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致读者

如果你希望在享受英语阅读乐趣的同时又能增长知识、开拓视野，由外语教学与研究出版社与美国国家地理学会合作出版的“国家地理科学探索丛书”（英文注释版）正是你的选择。

“国家地理科学探索丛书”（英文注释版）第二辑分为8个系列，共46本，内容涉及自然科学和社会研究，除对本套丛书第一辑已包含的“生命科学”、“物理科学”、“地球科学”和“文明的进程”4个系列进行了补充外，又推出了4个新的系列——“生活中的科学”、“科学背后的数学”、“专题研究”以及“站在时代前沿的科学家”。

这套丛书秉承《国家地理》杂志图文并茂的特色，在书中配有大量精彩的图片，文字地道易懂、深入浅出，将科学性和趣味性完美结合，称得上是一套精致的小百科全书。特别值得一提的是本套丛书在提高青少年读者英语阅读能力的同时，还注重培养他们的科学探索精神、动手能力、逻辑思维能力和沟通能力。

本套丛书既适合学生自学，又可用于课堂教学。丛书各个系列均配有一本教师用书，内容包括背景知识介绍、技能训练提示、评估测试、多项选择题及答案等详尽的教学指导，是对课堂教学的极好补充。

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生活中的科学

家小学问大

怎样坐飞机？

奇趣水族馆

食品店里的学问

商场里的秘密

公园乐事多

五光十色的海滩

动物园里的科学

为什么眨眼睛？

为什么打呵欠？

站在时代前沿的科学家

理解运动定律

寻找疫苗

揭示放射现象

解密 DNA 结构

揭秘晶体管

专题研究

探险热带雨林

了解海洋动物

窥视黑暗

亲历火山冰川

追踪迁徙动物

科学背后的数学

咀嚼数字

解读数据

多少蚂蚁是一家？

数字的奥妙

比比就知道

方圆之间

思前想后

机会几何？

文明的进程

印度

日本

马里

秘鲁

维京人的世界

生命科学

动物的适应性

分类的线索

生态系统

生活周期

地球科学

地球、太阳和月亮

灾害天气

岩石与矿物

恒星与星系

奇妙的水

物理科学

酸，还是碱？

化学变化

磁体的奥秘

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NATIONAL GEOGRAPHIC

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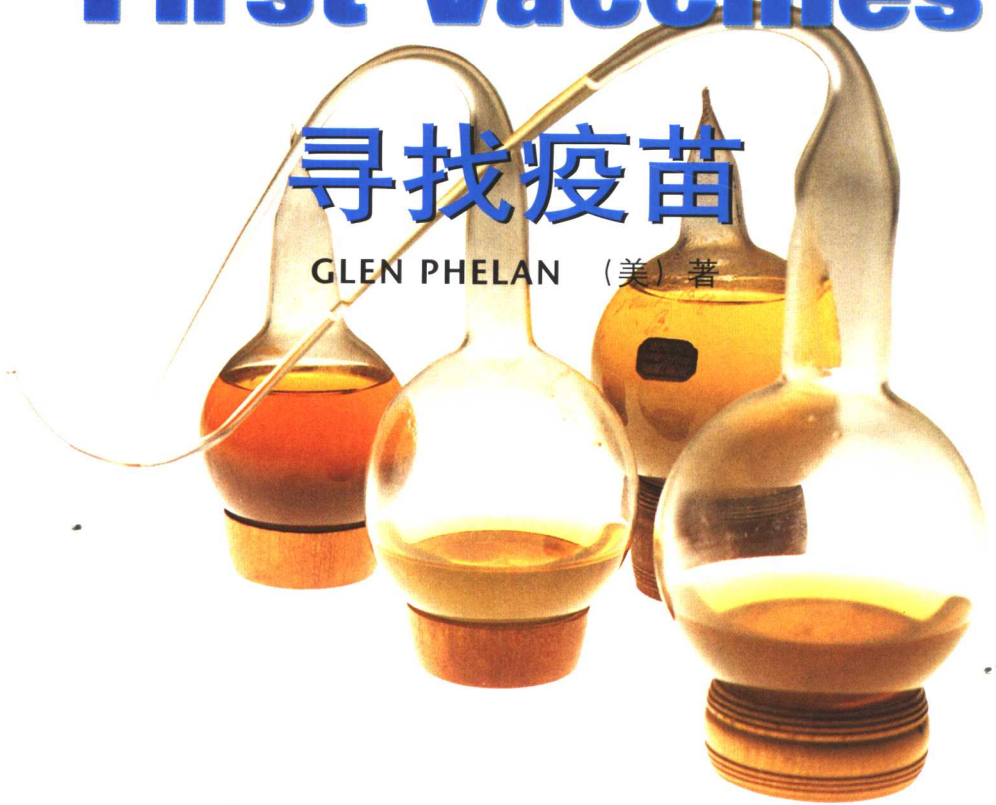
Finding the First Vaccines

