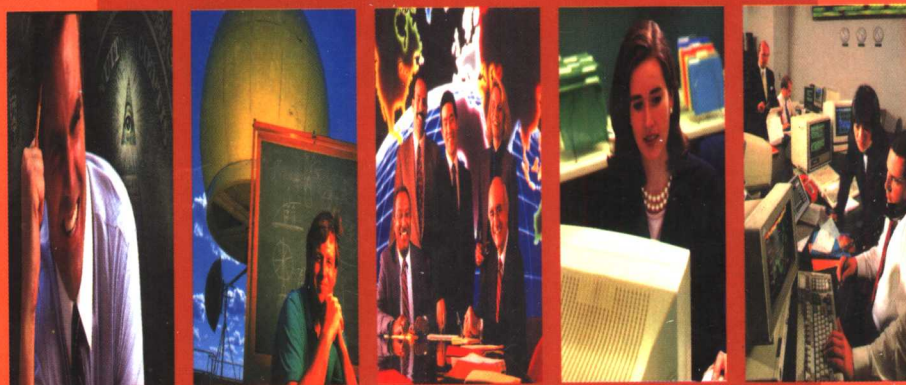


COLLINS
COBUILD

让您学到最纯正的英语

英汉双解
科技英语关键词

[英] 比尔·马斯库尔 著
杨庆云 译



荣获爱丁堡公爵奖

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使 用 说 明

- 本书旨在帮助读者理解和使用科技领域的基本词汇。
- 本书系统地收录了时新科技报道中的一些出现频率高、使用频繁的词汇和表达方式。有些词汇是科技文献的专业术语,大部分则在普通英语中广泛使用,但在科技英语中有其特殊含义和用法。
- 本书展示了这些关键词汇的基本含义和用法,以及词与词之间的搭配用法。
- 本书共收录七大主题。其中一章专门介绍研究、发现和发明的一些常用词组。这些主题中常见词汇的含义都用具体的实例来展示其用法,而这些例句都摘自英文原文的报刊和杂志。
- 掌握了词义后,书中所列的一些专门设计的练习可以进一步扩展所学的知识。这些练习大都节选自篇幅较长的文章。这些节选练习的主题都与科技工作者有着密切的关系。
- 本书的每一章都自成体系。
- 每一章都有若干专题小节,且都按一定的逻辑顺序排列,每一小节又分下面三部分:

结构

- ◇ 关键词和注释 专业词汇按具体领域列出,并在相应的语境中给出定义。
- ◇ 实例 这些例句进一步展示了这些关键词在上下文中的含义。大部分实例都是一个句子或句群。这样,读者就可以有一个完整的上下文语境。而且这些实例都是这些词汇在现实生活中的真实用法,能够充分展示词汇的含义和用法。
- ◇ 语言练习 通过练习能够加深读者对这些词汇的理解,掌握词语的搭配,并使您重视使用词汇的语言环境。很多练习都选自篇幅较长的文章,因而可以用来开展小组讨论。

单元内容

关键词和解释

每个注释都含有一连串相关的关键词,为了便于阅读,关键词在注释中用黑体字来区分。在注释的左侧还把关键词按顺序排列在黑底的方框中。例如:

micro-organism	The study of micro-organisms , very small living
microbiologist	things, is microbiology , undertaken by
microbiology	microbiologists .
bacteria	The study of bacteria , single-cell organisms without a
bacteriologist	nucleus, is bacteriology and specialists in this area are
bacteriology	bacteriologists .
virologist	Viruses are extremely small organisms invisible even
virology	under a microscope. Studying them is virology and its
virus	specialists are virologists .

例句

例句选择的是一些有趣又最能展示词义的句子,句中第一次出现的关键词用下划线标明。

The new experiments are an attempt to explain high levels of ozone in the troposphere across much of the southern hemisphere during parts of the year. This phenomenon was revealed in 1990 by data collected by NASA satellites.

