

332

BASIC SCIENCE SERIES

自然科学初级读物



SOUND

声

叶念伦 译



科学普及出版社

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出 版 说 明

当前，在实现四个现代化的新长征途中，广大青少年正在努力学习现代科学文化知识，为祖国的社会主义建设事业，增长才干，积蓄力量。编译出版《自然科学初级读物》的目的，就是为初学自然科学和英语的读者，提供一套浅近而有趣的参考书籍。

全套读物共有16个选题，细目见各书封底。英语部分采自 FEP INTERNATIONAL PRIVATE LIMITED 出版的 BASIC SCIENCE SERIES（修订版）。

为了便于阅读，对全书重新作了编排，绘制了插图，并附了参考译文。书中还配有相当数量的简单实验，使读者通过实验，加深理解有关科学内容。

由于编者水平所限，错误不当之处在所难免，请批评指正。

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插图



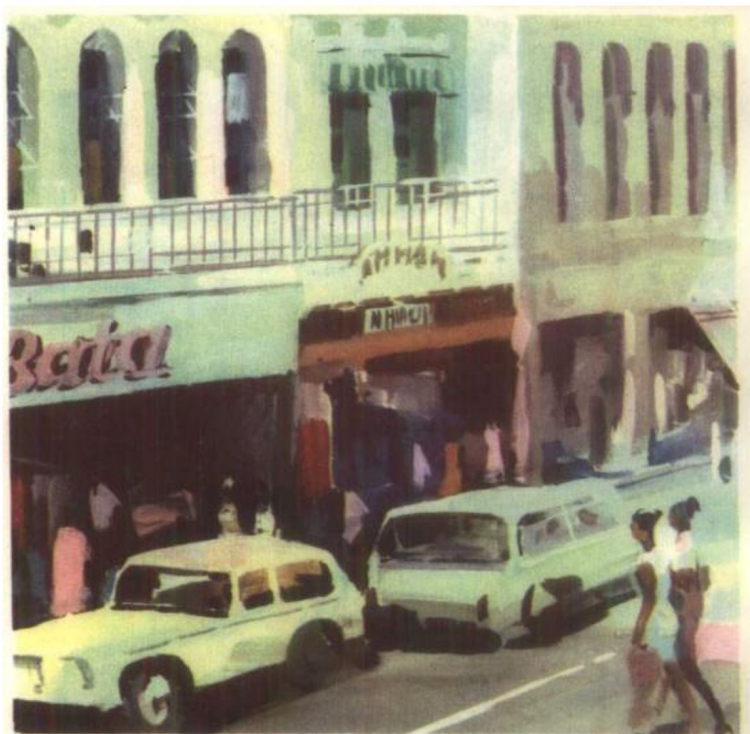
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INTRODUCTION

The world is filled with many interesting sounds. Some are unpleasant to our ears while others are very pleasant to hear. In a single day you probably hear hundreds of different sounds.

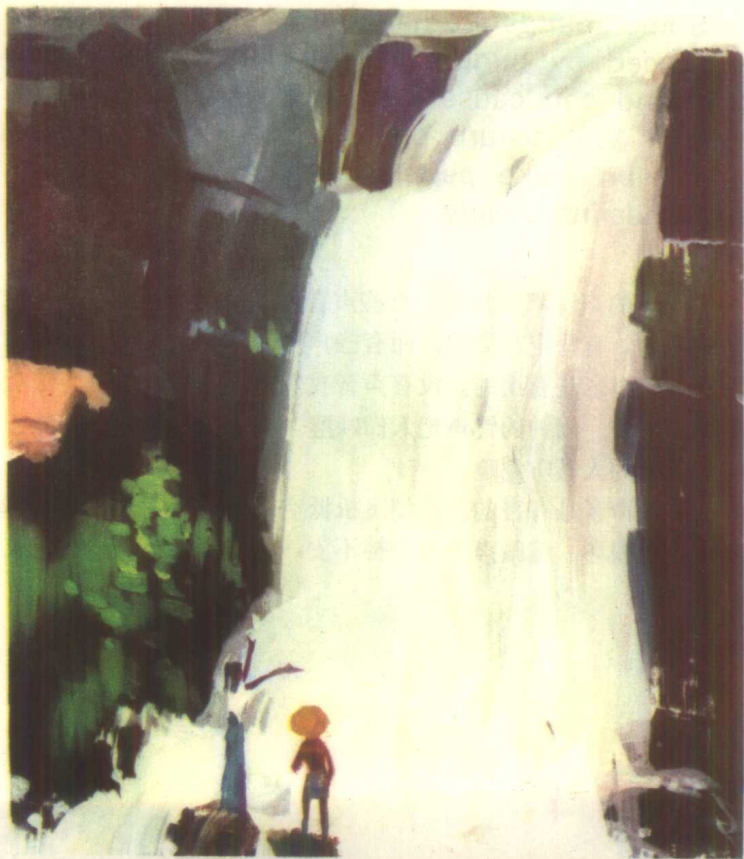


Name the sounds you can hear in these scenes.