寻找疫苗

GLEN PHELAN （美）著



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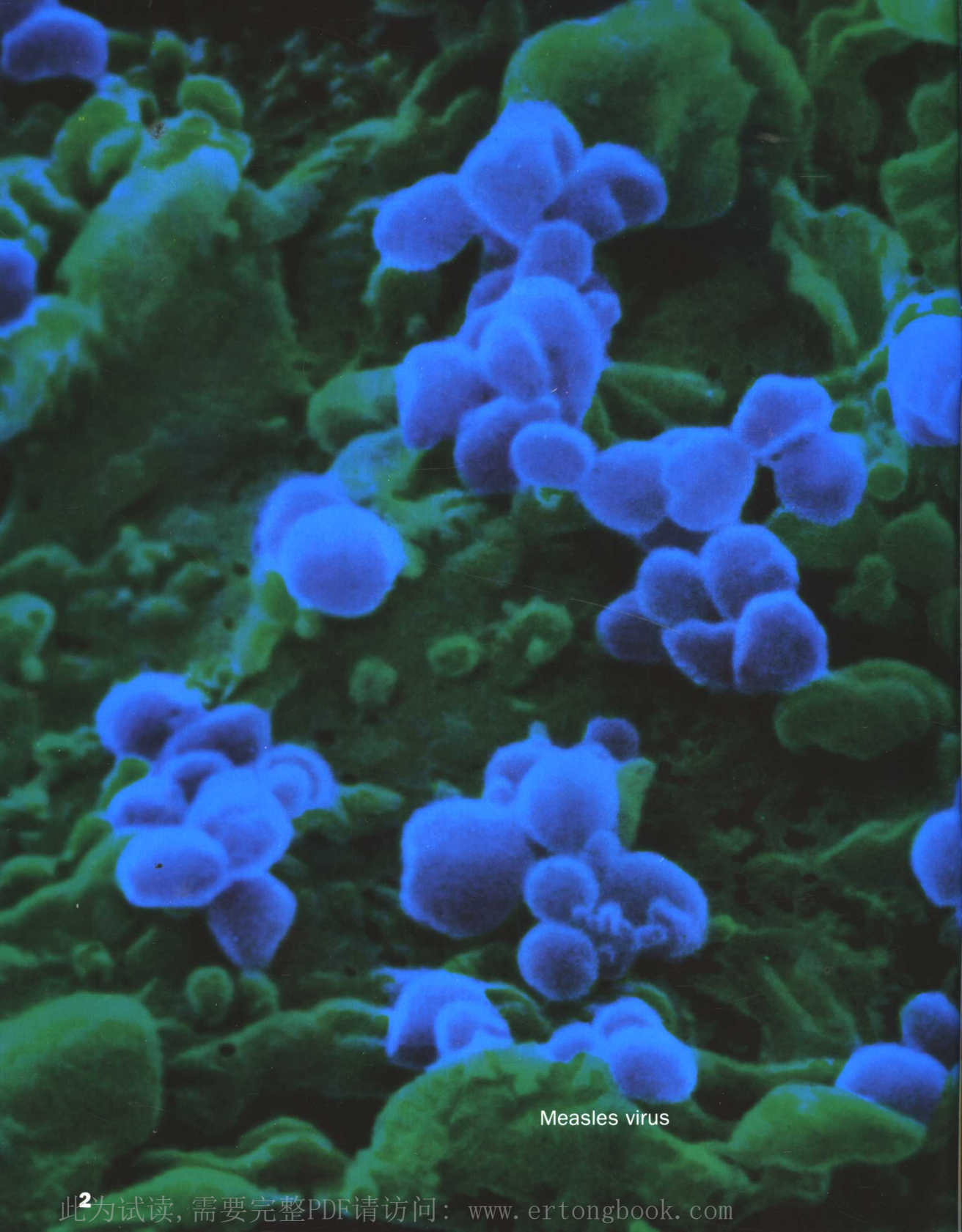