语言练习和解题提示

在练习中,您需要完成以下一项或几项任务:

- 选词填空:根据词义和有关语法提示,在不同的上下文中填写单词。
- 思考词义并把它们填到文章中去:当您掌握了所给出的待选词汇的意思后,还要仔细阅读题目要求,有些词至少要用两次,而有些词可能根本就不需考虑。
- 词汇与释义的搭配:在做这种练习前,最好先通读一遍,不要匆忙下笔。
- 连接句子或句子的某些部分:要认真考虑词义、上下文语境和语法。对那些暗示或线索要格外注意,这样才能选出意思相符而且语法正确的答案。
- 对句子或段落的重新排序:为了使从不同文章中选出的句子或段落有逻辑性,有时要对它们进行重新排序。阅读有关线索,找出首句或首段,然后再通过各种提示或方法把文章按逻辑顺序重新排列。
- 阅读理解:文章后所设计的问题不仅考察了您对单词意思的掌握程度,更要考查您在更为广泛的语境中理解关键词的能力。您要查找解释段落中的关键词义,重新使用本章中的重要词汇,并将它们与您所掌握的内容联系起来,必要时您还可以查阅字典。

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Genes and genetic inheritance 基因和基因遗传
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Chromosomes 染色体

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Space and the universe 太空和宇宙
Launching spacecraft 发射太空船
Putting payloads into orbit 把有效载荷送入轨道
Satellites 人造卫星
Manned flight 载人太空飞行
Shuttles and stations 航天飞机与空间站
Probes 太空探测
The sun and the planets 太阳和行星

Comets, asteroids 彗星, 小行星和陨星
and meteorites
Telescopes and celestial bodies 望远镜和天体
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研究、发现和创新

Science and scientists

科学与科学家

science 对自然和自然事物的行为及与之相关知识的研究（具体到某一门科学，是指关于某一特殊领域的研究及科学知识，或是对人类某种行为的研究。）

scientific 科学的，与科学有关的

scientist 科学家

Science is the study of the nature and behaviour of natural things and the knowledge obtained about them. A **science** is a particular area of scientific knowledge and study, or the study of an area of human behaviour.

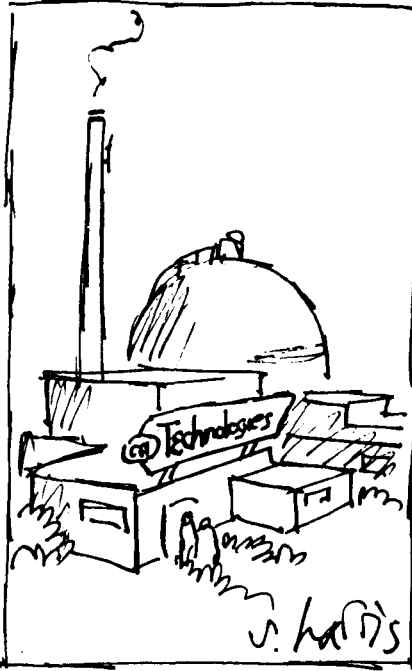
Scientific describes things that relate to science.

A **scientist** is someone who works in science.

BIG SCIENCE



LITTLE SCIENCE



Science is a force that should be used for the good of humanity.
科学服务于人类的利益。

Most of these academies of science had no ecologists in them and didn't regard ecology as a science.

大多数的理科学院没有生态学家，也不把生态学当作一门科学。

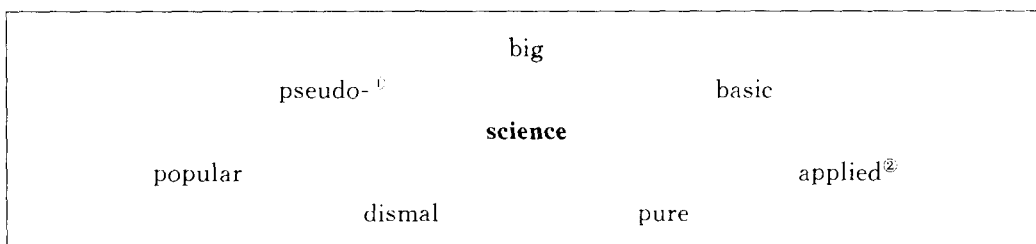
The Centre is running a series of talks on the relationship between science and literature, in which writers, poets and scientists discuss how scientific ideas over the past two centuries have influenced literature and social change.

这个中心正在举办关于科学与文学关系的系列讨论会，与会的作家、诗人和科学家们的讨论议题是：在过去两个多世纪里科学思想对文学和社会的影响。

1 Science partners. The words in the box can all come in front of 'science' .

Find combinations that refer to:

- 1 science that is not concerned with practical or commercial applications
(2 expressions)
- 2 science that is concerned with practical or commercial applications
- 3 science books and TV programmes meant for the general public
- 4 science that does not have serious theoretical backing
- 5 science that requires many resources and very large sums of money
- 6 what economics is sometimes known as: the _____ science



Now use the expressions to complete these extracts. Each expression is used once.