引 言

世界上充满了许多有趣的声音。有些声音听起来刺耳，有些却很悦耳。在一天中，你可能会听到几百种不同的声音。

说出在这些场合你能听到的声音的名字



All sounds are different. Some may be soft; others may be loud. Some sounds are high; others are low.

Some sounds are useful. Without sound we cannot talk or listen to one another. The ringing alarm clock wakes people up. The hooting of a horn on the road warns careless people of danger.

Some sounds are harmful. Very loud sounds produced by huge planes which fly low over the land can cause damage to houses. Loud sounds will disturb people. Very loud sounds can even make people deaf or prevent them from hearing clearly.

所有的声音都不相同。有些声音可能是轻细的，有些可能是响亮的。有些声音高昂，而有些声音低沉。

有些声音是有用的。没有声音我们就不能交谈，也无法听到对方讲话。闹钟的铃声把人们唤醒。路上的汽车喇叭声警告粗心大意的人谨防危险。

有些声音是有害的。巨型飞机低空飞行时产生的巨大轰鸣会使房屋损坏。喧闹声令人心神不安，特强声甚至震耳欲聋或聆听不清。

A hooting horn warns of danger.

汽车喇叭声警告注意危险



Things to Do

- (i) Collect as many solids as you can find, for example, coins, rocks, tins, pieces of wood and glass. Take two similar objects and knock them together. Then take different objects and knock them together. Try to make as many different sounds as possible.
- (ii) Next take two similar objects and rub them together. Then take different objects and rub them together. Try to make as many different sounds as possible.

动 手 做

一、尽量多收集一些坚硬的东西，如：硬币、石块、罐头盒、木块和玻璃。拿两个相同的物体互相碰击，然后再拿两个不同的物体互相碰击。尽可能多发出一些不同的声音来。

二、再拿两个相同的物体互相摩擦。然后拿不同的物体互相摩擦。尽可能多发出一些不同的声音来。

HOW WE MAKE SOUNDS

Whenever you hear a sound, find out where it comes from and what causes it. We make sounds by making things move to-and-fro. This to-and-fro movement is called **vibration**. It means moving up and down or forwards and backwards very fast. These vibrations cause the air to vibrate. This makes **sound waves**.

Things to Do

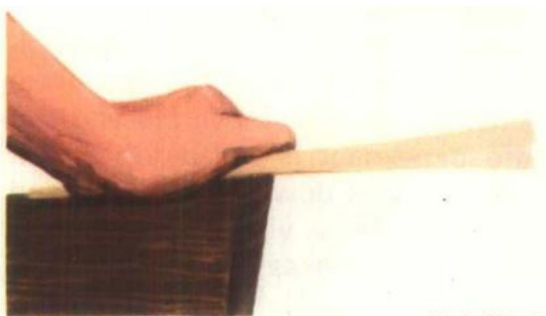
- (i) Look at this picture. Hold a long ruler on the table, so that two-thirds of the ruler is jutting off the table. Pull down on the free end of the ruler and let go. See the ruler **vibrate**. Can you hear a humming sound?

我们是怎样发出声音的

每当你听到什么声音时，找一找它来自何方，是什么原因引起的。我们使物体来回运动便能发出声音。这种来回运动叫做**振动**。振动就是上下或前后的迅速运动。物体振动使空气振动而发出**声波**。

动手做

一、看看这张图。把长尺压在桌子上，使尺子的三分之二伸出桌外。往下按尺子悬空的一端，然后松手。观察尺子的振动。你能听到嗡嗡声吗？



A vibrating ruler

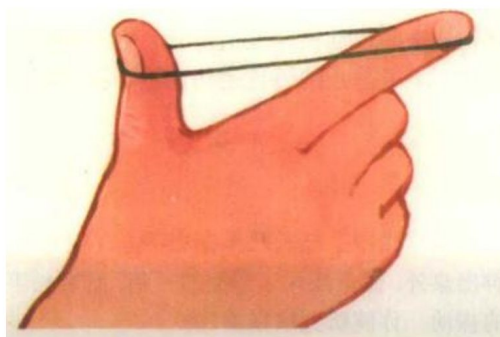
振动着的尺子

- (ii) Take a rubber band. Hold it between your finger and thumb like this. Pluck it. What do you notice? Can you hear it humming?