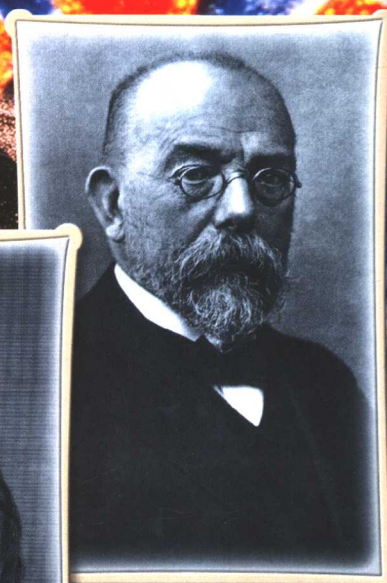
Measles virus

Contents

目 录

Louis Pasteur[1]

A chemist who transformed[2] medical science



Robert Koch[5]

A physician who linked specific[6] germs[7] with specific diseases

Florence Nightingale[3]

A reformer[4] who made hospitals cleaner and safer

1. Louis Pasteur		路易·巴斯德（法国化学家、微生物学家）
2. transform	*v.*	使改观
3. Florence Nightingale		弗洛伦斯·南丁格尔（英国女护士、近代护理学和护士教育创始人）
4. reformer	*n.*	改革者，重新者
5. Robert Koch		罗伯特·科赫（德国细菌学家）
6. specific	*adj.*	特定类别的
7. germ	*n.*	病菌

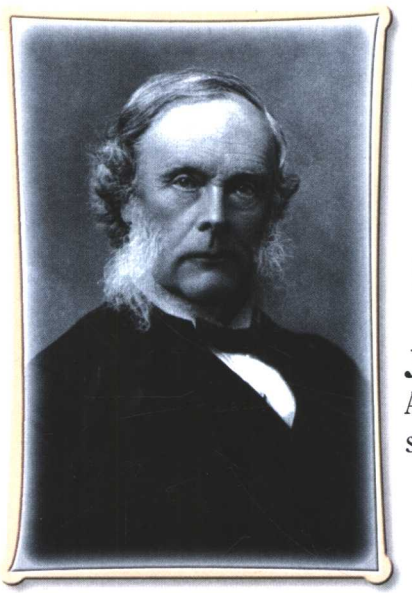
Introduction
引言

A "mad dog" causes terror in the streets. Mysterious[1] diseases threaten[2] a nation's economy[3]. Children are struck[4] by deadly illnesses. And no one knows why. This is a story about people who found out why. It's a story about people who fought on the front lines in the first key battles against disease. Most of all, it's a story about heroes.

Who were these heroes? They were scientists like Louis Pasteur and Robert Koch. These men probed[5] the microscopic[6] world of germs. They were doctors like Joseph Lister[7] and nurses like Florence Nightingale. They worked to make hospital care safer. What did these people do that was so heroic? This book will tell you their story.

Let's begin our story by taking a closer look at the mid-1800s. What was life like in those days? And what did people do when they got sick?

Edward Jenner[8]
A country doctor who created the first vaccine



Joseph Lister
A surgeon[9] who made surgery[10] safer

1. mysterious *adj.* 神秘的
2. threaten *v.* 威胁
3. economy *n.* 经济
4. strike *v.* （疾病等）突然侵袭
5. probe *v.* 探索
6. microscopic *adj.* 微观的
7. Joseph Lister 约瑟夫·利斯特（英国外科医师，医学科学家）
8. Edward Jenner 爱德华·詹纳（英国医生，发现牛痘对天花有免疫力，1796年试验牛痘接种成功）
9. surgeon *n.* 外科医师
10. surgery *n.* 手术

Life in the Mid-1800s

You might think life without TV and video games would be boring. But in many ways, living in the mid-1800s was exciting. Every year seemed to bring new developments in science and technology. The puffs[1] of smoke and the chug[2]-chug of trains became more common as railroads connected towns across the countryside. The telephone, invented in 1876, brought people even closer together.