- a Asimov spoke out in favour of science and reason and against _____ science and superstition.
- b Research and development largely takes place in industry, and although it involves some _____ science, it really consists of the application of science and the improvement of technology.
- c Developing and marketing new drugs has little to do with _____ science and everything to do with power and money.
- d *Black Holes and Time Warps* goes far beyond the average _____ science books by presenting the general reader with a detailed historical account of one area of physics research.
- e In _____ science, the national pride that sets country against country and scientist against scientist can be costly. The great projects of understanding have now reached such a scale that they are best served by the united efforts of all the world.
- f Some economists are trying to give their _____ science sex appeal.
- g When the Gillette company started investigating the _____ science of shaving in the 1950s, it was reacting to the threat of a cream that would dissolve beards.

Types of science

科学的种类

hard science 硬科学, 自然科学(例如: 物理学, 化学等)

soft science 软科学, 指行为科学与社会科学(例如: 心理学, 人类学等)

There are those who consider that some sciences are more 'scientific' than others, and they distinguish between **hard sciences** like physics and chemistry and **soft sciences** like psychology and anthropology. The division may be drawn almost anywhere, as the second example indicates.

Scientists in the hard sciences should not be too content with themselves. How many different answers exist, for example, to the following questions: how old is the universe, is the universe expanding or contracting, how many fundamental particles exist, when is the next earthquake due, what causes AIDS or Alzheimer's disease?

从事硬科学的科学家们不应满足于现状, 还有许多问题有待解答, 比如: 宇宙存在了多少年? 宇宙是在扩大还是在缩小, 有多少基本粒子? 下次地震将在什么时候发生? 爱滋病和早老性痴呆发病的原因是什么?

The statistics brought out a gender division between hard and soft science: girls tending towards biology, boys towards maths and physics.

统计学表明从事硬科学与软科学研究的科学家在性别上存在着差别: 女性趋向于生物学的研究, 而男性则趋向于数学和物理学的研究。

2 Science quiz. Match these sciences to their areas of study.

- | | |
|-----------------------------|-----------------------------------|
| 1 anthropology ¹ | a environment |
| 2 biology | b human mind and behaviour |
| 3 chemistry | c language |
| 4 ecology ² | d living things |
| 5 economics ³ | e matter and forces |
| 6 linguistics ⁴ | f money, industry, and trade |
| 7 mathematics | g numbers, quantities, and shapes |
| 8 meteorology ⁵ | h people, society, and culture |
| 9 physics | i substances and their reactions |
| 10 psychology ⁶ | j weather |

3 Science divisions. Look at the examples and complete the commentary below.

Economists have begun to study the implications of near-rationality. To do so, they are drawing on research in sociology, anthropology, and above all, psychology. Since economics is a behavioural science, this extension of its research programme is long overdue.

经济学家们已经开始研究近理性的含意。为此, 他们正在社会学、人类学尤其是心理学方面进行研究。因为经济学是一门行为科学, 早该对其进行更宽范围的研究。

At university, I rediscovered that attraction in earth sciences, finding out how ordinary things, rocks, rivers and the wind, became the way they are.

在上大学时，我对地学开始感兴趣，对一些自然事物，岩石，河流和风是怎样形成的有了一定的了解。

He is fascinated by the car in its fundamental role. 'Ergonomics is really the application, the technological side, of the other human sciences,' he explains. 'We are constantly aware that the skill involved in driving a car is phenomenal, but taken for granted.'

他对汽车给人带来的各种便利着迷。他解释说：“从技术角度讲，工效学即是其它人文科学的具体应用。我们也逐渐意识到开车技术是一种凭感觉的技术，人们对它总是想当然。”

There has been a huge increase in medical and biomedical science over the decade. In the US, for example, one-third of all scientists are now engaged in the life sciences.

过去十年里，从事医药和医学科学领域研究的人数有了巨大增加。比如，在美国有三分之一的科学家都在从事生命科学的研究。

...Newton's three laws of motion, which, it was thought, could theoretically explain (eventually) all the phenomena of the natural world. The influence of this work spread beyond the natural sciences to virtually all subjects.

