BE A LIQUID, A SOLID OR A GAS**

Water is found almost everywhere. Even in the driest part of the world there is some water in the air. You cannot see it or feel it when it is part of the air. The water in oceans and lakes and streams is a liquid. The water in the air is not a liquid but a gas. We call it **water vapour**.

Clouds are made of water. They may be made of tiny drops of water. They may also be made of snow crystals. Snow crystals are tiny crystals of ice. Ice is frozen water or water that has become solid.

Water, you have found out, may be a solid, or a liquid or a gas. When it is a solid, it may be as hard as rock. When it is a liquid, you can pour it out of a container. When it is a gas, you cannot see it or feel it.

### **Things to Do**

- (i) Take two glasses of different shapes. Pour some water into one glass. Dip a spoon into the water. Can the spoon go into the water easily? Is the water hard or soft?

Look at the water in the glass. Look carefully at the shape of the water in this glass. Now pour the water into the empty

## 水可以是液体、固体或者气体

几乎在任何地方都有水。甚至世界上最干燥的地区，空气中也有一些水分。当水是空气的一部分的时候，你是无法看见它或者感觉到它的。海洋、湖泊和溪流里的水是液体。空气中的水不是液体而是气体，我们把这种气体称为水蒸气。

云是水形成的。它们可以由很小很小的水滴形成，也可以由雪花的结晶体形成。雪花结晶体是很小很小的冰的结晶。冰是冻结了的水，或者说是变成了固体的水。

你已经知道，水可以是固体、液体或者气体。当它是固体的时候，它可以如岩石一般坚硬。当它是液体的时候，你可以把它从容器里倒出来。当它是气体的时候，你既看不见它，也感觉不到它。

### 做实验

- (1) 取两只不同形状的玻璃杯。在一只杯里倒一些水。把一把调羹放到水里。调羹能很容易放进水里去吗？水是坚硬的呢，还是柔软的？

观察杯里的水。仔细观察这只杯里的水的形状。现在把这只杯里的水倒进那只空杯里去。当水全都倒进了另一只杯里时，观察

glass. When all the water is in the other glass, look at the shape of the water. Is the shape of the water the same as before? From what you see, do you think that water has a definite shape? Can the shape of water be changed easily?

- (ii) Take a tray of ice cubes. Try to push a spoon into an ice cube. Is the ice hard or soft? Put one or two ice cubes into a glass. Does the ice change its shape? Is the bottom of the glass completely covered with ice? Leave the ice in the glass for about half an hour. What happens to the ice?
- (iii) Put some water in a kettle and heat the kettle. After some time the water boils. When water boils it changes into water vapour very fast. We usually call the water vapour that comes from boiling water by another name—steam. Steam comes out of the kettle through the spout.

Hold a metal spoon in front of the spout for a few seconds. Remove the spoon from the spout. What can you see on the spoon? What is steam made of?

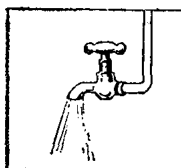
## **WATER EVAPORATES AND CONDENSES**

If you let a glass of water stand without a cover, the water will disappear, forming water

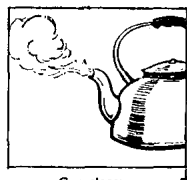
水的形状。水现在的形状与先前的一样吗？根据你所观察到的，你认为水有一定的形状吗？水的形状能够很容易地改变吗？

- (2) 取一盘冰块，把调羹往冰块里戳。冰是坚硬的呢，还是柔软的？在一只玻璃杯里放进一、两块冰块。冰改变了形状吗？玻璃杯底完全被冰盖住了吗？让冰在玻璃杯里放上大约半小时，冰发生了什么变化？
- (3) 在一只水壶里装一些水，把水壶加热。过一些时候，水沸腾了。水沸腾的时候，它很快变成水蒸气。从沸腾的水中产生的水蒸气，我们通常用另一个名称来叫它，即蒸气。蒸气通过壶嘴从壶里冒出来。

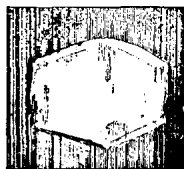
拿一把金属调羹在壶嘴前停上几秒钟。把调羹从壶嘴前移开。你在调羹上能看见什么？蒸气是什么形成的？



Liquid-water  
液体—水



Gas-steam  
气体—蒸气



Solid-ice  
固体—冰

## 水的蒸发和凝聚

如果你把一玻璃杯水放着不盖，水就会消失，形成水蒸气。当水变成水蒸气时，我们说它在蒸发。

vapour. When water changes to water vapour we say that it **evaporates**. If you heat water, you can make it evaporate faster. If you heat it long enough, you can make it boil. When water boils, water vapour forms very fast. When water vapour changes to water, we say that it **condenses**.