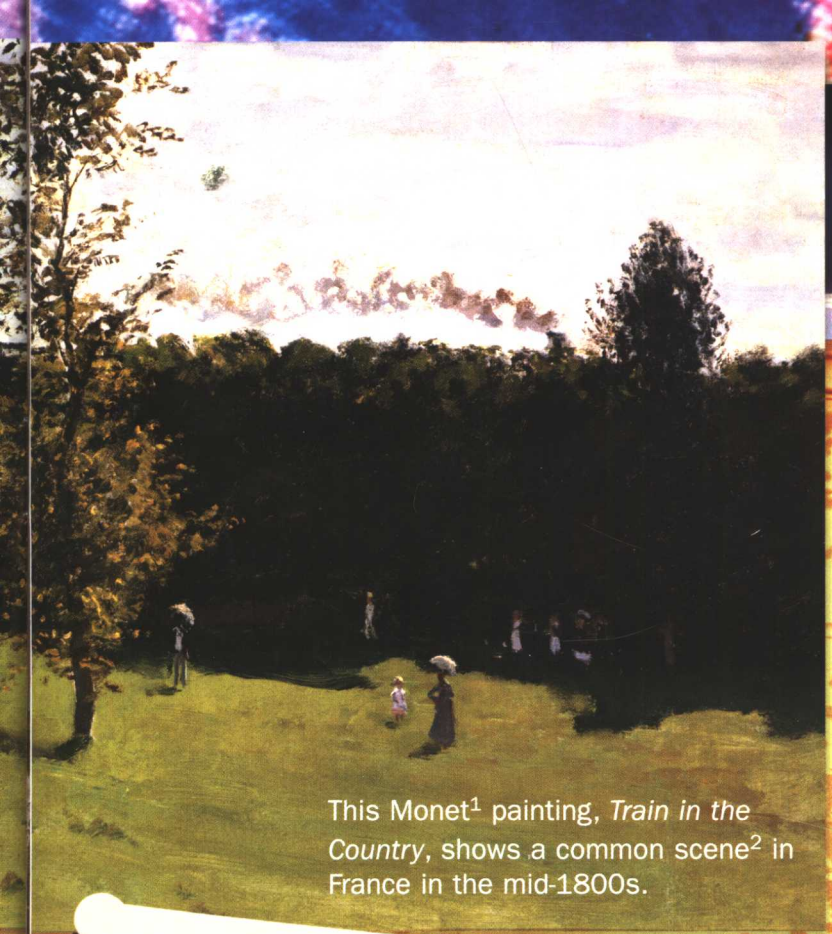
Other inventions seemed even more amazing[3]. Streetcars[4] and elevators[5] made life easier in cities. And electric light bulbs changed life forever.

Progress was being made in medicine, too. But not fast enough. If you were a sick child in the mid-1800s, there was plenty of reason for your parents to worry. Everyday diseases, such as the flu, strep throat[6], and the measles[7], were killers back then. Today we can treat[8] them. What caused these diseases? How did they spread from person to person? No one knew.

People had some theories, of course. Many thought diseases were spread by poisonous[9] vapors[10] from swamps[11], animal wastes, and decaying[12] matter. These things seemed unhealthy, so the idea made sense[13]. But there was no scientific proof to support this idea.

No one understood the causes of diseases. So they didn't know how to protect themselves. Armed with a microscope[14] and a few other tools, Louis Pasteur helped change all that.

1. puff	*n.*	（烟雾的）一股	8. treat	*v.*	医治
2. chug	*n.*	（引擎等开动或排气时的）嘎嚓声	9. poisonous	*adj.*	有毒的
3. amazing	*adj.*	令人吃惊的	10. vapor	*n.*	蒸汽
4. streetcar	*n.*	有轨电车	11. swamp	*n.*	沼泽
5. elevator	*n.*	电梯	12. decay	*v.*	腐烂
6. strep throat		脓毒性咽喉炎	13. make sense		讲得通
7. measles	*n.*	麻疹	14. microscope	*n.*	显微镜



This Monet[1] painting, *Train in the Country*, shows a common scene[2] in France in the mid-1800s.

1. Monet 莫奈（法国画家）
2. scene *n.* 景色
3. constant *adj.* 不断的

Nurses line up to weigh babies in a hospital in the mid-1800s. Childhood diseases were a constant[3] fear at this time, and their causes remained largely unknown.

Chapter 1 第一章

A Hero of His Time
时代英雄

One day in 1831, a wolf wandered[1] out of the woods near a French village. The wolf was foaming[2] at the mouth. It had a deadly disease called rabies[3]. The wolf bit several people. Now they would get rabies, too. The victims[4] went to the village blacksmith[5] to have their wounds burned. The shop was near the home of eight-year-old Louis Pasteur. He never forgot the screams[6] of pain he heard that day. Years later, he would find a way to stop the suffering caused by rabies and other diseases.

1. wander	*v.*	游荡
2. foam	*v.*	吐白沫
3. rabies	*n.*	狂犬病
4. victim	*n.*	受害者
5. blacksmith	*n.*	铁匠
6. scream	*n.*	尖叫声

A Close Observer[1]

Louis Pasteur was born in 1822. At that time, deadly diseases often struck infants[2] and young children. In fact, Louis's older brother had died as an infant. But Louis grew up healthy and happy. He enjoyed swimming and fishing in the river that ran through his hometown of Arbois[3] in eastern France. However, his favorite pastime[4] was art.