人们认为，牛顿的三个运动定理可以从理论上最终解释自然界的所有现象。这项工作对自然科学甚至所有学科都有一定的影响。

Decisions taken in the 1950s led to the bulk of science funding going into medicine, physical sciences such as nuclear power, and space research.

20世纪50年代引发人们投巨资于医药、自然科学（专指物理和化学）如核能、太空的研究。

Wisdom argues that the social sciences should rub shoulders with the natural sciences on equal terms.

睿智之人认为社会科学应与自然科学相辅相成。

behavioural science 行为科学

earth science 地学

human science 人文科学

life science 生命科学

natural science 自然科学

physical science 自然科学，专指
物理学与化学

social science 社会科学

The _____ **sciences** are those dealing with the naturally occurring world in general. They include _____ **sciences** such as physics and chemistry. _____ **sciences** include geology and oceanography. _____ **sciences** include areas such as medicine and biology. Studies of human behaviour such as economics or sociology are _____ **sciences**, _____ **sciences**, or _____ **sciences**.

Technology and technologists

技术与技术专家

technology 技术

technological 技术的

technologist 技术专家

high-tech 高技术

high-technology 高技术

hi-tech 高技术

low-tech 低技术

low-technology 低技术

Technology describes scientific knowledge applied for practical purposes. A **technology** is scientific knowledge applied in a particular area. **Technological** describes things relating to technology. **Technologists** are researchers who work in a particular area of technology.

Some technologies are more complex than others. Products, systems or industries using advanced technologies are **high-technology**, **high-tech**, or **hi-tech**. Those at the other end of the scale are **low-technology** or **low-tech**, but not 'lo-tech'.

Technology has made the world much smaller.

技术使世界变得很小。

Over \$ 1 billion a year has gone on research into nuclear fusion, a technology that has not yet generated a joule of electricity.

每年投入到核聚变研究的资金超过 10 亿美元，但至今尚未用此技术发一焦耳电。

Why has the pace of technological change accelerated so rapidly in the 20th century?

Science is always on the move. Its preference is to find a question that nobody knew needed answering, answer it and then move on, leaving technologists to turn the answer into a machine, a drug or a computer program.

为什么在 20 世纪科技发展速度如此之快？科学总是向前发展的，其目的就是在理论上解答那些别人解答不了但又急待解答的问题，然后由技术人员将这些理论转化为机器、药品或一个计算机程序。

Pressure has increased for the European Space Agency to cut back its big, high-technology projects, such as the spaceplane Hermes and the space station module Columbus.

欧洲航天局需要尽快削减它的大、高科技计划，比如建造 Hermes 航天飞机和作为太空站的哥伦比亚空间站。

Since the 1950s the Defense Advanced Research Projects Agency has laid the foundations of various high-tech industries, such as computing and satellite building.

自 20 世纪 50 年代以来，国防高级研究计划局一直在进行一些高科技的基础性研究，比如一些基础计算和人造卫星的制造。

Gerald Harris says he does not like anything hi-tech, so he has kept everything in his home-made submarine nice and simple.

Gerald Harris 说他不喜欢任何高科技的东西，所以，他保存在自制的潜水艇里的东西都很好而且简单。

... *training doctors and nurses to work in the villages, and concentrating resources on cheap but effective medicines and low-technology equipment.*

培训医生和护士适应在乡村工作，让他们学会使用价廉但有效的药品以及一些简单的医疗设备。

The best-selling mopeds are made by Tomos, a firm that is content to produce low-tech, but unbeatably cheap, machines.

这种畅销的脚踏车是 Tomos 公司生产的。Tomos 公司一直生产技术简单、价格极低的机器。



leading edge 前沿，先锋
state of the art 发展状况

The most advanced products and systems are said to be at the **leading edge** of technology or to represent the **state of the art**.

The leading edge of technology is the laser. Scientists regard the laser as the ideal form of communication.