二、拿一根橡皮筋。如图所示把它套在食指和大拇指上。拨动它。你看到了什么？你能听到它嗡嗡作声吗？

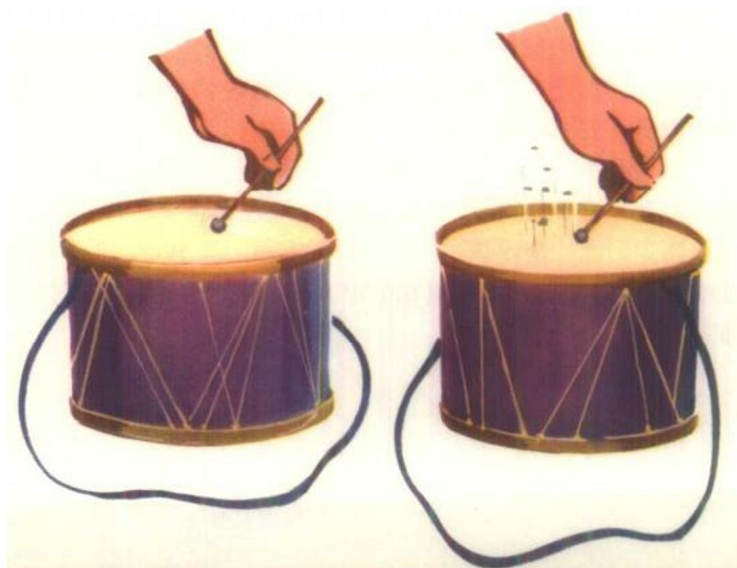
A vibrating rubber band

振动着的橡皮筋



- (iii) Strike a drum. You can hear the sound but you cannot see the drum moving. Put some small stones on the drum. Strike the drum again. The stones will jump up and down. This shows that the drum is vibrating.

三、敲敲鼓。你可以听到鼓声,但看不到鼓在运动。
把一些小石子放在鼓上。再敲敲鼓。石子会上下跳动。
这证明鼓在振动。



We can make sounds in many ways e.g. by shouting, clapping our hands and banging the table. We can make sounds only by making things vibrate. Sometimes these things vibrate so fast, or so slightly, that we cannot see them vibrating.

We can talk because we can make our **vocal cords** vibrate. Our vocal cords are in a sound-box or **voice-box**. Feel your throat gently. You can feel a hard lump. It moves up and down when you speak. This is your voice-box. Two vocal cords are stretched across it. They vibrate when your lungs force the air through them.

我们可以用喊叫、拍手或猛击桌面等许多方式发出声音。只有使物体振动，才能发出声音。有时这些物体振动得太快或太微弱，使我们看不到它们在振动。

因为我们能使我们的声带振动，所以我们能够说话。我们的声带处在一个共鸣箱，也就是喉里。轻轻地摸摸你的喉咽，你可以感觉到有一个硬块。你说话时，它就上下移动。这就是你的喉。两条声带绷紧着横贯在喉中。肺迫使空气通过声带时，声带就振动。

Things to Do

Let us make sound go through things:

- (i) Take a piece of tubing (or a pipe or hose), about one metre long, and ask your friend to hold one end to his ear. Whisper something through the other end of the tubing. Now remove the tubing and whisper to him again. Ask him whether it is easier to hear when you are whispering through the tubing or whispering without the tubing. What does this show?
- (ii) Take a clean empty tin and cup it over your mouth. Talk into it. Can the other children hear what is said? What does this show?

动手做

让我们使声音透过物体。

一、取一根约一米长的管状物(管子或软管)，请你的朋友把它的一端贴在他的耳朵上，你在另一端小声说话。现在拿开管子，再小声对他说话。问问他用管子比不用管子时是否更能听清你的低声说话。这说明了什么？

二、取一个干净的空罐头盒，把它罩在你的嘴上。对着罐头盒说话。别的孩子能听到你说了些什么吗？这说明了什么？

SOUNDS MADE BY ANIMALS

Animals can make sounds too. Different animals can make different sounds, but they all must make some part of their body vibrate.

(A) Birds can chirp and sing because they have voice-boxes. Many of them have two voice-boxes — one for singing and one for calling or warning other birds.

(B) Bees make a buzzing sound because their wings move up and down very fast. They have no voice-boxes.

(C) Bull-frogs croak by using the voice-boxes in their throats. When they croak they puff up their throats like balloons.

动物发出的声音

动物也能发出声音。不同的动物能发出不同的声音，但它们都必须使自己身体的某一部分产生振动。

一、鸟能鸣叫和歌唱，因为鸟有喉。许多鸟有两个喉——一个用来唱歌，一个用来呼叫或警告别的鸟。

二、蜜蜂发出嗡嗡声，因为它们的翅膀上下扇动得很快。蜜蜂没有喉。

三、牛蛙用喉咽中的喉发出呱呱声。当它们呱呱叫时，就把喉咽象气球一样鼓起来。

**Birds use their
voice-boxes to
chirp and sing.**

鸟用喉鸣唱



**Bees buzz with
their wings.**

蜜蜂用翅膀
发出嗡嗡声

**Bull-frogs use
their voice-boxes
to croak.**

牛蛙用喉呱呱叫



HOW DO WE HEAR SOUNDS?

We hear sounds with our ears of course! Ask your friend to clap his hands. Cover your ears. Can you hear your friend clapping? Ask your friend to blow his trumpet. Can you hear the blare of the trumpet? Cover your ears. What do you notice now?

You have read that sound makes air vibrate, thus making sound waves. Before you can hear the sound, the sound waves must reach your ears.



You hear sounds with your ears.

你用你的耳朵来听声音