Louis loved to draw and paint. He had a good eye for detail[5]. He would study his subject carefully, whether it was a flower, a butterfly, or a person's face. Then he would capture[6] every detail in his artwork.

Louis was just as careful in his schoolwork. Whether writing the alphabet[7] or figuring out[8] a math problem, he worked slowly and carefully.

1. observer	*n.*	观察者
2. infant	*n.*	婴儿
3. Arbois		阿尔布瓦
4. pastime	*n.*	消遣
5. detail	*n.*	细节
6. capture	*v.*	捕捉
7. alphabet	*n.*	字母表
8. figure out		计算出
9. scientific	*adj.*	科学（上）的
10. Jura Mountains		侏罗山
11. portrait	*n.*	肖像；画像

Louis Pasteur grew up near the Jura Mountains[10] in France.

He checked and re-checked his work until he thought it was good enough to hand in. His strong powers of observation and careful attention to detail would be important skills later in his scientific[9] work.

Louis Pasteur painted this portrait[11] of his mother in 1835, when he was 13 years old.

A Curious Mind

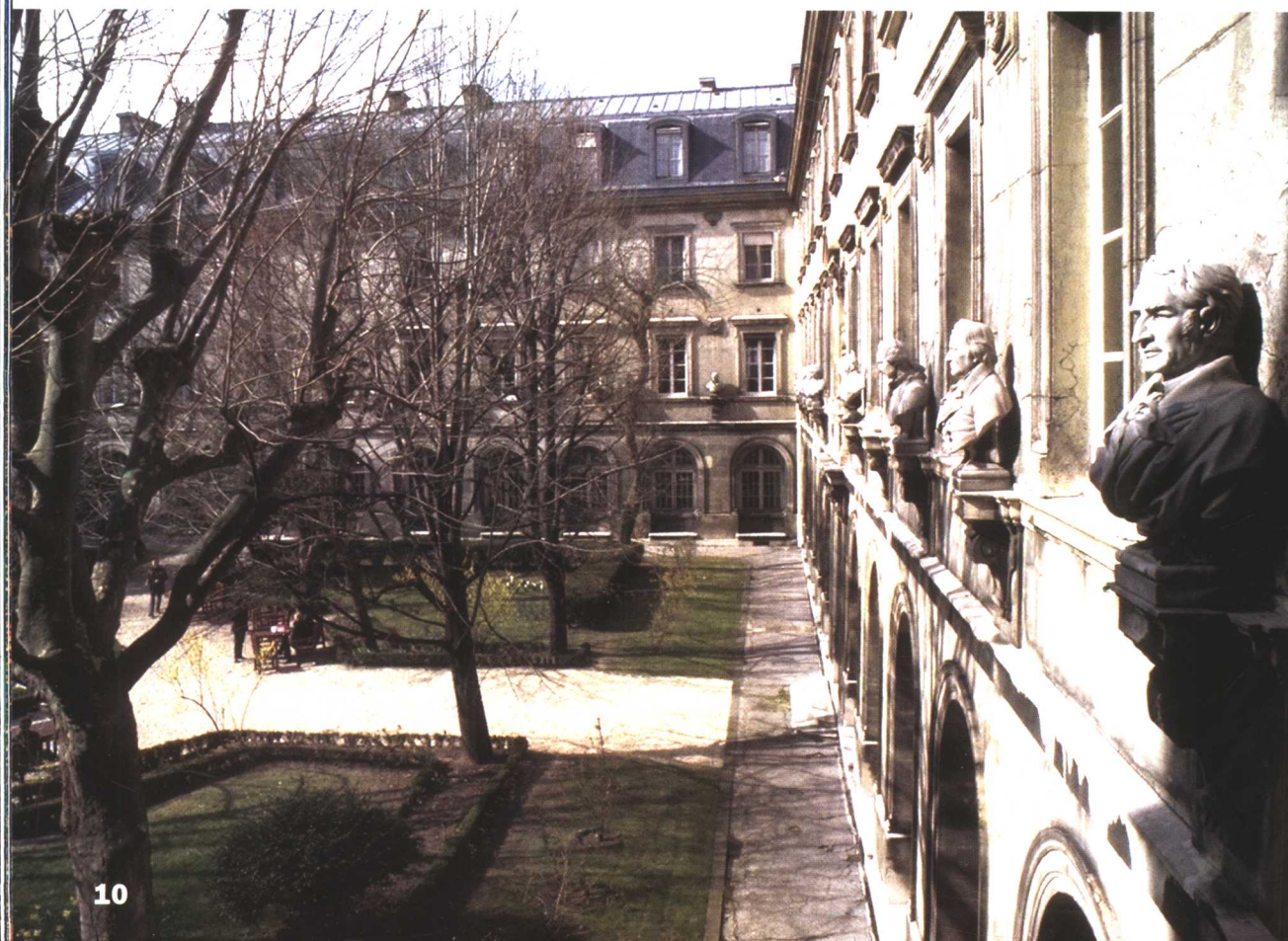
Curiosity was another of young Louis Pasteur's traits[1]. He was always asking questions. When his father read to him about French heroes of the past, Louis would interrupt[2] with questions. But his father didn't mind. He knew that asking questions was the best way to learn.