激光是一门尖端的科学技术。科学家认为激光是理想的通讯方式。

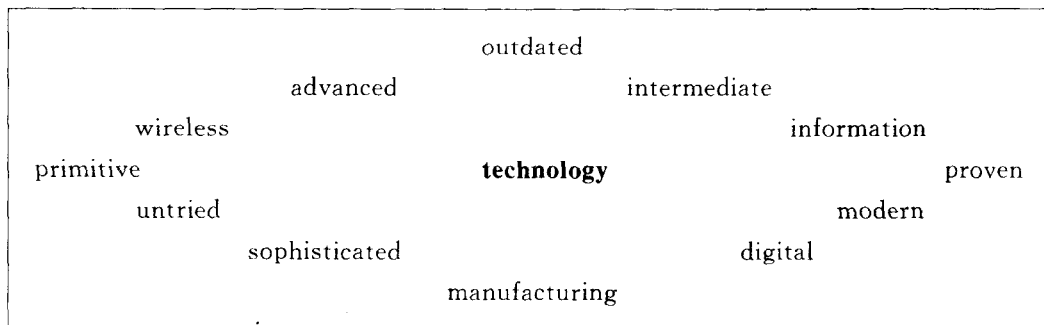
The book gives a succinct account of the technology of virtual reality and its history, from the pioneering work done in the 1960s to current state of the art.

本书简要叙述了现实技术及其发展史，从 20 世纪 60 年代的尖端技术到现在的发展状况。

4 Technology partners. The words in the box can all come in front of 'technology'. Find combinations that refer to technology:

- 1 that is more complex than others (2 expressions)
- 2 that is not up-to-date (2 expressions)

- 3 that is up-to-date
- 4 that is neither high nor low
- 5 collectively to mean the computer and telecommunications^① industries
- 6 used in computers and telecommunications
- 7 that is known to work
- 8 that has not been shown to work
- 9 that does not rely on wires and cables
- 10 that is used in making things industrially



Inventors 发明家

invent 发明

invention 发明，创造；发明物

inventor 发明者

inventive 有创造力的，有发明才智的

inventiveness 发明力，创造力

Invention or **inventiveness** is the ability to design new machines, devices, or products. An **invention** is a new machine, device, or product.

People who **invent** things are **inventors**. The associated adjective is **inventive**.

He worked for the Bell Telephone Laboratories, helping that renowned centre of invention to develop automatic tracking radar, television transmission systems and efficient coding devices.

他为贝尔电话实验室工作，帮助这个著名的发明中心研究自动雷达追踪系统，电视传输系统和高效的解码装置。

The country with the most Nobel prizes per head-Britain-is notoriously slow at commercialising inventions. Japan, to this day, stands as living proof that brilliant technological inventiveness can exist in a country with a lacklustre tradition of basic science.

在发明商业化这方面，英国——这个人均获诺贝尔奖最多的国家是极为落后的。而今在基础科学研究方面并不引人注目的日本，在技术发明上却大放异彩。

Even after the industrial revolution had applied science to technology, the successful inventors, the Edisons and Marconis, were little concerned with science.

即使在将科学应用于技术的工业革命之后，一些成功的发明家们如 Edisons 和 Marconis 也无意于基础

科学的研究。

Newcomen invented a steam engine by copying a piece of apparatus invented by Denis Papin, a French scientist.

Newcomen 利用法国科学家 Denis Papin 的发明而发明了蒸汽机。

People are so much more flexible and inventive than robots.

人类比机器人更灵活且更富有创造性。

5 Inevitable inventions. Read this article from *The Economist* and answer the questions.

The Art of the Soluble

...Science is, in Peter Medawar's words, the art of the soluble. A good scientist knows that the trick is to choose a problem that is ripe for solution, both because the technology is there and because the concepts are in place.

This explains the abundance^① of examples of simultaneous^② discoveries in the history of science: Adams and Leverrier found Neptune at the same time and accused each other of plagiarism,^③ contributing mightily to a mood of Anglo-French dislike. Newton and Leibnitz; Darwin and Wallace; Gallo and Montagnier; the list is long.

Scientists speak of the 'inevitability' of discoveries in sharp contrast to other historical events. The structure of DNA would not have remained mysterious for long if Francis Crick and James Watson had not existed. James Watt was not indispensable^④ to progress, though the steam engine^⑤ was. There is irony here.

Faraday's invention of the electric motor has done more to change your life today than Lee's defeat at the Battle of Gettysburg. But who can doubt that history would have taken a different course if Lee had won that battle, whereas somebody other than Faraday would have invented the electric motor. ...

- 1 A problem that is ripe for solution is
r _ _ _ y to be s _ _ _ _ d .
- 2 If there is an abundance of things, are there a lot of them?
- 3 If you plagiarize someone or something, you _ _ _ _ them.
- 4 Are inevitable events avoidable?
- 5 Would progress have been made without Crick, Faraday, Watson, and Watt?