### Things to Do

- (i) We can make water vapour condense by cooling it. Take an empty tin can. Fill it with ice and add water and a few drops of red ink. Let it stand on the table for a short while. You will see that the can seems to be "sweating". Drops of water are formed on the outside of the can. The drops are not coloured so that they could not have been formed by the leaking of ice-water from the can. The water is formed by the condensation of the water vapour from the air.
- (ii) You can get pure water from salt water by evaporation and condensation. Make a still by using a tin with a tight-fitting lid and a nail-hole in the side. Place one end of a rubber tubing into the nail-hole. Place the other end of the rubber tubing into a clean, empty glass that has been placed in a pan filled with ice cubes.

如果你把水加热，就可以使它蒸发得更快。如果你把它加热到一定的时候，就可以使它沸腾。当水沸腾的时候，水蒸气就形成得很快。当水蒸气变成水时，我们就说水凝聚了。

### 做实验

- (1) 我们可以让水蒸气冷却来使它凝聚。取一只空的罐头盒，给它装满冰，再加进水和几滴红墨水。让它在桌上放一会儿。你可以看到，罐头盒好象是在“出汗”。在盒子的外面结起了水滴。这些水滴是没有颜色的，所以它们不可能是由盒子里渗出的冰水形成的。这些水是空气中的水蒸气凝聚而成的。

- (2) 你可以用蒸发和凝聚的方法，从盐水中提取纯净的水。用一只只有密封盖的、侧边有一个钉眼的罐头盒来做一个蒸馏器。把一根橡皮管的一端插入钉眼，把它的另一端插到一只干净的空玻璃杯里，这只杯子是放在装满冰块的盘中的。

Pour some salt water into the still and heat the still over a burner. When the salt water boils, the steam formed passes down the rubber tubing and condenses to water which drips into the glass. The water collected is pure water and does not taste salty. When all the water in the still has been boiled away, what is left behind?

## WATER CYCLE

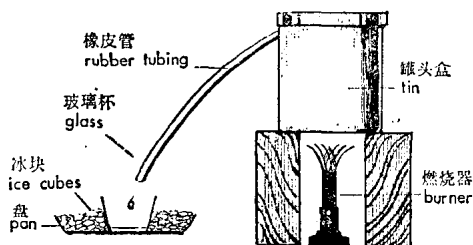
Water can change from one form to another easily. This is why we always have fresh supply of water. Let us find out how this is possible. The heat of the sun evaporates water from the oceans, seas, rivers and lakes. The heat also evaporates water from the ground and from plants and animals. Water vapour is formed. This rises and forms clouds in the air.

When the clouds come near a mountain, they are forced to rise. As the clouds rise, they are cooled. The higher they rise, the more they are cooled. This causes more and more water vapour to condense. In this way, the tiny drops of water in the clouds get bigger and bigger until they are heavy enough to fall to the Earth as rain.

Some rain water which falls on the Earth is again evaporated by the sun's heat. Some of it sinks into the ground. It may be used up by



在蒸馏器里倒入一些盐水，在燃烧器上将蒸馏器加热。当盐水沸腾时，形成的蒸气就顺着橡皮管流下，并且凝聚成水，滴进了玻璃杯。这样收集起来的水就是纯净的水，没有咸味。当蒸馏器里所有的水蒸发后，蒸馏器里还剩有什么呢？



## 水的循环

水能从一种形态很容易地转变为另一种形态。这就是为什么我们总能得到淡水供应的原因。让我们来看看这是怎样发生的。太阳的热把水从海洋、河流和湖泊里蒸发起来，热也从地上以及植物和动物身上把水蒸发起来。于是水蒸气就形成了。水蒸气上升，又形成了空气中的云。

当云靠近山的时候，云被迫上升。云在上升时冷却下来，上升得愈高，冷却的程度愈大。这就使得越来越多的水蒸气凝聚起来。这样，云里的很小很小的水滴越变越大，直到它们变得很重，最后成为雨而降落到地球上。

降落到地球上的一部分雨水又被太阳的热所蒸发。一部分雨水渗入到地里，或被干渴的植物所吸