Louis loved sharing knowledge as much as learning it. He decided to become a teacher—the best one possible.

So Louis studied hard to prepare to take the entrance exam[3] to the École Normale[4]. This was a famous school in Paris that trained people to

1. trait *n.* 特点
2. interrupt *v.* 打断
3. entrance exam 入学考试
4. École Normale 巴黎高等师范学校

The École Normale in Paris



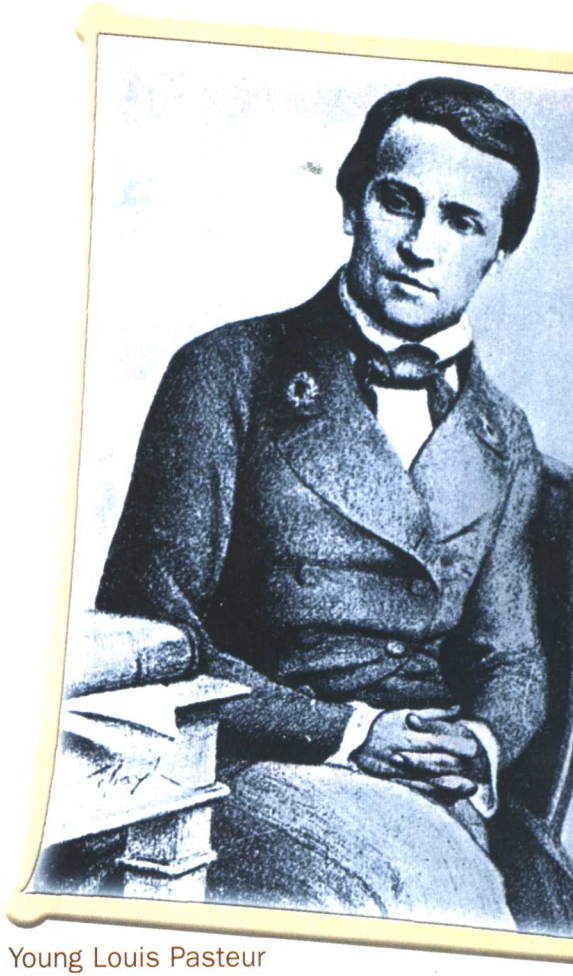
become professors[1]. Only those who had top scores[2] on the exam were admitted[3] to the École Normale. Louis was excited about the challenge[4].

The Hard-Working Professor

After graduating[5] from a prep school[6], Louis took the entrance exam for the École Normale. Then a strange thing happened. Louis was accepted into the school, but he turned down the offer! Why? Only 22 students were accepted from all of France. Louis placed 15th on the list. He thought he could do a lot better than that. So he decided to study one more year, then take the test again. This showed what high standards he had and how he always wanted to do his best.

When Louis took the test again, he placed 4th. That was good enough. He entered the École Normale in Paris where he studied chemistry and physics.

1. professor	*n.*	（大学）教授
2. score	*n.*	（考试、测验等的）分数
3. admit	*v.*	准许……进入
4. challenge	*n.*	挑战
5. graduate	*v.*	毕业
6. prep school		预备学校
7. in addition to		除……之外（还）