Innovators 创新家/革新家

innovate 创新, 革新

innovation 创新, 革新

innovator 创新家

innovative 创新的

Innovation is the act of thinking of new ideas, developments, and improvements. These are **innovations** and the people **innovating** them are **innovators**. The associated adjective is **innovative**.

...a compendium of inventors and innovators associated with the town. It seems that 'paper, banknotes, printing machines, tin cans, lifts, wire, aeroplanes and many medicines all owe their modern existence to people who lived or worked in Dartford'.

这些发明家和革新家与这个小镇都有联系。好像“纸，支票，印刷机，罐头，电梯，电线，飞机和许多药品都是这些住在或工作在 Dartford 的人发明创造的。”

The first invention is but a fraction of innovation. One reason is obvious: the first invention is, by later standards, primitive. The first electronic digital computer contained 18, 000 vacuum tubes and filled a room 100 feet long.

开始的发明只是创新的一个基础阶段，这个道理显而易见，按照后来的标准权衡，最初的发明仅是一个开端。第一台电子数字计算机内有 18, 000 个真空管，要有一间 100 英尺长的屋子才能容下它。

The Japanese appetite for foreign technology is one that supplements a fruitful home-grown crop.

The Japanese innovate at home and actively collaborate in the innovations of others.

日本吸收外国技术，培育出在家中生长结果实的作物。

日本人既自己在家搞创新，又积极主动地与别人合作搞创新。

The idea of representing data with music rather than showing it on a computer screen is just one of many innovative ideas to help the 100, 000 scientists and engineers around the world whose disabilities include blindness, deafness, impaired mobility and dyslexia.

用音乐替代电脑屏幕来显示数据只是许多有创意的想法之一。这些想法是为了帮助世界各地 10 万名残疾科学家和工程师——无论是盲人，聋人，瘫痪还是患诵读困难症的人。

experimental 实验的

prototype 原型，典型

The first, **experimental**, versions of a new technological idea are **prototypes**.

A group of German researchers has devised a way to cut dramatically the emissions of nitro-

gen oxides and sulphur dioxide from diesel engines. Their experimental system pumps an electric current through the exhaust gases to render the pollutants harmless.

一批德国研究人员设计出一种能够在很大程度上控制柴油机排放氧化氮和二氧化硫的系统。这个实验系统通过电流使废气变为无害的气体。

The technology, known as Electronic Paper, has been developed by Thorn EMI's Central Research Laboratories. CRL has built a 13-centimetre screen to prove that the idea works, and promises a prototype version in six months.

Thorn EMI's 中心研究实验室发明了一种叫做“电子纸”的技术。为了证实此技术，这个实验室已制造出一个 13 厘米的屏幕，并保证在六个月后就制造出一个原型。

6 Blind invention. Read this article from *The Economist* and answer the questions.

The Shock of the Not Quite New

It is a commonplace¹ that technologies move only slowly from first invention to widespread use. What is striking in the history of technological innovation, however, is that the dispersion of a new technology is not just slow but extraordinarily uncertain even after its first commercial applications have been realised.

This runs against² the conventional wisdom, which holds that the uncertainties are much reduced after the first commercial use. The evidence to refute that view comes not just from any old technologies, but from many of the most important innovations of this century.

Consider the laser³ a comparatively young technology with more development in store. Beyond uses in measurement, navigation and chemical research, applications have expanded to include the reproduction of music (to make the laser a household product); surgery;⁴ printing; the cutting of cloth and other materials; and, its most significant use to date, telecommunications.

Together with fibre optics, the laser has revolutionised the telephone business, yet lawyers at Bell Labs were initially unwilling even to apply for a patent⁵ for their invention, believing it had no relevance⁶ to the telephone industry.

- 1 If something is a commonplace, is it unusual?
- 2 If something disperses, it
s p _ _ _ _ s .
- 3 Does 'realised' mean 'understood' in its context here?
- 4 Is the conventional wisdom a minority view?
- 5 If an opinion is refuted, is it disproved?
- 6 Has the laser reached the end of its development?
- 7 'Applications have expanded': they have g _ _ _ n .
- 8 The most significant use of something is its most
i _ _ _ _ _ t use.
- 9 Is 'apply' used here in the same way as 'application' in the previous paragraph?