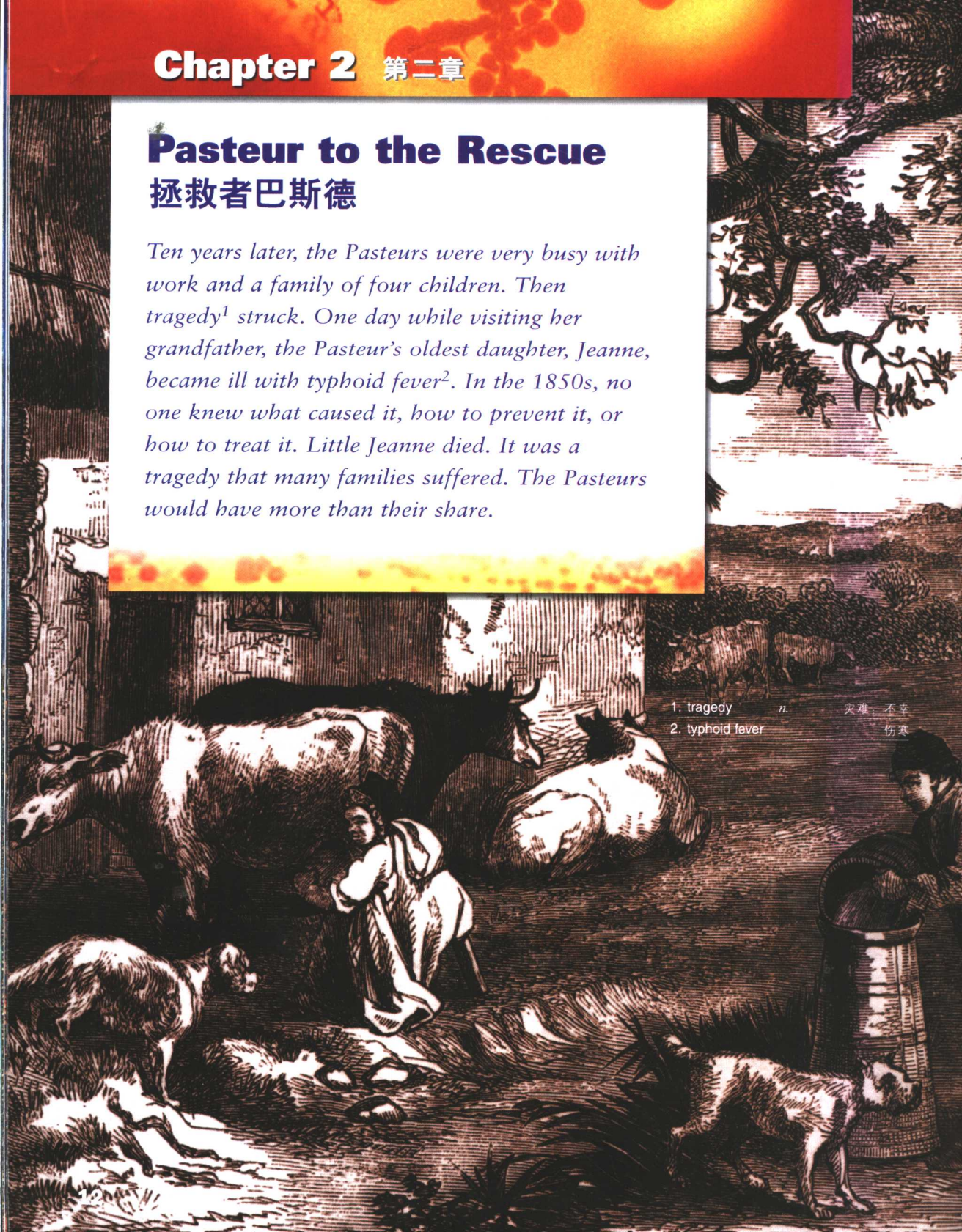
Young Louis Pasteur

Louis graduated and became a professor. In addition to[7] his teaching, he worked long hours in his laboratory. But even with all this work, he did find time to fall in love with Marie Laurent. They were married, and his new wife was a great help in his work. Soon, Louis Pasteur would begin making the discoveries that would make him a hero.

Chapter 2 第二章

Pasteur to the Rescue
拯救者巴斯德

Ten years later, the Pasteurs were very busy with work and a family of four children. Then tragedy[1] struck. One day while visiting her grandfather, the Pasteur's oldest daughter, Jeanne, became ill with typhoid fever[2]. In the 1850s, no one knew what caused it, how to prevent it, or how to treat it. Little Jeanne died. It was a tragedy that many families suffered. The Pasteurs would have more than their share.



1. tragedy *n.* 灾难，不幸
2. typhoid fever 伤寒

"Wee[1] Germs"

Pasteur would make many discoveries in his life that would help prevent infectious[2] diseases like the one that killed Jeanne. The first of these discoveries was what he called "wee germs." Pasteur used a microscope to find out that tiny living things were in liquids[3] like fruit juice and milk. Some of these "wee germs" made the liquid spoil[4].

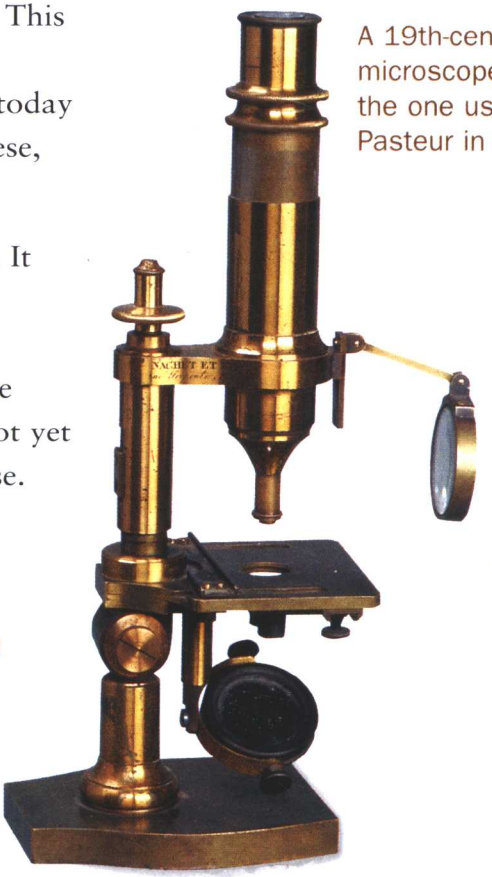
Pasteur discovered that he could kill the harmful[5] germs by heating the liquid to certain temperatures. This process[6] became known as pasteurization[7]. It is still used today to destroy[8] germs in milk, cheese, and other foods.

Pasteurization made food safe. It made milk last longer before spoiling. It also killed harmful germs in milk that caused some diseases, though Pasteur did not yet know that germs caused disease.

Until Pasteur discovered how to kill germs in milk, farmers sometimes sold milk that caused disease.

He had turned his attention to the world of germs, or microorganisms[9]. The results would change medicine forever.

1. wee	*adj.*	极小的
2. infectious	*adj.*	传染的
3. liquid	*n.*	液体
4. spoil	*v.*	（食物）变坏；变质
5. harmful	*adj.*	有害的
6. process	*n.*	过程
7. pasteurization	*n.*	巴（斯德）氏消毒法
8. destroy	*v.*	杀死
9. microorganism	*n.*	微生物



A 19th-century microscope similar to the one used by Pasteur in his work

From Wine to Worms

Pasteurization saved the day for the alcohol[1] industry in France. Alcohol was used for making vinegar[2], perfume[3], paint, medicine, and other products[4]. A lot of alcohol was made from beet[5] juice. Sometimes germs made the juice spoil. Then it wouldn't turn into alcohol.

Pasteurization prevented the juice from spoiling. The same process was used to keep wine from going sour. This was important in a country that was known for its fine wines.

In 1865, Pasteur was asked to look into another problem. A mysterious disease was killing silkworms throughout[6] France. Silkworms spin[7] cocoons[8] made of silk fibers[9]. The fibers are woven[10] into silk cloth. Without silk, the French clothing industry was in big trouble.

At first, Pasteur knew nothing about silkworms. But he learned everything he could about them. Soon he would know more than anyone else.

Using the Microscope

Pasteur used his microscope to observe healthy and sick worms. He saw oval[11] shapes on the sick worms. He guessed that these shapes were germs that caused a disease in the worms. After a lot more observation and research, Pasteur knew that he was right.

To solve the silkworm problem, the diseased silkworms had to be found and destroyed. Pasteur taught the silkworm growers how to use microscopes. Then they could identify[12] the germs in the silkworms or in the moths[13], which were a later stage in the silkworms' life cycle. If the germs were found, the worms, the moths, or any eggs the moths had laid were destroyed. In this way, only healthy silkworms were allowed to grow.

Silkworms, shown here on a mulberry[14] plant, were essential[15] to the French clothing industry.

1. alcohol	*n.*	酒精	9. fiber	*n.*	纤维
2. vinegar	*n.*	醋	10. weave	*v.*	织
3. perfume	*n.*	香水	11. oval	*adj.*	椭圆形的
4. product	*n.*	产品	12. identify	*v.*	识别
5. beet	*n.*	甜菜	13. moth	*n.*	蛾
6. throughout	*prep.*	遍及；贯穿	14. mulberry	*n.*	桑树
7. spin	*v.*	（蚕等）吐（丝）	15. essential	*adj.*	必不可少的
8. cocoon	*n.*	茧			